University of Strathclyde Glasgow

Exploring the Utility of the ICF-CY (International Classification Functioning Disability and Health Children and Youth Version) Framework as a Clinical Reasoning Tool for Physiotherapists who treat Children with Cerebral Palsy

Hanan Ahmed Demyati BSc, MSc

School of Psychological Sciences and Health
University of Strathclyde, Glasgow

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This thesis is the result of the author's original research. All material in this thesis, which is not the author's own work has been acknowledged. No material from this thesis has been previously submitted and approved for the award of a degree by this university or any other institution.

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Abstract

Three studies were conducted to explore the utility of the WHO taxonomy of health outcomes, namely the International Classification of Functioning Disability and Health, Children and Youth version (ICF-CY), as a Clinical Reasoning tool for Paediatric Physiotherapists (PPTs) treating children with Cerebral Palsy (CP) in Saudi Arabia. The first study was a *systematic review* to examine the integration of ICF knowledge into the clinical-thinking process in physiotherapy practice. All included articles utilised the ICF to identify ICF domains and apply it to the decision making process. However, only one paper examined the use of the ICF as a clinical-reasoning tool in physiotherapy practice. Contextual factors were often neglected in physiotherapist's decision making process.

The second was a *cross-sectional* study that utilised a questionnaire based on psychological theory to explore the use of the ICF by PPTs in their clinical reasoning in relation to the management of children with CP. Results indicated PPTs with ICF knowledge consider environmental and personal factors in their decision-making when developing treatment plans. However, none of the cognitive constructs from the Theory of Planned Behaviour correlated with PPTs decision-making behaviour in the application of contextual factors.

The third was a longitudinal *Quasi-Experimental* study that evaluated the impact of a two-day ICF-CY in-service training on PPTs' clinical reasoning and parental experience of the physiotherapy management of their child. The impact of training was significant on PPTs' knowledge of the ICF, performance and cognition including intention, attitude toward application and perceived control of the

application of contextual factors. Parents were more satisfied with the treatment provided by ICF-trained group. However, there were no differences between the two groups of parents in their perceptions about the use of the ICF by PPTs. Findings from this dissertation inform the development of ICF-CY training as clinical reasoning tool for future studies to investigate ICF-CY implementation.

Published Abstract

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Conference Presentations

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List of Abbreviations

AL:	Adult Learning
CP:	Cerebral Palsy
CRP:	Clinical Reasoning Problem
FIM:	Functional Independent Measure
GMFM:	Gross Motor Fine Movements
GMFCS:	Gross Motor Function Classification System
GMT:	General Movement Trust
ICF:	International Classification Functioning, Disability and Health
ICF-CY:	ICF-Children and Youth Version
ICF-DIN:	ICF-Disability Italian Network
KFP:	Key Feature Problem
MCQ:	Multiple Choice Questions
MOH:	Ministry of Health
NDT:	Neuro-Development Therapy
OMs:	Outcomes Measures
PEDI:	Paediatric Evaluation of Disability Inventory
PTT:	Paediatric Physiotherapist
PBL:	Problem-Based Learning
SCT:	Script Concordance Test

KSA:	Kingdom of Saudi Arabia
SPTA:	Saudi Physical Therapy Association
TPB:	Theory of Planned Behaviour
WHO:	World Health Organization

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Chapter 1

Introduction & Narrative Review

1.1 Introduction

This thesis seeks to establish whether training physiotherapists in the application of the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY) framework, in the management of children with Cerebral Palsy (CP), provides better treatment planning and parental satisfaction with treatment as a result of the attention to personal and environmental factors.

More than 20 years of clinical experience as a paediatric physiotherapist, continuous education and a master's degree in rehabilitation science prompted the query of this thesis. A specific interest in the International Classification of Functioning, Disability and Health (ICF) began on 5 November 2008 when the author (HD) attended an introductory workshop on the ICF and the ICF-CY (the children and youth version). This workshop focused on the application of the ICF and ICF-CY and how to use the ICF manual. In 2009, while studying for a MSc in Neuro-rehabilitation Science, the author began to develop a deeper understanding of the ICF-CY model, and how it might be applied to clinical physiotherapy practice. All of the above motivated the author to focus on the ICF model as an important subject for further research and thus this became the topic of this thesis.

The following case scenario provides one example of how the ICF-CY can be applied to physiotherapy compared to traditional practice. Hence, it illustrates the underlying ethos of the different studies in this thesis.

A 7-year-old girl with right CP hemiplegia was referred for management. Her previous treatment had been two hours of intensive Therasuit physiotherapy, three times a week, to improve her level of daily activity. Therasuit is a soft dynamic orthotic including a 2-piece suit comprising a series of attachments, which are connected to each other through a system of rubber cords. The entire suit acts as a soft exoskeleton which holds the body in proper physical alignment and adjusts the flexor and extensor muscle groups during an intensive therapy programme to improve the motor function of children with CP (Bailes et al., 2011). The child was then transferred to a different care model, where the management of her physical difficulties was guided by the ICF-CY framework and delivered by a trained physiotherapist educated in this approach. After three months, her previous physiotherapist commented, “I never saw R walking without her mother or myself reminding her not to drag her right foot, but now her walking is improved without prompting.” This result was achieved by focusing on the child’s personal and environmental intervention were enabled the child to walk better, as indicated by the ICF-CY framework, and so the topic for this thesis was developed from this clinical experience.

Physiotherapists are independent practitioners who are responsible for clinical decision-making, including treatment choices and evaluation methods (Guide to Physical Therapist Practice 3.0, 2015). These outcomes are based on consolidating information gained from child assessment, which leads to the generation of a hypothesis to be tested, perhaps followed by the creation of another hypothesis, in an iterative process, as new clinical information is presented (Higgs & Jones, 2008).

Collaboration among the family, child and physiotherapist is integral in establishing family-child-centred services to promote parent and child interactions and a supportive environment for all (Majnemer and Mazer, 2004; Palisano et al., 2004; Raver & Childress, 2015).

It is important that the physiotherapist is responsive to the information needs of the family and child and shares general and specific information in a way that is both useful and meaningful to the family and child. Parents are encouraged to actively participate in goal-setting and to maintain communication with their child's physiotherapist(s) as parental satisfaction is used to monitor how the child's physiotherapy is evaluated (Palisano et al., 2004). Mayston (2005) highlights the importance of considering the child's ability to perform activities and to participate in daily life, and also emphasises the influence of environmental and personal factors in physiotherapy treatment for a child with CP. These components are also integral to the ICF-CY model, which provides a framework that enables many entry points into the management of a child with CP, including five ICF-CY domains: impairment, activities, participation, environmental and personal factors (WHO, 2007). Applying the ICF-CY model involves an interactive, dynamic process to help physiotherapists move beyond a child's level of impairment and take into account activities, participation, environmental and personal factors in an integrative manner. The implementation of the ICF-CY model in physiotherapy services, however, requires physiotherapists to have knowledge of the original ICF model, an understanding of its the application to treatment planning, and the adaptation of their ICF knowledge to different clinical situations (Allan et al., 2006; Andrade et al., 2012; WHO, 2013).

Clinical reasoning skills are essential to everyday practice in order to guide health professionals through a multi-dimensional knowledge base according to task and situational demands in practice (Smith et al., 2008). Clinical reasoning, as defined by Jones et al. (2008), is the therapist's thought process that precedes clinical decision-making. Clinical reasoning strategies can be used as a tool to educate paediatric physiotherapists about the ICF-CY framework. Once educated about the ICF-CY framework, then it is possible to examine whether the ICF-CY can be used as a clinical reasoning tool to shape clinical decision making in physiotherapy practice.

1.2 The ICF and ICF-CY Conceptual Framework

The diagnosis of health conditions and the assessment of individual functioning are at the core of clinical practice. For more than a century, health professionals relied on the ICD (International Classification of Disease) to provide information about the aetiology and pathology of diseases and their manifestations (signs and symptoms). The ICD could not capture the impact of a disease on function, neither at the individual's activity level nor at the social level, thus making it difficult to measure the true burden of a disease (Kohler et al., 2012; Kostanjsek, 2011). Therefore, the International Classification of Functioning, Disability and Health (ICF) framework was endorsed by the World Health Assembly in 2001 to provide a structure to describe the diverse aspects of human health and well-being (WHO, 2002). The ICD and the ICF can be used together to provide comprehensive information to better inform intervention (Kohler et al., 2012).

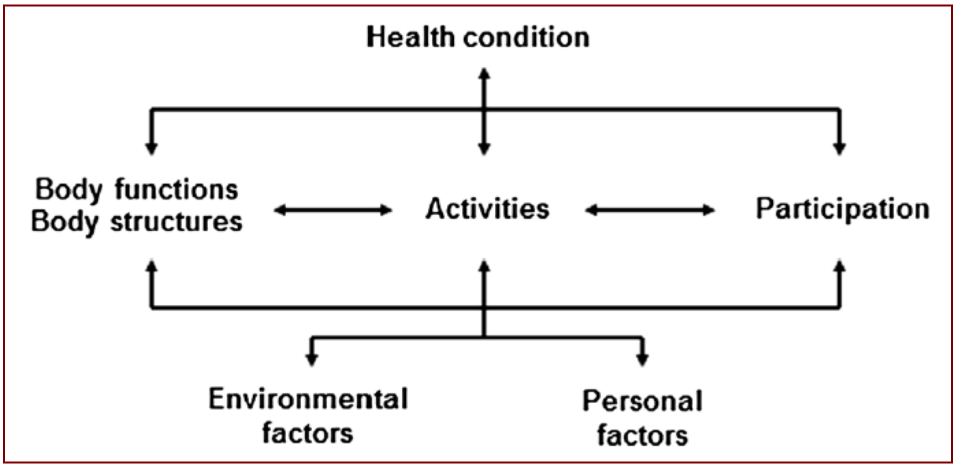
The ICF and the Children and Youth version (ICF-CY) are functional frameworks that classify health outcome; they can be used to describe the functioning of all people, not only persons with a health condition(s) (WHO, 2002, 2007). The ICF-CY includes all the content of the adult version of the ICF, and additional content intended to cover the developmental characteristics of children from birth up to 18 years of age, including bodily functions and structures, activities and participation, with particular environmental relevance to infants, toddlers, children and adolescents (WHO, 2007).

An important innovation introduced by the ICF-CY is that it captures and operationalizes the notion of child development within the child's environmental and personal/social context. It takes into account the child's needs, which are viewed in the context of the family and how the nature and forms of participation change dramatically from dependent relationships in infancy to complex, more autonomous life situations in adolescence (Kostanjsek, 2011). This innovation also attends to the concept of developmental changes in participation via the imitation of actions and behaviours. The ICF recognises that the nature and the number of environmental changes, in addition to the delays in the emergence of functions or the acquisition of skills, might reflect developmental delays rather than functional impairments or limitations (Kostanjsek, 2011).

Throughout this dissertation, the ICF and ICF-CY are used interchangeably, because the ICF framework was referred to in the paediatric literature before the ICF-CY framework was developed and published. Since its publication, the ICF-CY framework has consistently been used for paediatric physiotherapist in-service training.

The ICF/ICF-CY is based on the integration of social and medical models of disability and focuses on components of health rather than on the consequences of disease (WHO, 2002). The multiple ICF-CY dimensions synthesize biological, psychological, social and environmental aspects of child functioning (WHO, 2007). Evidence has shown that diagnoses alone do not predict the quality of care and patient functional outcomes (WHO, 2013). In other words, using the medical classification of a diagnosis as an isolated instrument, information necessary for optimal healthcare planning and management may be overlooked (WHO, 2002).

Figure 1.1. International Classification of Functioning, Disability and Health (copied from WHO, 2002)



As shown in Figure 1.1, for any given health condition, the ICF identifies three health outcomes, namely: body function and structure, activities, and participation.

Each of three health outcomes could be diminished by disease, disorder or injury, then described as impairment, activity limitations and participation restrictions. The relationship between the three components is influenced by contextual factors, which have two components: environmental and personal factors (WHO, 2002).

The 'body' domain (body structure and body function) concentrates on physical and mental functions, sensory responses, structure and function of the multi-organ system, movement capabilities and reproductive ability.

The 'activities and participation' domain assesses the patient's ability to learn and apply knowledge, follow general tasks, and communicate and care for him/herself. The ICF also described two types of contextual factors, namely environmental and personal factors. The domain of 'environmental factors' identifies: products and technologies available to assist the patient; community services that are available to the patient as well as relationships, support and care offered outside the clinical setting. Within the ICF, a hierarchy of classifications and codes is provided for each of these components. Personal factors, however, refer to attributes such as age, sex, educational background, social class, culture, past experiences, personal character traits, lifestyle, coping style and occupation, and these are not coded in detail (Jette et al., 2003).

The conceptual framework of the ICF emphasises that there is no linear causal relationship between a specific health condition and functional outcomes. Also, it identifies contextual factors as important influences on outcomes. Thus, the ICF-CY provides a framework and structure for collecting and organizing clinical, behavioural and contextual information, which can positively influence assessment, intervention planning and outcome evaluations (Edwards et al., 2004; Bruyère & Peterson, 2005; Leonardi et al., 2005; Martinuzzi et al., 2015).

This allows for the development of a full and complete clinical and contextual profile for a child with CP, and provides structured guidance for more efficient delivery of services to children and young people with CP, as well as their families, who need to be included in their physiotherapy management.

1.2.1 Critique of the ICF or ICF-CY Framework

One limitation of the ICF is its lack of attention to the specification of the personal factors component. It has been argued that personal factors have not been coded in detail because of their extensive social and cultural variability (Jette et al., 2003). Conti-Becker (2009) argues that the ICF has a medical perspective, with a focus on biological factors, whereas personal factors are neglected. Others, however, have argued that the ICF is based on a bio-psychosocial model of health that allows evaluation of the medical, psychological, social and environmental influences on functioning and disability (Allan et al., 2006; Borrell-Carrio et al., 2004; Darrah et al., 2006; Jones et al., 2008; Reed et al., 2008).

Critical comments on the feasibility of its use in the clinic have been made, even though many professionals consider the application of the ICF and ICF-CY meaningful in clinical settings (Allet et al., 2008; Bilbao et al., 2003; Cerniauskaite et al., 2011; Darrah, 2008; Jelsma, 2009). The concerns focus on a lack of guidance regarding how to measure an individual’s functional potential, since the classification system primarily facilitates decisions about what functions to consider for assessment, rather than how those functions are best assessed (Allet et al., 2008; Mayston, 2005).

The ICF classification has not yet been incorporated into clinical practice and several researchers note the challenge of concretely translating the use of the ICF into their daily clinical practice (Congdon et al., 2010; Rauch et al., 2010; Ravenek et al., 2012). Consequently, there is a lack of guidance as to how the ICF might best be used in clinical practice (Congdon et al., 2010). Despite these concerns, the ICF/ICF-CY has the potential to be used as a tool for clinical decision-making.

This thesis will explore the utility of the ICF/ICF-CY framework as a tool for improving clinical reasoning in physiotherapy practice. The ICF-CY provides a structure to organize multiple sources of information about the life situation of children with CP, and thus it may serve as an important tool for structuring assessment, not to be confused with assessment measures that most often provide protocols to quantify information (Darrah, 2008; WHO, 2013). The ICF-CY does not classify children with CP; rather it defines the factors of importance for a particular child's health. These factors include the child's environment and personal issues, which are not commonly found in assessment measures, indicating a shift from diagnosis to function (Schiariti et al., 2014). This means that a child with CP is not classified 'as a diagnosis' but rather described as a child with functional problems in specific situations, which makes offering solutions to improve their situation possible. From this perspective, the use of the ICF-CY may change how physiotherapists develop intervention programmes so that they are based on functioning. Further, the ICF-CY should enable paediatric physiotherapists to identify how individual problems relate to the five components of the ICF-CY (body structures, body functions, activity, participation, personal and environmental factors) in order to individualize treatment planning.

1.2.2 ICF-CY Classification System

The ICF-CY consists of 1,685 named categories. The classification includes Part 1, the components of body functions (b) and structures (s); activities and participation (d). Part 2 covers contextual factors and includes the environmental factors (ef) and personal factors (pf) components.

The letters b, s, d and ef, which refer to the components or domains of the classification, are followed by a numeric code starting with the chapter number (one digit), followed by a second-, third- or fourth-level code (adding two and one digits, respectively). For example, the component ‘activity and participation’ of the classification contains the following codes: d4-Mobility (first chapter level), d450-Walking (second level), d4502-Walking on a different surface (third level), and d45022-Moderate difficulty (fourth level) (WHO, 2007). The large number of categories limits the usefulness of the ICF-CY in clinical settings, as health professionals do not find it easy to incorporate these into their daily practice. In response to this problem the WHO has developed ICF Core Sets, which provide lists of categories that are relevant to specific health conditions, to facilitate a systematic approach to functional assessment and descriptions of functioning in clinical practice (Schiariti et al., 2014). Also, ICF Core Sets are linked to outcomes measures, interventions and qualitative data for translating health and health-related information into the ICF classification, using guidelines proposed by Cieza et al. (2005), which are applied to select appropriate treatment plans in clinical practice.

Qualifiers record the presence and severity of functional limitations in each of the ICF categories, e.g., physical impairment within each code is characterised with a score, from zero to four, which correlates with the degree of the loss of function ranging from ‘no impairment’, to ‘mild’, ‘moderate’, ‘severe’ and ‘complete’ impairment (WHO, 2002).

Qualifiers of the environmental factors indicate the extent to which an environmental factor acts as facilitator or barrier using either a negative or positive scale followed by a score, from zero to four, which relates to degree of the barrier/facilitator ranging from ‘no barrier/facilitator’, to ‘mild’, ‘moderate’, ‘severe’ and ‘complete’ barrier/facilitator (WHO, 2002). For facilitators such as the accessibility of a resource and whether access is dependable or variable, and for barrier, whether the access poses small or big hindrance on the child. The use of categories and qualifier codes enables different clinicians to ensure they are assessing the patient according to standardised criteria and also, to set goals and develop treatment plans based on quantified degrees of patient problems (Xiong & Hartley, 2008). Training in the application of the ICF Core Set and Qualifiers in clinical practice is required. Therefore, the training programme described in this thesis included training in the use of the ICF-CY classification system.

1.3 Rationale for Re-examining the Physiotherapy Management of Children with Cerebral Palsy

1.3.1 Cerebral Palsy

Cerebral Palsy (CP) is a non-progressive neuro-developmental disorder with a congenital or acquired lesion or abnormality of the immature brain, which persists throughout the lifespan of the person (Rosenbaum et al., 2006).

CP is relatively common among various genetic and developmental paediatric conditions (Dolk et al., 2010). The overall prevalence of CP worldwide is currently 2.1 per 1,000 live births (Oskoui et al., 2013). Cerebral palsy (CP) is the most common chronic neurological health condition in Saudi Arabia (Al-Jadid, 2013).

Several studies have investigated the prevalence of CP in Saudi Arabia and have estimated the rate as 2.34 per 1000 live births (Al Salloum et al., 2011; Al-Asmari et al., 2006; Al-Rajeh et al., 1995). However, these prevalence estimates tend to be based on data from a single hospital rather than national level data. For comparison the UK prevalence rate is estimated as 2.0 for 1000 live births (Surman et al., 2006).

The brain abnormality in CP may occur during the prenatal, perinatal or postnatal period. The diagnosis of CP always involves a motor deficit and the usual defining or indicative complaint is that the infant or child has developmental delay and/or behavioural difficulties (Pountney, 2007). This history combined with a neurologic examination establishing that the patient's motor deficit is due to a cerebral abnormality leads to a diagnosis of CP (Styer-Acevedo, 1994). There is disagreement in the literature and in practice regarding how early an infant can be diagnosed with CP. The great majority of children with CP present symptoms as infants or toddlers, and a diagnosis of CP is often made before the age of two years (Ashwal et al., 2004).

In some children, symptom onset may be delayed (e.g. dystonic CP), whereas in others pseudo-progression of symptoms may be seen. The term CP is descriptive and includes a number of aetiologies and clinical presentations (Ashwal et al., 2004).

During the diagnosis stage, and immediately following a formal diagnosis, many other evaluations are required in order to plan for and manage a child's future development. It is probable that his or her paediatrician will refer the child to a rehabilitation team to ascertain the therapy services they may need (Ashwal et al., 2004). The level of lifetime support required for sufferers contributes to making CP a significant health problem (Pervin et al., 2013).

1.3.2 Physiotherapy Assessment for Children with CP

Ideally, the assessment of children with CP involves an early diagnosis to classify the type of CP and to perform a motor assessment, using standard procedures to distinguish between functions and limitations of the child with CP (Debuse & Brace, 2011). CP has been classified in different ways, the traditional classification being related to the nature of the movement disorder including: spastic, ataxic, athetotic and dystonic CP (Pountney, 2007). Spastic CP is the most common type and accounts for 70-80% of all cases, followed by dyskinetic at 10–15%, and ataxic at less than 5% of cases (McCarthy, 1992). CP can also be classified according to abnormal muscle tone, posture or movement, including: diplegia, hemiplegia and quadriplegia (McCarthy, 1992). These CP classifications do not involve an assessment of the child's functional capacities. Tools are, however, available to assess function in CP. For example, the Gross Motor Classification System (GMFCS) has been widely used in research and clinical practice to measure the severity of motor function of a child with CP and to predict a child's ambulatory status after two years. The GMFCS is a 5-level classification system that describes the gross motor function of children and young people with CP.

The GMFCS levels are based on a child's self-initiated movements and functional mobility, as observed by clinicians or parents. The GMFCS takes into account a child's performance at home, school and in community settings. For example, a 6-year-old child will classify at Level I: if the child walks at home, school and outdoors (Rosenbaum et al., 2008).

The most frequent outcome measures (OMs) of motor function used in physiotherapy for children with CP are: Gross Motor Function Measure (GMFM), Paediatric Evaluation of Disability Inventory (PEDI), Functional Independent Measure (FIM), Wee-Functional Independent Measure (Wee-FIM), Prechtl's Method for the Qualitative Assessment of General Movements (GMT) and Reflexes and Cerebral Palsy Quality of Life-Child (CP QOL-Child). A definition of each of the OMs is presented in Appendix1 (p. 286).

The GMFM-88 and -66 are condition-specific instruments designed to assess gross motor function in children with CP (Russell et al., 2002). PEDI, FIM and Wee-FIM were designed for chronically ill children with disabilities, and are generic questionnaires that measure the effect of a condition on a person's functionality, health and/or self-care in a range of environments (Debuse & Brace, 2011). Administration time varies across OMs, from 15 to 45 minutes and over, and assessor training in some form is required for all of them. PEDI and GMFM require specialized scoring software. Most of the OMs can be used in any environment if basic resources are available, while GMT requires video-recording of an infant to assess general movements and is therefore much more involved and labour-intensive than the other measures (Debuse & Brace, 2011).

A systematic review by Schiariti et al. (2014) compared the contents of outcome measures used in CP against the ICF-CY, and highlights that no single measure fully incorporates the domains of the ICF-CY model. Each measure only provides partial information about the functional profile of a child with CP and none of the OMs assess the body-structure component of the ICF. Therefore, a combination of measures seems most appropriate if the goal is to capture all components of the ICF-CY (Schiariti et al., 2014).

The GMFM or PEDI, plus the CPQOL, questionnaires together cover all the components of the ICF-CY except body structure. The GMFM and PEDI primarily cover the components of body functions, activity and participation, while CPQOL focuses on contextual factors (environmental and personal factors). Moreover, GMFM and CPQOL are CP condition-specific measures that focus on the domains affected by CP (see Appendix1).

Although CP is neurological in nature, the problems associated with it extend beyond physical impairments to include the psychological, social and emotional well-being of the child (Pervin et al., 2013). This can negatively impact the daily physical functioning of children living with CP; this is not only related to impairments in body structure and function, but also in performing tasks. These tasks include their engagement in daily activities, what the children want to do within their environment, as well as personal factors facilitating or impeding the child's functional activities (e.g. at home or while moving within or around the community or at school) (dos Santos et al., 2012). Thus, it is important to consider the social and family circumstances of a child with CP.

It has been established that children with CP are not a homogenous group, therefore discrete classifications of the various childhood disabilities can negatively impact the child and their family (SCPE, 2000). It can be a challenge for healthcare, education and social services to provide adequate support and care for children with CP and their families (SCPE, 2000). The complexity of this condition demonstrates the necessity for a model, such as the ICF-CY that takes into account not only bodily impairments, but also personal and environmental consequences leading to a more holistic approach to the management of children with CP (dos Santos et al., 2012).

1.3.3 Contextual Factors: The Saudi Arabian Family Context

To understand Saudi culture surrounding a child with CP, it is necessary to address the structure and function of the Saudi family unit. Family members in Saudi Arabia expect great loyalty from each other when a family has to cope with a child with CP. This, may have consequences for the quality of life of these families and play an essential role in determining their response to medical care (Madi, 2014).

A child with CP is usually cared for by his/her mother or older sister(s), who play an active role in managing childcare within the family. Many family members, however, do not have the knowledge or expertise to provide adequate or appropriate care for the child (Madi, 2014). In cases where there is severe disability, the responsibility may shift to a housemaid or private nurse who will then work as a caregiver for the child. In addition, caregivers might look to place the child in a governmental or non-governmental residential rehabilitation centre.

Therefore, the application of the ICF-CY in physiotherapy could assist families to actively participate in goal-setting and allow the therapist to be more responsive to the family's needs and to share information in a manner that is useful to them (Palisano et al., 2004). Also, application of the ICF in physiotherapy practice could facilitate a physiotherapist's interaction with the child and family. It could assist realistic goal-setting and promote a smooth transition from one level of care to another, based on the child's functioning, disability and health, with consideration given to the child's environment and personal factors.

1.3.4 Rehabilitation Services for Children with CP in Saudi Arabia

Rehabilitation services in Saudi Arabia are interdisciplinary and consist of a range of clinical services, including rehabilitation medicine, physiotherapy, occupational therapy, speech therapy, orthotics and prosthetics, nutrition, psychology and social services. The rehabilitation system in Saudi Arabia is a national healthcare system, in which the government provides healthcare services through several governmental agencies. Health services in Saudi Arabia are provided through three main sectors: Ministry of Health (MOH) network of hospitals and primary healthcare centres located throughout the country, other governmental institutions, and the private sector (Albejaidi, 2010). The overall supervision of healthcare facilities, in both the public and private sectors, is managed by the Ministry of Health (MOH, 2015), which is responsible for the management, planning, financing and regulation of rehabilitation provision in the healthcare sector. There are several other governmental sector healthcare rehabilitation facilities providing services for children with disabilities, as well as university and specialist hospitals. Because of the variations among these organisations in terms of governance and policy, it has proved difficult to apply consistent regulations to working practices across the Saudi healthcare system. This diversity may influence the quality of services provided to such patients by healthcare professionals.

1.3.5 Physiotherapy in Saudi Arabia

Physiotherapy plays a central role in the management of children with CP. In many clinical settings, physiotherapy is often one of the most critical parts of a multidisciplinary rehabilitation programme that aims to help a child with CP to achieve and maintain optimal physical functioning and encourage full participation of these individuals in all aspects of life in their environment (Guide to Physical Therapist Practice 3.0, 2015).

Physiotherapy-led education programmes were introduced relatively late in Saudi Arabia compared to other countries. King Saud University introduced the first bachelor's programme in physiotherapy (PT) about 30 years ago, but there is no published data on the number of physiotherapy graduates in the last decade.

The number of universities offering a bachelor's degree in physiotherapy in the country has increased from 6 to 16, of which 14 are governmental and two are private (Alghadir et al., 2015).

The Saudi Health Commission holds licensure examinations for native and foreign diplomats and nationals before they are certified as competent to practice as physiotherapists, thus ensuring an adequate level and quality of care at graduation. There are four consultant physiotherapists, 327 physiotherapists, 832 physiotherapy technicians and 16 assistant physiotherapy technicians registered as working in the Kingdom of Saudi Arabia (KSA). Of these, 80 per cent work for government hospitals (Alghadir et al., 2015). The Saudi Physical Therapy Association was established in 2001, in Riyadh, by a number of Saudi and non-Saudi physiotherapists, as the professional and scientific body for the profession in Saudi Arabia. Since then, this body has expanded to cover the whole kingdom and became a member of the World Confederation for Physical Therapy (2003), as well as a member of the Arab Confederation for Physical Therapy (2004). The number of physiotherapists registered by the Association increased from 181 in 2002–4 to 6,511 in 2015 (Saudi Physical Therapy Association, 2016). This number, however, only reflects the total number of physiotherapists working in KSA without any specification of subspecialties, such as paediatrics or women's health physiotherapists.

The Saudi Physical Therapy Association is a professional body that aims to help physiotherapists build their professional knowledge and skills post-qualification. It also works to support the Saudi community by increasing awareness for parents of children with disabilities, such as CP, by means of brochures, and public awareness through such initiatives as International Disability Day. To date, however, there is no national database that holds details of the numbers of physiotherapy departments across these various facilities, or the total number of working paediatric physiotherapists. Additionally, there is little information about how paediatric physiotherapists treat children with CP, including the decisions they make about their treatment and how they arrive at those decisions.

1.3.6 Physiotherapy Training in Saudi Arabia

The educational process in any professional training is based on how the information learned can be applied in various clinical situations, therefore it is not simply the mere assimilation of facts or the processing of information (Oyeyemi, 2014).

Entry-level physiotherapy education for professional status is a bachelor's degree earned after five years of university education, the first two and a half to three years of which are spent in the preclinical phase of training.

In the clinical phase, experienced clinicians and academic staff work with students in teaching hospitals with clinical placements. Upon graduation, new professionals undergo a one-year internship at an accredited teaching or specialist hospital centre under the direction and supervision of experienced physiotherapists (King Saud University College of Applied Medical Sciences, 2016). But possession of these generic university-education skills does not in itself provide a guarantee of competence in paediatric physiotherapy. Learning different cognitive and handling skills in paediatric physiotherapy that are taught and then applied in a clinical context is compulsory during the fourth year of the undergraduate programme of the Saudi University curriculum (King Saud University College of Applied Medical Sciences, 2016).

This includes psychomotor skill development, which can be taught during laboratory practice and refined during clinical placements. However, the development of professional interactive and communication skills, which are achieved through mentorship, is only encountered in the later part of professional training. In the placement year, paediatrics is an elective subject in clinical rotation; physiotherapy students who are interested in paediatric physiotherapy can choose to work in this speciality under supervision. Novice physiotherapists (students) continue to build their competence in paediatric physiotherapy by attending on-going education courses; workshops and departmental in-service training sessions to further develop their clinical skills.

More recently, starting in 2008, King Saud University Medical Science College began offering a master’s programme in paediatric physiotherapy. This programme focuses on the further development of skills and knowledge in research methodologies, project management and evidence-based practice in paediatric physiotherapy (King Saud University College of Applied Medical Sciences, 2016). To date, there is no formal teaching of the ICF/ICF-CY model neither at undergraduate not postgraduate level of study in Saudi universities.

Although physiotherapists are often perceived as having a focus on a patient’s physical health, a contemporary bio-psychosocial understanding of health and disability requires the assessment of a patient’s physical health to include a full consideration of both environmental and psychosocial factors that may influence physical health, within the scope and limits of a physiotherapist’s education (Darrah et al., 2006; Jones et al., 2008). This requires teaching clinical reasoning proficiency in how physiotherapy applies the bio-psychosocial model to recognize the relevance of these potential contributing factors to an individual patient.

This is crucial in order to lead to appropriate decision-making that may contribute to the patient’s holistic care (Jelsma & Scott, 2011). Allan et al. (2006) stated that both experienced and novice healthcare professionals should receive instructions in the conceptual framework and language of the ICF. Experienced healthcare professionals will probably recognize the value of adopting the ICF model in their practice. But they may be unfamiliar with the ICF as a specific conceptual framework that can facilitate collaborations among wide ranges of domains of care. Novice professionals (students), because of their limited experience, may be less familiar with the benefits afforded by the ICF approach.

Thus, ICF/ICF-CY training could: guide both experienced and novice professionals' clinical reasoning skills; bridge the gap between cognitive knowledge and interaction in a clinical setting; and teach clinicians how to gather all relevant data, including all aspects of patient functioning, disability and health. This is especially important since the amount of information that needs to be gathered for a child with CP is filtered as to whether it is important, essential or irrelevant.

1.4 Clinical Reasoning

Clinical reasoning is a key concept for successful physiotherapy practice. This section discusses the definition of clinical reasoning and the current clinical reasoning model, including the ICF/ICF-CY, used in physiotherapy practice in general, and specifically in paediatric physiotherapy for children with cerebral palsy. This is followed by a review of the factors that influence the application of the ICF as a clinical reasoning tool. Finally, the assessment and teaching of the application of the ICF/ICF-CY model in clinical reasoning using evidence, theoretical and practical approaches are explored.

1.4.1 Definition of Clinical Reasoning

Clinical Reasoning (CR) is a vital skill practiced by healthcare professionals to avoid assumptions in practice, reduce unnecessary investigations and provide desirable outcomes that improve patient satisfaction (Linn et al., 2012). Despite general agreement regarding the importance of clinical reasoning, there is no agreement as to what constitutes clinical reasoning, with numerous definitions being available.

For example, Higgs & Jones (2008) define clinical reasoning as "a context-dependent way of thinking and decision-making in professional practice to guide practice actions" (p. 4). This definition is very broad, suggesting that all healthcare professionals use the same clinical reasoning process in clinical practice. The context of this definition seems adaptable in each clinical situation and profession. But the definition does not say how to achieve this within each context or how clinical reasoning has been studied within specific professional groups. Although health professionals from different disciplines need to use clinical reasoning; in practice, everyone seems to use different approaches to describe the patient's problem and treatment goals (Higgs et al., 2008). Ajjawi (2009) argues that different educational strategies are equally effective for developing clinical reasoning skills, perhaps because each discipline defines clinical reasoning differently and concludes that there is no optimal method to teach it.

However, Banning (2008) argues that there are difficulties in measuring and teaching clinical reasoning and that these stem from the lack of a clear and standard definition of clinical reasoning. A definition is important because it provides the foundations for health professional educators to implement educational strategies that will facilitate the development of clinical reasoning. Thus, a definition creates a context for developing measures of clinical reasoning and its influence on the physiotherapy practice.

Within physiotherapy, Holdar et al. (2013) refer to clinical reasoning as a cognitive process influenced by the thinking of the physiotherapist and his/her knowledge base as regards working towards clinical decisions. This definition encompasses the notion that clinical reasoning is a process that includes the physiotherapist's acquired knowledge, cognition and metacognition, operating through all phases of a continuous cycle of practice that involves identifying the problems and needs of each individual patient, relating problems to factors relevant to the person and the environment, defining therapy goals, planning and implementing an intervention, and assessing the effects of the intervention prescribed (Jones et al., 2008).

The clinical reasoning definition also highlights the importance of the metacognitive processes used to judge and reflect on possible outcomes of cognitive activities as part of the regulation of the physiotherapist's own reasoning process. In the literature, clinical reasoning, clinical thinking and clinical decision-making are frequently used interchangeably. Therefore, the definition of clinical reasoning by Holdar et al. (2013) above will be used as a point of reference for this thesis, as it is deemed to be the most comprehensive, with greater clarity and relevance to physiotherapists compared to other definitions. Clinical thinking is the use of cognitive skills (such as application, analysis, synthesis and evaluation) behind an action, and clinical decision-making is the action taken in a particular clinical situation (Higgs & Jones, 2008). Clinical reasoning involves the application of the knowledge base into cyclical decision-making processes including patient assessments, identifying problems and the development of goal setting and treatment plans.

Clinical reasoning in physiotherapy remains a relatively under-researched area. Most studies in this area have been designed to identify the factors that influence physiotherapists' clinical reasoning and how physiotherapists manage multiple factors to make decisions, but this can become difficult when comparing expert and novice physiotherapists (Bartlett & Palisano, 2002; Edwards et al., 2004; Edwards et al., 2006; Masley et al., 2011; Smith et al., 2008).

The main focus of clinical reasoning research is to understand the process of 'how experts think', motivated by the premise that if one understands how an expert reasons when solving clinical cases, then it will be possible to help novices improve their clinical reasoning skills. This also relates to the idea that clinical reasoning develops opportunistically with experience in a clinical setting (May et al., 2010) and is not formally taught in physiotherapy education (Edwards et al., 2004).

Teaching clinical reasoning requires an explicit focus by a clinical educator, as well as specific strategies designed to model clinical reasoning skills. For instance, in Saudi Arabia, clinical reasoning skills are taught based on daily clinical experience, during a period of clinical placement in fourth and fifth-year study and specific experience is gained by postings outside the teaching environment. In addition, clinical learning experience is evaluated based on documentation and a case-based oral examination.

1.4.2 Clinical Reasoning Models in Physiotherapy

The clinical reasoning model is a conceptual scheme that converts information into applied knowledge in clinical practice and provides a guide for therapists, with a tool for evaluation and treatment planning. This process is conducted through the use of a logical sequence of activities (Rothstein & Echternach, 1986).

Clinical reasoning is important as it encourages learning by efficiently acquiring knowledge using concise and easy terms that assist in the learning of complex relationships (Darrah et al., 2006).

The models that are considered relevant to physiotherapy practice include: the analytical, non-analytical and hypothetico-deductive reasoning. The analytical model relies almost entirely on a systematic approach to assessment before decision-making, whereas the non-analytical model involves a more spontaneous process that draws on recognition of similar prior cases (Eva et al., 2007). Hypothetico-deductive reasoning, however, involves diagnostic hypotheses which are tested analytically (by patient history and physical examination etc.) to confirm or invalidate solutions that have been generated non-analytically (Doody & McAteer, 2002).

Clinical reasoning models in physiotherapy are often influenced by biomedical model of disability, which may lead physiotherapists to focus on diagnostic reasoning following a biomedical model (Cruz et al., 2012; Jones et al., 2008). The biomedical model utilizes common vocabulary and language relating to thinking and speaking at each stage of treatment decision-making, such as: meeting, gathering information, formulating assumptions and action planning for care, but the focus is only on physical symptoms and does not take into account the psychological, social, cultural or environmental aspects of a condition (Wade & Halligan, 2004). The biomedical model hinges on two assumptions: disease or pathology is the single underlying cause of all physical dysfunction, and removal or attenuation of the disease will result in a return to “normal” (Marcum, 2004).

The ICF/ICF framework could be used as clinical reasoning tool, as it guides thinking and decision making based on the reciprocal relationships between three main ICF components and a role for contextual factors in the relationship between these three components. Thus, changes in the patient's environmental and personal context, in activity and social participation and in pathology can all affect patient outcomes within the ICF-ICF-CY framework. The improvements in outcomes do not need changes in pathology and, as a consequence, is a useful clinical reasoning tool for physiotherapy.

1.4.2.1 *Analytical Clinical Reasoning Model*

Analytical models of clinical reasoning assume that there is a series of analytical steps that are applied to establish a relationship between a patient's symptoms and the eventual diagnosis (Eva, 2007). This model more consciously utilizes analytical thinking to follow specific steps: careful observation, obtaining information, physical examination, hypothesis generation and, finally, using this information to confirm the hypothesis through diagnostic testing (Tan et al., 2010). Physiotherapists with an orientation towards the biomedical clinical reasoning tool may focus solely on a recovery strategy and diagnosis as an end result.

1.4.2.2 *Non-analytical Clinical Reasoning Model*

Non-analytical reasoning is a pattern of recognition in which previous encounters and experiences allow the individual to infer a conclusion without the need to follow a formal analytical process (Eva, 2007; Carraccio et al., 2008).

This process is often observed to be automated and seen as a marker of increased clinical expertise. This is due to the fact that novices have less prior clinical experience on which to base their judgements, whereas those with higher levels of expertise have greater previous experience to draw on (Carraccio et al., 2008). This approach allows for quick decisions to be made, although it has been argued that for less experienced professionals there is a risk that it may lead to inappropriate conclusions being drawn.

1.4.2.3 *Hypothetico-deductive Clinical Reasoning Model*

This model relies on information gathered from the patient and is used to develop a hypothesis based on the therapist developing an initial hypothesis, and subsequently testing it. Because the hypothesis should be confirmed (or not) by how the patient responds to treatment, it involves repeated assessments (Norman, 2005). Physiotherapists in various disciplines tend to use this model (Doody & McAteer, 2002; Kenyon, 2012). The first step is when the physiotherapist is provided in advance with a complete and detailed patient history that includes the patient's reason(s) for seeking physiotherapy services. Then, the physiotherapist conducts an examination procedure using tests and measures. After the examination is complete, the physiotherapist constructs multiple hypotheses regarding 'Evaluation/ Diagnosis/ Prognosis' in which data collected during the examination are synthesised and used to form a hypothesis. The physiotherapist may use collaborative reasoning with the patient and his/her knowledge base throughout the encounter to achieve a sufficient understanding of the problem. During hypothesis generation, general questions may be posed by the physiotherapist, then reflect on the patient's concerns.

Finally, the physiotherapist settles on a diagnosis or plan for a specific intervention (Rothstein & Echternach, 1986). Empirical evidence supports these models in physiotherapy practice. Doody and McAteer (2002) conducted a qualitative study using the hypothetico-deductive model to investigate the clinical reasoning of expert and novice physiotherapists in an outpatient orthopaedic setting. Ten experienced clinicians and ten students were observed and audiotaped as they examined and treated a real and previously unseen patient.

The results showed that all participants used a hypothetico-deductive reasoning process. But both experts and novices went beyond the diagnostic process to include reasoning focused on treatment. In particular, manual therapy treatment was used as a method for further hypothesis testing. In addition to hypothetico-deductive reasoning, the experts also made use of a non-analytical model, which was to be expected, given that they had more clinical experience to draw on. This model is quite mature and contributes to clinical-decision making in physiotherapy by closely interrelating decisions and actions and observing dynamic changes made as the care of the patient progresses. This model was used by Kenyon (2012) to teach clinical reasoning to paediatric physiotherapy students. It was observed, however, that students had a tendency not to give an accurate account of what they actually did or thought at the time of the diagnosis process. Instead, they only gave a reconstructed conception of how the problem should be solved.

Tan et al. (2010) argue that physiotherapists regularly use a combination of different reasoning models in clinical practice. For example, even when a non-analytical approach is used as the dominant approach, a more analytical approach with the collection of additional information is also used (Doody & McAteer, 2002). For instance, Sweeney and Doody (2010) investigated the clinical reasoning processes of physiotherapists in relation to the assessment of vertebra-basilar insufficiency (VBI). Using a qualitative multiple case-study design, 12 physiotherapists with an MSc in Manipulative Physiotherapy were shown two patient vignettes of a cervical spine disorder and associated symptoms of VBI in four sequential sections. They were then questioned as to their clinical reasoning processes via audiotaped semi-structured interviews.

The physiotherapists' decision-making relied more on subjective findings through physical examination rather than objective testing, and the physiotherapists reported a lack of confidence in function positional testing. Therefore, in practice, evidence seems to support the assumption that a mixture of analytical reasoning, non-analytical reasoning and hypothetico-deductive reasoning is used in physiotherapy (Case et al., 2000; Doody & McAteer, 2002; May et al., 2010). These clinical reasoning models most probably derive from the framework of biomedical knowledge, and as a consequence physiotherapists often assume that an intervention utilizing the component of body function will have the desired effects on the patient's physical performance and activity competence (Darrah et al., 2006). For example, it is often assumed that muscle strengthening of an ambulant child with CP (body function) will influence the ability of the child to walk efficiently (activity).

Physiotherapists need a clinical reasoning model that does not diminish the role of the biomedical model but also provides a systematic method to identify and manage both biomedical and psychosocial aspects. The ICF is such a model; it allows the development of a hypothesis with consideration of the relationships between body structure, function, activities and participation, and environmental and personal factors, for each client.

1.4.2.4 *ICF and ICF-CY Model*

The ICF/ICF-CY provides the practitioner with a tool to guide the iterative process of client assessment, intervention and evaluation of outcomes across all conditions, ages and settings (WHO, 2002, 2013). "Towards a Common Language for Functioning, Disability and Health: The International Classification of Functioning, Disability and Health (ICF)" describes how the ICF can be applied to the clinical reasoning process, and provides some guidance as to how to apply the ICF's concepts and framework in clinical practice (WHO, 2002). Also, "How to Use the ICF: A practical Manual for Using the International Classification of Functioning, Disability and Health (ICF)" describes case studies used in the development of the ICF and brings together the experiences of practitioners who have applied the framework in various countries and settings since the publication of the ICF in 2001 (WHO, 2013).

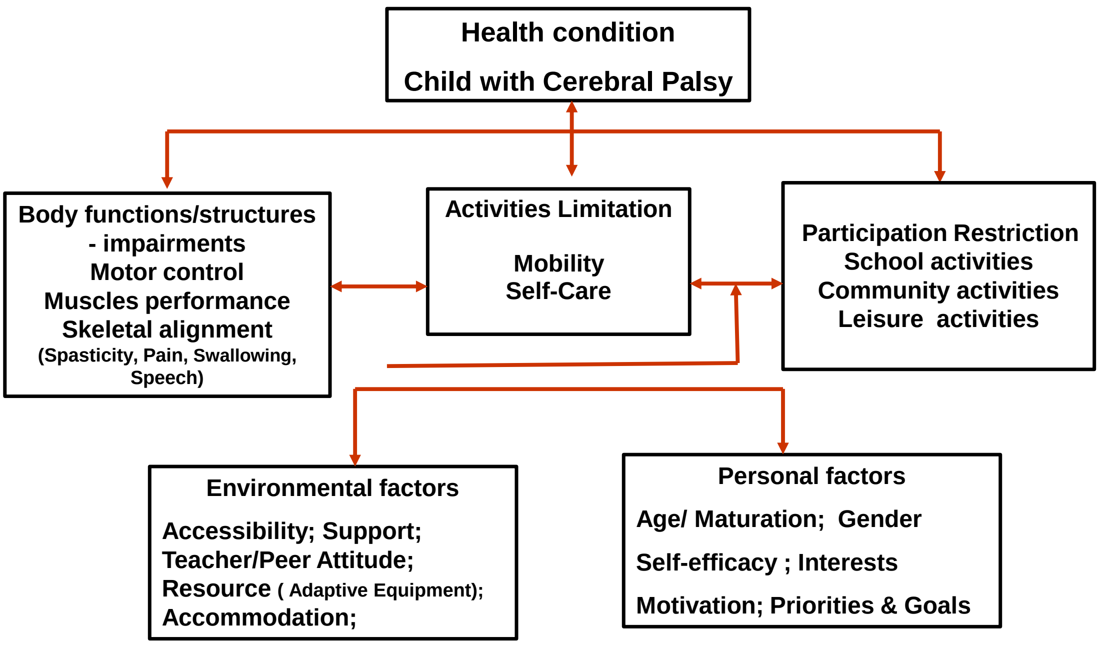
The ICF/ICF-CY model offers a framework for understanding and operationalizing interactions between clinicians and patients as a key component of clinical practice and explains how clinical reasoning can be better utilized in healthcare. The ICF/ICF-CY model emphasizes the essential role of the child and the family in both the decision-making process and when establishing goals and objectives in practice (Darrah et al., 2006; Schwartz & Elstein, 2008; WHO, 2007).

Also, the ICF classification system defines different health components and provides a systematic method to abstract the thought processes and strategies used by a physiotherapist to collect relevant information, identify problems, generate goals, make intervention decisions and evaluate outcomes (Allet et al., 2008; Darrah, 2008; Darrah et al., 2006; Edwards et al., 2004).

Schematic representations of the ICF/ICF-CY model encourage the physiotherapist to integrate and synthesize the child's problems for assessment, intervention and outcomes across the five ICF/ICF-CY domains (Figure. 1.2).

Thus, the ICF/ICF-CY model helps physiotherapists to integrate large amounts of clinical information efficiently and thus understand the relationships between ICF domains and how these contribute to the current presentation of problems (Allan et al., 2006).

Figure 1.2. International Classification of Functioning Disability and Health as Applied to a Child with Cerebral Palsy (Copied from Wright et al., 2008)



Using the ICF model can encourage physiotherapists to identify possible causes and maintenance factors of functional problems rather than just seeing them as the result of bodily impairments. During the assessment phase, the identification of a problem is considered in relation to potential positive and negative influences across ICF domains. Each of these suspected causal factors becomes a hypothesis that can then be systematically examined during the assessment phase.

Each hypothesis can be modified or changed as additional information is gathered (Edwards & Jones, 2013; WHO, 2013). After assessment, collaboration between the child, parent and therapist generates realistic short- and long-term goals that target different ICF components. Darrah et al. (2006) highlight the importance of using the ICF model to plan treatment decisions focusing on a strategy of adaptation, recovery or prevention, based on ICF components.

For example, the intervention decision for a child with CP may be to identify adaptation strategies for the environment (contextual factors) to compensate for the child's expected inability to have normal motor performance. A prevention intervention focus may be appropriate if secondary complications related to the identified problem are anticipated and the goal is to stop those problems (such as muscle contracture) occurring. Application of the ICF model can help to demonstrate that all three interventional approaches have equal value and that interventions don't always focus solely on one recovery strategy (Darrah et al., 2006). The generation of different hypotheses and treatment strategies across ICF components, with an emphasis on treating the problem of concern to the child and their family rather than an abstract health condition, supports the concept that treatment is specific to a problem.

1.4.3 Application of the ICF/ICF-CY model in clinical reasoning

Evidence-based practice for the use of the ICF in clinical reasoning has been documented in a range of research evidence. This includes clinical case studies and literature reviews (Atkinson & Nixon-Cave, 2011; Darrah, 2008; Furze et al., 2012; Nijhuis et al., 2008; Rauch et al., 2010; Rundell et al., 2009; Steiner et al., 2002; Tempest & McIntyre, 2006; Trabacca et al., 2012). The current evidence base provides examples of how to apply the ICF in the clinical reasoning process but cannot determine whether particular studies provide robust or generalizable findings. Expert opinions in the study by Tempest and McIntyre (2006) provide examples of how the ICF can be used to demonstrate the different clinical reasoning skills used by rehabilitation teams working in collaboration on the same activity, e.g. maintaining a sitting position in acute stroke management. The physiotherapist may address maintaining a sitting position (activity) to promote muscle tone (body function). A speech and language therapist might review the same activity to assess swallowing function (body function) and an occupational therapist could work on maintaining a sitting position (activity) in order to assess consciousness and orientation (body function). Therefore, whilst there may be appear to be some role overlaps between interventions geared to maintaining a sitting position, the clinical reasoning behind each intervention will be from a different clinical, yet complementary, perspective. The question has been raised as to whether each specialist is aware of the domains assessed by other specialists in order to devise an integrative rehabilitation plan. To do so should maximise the effectiveness of each contributing specialist and create synergy for all those involved in the care of the patient.

Since the development of the ICF and ICF-CY, there has been a great deal of interest from physiotherapy professionals regarding how these frameworks may be best applied as a clinical reasoning tool to improve patient care and outcomes (Darrah, 2008; Darrah et al., 2006; Majnemer and Mazer, 2004; Mayston, 2005; Palisano, 2006; Trabacca et al., 2012). In paediatric physiotherapy, the ICF-CY can provide a framework to support the clinical decision-making process that physiotherapists engage in when working with patients. Darrah (2008) provides a research-derived example of how using the ICF in paediatric physiotherapy can illustrate the conceptual benefits of applying it. For instance, she states that physiotherapists interested in incorporating the ICF into their clinical practice should not feel they have to use the coding structure.

Rather, they can use the ICF framework as a conceptual model for practice and she gives several examples of how to adapt the ICF framework to paediatric physiotherapy. For instance, a paediatric physiotherapy department does not need to change its practice or chart procedures but simply needs to indicate which of the ICF components is represented by each treatment goal and intervention strategy in their documentation. Darrah (2008) also highlights that the ICF framework can be used as a reminder of the necessity to evaluate the effects of interventions in relevant environments, and that different motor solutions may be needed for different environments.

The ICF model makes the data more transparent by systematically evaluating and refining the therapist’s decision-making. This application of the ICF-ICF/CY can help to identify whether clinical decision-making is focused on a single component of the ICF or multiple components. For example, if a therapist’s goal is to strengthen a child’s quadriceps muscle and he/she uses specific resisted exercises to accomplish this goal, and the expected outcome is increased quadriceps strength, then the focus is solely on the impairment component. But if the goal and intervention remain the same but the expected outcome is that the child will improve his or her ability to climb stairs at school, both impairment and activity components are targeted. In this case, the expected outcome of stair-climbing now represents the ICF component of activity, with the clinical assumption being that increased quadriceps muscle strength (impairment) will result in improvement in stair-climbing.

Rundell et al. (2009) describe an integrated model that incorporates the ICF within a continuous decision-making cycle in physiotherapy and applies it to two cases of lower back pain. It is suggested that a systematic method for using the ICF can assist in devising important clinical strategies to help in goal-setting and treatment planning based on the interactions between the five ICF domains.

The ICF knowledge base can support physiotherapists who process and synthesise data analytically, as the physiotherapist is provided with an examination procedure that can guide the physiotherapist to determine *what* to examine, rather than just *how* to examine (ICF Research website, 2013). Additionally, it can provide a standard way to guide clinical thinking and decision-making in clinical practice (Rundell et al., 2009; Darrah, 2008).

Edward et al. (2004) stated that the ICF model could enhance students' clinical reasoning, allowing them to better develop a full and complete clinical and contextual profile of the patient. The conceptual framework of the ICF, which emphasises that there is no linear causal relationship between a specific health condition and a functional outcome, is an ideal tool to encourage students to investigate and integrate the relationships among different components (WHO, 2013). It has been shown that using the ICF in stroke rehabilitation clarifies students' learning of intervention strategies and demonstrates the clinical reasoning behind treatment delivery (Tempest & McIntyre, 2006). To assess the significance of using the ICF as a clinical reasoning tool, it is necessary to generate evidence, through quantitative or qualitative study designs, that explores how clinical reasoning skills, based on the ICF, can be developed. Tempest and McIntyre (2006) highlight the need for robust evidence from clinical examinations in order to substantiate or refute claims that the ICF can inform clinical reasoning.

There is, however, little systematic operational guidance as to how the ICF-CY in particular can be used to guide a paediatric physiotherapist's clinical reasoning and improve treatment planning for children with CP. Using the ICF model in clinical reasoning needs a unified theoretical and clinical-based approach to teaching and assessment. This should include application of the ICF/ICF-CY to determine the level of existing ICF knowledge, clinical thinking and clinical decision-making of physiotherapists.

1.4.4 Factors influencing application of the ICF/ICF-CY model in clinical reasoning

In order to develop effective educational strategies for teaching the ICF as a clinical reasoning tool, an understanding of the factors that influence the development of clinical reasoning skills is necessary. Factors related to physiotherapists' clinical reasoning and how physiotherapists manage multiple clinical factors include a knowledge base and cognition, metacognition and contextual factors (Bartlett & Palisano, 2002; Edwards et al., 2004; Edwards et al., 2006; Holdar et al., 2013; Smith et al., 2008). Each of these is described in turn.

Knowledge the clinical reasoning process involves combining a knowledge base, including theory and levels of evidence, via which the patient's clinical situation can be considered (Higgs & Jones 2008), with procedural know-how in applying theory to clinical practice, and personal knowledge to allow a deeper understanding of the clinical problem within the context of the patient's particular situation (Jones et al., 2008). Based on Higgs & Jones' (2008) description of the ICF, knowledge is considered to be procedural and can influence the application of theory in clinical practice.

This knowledge constitutes the physiotherapist's justified beliefs or information he/she has obtained before entering practice, along with knowledge and beliefs acquired through practice.

Cognition refers to the conceptual processing of information and structured expression of a response (Lee, 2011). Therefore, adopting a cognitive perspective implies both conscious and unconscious processes are used to evaluate new situations and determine responses (Lee, 2011; Schmidt et al., 1990).

Based on the revised version of *Bloom's Taxonomy of Educational Objectives* (Anderson et al., 2001), that was developed to assist in the design and assessment of learning strategies, the application of cognitive processes to existing knowledge is required to enable the application of that knowledge in a new situation, and thus to determine an appropriate response. Within the clinical context, the integration of ICF knowledge into the cognitive process necessitates an understanding of how the ICF can be applied to clinical practice. Interpretations of patient assessments, from the perspective of the five ICF components, enable relationships among those components to be considered and to contribute to the formulation required for a successful treatment plan.

Metacognition refers to a form of reflective learning, problem-solving, and self-awareness (Jones et al., 2008). For instance, ICF knowledge can influence physiotherapy metacognition by generating a hypothesis and taking into account the patient’s body structure and function, activities, participation, and personal and environmental factors as barriers to or facilitators of social activities.

Contextual factors the ICF also acknowledges the influence of contextual factors on a client’s functioning (WHO, 2002). Bartlett and Palisano (2002) highlight the importance of personal factors, such as the motivation of a child with CP, and family factors, including the support provided to the child and family, in impacting changes in the motor ability of children with CP. Therefore, it is important to consider contextual factors as key elements in the development of effective educational strategies when teaching the ICF model as a clinical reasoning tool.

1.5 Exploring the Application of the ICF/ICF-CY in Clinical Reasoning Using Theoretical Evidence and a Practical Approach

In the present research, a theoretical approach was used in both assessment and teaching to provide greater insights into the cognitive processes involved in clinical reasoning. The ICF/ ICF-CY framework is considered to be the gold standard for clinical reasoning by the World Health Organization (WHO, 2013) and is adopted as such throughout this thesis. Bloom’s Taxonomy of Educational Objectives (Anderson et al., 2001) is also adopted in this thesis to analyse how levels of ICF knowledge can be applied in practice.

Bloom's Taxonomy of Educational Objectives (Anderson et al., 2001) was developed to assist in the design and assessment of teaching strategies in the field of education. It provides an assessment strategy for how the ICF knowledge base can develop physiotherapists' clinical reasoning and provides a promising approach to build a model of how to effectively introduce ICF knowledge and clinical thinking processes into clinical practice. In accordance with Bloom's taxonomy, there are four types of ICF knowledge that can be applied in clinical practice. *ICF factual knowledge* includes general ICF terminology and the classification of function and disability knowledge. *ICF conceptual knowledge* is knowledge about ICF classifications and categories, along with principles, generalisations, theories, models and structures. *ICF procedural knowledge* is related to the application of *ICF conceptual knowledge* in clinical practice. Finally, *ICF metacognition knowledge* is based on *ICF factual knowledge* and helps physiotherapists to develop general strategies for approaching different tasks and conditions.

The integration of the four types of ICF knowledge in clinical thinking is defined by Higgs and Jones (2008) as the use of cognitive skills (such as application, analysis, synthesis and evaluation) behind actions taken in clinical practice to help identify how the ICF knowledge base can be applied to physiotherapy clinical practice. The clinical-thinking process in professional practice is conceptualised by Bloom's taxonomy into categories, namely: remembering (closely related to retention skills), mapping, applying, analysing, evaluating and generating; all of which are increasingly related to the transfer of skills to clinical practice (Anderson et al., 2001).

Based on Bloom's Taxonomy, three objectives can be achieved by integrating ICF knowledge into the clinical thinking process. First, such integration could help physiotherapists to structure and specify clinical aims. Second, physiotherapists would benefit from acquiring an understanding of the ICF domains and classification system; and third, they would be able to apply ICF knowledge to their decision-making processes. Clinical decision-making, as defined earlier, are the actions taken in a particular clinical situation (Higgs & Jones, 2008). These three objectives are interrelated, play a crucial role in determining the appropriateness of decision-making strategies for different situations and clearly define how to apply ICF skills in practice (Anderson et al., 2001).

1.5.1 Theory Based Approach for assessment and teaching of application of the ICF/ICF-CY model in clinical reasoning

In this thesis, three theoretical models were used to guide our understanding of Saudi paediatric physiotherapists' clinical reasoning when developing a treatment plan for children with CP, namely: Miller's Pyramid (1990) of clinical competence for clinical reasoning; Bloom's taxonomy of learning & teaching (Anderson et al., 2001); and the Theory of Planned Behaviour (Ajzen, 1985).

Miller's Pyramid model (1990) identifies health professionals' progress through four stages "knows, knows how, shows how, and does of acquiring knowledge to performing a task in practice". In this thesis, Miller's model was used to develop a questionnaire to assess paediatric physiotherapists' level of ICF knowledge and their decision-making behaviours in the application of environmental and personal factors in the management of children with CP, as well as how the knowledge base transfers to the decision-making process. Competence in each stage was assessed using a variety of assessment methods relevant to a particular clinical field.

Theory of Planned Behaviour (TPB) (Ajzen, 1985) was utilized to predict paediatric physiotherapists' volitional behaviours (actions) and intentions to apply environmental and personal factors in the management of children with CP. As these are the aspects of the ICF that are least adopted in clinical practice, it was felt important to understand and explain physiotherapists' attitudes and beliefs vis-à-vis taking these factors into account in their assessment of children's problems.

The TPB has received much attention in social and health psychology, and it has been used extensively for understanding many health related behaviours such as physical activity and activity-limitation behaviours (Johnson & Dixon, 2014; McEachan et al., 2012; Bonetti & Johnston, 2008; Eccles et al., 2007 ; Hagger et al., 2002). Details of how this theoretical model can be used to develop a survey of Saudi paediatric physiotherapists' clinical reasoning and ICF knowledge regarding children with cerebral palsy are presented in Chapter Three.

1.5.2 Clinical Based Approach for application of assessments using the ICF/ICF-CY model in clinical reasoning

Several clinical assessment methods have been adopted in training programmes that aim to offer an objective assessment of competence in clinical reasoning, often using case vignettes or simulated patients. Despite the recognised importance of clinical reasoning in physiotherapy, the unanswered question is: How is clinical reasoning best measured? It is important to explore this question as clinical reasoning is the focus of this thesis. Clinical reasoning is assessed either as performance-based measures, such as objective structured clinical examinations (Petrusa, 2002), or by methods involving real-life clinical settings or using simulations (Turnbull & Van Barneveld, 2002). Measurement by direct observation is difficult to apply, especially in large samples due to the lack of inter-rater reliability. It is also potentially biased, as examinees may perform better when being observed. Currently, a patient's medical record is the standard method of assessing decision-making in clinical practice, but this might not reveal therapists' decision-making (Van der Vleuten et al., 2008). Additionally, clinical reasoning, as with any other type of high-order cognitive process, is not amenable to direct observation; it can only be assessed indirectly (Van der Vleuten et al., 2008).

Case scenario-based assessment tools have been used extensively in healthcare to gain access to clinicians' decision-making processes (van der Vleuten et al., 2008). Clinical vignettes are well suited to indirectly evaluate the accuracy of therapists' decision-making and are valid tools for measuring clinical performance, which is relevant to clinical practice (Peabody et al., 2004). Clinical case scenarios have been increasingly used in medical schools to understand hypothetical decision-making (Brauer et al., 2009; Peabody et al., 2004). The various methodologies may include Key Features (KF) (Page & Bordage, 1995), Clinical Reasoning Problems (CRP) (Groves et al., 2002) and the Script Concordance Test (SCT) (Charlin & van der Vleuten, 2004). The choice of assessment method is based on the purpose of the assessment and particular predetermined evaluation criteria. For example, KFP was developed to assess the ability to solve problems. The problem is usually a clinical-case scenario, followed by questions that focus only on diagnosis. The response formats are either short answer or MCQs (van der Vleuten et al., 2008). The CRP (Groves et al., 2002) assesses the process of clinical reasoning rather than resultant outcomes. The simulation format consists of clinical scenarios, including clinical history and data from a physical examination. Therapists are asked to select the two diagnoses considered most likely, with no single correct answer. The SCT (Charlin & van der Vleuten, 2004) is administered as a group of clinical-case scenarios, followed by hypothesis generation and evaluation. A menu of options is presented and responses are compared to the answers given by a panel of experts. In this thesis, the decision was taken to use case vignettes as the tool of choice for the assessment of therapists' performance. The method is described in detail in Chapter Three.

1.5.3 Clinical-based Approach for Teaching Application of the ICF/ICF-CY Model in Clinical reasoning

A variety of clinical educational strategies have been utilised to teach clinical reasoning in physiotherapy and other medical specialties, including reflection, case studies, problem-based learning and simulation (Delany & Golding, 2014; Gunn et al., 2012; Neistadt et al., 1997), each of which is explored below. Other educational strategies have been discussed in the literature, including online learning, role-playing and storytelling. Many of these strategies can be implemented to either teach clinical reasoning to students or to enable professionals to further develop their clinical reasoning skills. Despite the variety of educational strategies available, few research studies have actually compared the effectiveness of these strategies (Ajjawi & Higgs, 2008).

Reflection is thinking about the context of clinical practice. This type of reflection is most often completed through writing, although it can also occur as spoken dialogue (Oliver & Butler, 2004). Delany and Golding (2014) present an action research study where clinical educators reflect on how to teach clinical reasoning through the lens of making thinking visible. Twenty-one clinical educators from three tertiary Australian hospitals participated, covering eight allied health disciplines (physiotherapy, social work, podiatry, occupational therapy, education play therapy, music therapy, prosthetics and speech pathology), all having an average of ten years of clinical practice experience and eight years of clinical supervision. They attended up to seven action-research discussion sessions with the two authors (Delany and Golding) and their peers.

Data include participants sharing their written descriptions of thinking routines they have developed and tested with their students; then, action-research discussion sessions were transcribed and analysed using content analysis. As an example of developing and refining thinking routines for physiotherapy, clinical activities are discussed after the assessment of a patient with a musculoskeletal injury, and then there is a reassessment of the patient after initial treatment. Thereafter, the patient's problems are defined, initial impressions made and evaluation and refined thinking routines focus on a diagnosis including the patient's physical impairment and the impact of previous treatment on that impairment, such as muscle tone. Clinical educators state that the complexity and challenges for students wishing to understand what to consider in their assessments and make connections with how previous treatment has impacted a patient are difficult and obscure. The results support the approach of making thinking more visible to assist educators to become more reflective when teaching clinical reasoning, and to enable them to articulate expert reasoning for students to access and use.

Case studies are an educational strategy that apply theoretical and educational approaches to replications of real-life situations (Neistadt et al., 1997). Case studies involve the application of knowledge to clinical problems, rather than simple recall of content. After a brief clinical scenario is presented, the case study continues with a series of questions for the learners to address (Rivett & Jones, 2008). It is intended to be used with groups of learners and can be delivered through a variety of different educational strategies, including written, oral and videotape modalities, simulated client cases, and real client cases (Jensen et al., 2000).

Neistadt et al. (1997) examined the effectiveness of traditional case studies vs. clinical-reasoning case studies in teaching the clinical reasoning process to four occupational therapy students in two sessions. Videotaped discussions of this learning experience were collected. Case studies were based on clients who had had a stroke, and traditional case studies consisted of information found in chart reviews, including the client's age, diagnosis and medical and social history. Clinical-reasoning case studies were created as a format that included questions related to the clinical-reasoning process. For example, they included what activities a patient wanted to engage in after occupational therapy in order to develop student thinking. For the first session, students completed intervention plans on two separate case studies and were then asked to write an intervention plan that included precautions, problems, treatment activities and their rationale for treatment. For the second session, students were asked to rewrite or adapt their first intervention plan as they thought was necessary. They were allowed one hour to complete their plans during each session. At the end of both sessions, after completing their intervention plans, participants were asked: "If this was a real client of yours, how confident would you feel about completing their intervention plan?" Interestingly participants preferred clinical-reasoning case studies over traditional paper case studies. The authors concluded that clinical reasoning case studies could be used as an effective tool to teach clinical reasoning, thereby providing students with a holistic picture of the client and their occupational therapy treatment.

In addition, the use of clinical reasoning case studies helps to facilitate the student's view of their client, not only as an individual with a physical impairment, but also as a social individual within a context of family, environment and culture.

Problem-based learning (PBL) is similar to case study learning. One of the main differences between PBL and case studies, however, is that PBL does not necessarily depend on prior knowledge (Sefton et al., 2008). Individuals working with PBL should identify what they already know and, more significantly, what they do not know. PBL removes the passive transfer of information from teacher to learner and replaces it with active participation, making individuals responsible for their learning process (Sefton et al., 2008).

Gunn et al. (2012) investigated how skills gained through PBL are applied in practice by student physiotherapists from the perspective of their placement supervisors. A qualitative one-to-one semi-structured interview methodology was used, purposefully recruiting a sample of ten qualified physiotherapists with experience in the supervision of students studying for a PBL physiotherapy undergraduate degree. The supervisors reflected that the PBL approach offers a range of benefits for both student education and clinical practice. Students with a PBL background were able to utilise and apply existing skills and knowledge to new scenarios, which is particularly relevant to the practice setting. Participants felt however that, given their experience, they might need further help and input to successfully integrate theory into practice. It was noticed that some students tended to struggle with their approach to both learning and placement experiences. The particular strengths of PBL include the ability to utilise a holistic approach in patient management and being able to problem-solve in unfamiliar situations.

Within the literature there has been a debate as to whether this effect is due to selection bias in the cases presented or skills development.

However, Gunn et al. (2012) argue that integral to the PBL process is the need for students to review scenario data, to reflect on existing knowledge and experience, and to generate ideas and theories linking problems with solutions, which are then supported by research and the acquisition of further knowledge. Students may, therefore, tend to develop a more questioning and inquisitive approach because of the need to seek out information, rather than it simply being provided. Also, it has been stated that the PBL approach is suited to developing and maintaining social and cognitive dimensions, but not psychomotor skills, which are more effectively instilled using deliberate practice methods, including formal procedural skills training (Koh et al., 2008).

All of these educational strategies are well developed and yield results suggesting that educational strategies are effective for developing clinical reasoning skills. In this thesis, however, case studies were used to teach paediatric physiotherapists' application of the ICF-CY as a clinical reasoning tool in ICF-CY in-service training. The development of the ICF-CY in-service training programme is presented in Chapter Five.

1.6 Structure, Purpose and Research Questions of this Thesis

This thesis is set within Saudi Arabia physiotherapy practice for children with cerebral palsy. It seeks to explore whether training in the application of the most commonly accepted model of disability, the ICF and ICF-CY models, improves the delivery of physiotherapy practice by taking into account personal and environmental factors when treating children with CP. In other words, this thesis aims to explore the impact of training physiotherapists to apply the ICF-CY as a clinical reasoning tool in their management of children with CP.

This will be achieved by examining how Saudi paediatric physiotherapists develop their treatment plans for children with CP, and how training on the ICF-CY model influences their clinical reasoning process for treatment planning using case vignettes. In addition, the impact of ICF-CY training is explored from the perspective of parents of children with CP. Prior to the primary empirical research (Chapters Four and Six), a systematic review of the existing literature on using the ICF/ICF-CY as a clinical reasoning tool in clinical physiotherapy was undertaken (Chapter Two). Chapter Three presents the theoretical models and methods that were used to develop the study questionnaire, including translating procedures as well as pilot testing. Chapter Four presents a cross-sectional survey of Saudi paediatric physiotherapists' clinical reasoning regarding children with CP. Chapter Five describes the development, design, delivery and assessment of an ICF-CY in-service training programme. Chapter Six presents the impact of the ICF-CY training programme on physiotherapist knowledge of the ICF-CY and their clinical reasoning and decision making. In addition, Chapter Six also presents the impact of the ICF-CY training on the management of children with CP from the perspective of their parents. Chapter Seven presents an overall discussion of the thesis findings in relation to the theoretical perspectives and the ICF model as well as clinical and research implications and a final conclusion. An overview of this thesis is presented in Table 1.2.

Table 1.1. Overview of Thesis

Aim of each study	Research Method	Research Questions	Instrument/Tool	Data Collection
To establish the extent to which the ICF/ICF-CY is being used as a clinical reasoning tool in clinical physiotherapy practice.	Systematic Review (Study One) Chapter 2.	1- How and in what ways is the ICF used for clinical reasoning in physiotherapy practice? 2- Does using ICF framework change the clinical thinking processes in physiotherapy practice?	Electronic databases were used to identify relevant papers that meet the review selection criteria: AMED, Academic Search Premier, PsychINFO, CINAHL, Medline, Embase and @Ovid Journals.	A systematic search of the literature on the ICF, ICF-CY and physiotherapy/rehabilitation was performed from June 2001 to April 2015.
To identify current Saudi paediatric physiotherapists' clinical reasoning, knowledge of the ICF, and the predictors for applying environmental and personal factors in their treatment plans for children with cerebral palsy.	Cross-sectional research design (Study Two) Chapters 3 & 4.	1- What is the level of Saudi PPTs' ICF knowledge? 2- Do those PPTs who report ICF knowledge differ from those who do not report ICF knowledge, on demographic and clinical variables? 3- Do those PPTs who report ICF knowledge differ from those who do not report ICF knowledge, in their decision-making in physiotherapy management for children with CP? 4- Does the Theory of Planned Behaviour (TPB) predict PPTs' application of environmental and personal factors in physiotherapy management for children with CP?	Developed a national paediatric physiotherapist survey, which is presented in Chapter 3.	Online using Qualtrics software, or a pen-and-paper survey.

Aim of each study	Research Method	Research Questions	Instrument/Tool	Data Collection
To evaluate a two-day training programme designed to train paediatric physiotherapists on the ICF-CY model.	Longitudinal quasi-experimental study design (Study Three) Chapters 3, 5 & 6.	Phase one: 1-What is the impact of a two-day ICF training workshop on a paediatric physiotherapist's level of ICF knowledge? 2- What changes are seen in a paediatric physiotherapist's decision-making to apply the ICF model to case based vignettes following ICF-CY training? 3- Does the Theory of Planned Behaviour (TPB) predict a PPTs' application of environmental an personal factors in the physiotherapy management for children with CP as a result of ICF-CY training? Phase two: 1- Does the parent's rating of their child's physiotherapy differ when they are treated within a setting where the staff has received training in the ICF-CY model versus a setting where the staff has not been trained in the ICF model?	Two days of ICF-CY in-service training was given to Saudi paediatric physiotherapists. Phase one: Pre-and-post questionnaires were distributed (the same three clinical reasoning domains were used in the national paediatric physiotherapist survey (Chapter 3). Phase two: Five months after two-day in-service training, parent questionnaire was conducted (Chapter 3).	Phases One and Two used a pen-and paper questionnaire method.

Chapter 2

The ICF model as a Clinical Reasoning Tool in Physiotherapy: A Systematic Review

2.1 Introduction

This chapter presents a systematic review of the literature to understand how and in what ways the ICF/ICF-CY framework has been applied as a clinical reasoning tool in physiotherapy practice. While the narrative literature review in Chapter One led to refinement of the initial idea that the ICF model and clinical reasoning are mutually complementary, it is important to examine this using a more robust methodology. This chapter systematically reviews the published ICF-related literature on clinical reasoning in physiotherapy using a priori methods and the theoretical approach of Bloom's taxonomy of learning and teaching methods as a framework for data synthesis.

2.2 Published reviews of ICF-related literature

Jelsma (2009) reports that numerous published studies have applied the ICF framework to clinical practice, but suggests that the ICF has been interpreted too broadly, and in some cases incorrectly, while many studies did not fully address the classification in its entirety. This broad interpretation is perhaps because the ICF framework has multiple applications, it is used in the literature as a tool for research, as well as an instrument in clinical practice and educational settings (Cerniauskaite et al., 2011).

Various reviews of the ICF literature have been undertaken since its inception in 2001 (Allet et al., 2008; Bornbaum et al., 2015; Bruyère & Peterson, 2005; Cerniauskaite et al., 2011; Constand & Macdermid, 2014; Jelsma, 2009).

These narrative reviews provide a rigorous and transparent method for identifying ICF fields of research and describe the volume, nature and characteristics of primary research using the ICF. However, these reviews do not include the application of the ICF in clinical practice. Only three reviews focus on use of the ICF in healthcare education and clinical practice (Bornbaum et al., 2014; Constand & Macdermid, 2013; Allet et al., 2008).

The aim of the narrative review by Allet et al. (2008) was to identify how the ICF is used in routine physiotherapy clinical work, including examinations, evaluations, diagnoses, prognoses and interventions, and to ascertain whether the complexity of the ICF classification hinders its application in daily use and for developing patient profiles. Of the 154 studies reviewed, only 22 describe the feasibility of the application of the ICF to physiotherapy practice in particular. A further 72 articles, however, indicate that the ICF can be successfully integrated into daily practice by a range of other healthcare professionals and can facilitate decision-making in clinical application.

A scoping review by Constand and MacDermid (2014) specifically focuses on whether the existing ICF literature addresses how the ICF can enhance the goal-setting process in clinical practice. Nineteen articles identified that researchers and clinicians integrate the ICF into healthcare goal-setting to organize, describe and facilitate the formation and reporting of patients' and clinicians' goals according to the five ICF domains. However, the levels of ICF knowledge that clinicians possess in order to use the ICF to set their goals in practice is not described. Yet, an ICF knowledge base is crucial to facilitate the application of ICF goal-setting in clinical practice and research (Allet et al., 2008; Bornbaum et al., 2015).

Another scoping review by Bornbaum et al. (2015) focused on publications that describe the use of the ICF in educating healthcare professionals, building on three previous reviews by Bruyère and Peterson (2005), Cerniauskaite et al. (2011) and Jelsma (2009). The aim of Bornbaum et al.'s (2015) review was to determine if the ICF is being incorporated into curricula for the education of students and health care professionals. Eighteen examples of ICF-based education show the integration of the ICF into the education of students and health professionals within the healthcare settings. In addition, the authors note that the ICF has been endorsed by other healthcare professional organizations and applied in other health education initiatives that are not captured in their review, and they provide several examples of ICF-based educational initiatives, such as the ICF e-Learning Tool and the American Physical Therapy Association. However, the outcome measures used to evaluate the ICF/ICF-CY educational programmes were not addressed in this review. The lack of reporting these outcome measures might make it challenging to determine the impact of those educational programmes.

As described in Chapter One, the application of the ICF in clinical reasoning is a conceptual scheme that can convert ICF knowledge into applied knowledge in clinical practice. Such an application of the ICF could add to our understanding of the thought processes involved in how the ICF model can be applied to clinical practice, education and goal-setting within healthcare settings, including physiotherapy practice. Bloom’s taxonomy enables us to understand the cognitive processes employed by physiotherapists when using the ICF in their clinical decision-making.

Also, Bloom’s Taxonomy (Anderson et al., 2001) could be used to assess how physiotherapists process their ICF knowledge in clinical practice. Congruence is necessary between three objectives: the first is related to specific clinical aims that utilize ICF knowledge, the second is related to clinicians acquiring ICF knowledge, and the third is related to the outcomes of utilizing ICF knowledge in the decision-making process. The extent of congruence between these three objectives might offer insights into how the ICF model can be used as a clinical reasoning tool. Assessment of the application of the ICF in clinical practice based on Bloom’s Taxonomy could provide guidance to explore how ICF knowledge can be extensively utilised during the decision-making process. Therefore, this systematic literature review aims to provide an understanding of the utility of the ICF model in clinical reasoning in physiotherapy practice.

2.3 Objectives

The aim of this chapter is to conduct a systematic review of the evidence from studies reporting application of the ICF model in the development, execution and delivery of physiotherapy treatment plans.

This systematic review will be focused on two questions:

1. How and in what ways is the ICF used for clinical reasoning in physiotherapy practice?
2. Does using the ICF framework change the clinical thinking process in physiotherapy practice?

2.4 Methods

2.4.1 Criteria for considering studies for this review

All publications with the keywords ‘‘ICF’’ or “ICF-CY”, referring to the Classification of Functioning Disability and Health as the topic of enquiry and also referencing physiotherapy and rehabilitation-specific keywords were identified. This was done regardless of the study’s main setting, patients’ ages or health conditions. Inclusion and exclusion criteria were developed to select publications that were relevant to the objectives of this review by following the PICOS (Participants of interest, Intervention delivered, Control group, Outcomes measures, Study design) framework for systematic reviews (Liberati et al., 2009).

Participants: Studies were included if participants were physiotherapists working in clinical, community or home-based practice settings, including primary care, physiotherapy departments in hospitals and rehabilitation facilities. The settings were inpatient hospital or rehabilitation centres, outpatient physiotherapy clinics or community settings.

Intervention: Any physiotherapy assessment or treatment derived from a decision-making process promoting the cyclical procedure, which is undertaken by physiotherapists in their day-to-day clinical work. This included patient assessments, identifying problems and the development of treatment plans.

Goal setting delivered by individual physiotherapists or interdisciplinary physiotherapy teams were also included.

Outcome: Development, execution and delivery of physiotherapy or rehabilitation practice informed by use of the ICF/ICF-CY.

Types of studies:

Inclusion criteria: Prospective studies including randomised controlled trials, controlled trials, qualitative and mixed-methods studies. Only papers published in English were included.

Exclusion criteria: Retrospective studies, systematic or literature reviews, ICF Core Sets validity/ reliability studies, secondary analyses of data, protocols and guidelines, letters, discussion threads, doctoral dissertations, conference abstracts and non-English articles were excluded.

2.4.2 Data sources and searches

Comprehensive search criteria were applied to this review to capture as many relevant articles as possible; to ensure all relevant studies that used the ICF and/or ICF-CY in physiotherapy and rehabilitation practice were identified.

Electronic Search

Seven electronic databases were searched between June 2001 and April 2015 to identify relevant papers that satisfied the review selection criteria: AMED (Allied and Complementary Medicine Database), Academic Search Premier, PsychINFO, CINAHL, Medline (EBSCO), Embase and @Ovid Journals. The search strategy protocol consisted of search terms including keywords and Medical Subject

Headings (MeSH) identified to capture application of the International Classification of Functioning Disability and Health (ICF) and/or the International Classification of Functioning Disability and Health for Children and Youth (ICF-CY). A similar approach was taken to identify keywords and MeSH for ‘physiotherapy’ and ‘rehabilitation’. The results of individual searches were then combined (see Table 2.1).

Table 2.1. Search strategy

Search terms	
1	‘Physiotherapy’ OR ‘physical therapy’ OR ‘rehabilitation’ OR ‘habilitation’
2	‘ICF’ OR ‘International Classification of Functioning, Disability and Health’ OR ‘ICF-CY’ OR ‘International Classification of Functioning, Disability and Health for Children and Youth’ OR ‘World Health Organization’s International Classification of Functioning, Disability and Health’ OR ‘WHO-ICF’**.**
3	Combine #1 AND #2

Searching other resources

In addition, the reference lists of six previous narrative reviews (Allet et al., 2008; Bornbaum et al., 2015; Bruyère & Peterson, 2005; Cerniauskaite et al., 2011; Constand & Macdermid, 2014; Jelsma, 2009) and all articles included in the final stage of this review were checked to identify further references.

All the citations were exported to the reference system Endnote web, and duplicates were removed. The number of citations in each of the databases is presented in Appendix 2 (p.288).

2.4.3 Data Collection and Analysis

The process of article selection was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Liberati et al., 2009). All citations identified were screened for relevance based on titles and abstracts. A first reviewer, HD, screened the titles and abstracts of retrieved articles for potential eligibility. If the screening of titles and abstracts was not sufficient evidence for inclusion of the article concerned, the full text of the article was retrieved to make a final judgement.

Two reviewers then screened the full text of the article for eligibility independently, and any disagreements were resolved by discussions between these two reviewers.

2.4.4 Data extraction

For each included study the following data were recorded:

1. Study characteristics: country of origin, study design, health condition and main setting.
2. Participants: number of participants, number of physiotherapists who participated, their years of work experience.
3. Application of the ICF/ICF-CY in assessment, goal-setting, plan of treatment and intervention, and level of ICF/ICF-CY knowledge.
4. Outcome measures for ICF/ICF-CY application.
5. Benefits and limitations of application of the ICF/ICF-CY.

Data extraction was performed by a first reviewer (HD), and then a second reviewer (PA) assessed the data extracted. The first and second reviewers resolved any differences of opinion by discussion to reach a consensus.

2.4.5 Assessment of the quality of the studies and risk of bias

Assessing the quality and source of bias is good practice when interpreting research findings and conducting systematic reviews (Portney & Watkins, 2009). The quality of a study and/or interpretation of potential of bias were not used as criteria to determine whether to include it in this review. However, study quality and its potential for bias are important considerations when conducting a systematic review.

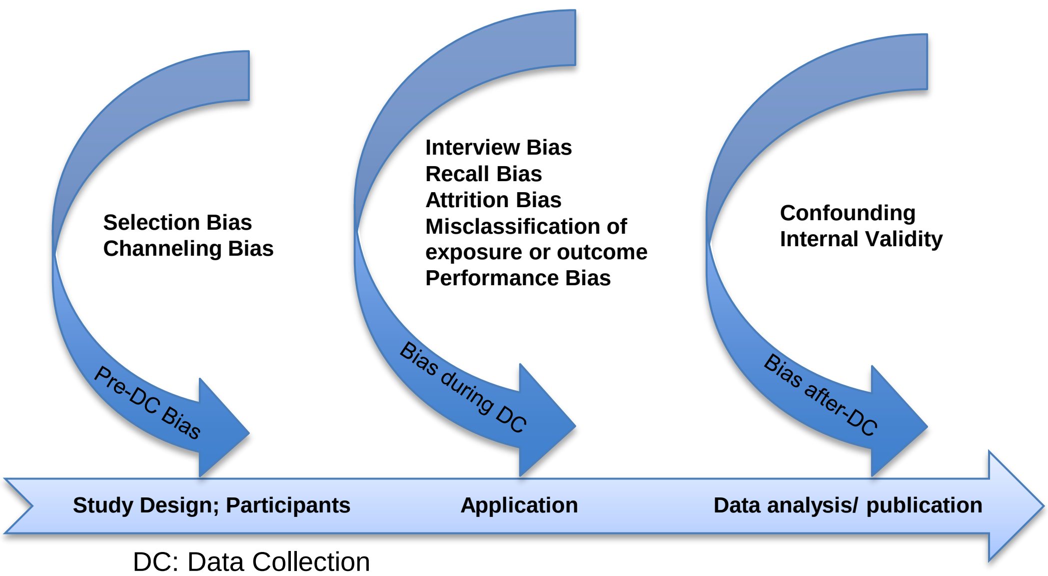
Highlighting the available level of evidence and source of bias that could exist as a result of poor reporting in primary studies helps to identify areas for improvement in future research (Pannucci & Wilkins, 2011). The Mixed Methods Appraisal Tool (MMAT) was deemed appropriate to assess the quality of the studies in this review. This is due to both the MMAT being designed to appraise quantitative, qualitative and mixed-methods studies in addition to non-randomised or descriptive studies, and the ease of its practical application. It lists a structured series of questions to aid in the identification and scoring of possible bias and confounding for each study design (Pluye et al., 2011). The potential type of bias was evaluated for each study included in this review during pre-data collection, data collection and after-data collection phases, as described in Figure 2.1 (Pannucci & Wilkins, 2011).

Selection and channeling bias at the pre-data collection level was scrutinized. These sources of bias are often found in participant recruitment and the setup of a study, and they can result in fatal flaws in the data, which cannot be compensated for during data analysis.

Selection bias can occur during the identification of the study population, and channeling bias occurs when study outcomes or interests dictate the treatment groups into which participants are placed or the setting of a study. The subtypes of potential information bias, including interviewer bias, recall bias, attrition bias, misclassification bias and performance bias that may occur in the measurement of an exposure or outcome during data collection, were also evaluated. Finally, a data-collection bias assessment was performed to evaluate the role of confounding during the analysis of data and to verify the internal validity of study results (Pannucci & Wilkins, 2011).

The quality of the selected studies and risk of bias were assessed by a first reviewer (HD) and reviewed by a second reviewer (PA), and any differences of opinion were resolved by reaching a consensus.

Figure 2.1. Types of Bias in Research Studies (Copied from Pannucci & Wilkins, 2011)



2.4.6 Data synthesis

Study characteristics, participants, application of the ICF/ICF-CY, outcome measures, benefits and limitations of ICF/ICF-CY application were collected based on the categories of data extraction. Risk of bias was collated based on each level of the study research series.

Furthermore, all included articles were examined and classified based on the degree of integration of ICF/ICF-CY knowledge within the process of thinking, using the concept of Bloom’s taxonomy (Anderson et al., 2001). A study was considered to be strong when the study presented three components: study objectives, the researchers’ and/or participants’ acquisition of ICF knowledge, and a record of the outcomes that provided a measure of rehabilitation professionals’ and/or researchers’ use of ICF knowledge during the decision-making process. If one of the components was absent, the integration was considered moderately weak.

If the study only presented one of the three components, the integration was considered very weak. All included studies were exported and presented in table format, based on the concept of Bloom’s taxonomy as shown in Table 2.5 (p.94).

On the left, the table has four levels of ICF knowledge (Factual, Conceptual, Procedural and Metacognition) and on the right; the table has six clinical-thinking processes (Remember, Understand, Apply, Analyse, Evaluate, and Create). Each study is allocated to a thinking process based on its level of integration and level of ICF knowledge, as presented in the study.

2.5 Results

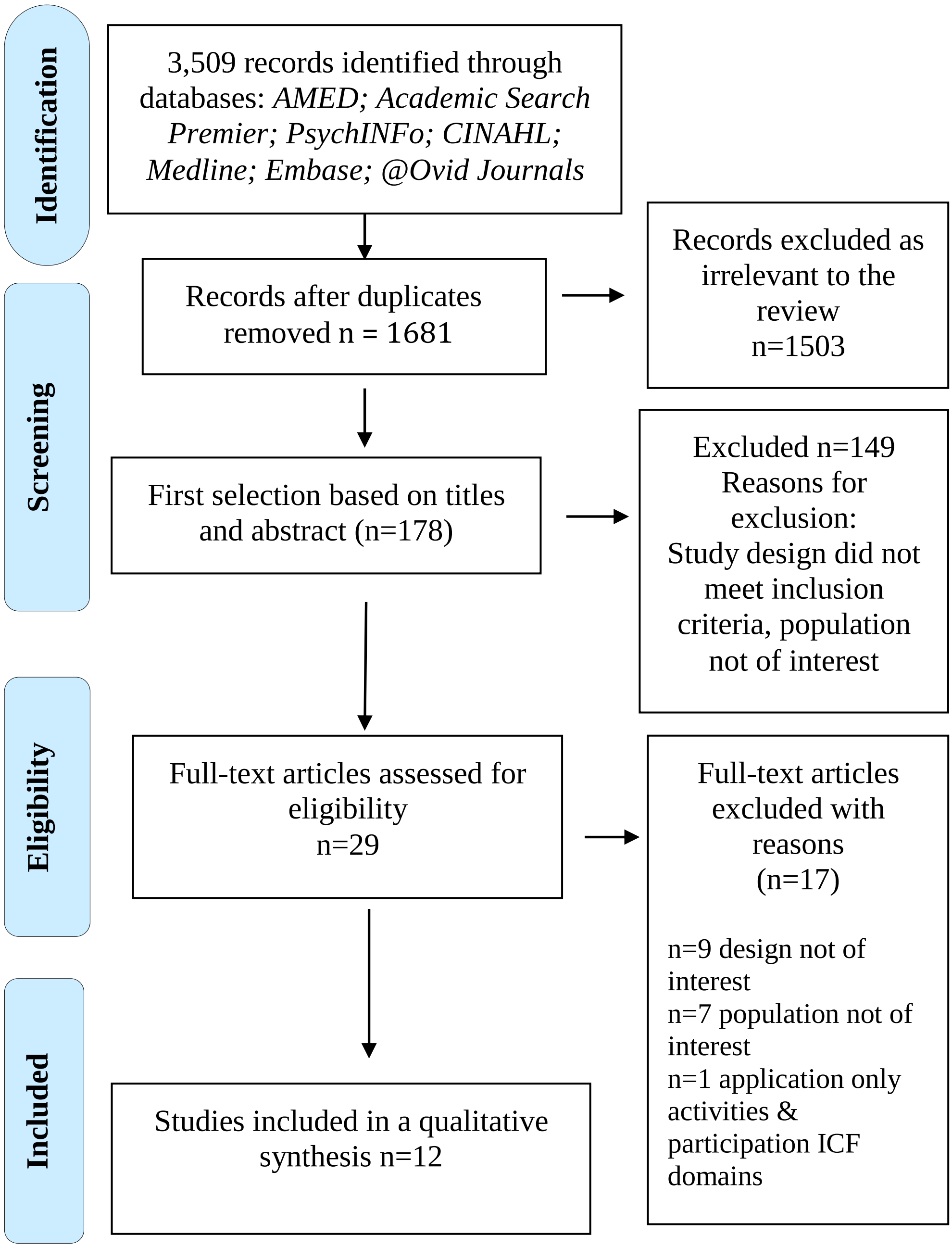
2.5.1 Search Results

The study selection process is described in Figure 2.2. A total of 3,509 records were identified through an electronic search of databases. After duplicates were removed, 1,681 citations remained. Of those, 1,503 were discarded as irrelevant to the review. Application of the inclusion/exclusion criteria to titles and abstracts identified 178 qualifying citations, 149 citations were excluded based on titles and abstracts for a variety of reasons: e.g. studies were either narrative or systematic literature reviews, data were from secondary analyses, protocols, guidelines, letters, discussion threads or full-text papers not written in English.

Twenty-nine full-text articles were assessed for eligibility by a first reviewer (HD), and thereafter these full-text articles (n=29) were independently screened by two reviewers (HD, PA). Differences of opinion were resolved by reaching a consensus between the two reviewers. Seventeen full-text articles were further excluded for not meeting the inclusion criteria, either because a study design was a validity/ reliability study in the ICF core set, or secondary data analysis (articles that were excluded and reasons for exclusion are presented in Appendix 3 p. 289).

The majority of articles were excluded either because the study design did not meet the inclusion criteria, participants were not physiotherapists or physiotherapists were not included in rehabilitation teams. Finally, 12 articles were retrieved that met the criteria for inclusion in this review.

Figure 2.2. PRISMA Flow Diagram of Selected Studies



2.5.2 Characteristics of included articles

Table 2.2 displays individual study characteristics for each of the 12 articles included in this review. The locations for the included articles are spread across nine countries; ten articles originated in mainland Europe (Adolfsson et al., 2010; Franki et al., 2014; Holmberg & Lindmark, 2008; Huber et al., 2011; Jeglinsky et al., 2012; Martinuzzi et al., 2010; Pless et al., 2009; Soberg et al., 2008) and two in the UK (McDonald et al., 2007; Sivan et al., 2014). The two remaining articles are from Canada (Fradette et al., 2011) and Brazil (de Oliveira Andrade et al., 2011).

A variety of methodological approaches were employed. Specifically, three studies used mixed methods (Adolfsson et al., 2010; Martinuzzi et al., 2010; McDonald et al., 2007). Two studies (Martinuzzi et al., 2010; McDonald et al., 2007) did so to better understand the efficacy of ICF implementation in clinical practice. McDonald et al.'s (2007) article used the ICF to assess the perspectives of parents and therapists in relation to seating equipment for children with cerebral palsy.

Five used quantitative methodological approaches, such as quasi-experimental (Pless et al., 2009), cohort (Huber et al., 2011; Soberg et al., 2008), cross-sectional (de Oliveira Andrade et al., 2011) and exploratory designs (Franki et al., 2014). Four articles adopted a qualitative design, such as a focus group and questionnaires with open-ended questions (Fradette et al., 2011; Holmberg and Lindmark, 2008; Jeglinsky et al., 2012) and, lastly, one utilized semi-structured interviews (Sivan et al., 2014).

Four studies reported data on patients over 18 years of age (Holmberg & Lindmark, 2008; Huber et al., 2011; Sivan et al., 2014; Soberg et al., 2008), and eight articles discussed paediatric rehabilitation (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Fradette et al., 2011; Franki et al., 2014; Jeglinsky et al., 2012; Martinuzzi et al., 2010; McDonald et al., 2007; Pless et al., 2009).

Four studies focused on cerebral palsy (de Oliveira Andrade et al., 2011; Franki et al., 2014; Jeglinsky et al., 2012; McDonald et al., 2007). Only three articles had solely physiotherapist participants (Franki et al., 2014; Holmberg & Lindmark, 2008; Huber et al., 2011), with the total number being 35, though Huber et al.'s (2011) study examined 425 physiotherapy patient records from an acute care hospital. Nine studies included participants from rehabilitation teams, but physiotherapists were the predominant members (McDonald et al., 2007; Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Fradette et al., 2011; Jeglinsky et al., 2012; Martinuzzi et al., 2010; Pless et al., 2009; Sivan et al., 2014; Soberg et al., 2008) . The total number of physiotherapists was 138 in total over the various studies. Some studies included a variety of healthcare professions, making it difficult to divide them into groups based on speciality (McDonald et al., 2007, Soberg et al., 2008).

Table 2.2. Data Extracted from Included Studies

Author Year of Publication Country of Origin	Study Design Setting Health Condition	Numbers of Participants Number of Physiotherapists Years' Experience	Intervention Level of ICF Knowledge	Outcome	Benefit of Application of ICF/ICF-CY Limitations of Application of ICF/ICF-CY
Adolfsson et al. 2010 **Sweden**	Longitudinal mixed-methods design Child & Youth Rehabilitation centre No Specific Health Condition	Participants - 115 multidisciplinary teams attended training. 12 months after training, 113 remained. 30 months after training, 16 remained 26 Physiotherapists attended training. 12 months after training, 23 remained. 2.5 years after training, 5 remained. Mean years of experience: 15	2 day in-service training in use of ICF and ICF-CY to evaluate changes over time in application of ICF-CY in therapist's daily work. Factual Knowledge.	Manifest content analysis on rehabilitation team's comments about the area of ICF-CY application, including children's and family's assessment, treatment plan, goals set.	After training: assessment of rehabilitation planning, intervention and evaluation needs to be revised. 12 months after training: assessment formulated according to the ICF-CY. 30 months after training: ICF-CY used for assessment, goal setting & rehabilitation planning for children. Developed two brochures; one for parents and one for youth. Attended training: Application time-consuming, ICF-CY theory complicated. 12 months after training: Comprehensive system to be familiar with, a lack of time in daily work. 30 months after training: current documentation templates not linked to ICF-CY terms.

Author Year of Publication Country of Origin	Study Design Setting Health Condition	Numbers of Participants Number of Physiotherapists Years' Experience	Intervention Level of ICF Knowledge	Outcome	Benefit of Application of ICF/ICF-CY Limitations of Application of ICF/ICF-CY
de Oliveira Andrade et al. 2011 **Brazil**	Cross-sectional study Rehabilitation centre Cerebral Palsy	Multidisciplinary teams: Before training: 18 After training: 6 Number of physiotherapists: Not reported. Mean years of experience: 16	3hrs ICF-CY in-service training to select ICF items relevant to assessment of CP functioning. Before training, semi-structured questionnaire conducted to select assessment items relevant to assessment of CP. Authors' linked participant's answers to ICF categories. After training, structured questionnaire conducted to select ICF items relevant to assessment of CP. Conceptual knowledge	After ICF training, the mean of the reported ICF items in assessment of CP functioning increased	ICF code set to assess CP functioning was defined from this study.

Author Year of Publication Country of Origin	Study Design Setting Health Condition	Numbers of Participants Number of Physiotherapists Years' Experience	Intervention Level of ICF Knowledge	Outcome	Benefit of Application of ICF/ICF-CY Limitations of Application of ICF/ICF-CY
Fradette et al. 2011 **Canada**	Focus group and Survey Paediatric Hospital Infants with Torticollis	Paediatricians Survey: 18 Focus group: 16 PPTs PPTs survey: 70 PPTs Years of Experience Paediatricians Survey: referred 10 infants to physiotherapy in 2010 Focus group: Involved in physiotherapy assessment & treatment in last 2 years, 7 have seen 3 infants every week. PPTs survey: have seen 10 infants in 2010	Identify factors influencing determination for intervention needs for infants with torticollis. Then contents analysis of surveys and focus group were mapped to third-level ICF categories by study principle investigator. Conceptual Knowledge	Factors encompassing all the ICF-CY domains regarding intervention needs	Distribution of factors among ICF-CY domain help to determine some body structures and body functions factors that were not previously reported in the literature.

Author Year of Publication Country of Origin	Study Design Setting Health Condition	Numbers of Participants Number of Physiotherapists Years' Experience	Intervention Level of ICF Knowledge	Outcome	Benefit of Application of ICF/ICF-CY Limitations of Application of ICF/ICF-CY
Holmberg & Lindmark 2008 **Sweden**	Focus group Hospital-based Rehabilitation-based Community-based Traumatic Brain Injury	3 physiotherapists from acute in-patients 4 physiotherapists from sub-acute in-patients 4 physiotherapists from community-based	To determine what & why physiotherapy methods of assessment, treatment and outcomes evaluation used for TBI patients during different phases of rehabilitation. Then a thematic analysis of focus groups was mapped to ICF domains by authors. Factual Knowledge	Goal-setting of TBI in all phases related to all ICF components except body structure. Assessment methods are mostly related to body functions in acute phase Direction of treatment related to body function components. Home-based treatment was related to environmental factors.	None

Author **Year of Publication** **Country of Origin**	**Study Design** **Setting** **Health Condition**	**Numbers of Participants** **Number of Physiotherapists** **Years' Experience**	**Intervention** **Level of ICF Knowledge**	**Outcome**	**Benefit of Application of ICF/ICF-CY** **Limitations of Application of ICF/ICF-CY**
Huber et al. 2011 **Switzerland**	Prospective cohort study Acute hospital Physiotherapy department has been part of ICF research Various health conditions, in- and out- patients had referral to physiotherapy	Total 425 physiotherapy records from various departments: Surgery: 94 Internal medicine: 80 Intensive care unit: 41 Neurology:73 Neuro-surgery: 81 Low back pain : 56 Physiotherapy department has been part of ICF research since the beginning	To describe physiotherapist's therapy goals and assess effect of intervention, by comparing between physiotherapist's initial assessment and at end according to 6 ICF Core sets of patients' physical impairment in body function and structure and activities and participation. Procedural Knowledge	Percentage of majority of patients had improved or stable results, and improvement was most prominent in the surgical and internal medicine group The ICF category Walking (d450) is frequently treated in all patients group except in ICU and LBP.	None
Jeglinsky et al. 2012 **Finland**	Five Focus Groups Neuro-paediatrics ward at five university hospital Cerebral Palsy	45 Members of multidisciplinary teams Number of physiotherapists in each focus group: 2, 1, 2, 2, 1	Focus group interviews asked about how the ICF-CY was used in rehabilitation planning, procedure, discussed advantages of using ICF-CY. All the participants were conceptually aware of the ICF-CY.	Theme arose from content analysis that ICF not formally used in rehabilitation planning for children with CP.	Limitation: Difficult to use and lack of time

Author **Year of Publication** **Country of Origin**	**Study Design** **Setting** **Health Condition**	**Numbers of Participants** **Number of Physiotherapists** **Years' Experience**	**Intervention** **Level of ICF Knowledge**	**Outcome**	**Benefit of Application of ICF/ICF-CY** **Limitations of Application of ICF/ICF-CY**
Martinuzzi et al. 2010 **Italy**	Pilot prospective study in Paediatric neuro-rehabilitation centre with 40 beds. Complex paediatric neurological conditions.	17 Paediatric neuro-rehabilitation teams 3 Physiotherapists Inclusion criteria: attended basic & advanced ICF training, 3 years of experience of use of ICF in clinical setting.	Introducing a format based on the ICF-CY conceptual framework in goal definition, process analysis, and outcome evaluation. After 12 months, questionnaire was completed to evaluate utility, clarity and timing of proposed format using 7-point scale. and one open question regarding participants' comments. Procedural Knowledge	All reported positive judgment in effectiveness and targeting intervention,. Also, clarity in use of ICF codes and qualifiers had positive judgment, Time allotted workload (30 min).	Participants' comments indicated that proposed format gave them opportunity to involve children's families in setting goals. Reported difficulties in accommodating the proposed format in their daily programme.
McDonald et al. 2007 **UK**	Questionnaire developed Community-Based Children with severe CP	32 Local therapists (Occupational therapists & PT). 36 Parents of children with CP	Similar questionnaire developed for parents/therapists - like and do not like about seating system. Then keyword analysis content was mapped to ICF domains. Factual Knowledge	Environmental and personal factors most tangible reasons for both therapists and parents to like or dislike seating system.	None

Author **Year of Publication** **Country of Origin**	**Study Design** **Setting** **Health Condition**	**Numbers of Participants** **Number of Physiotherapists** **Years' Experience**	**Intervention** **Level of ICF Knowledge**	**Outcome**	**Benefit of Application of ICF/ICF-CY** **Limitations of Application of ICF/ICF-CY**
Pless et al. 2009 **Sweden**	Quasi-experimental Child & Youth Rehabilitation centre No Specific Health Condition	Attended training: 115 One year after training: 113 remained. Number of physiotherapists: 23 Mean years of work experience: 15	Same in-service training given in Adolfsson et al. (2010) study to evaluate changes over time in application of ICF-CY in therapists' daily work. 2 similar questionnaires answered Q1: 2 months prior to training. Q2: one year after training to compare between therapists who attended & used ICF & therapists who attended and did not use ICF. Conceptual Knowledge	After training mean difference was significant only in assessment "what the child does in his own environment at home or in school" of activity statement in favour of the group who attended and used ICF.	Therapists who reported that they used the framework seemed to focus more on assessing the child in relation to performance of activities in everyday environment than those who did not use the framework.

Author Year of Publication Country of Origin	Study Design Setting Health Condition	Numbers of Participants Number of Physiotherapists Years' Experience	Intervention Level of ICF Knowledge	Outcome	Benefit of Application of ICF/ICF-CY Limitations of Application of ICF/ICF-CY
Soberg et al. 2008 **Norway**	Prospective cohort study Community-based Severe multiple injuries	66 Patients with multiple injuries. 76 rehabilitation providers including physiotherapists.	Structured interview of patients about most important recent and future rehabilitation goals. Questionnaire with open-ended questions to rehabilitation providers about their respective patients' problems, resources short &longer term goals? The raw text materials were transcribed of rehabilitation goals from professional questionnaires patients and interviews. Then Linking rules developed for linking descriptions of functioning to the ICF categories were applied using Second-level categories. Conceptual Knowledge	The statistical difference between the patient and the professionals' goals showed that the professionals reported significantly more goals related to musculoskeletal functions/structures & fewer goals concerning interpersonal interactions/relationships work/education & recreation/leisure than the patients.	None

Author Year of Publication Country of Origin	Study Design Setting Health Condition	Numbers of Participants Number of Physiotherapists Years' Experience	Intervention Level of ICF Knowledge	Outcome	Benefit of Application of ICF/ICF-CY Limitations of Application of ICF/ICF-CY
Franki et al. 2014 **Belgium**	Exploratory studies (Validity & reliability) Experts structure meeting Ambulant children with CP	For validity: 4 expert PPTs For reliability: 25 PPTs For validity: 10 Years For Reliability: 3years & above	3 steps of validation & reliability testing clinical reasoning framework based ICF+ HOACII 1- Develop then define list of main problems and treatment goals of children with CP. 2- Expert meeting: introduce clinical reasoning framework & two case studies presented, then PPTs asked to determine numbers of main problems and goals. 3- 2 days Seminar: introduced clinical reasoning framework & 8 case studies presented, then after each case presented, PPTs asked to determine 3 numbers of main problems and 8 goals setting. Factual Knowledge	Step 1: organised assessment of children with CP within ICF domains, then hypothesis why problems existed and rationale behind at all levels of ICF. Step 2: therapists agreed maximum number of main problems identified per child should be three, and eight goals could be selected. Step 3: Cluster analysis revealed a logic connection between therapists' identification of main problems & specific goal parameters.	Benefits: The selected goals were directly derived from the definition of main problems. In all children, a direct relation could be noticed between the main problems and the most frequently selected goal.

Author Year of Publication Country of Origin	Study Design Setting Health Condition	Numbers of Participants Number of Physiotherapists Years' Experience	Intervention Level of ICF Knowledge	Outcome	Benefit of Application of ICF/ICF-CY Limitations of Application of ICF/ICF-CY
Sivan el al. 2015 **UK**	Qualitative (semi-structure interview) Home-based rehabilitation Stoke with arm weakness	9 patients with arm weakness & their carers 2 Occupational therapists 4 physiotherapists Years of Experience: 5 years of working with stoke.	Three stages: 1- Interview process, topics asked: therapy received after stroke, type of arm exercise, home arm exercises, functional activities goals, Information Technology skills & computer games, perceptions on home-based technology& comparison to hands-on conventional therapy. 2- Extraction interview concept, linking concepts that describe the health condition, person, functional activity or any of the environmental factors. 3- Matching interview concepts to comprehensive ICF Core Set for Stroke Conceptual Knowledge	Most meaningful concepts were linked to relevant ICF Core Set category(s). Type/time of stroke & side of weakness were assigned related to health condition, 14 concepts were assigned to personal factors, and one concept (usage of affected arm) was assigned as not covered. One concept related to Quality of life.	Benefit: ICF Core Set for stroke can be used as a tool to understand the critical problems or needs of stroke survivors, also, help in the development of an inclusive technology that meets needs of both therapists and patients. Limitation: Lack of personal factor categories within the ICF comprehensive core set for stroke impact, to determine how much the technology will appeal to or motivate the therapists or patients, and determine the extent of engagement of the patients or therapists.

2.5.3 Risk of bias in included studies

Risk of bias was assessed, and sources of bias were identified pre-data collection, during data collection and after the data collection phase. Table 2.3 presents a summary of the sources of bias for the 12 studies included in the review.

Before Data Collection

Channelling bias was observed in three studies (Adolfsson et al., 2010; Andrea Martinuzzi et al., 2010; Pless et al., 2009). The sources of bias detected in Pless et al. (2009) and Adolfsson et al. (2010) were a lack of participants' inclusion criteria and the selection of convenience sampling. A potential source of *channelling* bias was observed in the use of convenience sampling involving rehabilitation directors who had expressed an interest in using the ICF-CY. Additionally, it is not clear whether the content of in-service training focused on transferring ICF and/or ICF-CY knowledge to day-to-day work. Apart from this, the authors stated that in-service training lacked the criterion of "training in what?". In Martinuzzi et al. (2010), questionnaire items were limited to testing the impact of introducing a ICF-CY form including patient assessments, defining problems, setting goals and planning treatment for paediatric neuro-rehabilitation teams over 12 months. The questionnaire addressed three constructs: utility, timing and clarity. However, single-item measures were used for each construct, thereby preventing an assessment of reliability. For example, the utility item was "The proposed format will improve effectiveness and targeting of my intervention." However, the proposed format looked at four decision-making processes, not just intervention.

During Data Collection

Sources of bias during data collection were attrition, performance, misclassification and interview procedures.

Attrition bias was seen in Pless et al. (2009) who do not provide an adequate description of the reasons for attrition in this 12-month study. Attrition bias was also observed in de Oliveira Andrade et al. (2011). Neither de Oliveira Andrade et al. (2011) nor Pless et al. (2009) describe treatment effects arising from missing data for health professionals who were not followed up in their data analysis. Moreover, in Huber et al. (2011), it is not clear how many participants were recruited and found eligible from the total number of patients.

Performance Bias Huber et al.'s (2011) study was conducted in the physiotherapy department at the University Hospital in Zurich, which has been part of ICF since its inception and ICF core sets have been continually used for assessing patients. This may have influenced the study results, in that they already had an understanding that the ICF model helps physiotherapists in acute care hospitals to demonstrate treatment goals and treatment results.

Holmberg and Lindmark's (2008) study does not illustrate the ICF linking process for data collection of the physiotherapists' interview, which aims to explore physiotherapy goals and the method of assessment for patients with traumatic brain injury. In McDonald et al. (2007), they do not clearly define the ICF linking process to the priorities of parents and physiotherapists regarding the adaptive seating systems for children with CP.

Misclassification Bias Three studies (Soberg et al., 2008; Huber et al., 2011; Franki et al., 2014) have *misclassification* bias in the identification of treatment goals based on the ICF model, along with the potential for missing relevant information. In Soberg et al. (2008), for example, the professionals' goals reported include three ICF components: body function/structures, activities and participation, and environmental factors. However, data are only analysed for body function/structures, activities and participation-reported goals. Franki et al. (2014) had a source of bias during data collection from the *misclassification* of ICF components identifying patient problems. It is clearly implied from the decision tree they developed that problems identified by physiotherapists included body structure, function and activity. Problems identified by patients included participation, personal and environmental factors. While, children's main problems and treatment goals were only focused problems identified by physiotherapists in the decision tree.

After Data Collection

Confounding factors A major source of bias identified was the role of confounding during assessment of the ICF between integration of the ICF and the decision-making process. For instance, some studies did not integrate the five ICF domains in goal-setting or problem identification. In Pless et al. (2009), confounding factors were present in the association of outcomes of the two participant subgroups. Participants had agreed to participate in the study after their employer informed them about the project, so it should be borne in mind that this is not the same as members of a team, or an employer, having decided to use the framework in their daily work after training.

The confounder detected in Franki et al. (2014) was that child/parent-identified problems were neither explained in children's assessment results, nor was there any validation or reliability testing of the clinical reasoning form. This study clearly showed that use of the ICF model was fragmented and only body function/structures and activities were integrated into the clinical reasoning process. The confounder in Adolfsson et al. (2010) was identified as similar to that in Pless et al. (2009), wherein the participants agreed to participate in the study after their employer informed them about the project; again, this is not equivalent to members of a team or an employer having decided to use the framework in their daily work after training.

Internal Validity In Pless et al. (2009), there is no clear definition or validation of the questionnaire, which could be an important source of bias, raising questions about the *validity and reliability* of the measured outcome. In Holmberg and Lindmark (2008) and Sivan et al. (2014), the validation of results of mapping the ICF to clinical reasoning by each group is not identified, which could have influenced the accuracy of the studies. In Jeglinsky et al. (2012), it is not clear how the ICF-CY is used in rehabilitation planning and goal-setting for children with cerebral palsy, as the data were solicited from a focus group. The study results showed that five focus groups were aware of the concept of the ICF-CY model, which implies that the participants' ICF knowledge and ICF education tool had been used.

Table 2.3. Source of Bias in Studies Meeting the Inclusion Criteria

Author, Year of Publication	**Before Data collection**	**During Data Collection**	**After Data Collection**
Adolfsson et al., 2010	Channelling bias		Confounding (assessment of ICF integration)
de Oliveira Andrade et al., 2011		Attrition bias	Confounding (assessment of ICF integration)
Fradette et al., 2011		Performance bias	
Franki et al., 2014		Misclassification (outcomes)	Confounding (assessment of ICF integration)
Holmberg and Lindmark, 2008		Performance bias	Confounding (assessment of ICF integration)
Huber et al., 2011		Performance bias, attrition bias, misclassification (clinical reasoning)	Confounding (association between ICF integration and decision-making process)
Jeglinsky et al., 2012		Interview bias	
Martinuzzi et al., 2010	Channelling bias		Confounding (assessment of ICF integration)
McDonald et al., 2007		Performance bias	Confounding (assessment of ICF integration)
Pless et al., 2009	Channelling bias	Attrition bias	Confounding (ICF integration)
Sivan et al., 2014		Performance bias	Confounding (assessment of ICF integration)
Soberg et al., 2008		Performance bias, attrition bias, misclassification (ICF integration)	Confounding (association between ICF integration and decision-making process)

Q1: How and in what ways is the ICF used for clinical reasoning in physiotherapy practice?

All twelve articles in this review identified specific aims to integrate the ICF/ICF-CY into clinical practice. In nine of these, the ICF/ ICF-CY educational programmes for researchers or participants was delivered before the integration of the ICF/ICF-CY model in the decision making process (see Table 2.2 for details) (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Franki et al., 2014; Huber et al., 2011; Martinuzzi et al., 2010; Pless et al., 2009; Soberg et al., 2008; Fradette et al., 2011; Sivan et al., 2014).

2.5.4 ICF/ICF-CY Education-based Programmes

The in-service training was delivered in five studies, before the application of the ICF/ICF-CY in the decision-making process in practice was evaluated (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Franki et al., 2014; Pless et al., 2009; Soberg et al., 2008). In three studies, the authors examined ICF-DIN (Disability Italian Network) basic and advanced courses, both courses being part of the European project for Measuring Health and Disability in Europe (Adolfsson et al., 2010; Pless et al., 2009; Martinuzzi et al., 2010). ICF and ICF-CY in-service training for rehabilitation staff was developed and piloted using a quasi-experimental pre-post design in one study (Pless, et al., 2009) and questionnaires were used to assess changes in the ability of particpants to apply the ICF-CY to daily practice following training in another study (Adolfsson et al., 2010). In Martinuzzi et al. (2010), the inclusion criteria for participants were only those who had attended basic and advanced ICF training and had acquired at least three years of clinical experience in applying the ICF.

In Huber et al. (2011), data were collected in the physiotherapy department as part of an ICF research project. Other studies focused on self-study of the ICF manual, with one using the ICF manual to guide coding systems in the decision-making process (Fradette et al., 2011; Sivan et al., 2014). In Soberg et al. (2008), the two raters had training in the coding procedure before linking patients' goal-setting to ICF classification.

2.5.5 Application of the ICF/ICF-CY in physiotherapy practice

All twelve studies reported sufficient data about the application of the ICF/ICF-CY in the decision-making process, for either assessment, goal-setting, defining problems or intervention in practice. Five studies examined which of the ICF domains were considered in therapists' decision-making processes in practice using the ICF linking rule (Fradette et al., 2011; Holmberg and Lindmark, 2008; McDonald et al., 2007; Sivan et al., 2014; Soberg et al., 2008). In McDonald et al. (2007), parent and therapist questionnaires explored their point of view regarding using adaptive seating systems for children with severe cerebral palsy. Then their responses were content-analysed to identify ICF domains. Additionally, in Holmberg & Lindmark (2008), thematic analysis was used to identify ICF domains expressed within five focus groups, wherein physiotherapists discussed goal-setting, assessment tools and treatment plans in each phase of traumatic brain injury rehabilitation.

Application of the ICF/ICF-CY in the decision-making process in practice was evaluated in seven studies (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Jeglinsky et al., 2012; Martinuzzi et al., 2010; Pless et al., 2009; Huber et al., 2011; Franki et al., 2014).

In de Oliveira Andrade et al. (2011), the participants first received three hours of ICF in-service training to understand how to apply ICF conceptual knowledge, while the relevant ICF code set for cerebral palsy was identified for them. Before training, 18 therapists completed semi-structured questionnaires to identify items for assessing CP functioning, linking their answers to ICF conceptual knowledge. After training, only eight therapists completed a structured questionnaire selecting items in the first, second and third levels of ICF categories for comprehensive evaluation of CP. Huber et al. (2011) used physiotherapist documentation to examine the most frequently treated ICF core sets in physiotherapy for patients in acute hospitals both initially and post-discharge. In Jeglinsky and colleagues (2012), a 5-focus-group design was used to understand how the ICF-CY could be applied to rehabilitation, planning and goal-setting for children and adolescents with cerebral palsy. Martinuzzi and colleagues (2010) evaluated the impact of introducing the ICF-CY format, which guided paediatric neurology rehabilitation teams during assessment, goal-setting, outcomes evaluation and the decision-making process. After 12 months, the teams completed a questionnaire that assessed the utility, workload and clarity of the ICF-CY format. Only one study evaluated the reliability and validity of developing a clinical reasoning tool based on the ICF framework. This study involved the use of a Hypothesis-Oriented Algorithm for Clinicians (HOAC-II) (Franki et al., 2014). The authors developed a decision tree which included “non-patient-identified problems” addressing body structure, function and activities. “Patient-identified problems” were also included in the decision tree to gather information from patients on participation, personal and environmental factors.

The decision tree was developed to generate a hypothesis for why each problem exists and to set goals to address each problem and refine a clinician-developed list of main problems. Three steps were followed to test the validity and reliability of the decision tree. First, the authors defined a list of main problems and main treatment goals for ambulant children with CP. The second step included a validation study, where four expert physiotherapists were given two case studies and applied the decision tree to each one. The third step's reliability was assessed by searching for agreement between the 25 therapists in terms of the main problems identified and the treatment goals each one identified based on decision tree.

2.5.6 Outcome Measures Application of the ICF/ICF-CY

The most frequently used subjective outcome measures include questionnaires, focus groups and interviews. Franki et al. (2014) and Huber et al. (2011) used measures based on judgements made by physiotherapists. Franki et al. (2014) used both a case-study assessment tool for children with CP and a short video of children walking, with a section on GMFM (Gross Motor Functional Movement). Then, the physiotherapists identified the most frequently occurring main problem and specific goals for ambulant children with CP. Huber et al. (2011) assessed patients' records which reported improvement, stability or deterioration using the most common ICF Core set used by physiotherapists for initial physiotherapy treatment as well as after discharge.

2.5.7 Benefits and Limitations of Application of the ICF/ICF-CY

The benefits and limitations of the application of the ICF/ICF-CY to the decision-making process within physiotherapy practice were considered in several studies.

Five studies indicated that the application of ICF/ICF-CY categories facilitates the organization of data collection including content and thematic analysis of qualitative results (Fradette et al., 2011; Holmberg and Lindmark, 2008; McDonald et al., 2007; Sivan et al., 2014; Soberg et al., 2008). Fradette at al (2011) identified the factors influencing treatment decisions for infants presenting with torticollis and matched them to ICF-CY domains. Their results indicated that all domains are required for all presenting infants. Sivan et al. (2014) conducted semi-structured interviews with patients with stroke who had arm-movement difficulties, and physiotherapists and occupational therapists from local stroke services. Then, they matched the content of interviews with the ICF core set for stroke. They identified that only health condition, functional activity and environmental factors were considered for a potential home-based rehabilitation device for self-managed arm exercises. It was suggested that this information can be used to understand critical problems and the needs of stroke survivors. This in turn will help to develop a home-based rehabilitation device to facilitate self-managed arm exercise in order to meet both therapists' and patients' needs.

Holmberg and Lindmark (2008) interviewed physiotherapists about their assessment, treatment and outcome measures used for patients with traumatic brain injury in acute inpatient and subsequent home-based phases. Then, they coded interviews to identify ICF domains, ICF categories and sub-categories expressed within interviews. This study indicated that physiotherapists' goal-setting for all stages of patients with traumatic brain injury is related to all ICF components, except body structure. The assessment methods used and directions of treatment were mostly related to body function components, except for home-based treatment, which was related to environmental factors. Soberg et al.’s (2008) results showed significant discrepancies between the goals identified by professionals and the goals of patients with multiple injuries. Professionals identified a significantly greater number of goals related to musculoskeletal functions/structures, whereas patients identified significantly more goals related to interpersonal interactions/relationships, work/ education, and recreation/leisure.

Three studies described changes over time in the application of the ICF/ICF-CY to the decision-making process in practice (Adolfsson et al., 2010; Martinuzzi et al., 2010; Pless et al., 2009). The provision of ICF and ICF-CY in-service training resulted in an increase in the multidisciplinary team’s belief in the importance of measuring the child’s functioning within his/her environment at home or school. Therapists who reported that they used the framework were able to demonstrate more focus on assessing the child in relation to the performance of activities in his/her environment, compared to those who did not use the framework.

Also, Adolfsson et al.’s (2010) participants reported that, one year after training, the assessment of rehabilitation planning, intervention and evaluation of the child was formulated according to the ICF-CY model. Then two and a half years after training, participants reported that the ICF-CY was being used for the assessment of writing goals. Also, they developed rehabilitation planning for children with two ICF-CY based brochures: one for parents and one for youths.

Martinuzzi et al. (2010) indicated that a year after introducing the ICF-CY format there was a change in judgements of its effectiveness and clarity in the use of ICF codes and qualifiers in practice. Participants reported that the proposed ICF-CY format gave them an opportunity to involve children's families in goal-setting.

Franki et al. (2014) used cluster analysis to examine the relationship between the selection of a pain problem and the nature of subsequent goal-setting. The analysis reveals a logical connection between the selection of muscle weakness as a main problem and a specific goal parameter. In all children with CP, a logical direct relationship was identified between the main problem and the most frequently selected goal.

The limitations associated with ICF application during the decision-making process in practice were identified by four studies. Three studies suggested that educating clinicians about the ICF is time-consuming and there was a lack of the adoption of a standardized ICF curriculum (Adolfsson et al., 2010; Martinuzzi et al., 2010; Pless et al., 2009). Further, a lack of tools for assessment, intervention and standard outcomes relevant to the five ICF domains may hinder its application. Sivan et al. (2014) also highlighted the importance of personal factors categories in the ICF Core Set for stroke patients to determine patient perceptions, self-efficacy and belief in therapy. They note that these factors may influence patients' motivation and engagement with therapy.

Five of the mentioned studies (40%) (Fradette et al., 2011; Holmberg and Lindmark, 2008; McDonald et al., 2007; Sivan et al., 2014; Soberg et al., 2008) mapped the ICF onto the data collection to understand whether decision-making processes in relation to assessment, goal-setting, patients' problems or intervention in practice considered all ICF domains.

Six studies (50%) (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Jeglinsky et al., 2012; Martinuzzi et al., 2010; Pless et al., 2009; Huber et al., 2011) examined the application of ICF knowledge to decision-making processes in practice and acknowledged the usage of the ICF in clinical practice by healthcare professionals. However, only one study evaluated the reliability and validity of developing a clinical reasoning tool based on the ICF framework (Franki et al., 2014).

Q2: Does using the ICF framework change the clinical thinking process in physiotherapy practice?

Application of the ICF/ICF-CY to understand the decision-making process in physiotherapy practice was subject to high levels of heterogeneity and variation in the methods for outcome measurement. The studies included in this review provided limited evidence to answer questions regarding how and in what ways the ICF is used as a clinical reasoning tool in physiotherapy practice. Also, it is not clear from these studies whether using the ICF can change the clinical thinking processes of physiotherapists in practice. Application of the ICF/ICF-CY model as a clinical reasoning tool was not described in detail in the published reports. Many of these studies trained researchers or participants to target ICF/ICF-CY knowledge before integrating the ICF into the decision-making process (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Fradette et al., 2011; Franki et al., 2014; ; Martinuzzi et al., 2010; Pless et al., 2009; Sivan et al., 2014; Soberg et al., 2008).

In the reliability and validity tests for the ICF decision making tree developed by Franki et al. (2014), it is unclear whether the researchers and participants attended ICF/ICF-CY in-service training. The data presented by Franki et al. (2014) indicated that the moderate agreement between the main problems and goal-setting might be as a result of therapists not being sufficiently trained in using the ICF clinical reasoning tool.

The level of integration of ICF knowledge into clinical thinking processes for each study is shown in Table 2.4. These levels of integration predominantly focused on the congruence between the objectives of using the ICF/ICF-CY in practice, the researchers/participants' ICF-based education, and the assessment of ICF integration in the decision-making process in practice. One study was excluded (Jeglinsky et al., 2012) because it only reported participants' awareness of the benefits of applying the ICF to rehabilitation planning and goal-setting for cerebral palsy; they did not use the ICF model in rehabilitation planning for children with cerebral palsy and their level of ICF knowledge was not described.

Table 2.4. Degree of Alignment between ICF integration Components

Author, Year of Publication	Integration of ICF Knowledge with Professional Clinical Thinking Process			
	Objectives of ICF Integration	**Researchers/ Participants ICF-based Education Programme**	**Outcomes Measuring Decision-making process**	**Level of Integration**
Adolfsson et al., 2010	✓	✓	✓	Strong
de Oliveira Andrade et al., 2011	✓	✓	✓	Strong
Fradette et al., 2011	✓	✓	✓	Strong
Franki et al., 2014	✓	✓	✓	Strong
Holmberg and Lindmark, 2008	✓	×	×	Weakest
Huber et al., 2011	✓	✓	✓	Strong
Martinuzzi et al., 2010	✓	✓	✓	Strong
McDonald et al., 2007	✓	×	×	Weakest
Pless et al., 2009	✓	✓	✓	Strong
Sivan et al., 2015	✓	✓	×	Weak
Soberg et al., 2008	✓	✓	✓	Strong

Strong indicates strongest alignment: Objective of ICF integration, ICF-based Education and outcomes measuring ICF integration in decision making process in practice all presented

Weak: indicate weak alignment: outcomes measuring ICF integration to decision making process not presented.

Weakest: indicate weakest alignment: ICF-based Education &outcomes measures

ICF integration in decision making process not presented

The theoretical basis of Bloom's Taxonomy is provided in Table 2.5, which shows the degree of integration of ICF/ICF-CY knowledge within the process of thinking for each study. All the studies reported data on integrating different levels of ICF/ICF-CY knowledge into the clinical thinking process in physiotherapy practice. They identified the ICF as being related to the aim of integration, which improves through stages, from being aware of the ICF/ICF-CY classification of functioning and disability, through linking the ICF/ICF-CY knowledge to decision-making processes by researchers, application of the ICF/ICF-CY in the decision-making process, and finally adopting the integration of the ICF/ICF-CY model as a clinical reasoning tool during the decision-making process (see Table 2.5).

Five studies link or map ICF/ICF-CY knowledge onto data on clinical decision-making processes (Fradette et al., 2011; Holmberg and Lindmark, 2008; McDonald et al., 2007; Sivan et al., 2014; Soberg et al., 2008). The level of integration is weakest in two of the studies (Holmberg and Lindmark, 2008; McDonald et al., 2007) as the authors' ICF-based education programmes were not reported; and in Sivan et al. (2014), ICF linking rule results are not reviewed for accuracy.

The level of integration is indicated as strong in six studies that examined application of the ICF and its impact on the clinical-thinking process (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Martinuzzi et al., 2010; Pless et al., 2009; and Huber et al., 2011). Only one study showed how the ICF-CY model might be used as a clinical reasoning tool (Franki, et al., 2014). The distribution of studies in Table 2.5 clearly showed the progression in changes to the clinical-thinking process for physiotherapy practice that might be promising for the use of the ICF/ICF-CY as a clinical reasoning tool.

Table 2.5. Theoretical Basis of Bloom's Taxonomy in Analysis of the Integration of ICF Knowledge into the Clinical Thinking Process

Levels of ICF Knowledge	Adolfsson et al., 2010	de Oliveira Andrade et al., 2011	Fradette et al., 2011	Franki et al., 2014	Holmberg &Lindmark, 2008	Huber et al., 2011	Martinuzzi et al., 2010	McDonald et al., 2007	Pless et al., 2009	Sivan et al., 2015	Soberg et al., 2008	Clinical thinking Process
Factual Knowledge[1]												**Remember[5]**
					✓			✓				**Understand[6]**
												Apply[7]
												Analyse[8]
	✓✓✓								✓✓✓			**Evaluate[9]**
				✓✓✓								**Create[10]**
Conceptual[2] Knowledge												**Remember[5]**
			✓✓✓								✓✓✓	**Understand[6]**
		✓✓✓										**Apply[7]**
												Analyse[8]
												Evaluate[9]
												Create[10]

Levels of ICF Knowledge	Adolfsson et al., 2010	de Oliveira Andrade et al., 2011	Fradette et al., 2011	Franki et al., 2014	Holmberg &Lindmark, 2008	Huber et al., 2011	Martinuzzi et al., 2010	McDonald et al., 2007	Pless et al., 2009	Sivan et al., 2015	Soberg et al., 2008	Clinical thinking Process
Procedural Knowledge[3]												**Remember[5]**
										✓✓		**Understand[6]**
												Apply[7]
						✓✓✓						**Analyse[8]**
							✓✓✓					**Evaluate[9]**
												Create[10]
Metacognition Knowledge[4]												**Remember[5]**
												Understand[6]
												Apply[7]
												Analyse[8]
												Evaluate[9]
												Create[10]

Remember: Retrieve ICF knowledge from long term memory, **Understand:** Mapping assessment, problems, goals and intervention to each part of the ICF knowledge, **Apply:** Being able to implement the ICF knowledge

Analyse: Infer point of view underlying application of the ICF knowledge, **Evaluate:** Making judgments based on criteria and standards. **Create:** Reorganising the ICF knowledge together in the form of a structure that functions as whole.

Factual Knowledge: General idea about the ICF terminology. Classify function and disabilities based on: The ICF has two parts, each with two components: *Part 1*: Functioning and Disability: a) Body Functions & Structures; b) Activities and Participation *Part 2:* Contextual Factors : c) Environmental Factors d) Personal Factors,

Conceptual Knowledge: Interrelationships among ICF theories, model and structures. Classify function and disability based on: Each component consists of various chapters and, within each chapter, categories, which are the units of classification.

Procedural Knowledge: How ICF conceptual knowledge transfers into clinical practice.

Metacognition Knowledge: Develop general strategies based on ICF factual knowledge and use in different tasks and conditions.

✓✓✓: indicate strongest alignment- Objective of ICF integration, ICF-based Education and outcomes measuring ICF integration in decision making process in practice all presented

✓✓ : indicate weak alignment- outcomes measuring ICF integration to decision making process not presented.

✓ : indicate weakest alignment- ICF-based Education & outcomes measuring ICF integration to decision making process not presented.

2.6 Discussion

This systematic review has investigated how the ICF is used as a clinical-reasoning tool in physiotherapy, and whether using this ICF knowledge improves the clinical-thinking process in the practice of physiotherapy. This section summarises and discusses the main findings, relates the results to published reviews of the ICF-related literature, presents a methodological critique, and highlights the implications of this study for practice. While introducing a number of new aspects, this systematic review differs from those reported in the literature in two key respects.

This is the first systematic review of the ICF and ICF-CY to focus on use of the ICF in the clinical decision-making process in physiotherapy practice. Second, Bloom's taxonomy of learning, teaching and assessment was used for further evaluation of the included studies to identify changes in the clinical-thinking process as a result of using the ICF framework. Further, an assessment of the level of congruence among study objectives, participants' and/or researchers' ICF knowledge, and outcome measures for decision making process to determine how the ICF model was used as a clinical reasoning tool was also undertaken.

2.6.1 Summary and discussion of main findings

Bloom's taxonomy was used for further analysis to answer two research questions: how and in what ways the ICF is used as a clinical reasoning tool in physiotherapy practice. Also, does using the ICF can change the clinical thinking processes of physiotherapists in practice, to provide evidence of how the integration of ICF knowledge into the clinical-thinking process is progressing.

Using Bloom's Taxonomy could help physiotherapists to better understand clinical problems, enhance their use of ICF knowledge, and propagate change within clinical-research protocols. The majority of reviewed studies describe ICF knowledge being integrated into clinical-thinking processes at different levels. However, this review identified only one study that empirically examined the use of the ICF as a clinical-reasoning tool in physiotherapy practice (Franki, et al.,2014).

Most of the included studies reported the ICF-based education of researchers or/and clinicians. However, application of the ICF model to physiotherapy practice is inconsistent, and the consideration of environmental and personal factors in decision-making behaviours is neglected. This is rather than supporting the concept that treatment is only for impairment or activities limitation problem. While, the generation of different hypotheses and the strategies set for treatment across ICF components emphasized treating patients' presenting functional problems and environmental and personal barriers.

2.6.2 Integration of the ICF model as a clinical-reasoning tool into physiotherapy practice

Bloom's Taxonomy was used to examine application of the ICF/ICF-CY model in clinical thinking for physiotherapy. The balance between the aims of utilizing ICF knowledge in the decision-making process, ICF-based education, and measuring outcomes of utilizing ICF knowledge in the decision-making process is an important theme. The interaction between these three elements enables the clarification of physiotherapists' clinical reasoning based on a model of ICF knowledge.

The results of this review are similar to three previous narrative reviews (Bornbaum et al., 2015; Jelsma, 2009; Allet et al., 2008), in that, the variation in the application of ICF knowledge to the decision-making processes in physiotherapy may explain some of the apparent inconsistencies in study findings.

Also, variations in the definition and utilisation of the ICF across research papers reveal the difficulties in establishing a universal method of application in practice. A good example of this inconsistency is Jeglinsky et al.'s (2012) study. The aim of this study was to understand the application of ICF-CY knowledge in rehabilitation planning and goal-setting for children and adolescents with cerebral palsy. However, the participants were only aware of the ICF model; they did not have a sufficient depth of understanding of ICF knowledge, and thus were not able to transfer their ICF knowledge into clinical practice.

Furthermore, review findings indicated that inappropriate use of ICF knowledge may result in a misunderstanding of the ICF's complexity, especially regarding the interaction between the five ICF domains. The findings of this review suggest that physiotherapy practice has neglected environmental and personal factors in decision-making behaviour. For instance, three studies linked factual or conceptual ICF knowledge to the clinical-thinking process (McDonald et al., 2007; Soberg et al., 2008; Holmberg & Lindmark, 2008). The results of those studies showed that physiotherapists' decision-making processes, methods and assessments largely correspond to the body function and activity components of the ICF, whereas the ICF components for personal or environmental factors are not considered. Also, physiotherapists' methods of treatment concentrate on body function and activity domains, to the exclusion of all other ICF domains.

Physiotherapists reported four ICF components: body function /structures, activities, and participation and environmental factors in their goal setting. The environmental factors component of the ICF is often omitted from goal-setting and thus its importance in the formation of a complete spectrum of care is neglected (Soberg et al., 2008).

Huber et al.'s (2011) study assesses the application of *ICF conceptual knowledge* in physiotherapy practice for patients. The most frequent treatment goals and interventions are integrated into ICF categories that relate to body function/structures, activities and participation. Finally, in a study which used the ICF as a clinical-reasoning tool (Franki et al. 2014), the decision tree developed by the authors made it clear that they use the ICF as a clinical reasoning tool for ambulant children with CP. The non-patient identified problems include body structure, function and activities. Patient-identified problems include participation, personal and environmental factors. Child/ parent-identified problems are not explained in the children' assessment results, neither in the validation of the clinical reasoning form nor in reliability testing. Evidently, this study clearly shows that the use of the ICF model is fragmented and only body function/ structures and activities are integrated into the decision-making process (Franki et al., 2014). Generating hypotheses based on the five domains of the ICF model could be an effective tool to change clinical behaviour in the application of the biomedical model. This process could also facilitate interaction among the five ICF domains, as well as the consideration of environmental and personal factors during decision-making processes. Also, this could help in the identification of child/parent problems, which have previously been neglected when considering the child's main problem.

In addition, some studies report the application of the ICF/ICF-CY after clinicians receive in-service training (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Pless et al., 2009). These studies measured the impact of training on attitudes toward the ICF model in general, theoretical knowledge about the ICF model, and coding skills in everyday situations. The different study designs suggest that longitudinal studies are necessary to demonstrate the steps that have been taken to diffuse ICF/ICF-CY knowledge in rehabilitation practice. Applying ICF and ICF-CY knowledge in the clinical-thinking process in a cross-sectional study can be only viewed as an indicator of integration.

There is a strong dependency on the use of subjective measures when integrating ICF/ICF-CY knowledge into clinical thinking. Many of the studies reviewed could have been improved by using outcome measures that can be objectively validated. Based on the definition referenced by Holdar et al. (2008), as presented in Chapter 1 (Section 1.4.1: definition of clinical reasoning), there is a need to assess three clinical reasoning elements: acquisition of an ICF knowledge base, decision-making behaviour for application on environmental and personal factors, decision-making processes in the ultimate use of the ICF framework in physiotherapy practice.

This review supports the finding of Edward et al., (2004), that using the ICF model as a clinical reasoning tool facilitates decision-making processes based on patient's needs, and offers physiotherapists the ability to consider interactions across the five ICF domains. Interaction between ICF knowledge and clinical thinking is critical for expanding ICF knowledge beyond the limits of ICF terminology, definitions and classifications of functioning and disabilities in order to form an integrated structure that can function as an advanced clinical-reasoning tool. Decision-making processes can be based on the interactions identified between patient difficulties when engaging in specific activities and different life situations and environments (Atkinson & Nixon-Cave, 2011; Darrah, 2008; Edwards & Jones, 2013; Furze et al., 2012; Edward et al., 2004).

Integration of ICF knowledge into clinical-thinking processes may change decision-making behaviour of the application of biomedical knowledge in clinical practice and a simplified implementation of the ICF model. The importance of incorporating the measurement of both knowledge acquisition and behaviour change into ICF-education based programmes might enhance training among users in the ICF as a clinical reasoning tool for physiotherapists to be effective and have a positive impact on the care of patients.

2.6.3 Strengths and Limitations of the Review

This systematic review was designed to overcome a lack of attention to the process of applying the ICF in clinical practice found in previously published reviews (Allet et al., 2008; Bornbaum et al., 2014; Jelsma, 2009). This review proposes training in the ICF model as a clinical-reasoning tool and provides guidance for physiotherapists wishing to integrate ICF knowledge into their decision-making process in clinical practice.

This review included only prospective studies as retrospective studies and secondary data can only be used to characterize processes that are not dependent on concurrent presentation of ICF application. In addition, retrospective studies are not able to investigate the cognitive aspect associated with application of the ICF model (Arocha & Patel, 2008).

However, retrospective studies can reveal the outcome of integrated ICF and clinical thinking when such thinking is applied at the time of enrolment. Also, it may identify important factors that contribute to the interaction between ICF knowledge and clinical thinking by exploring the views and experiences of health professionals.

The search strategy in this review is limited to a computerised search of only seven bibliographic databases, but these multiple databases help ensure the review is not biased due to source selection. However, grey literature was not considered, and contacting local experts regarding unpublished studies or theses was not feasible, so only publications in English were included. As a consequence, there may be other studies on the integration of ICF/ICF-CY models and the decision-making process.

The review did not use study quality or interpret the potential risk of bias in determining whether to include or exclude studies. However, the quality of included studies was assessed.

2.7 Conclusion

Despite the comprehensive literature search, this review has identified only one paper that examined the use of the ICF as a clinical-reasoning tool in physiotherapy practice (Franki et al.,2014). In this review, many studies aimed to apply the ICF in practice, ICF-based education and outcomes from the integration ICF knowledge in practice. One of the barriers for research on using the ICF as a clinical-reasoning tool is that not all the ICF domains are assessed in all the studies and contextual factors are the ones most often neglected. Application of the ICF as a clinical-reasoning tool requires the user to have a strong prior knowledge of the ICF, its structure and terminology, as well as the capacity to describe clinical situations, giving consideration to each of the five domains of the ICF model in their decision-making processes in practice.

Chapter 3

Development, Translation and Testing of Physiotherapist and Parental Questionnaires

3.1 Introduction

This chapter describes the development of two questionnaires designed to assess the impact of an ICF-CY in-service training programme for physiotherapists. One questionnaire was designed to assess physiotherapists' ICF knowledge and the application of the ICF-CY in clinical decision making. The other questionnaire was designed to assess the experience of and satisfaction with physiotherapy management in parents of children with CP. The aim was to develop sensitive and culturally appropriate measures to evaluate the application of the ICF-CY in physiotherapy practice in Saudi Arabia and to assess the impact of an ICF-CY in-service training programme. The translation and piloting procedures used to develop the primary survey questionnaire are described below.

In light of the systematic review reported in Chapter Two, only one study utilised the ICF model as a clinical reasoning tool to define problems and set goals for ambulant children with cerebral palsy (Franki et al., 2014). In addition, not all the ICF domains were considered in the decision-making processes of identifying the problems and defining therapy goals. The environmental and personal factors are often neglected in decision-making processes in physiotherapy practice (Huber et al., 2011, Holmberg and Lindmark, 2008 and Soberg et al., 2008). Consequently, a further review was undertaken to investigate the availability of an appropriate and valid instrument to enable the examination of the application of the ICF in clinical reasoning, using theoretical and clinical based approaches, to provide insight into the cognitive processes involved in clinical reasoning. Furthermore, the instruments would need to contain objective measures, designed to examine the following factors: acquired ICF knowledge, and application of ICF knowledge in decision-making processes through all phases of a continuous cycle of practice. In addition, the instrument would need to examine decision-making behaviour and intention in the application of environmental and personal factors in clinical practice.

In the past 16 years ago, there have been numerous studies that have applied the ICF to physiotherapy and/or in which physiotherapists were dominant participants (see Chapter Two). Several of theses studies examined the application of the ICF model in practice either using case scenarios or self-reported questionnaires. The health professionals' skills in application of ICF knowledge in practice were examined using case scenarios, which were related to functional standard measures familiar to the participants (Franki et al., 2014; Reed et al., 2008). While, self-reported questionnaires are subjective and were developed to assess perceived ICF/ICF-CY knowledge, application of ICF components in assessment, attitudes and beliefs towards the application of the ICF/ICF-CY framework in general (Pless et al., 2009, Reed et al., 2008, Farrell et al., 2007). The evaluative measures used in these studies tended to suffer from lack of structure, lack of standardisation, subjective marking, and/or bias in case selection.

Reed et al. (2008) argue that any assessment of the application of the ICF model needs to be based on Bloom's Taxonomy of educational objectives. This can be done by evaluating therapists' knowledge of the ICF along with their attitudes and beliefs towards application of this knowledge. An assessment of the application of the ICF model should be anchored in case-based material, and presented in a way that takes a physiotherapist through a full data-gathering exercise to develop a treatment plan based on ICF knowledge. The application of the ICF to clinical practice involves more than just the ability to use the ICF to identify clinical problems. It also involves justifying clinical decisions via its application to the development of appropriate and optimal treatment plans that improve patient outcomes. However, none of the instruments are specific for paediatric physiotherapists, and consideration of the role of environmental and personal factors for children with CP is neglected. Furthermore, none of instruments were either developed for, or adapted to be used in, Arab countries including Saudi Arabia. The majority of the instruments reviewed were developed or adapted in different cultures, therefore, there is a clear need to develop an accurate means to assess the use of the ICF as a clinical reasoning tool for paediatric physiotherapy practice, particularly in the area of children with CP in Saudi Arabia. The development of a bespoke instrument for gathering accurate data for this thesis, in order to evaluate the application of the ICF-CY in physiotherapy practice in Saudi Arabia, is described in full detail later in this chapter.

3.2 Assessment of the Application of the ICF Model as a Clinical Reasoning Tool

Based on the reference definition (see Section 1.4.1, Clinical reasoning: a definition p.22), clinical reasoning encompasses both acquired ICF knowledge, physiotherapists' attitudes and beliefs vis-à-vis application of the ICF in clinical practice, and their decision-making processes that operate through all phases of the continuous cyclic process of gathering relevant information to develop a treatment plan (Holdar et al., 2013). All of these components must be assessed concurrently.

Current understanding suggests that clinical reasoning is not an entirely separate skill but rather something which develops with training and experience, and therefore it cannot be measured independently of relevant content knowledge (Higgs et al., 2008). Clinical reasoning appears to be highly dependent on stores of knowledge, the process of clinical thinking while applying that knowledge, and the decision-making that a therapist utilizes in putting knowledge into clinical practice (Higgs et al., 2008). Each of these aspects, such as pertinent knowledge, the process of clinical thinking and clinical decision-making will now be explored from an assessment perspective.

3.2.1 Assessment of ICF Knowledge

To ensure that professionals use the ICF framework correctly, they must have a basic knowledge of its content and understand how to apply it in clinical practice in order to develop and implement treatment plans (Reed et al., 2008). There are no published formal assessments of ICF-related knowledge and no standardization in the tools for assessment of the ICF in the literature; rather, they vary with each study. Rating scales, Multiple Choice Questions (MCQs**)** and true/false questions have been used to evaluate ICF knowledge and coding skills (Reed et al., 2008; De Oliveira Andrade et al., 2011; ICF research branch of the Swiss Parapalgic Rehabilitation Centre). This thesis adopts a method similar to that used in the ICF workshop of the ICF research branch of the Swiss Parapalgic Centre (2013), i.e. it utilizes a pre-and-post survey method.

This survey assesses the self-reported ICF knowledge and comprises 20 questions that assess the ability to describe and explain the application of the ICF in clinical practice. Similarly, a large survey of Canadian occupational therapists assessed types of ICF knowledge, how this knowledge was acquired and suggestions for preferred methods to learn about the ICF (Farrell et al., 2007).

A majority (70%) of respondents reported that they were aware of the ICF, though only a minority (29%) reported using it in practice. Eighty-nine per cent of participants were interested in learning more about the ICF and suggested learning through live workshops, newsletters and online content, and some participants requested information about using the ICF in daily practice due to a lack of in-depth knowledge and experience in using the ICF framework in occupation therapy in Canada.

3.2.2 Assessment of decision-making using clinical vignettes

Clinical vignettes have been used to assess decision-making and serve several purposes: building a rapport with respondents, eliciting information about general attitudes and beliefs held by respondents, and comparing perceptions between groups (Barter & Renold, 1999). Also, an authentic professional situation is typically used for assessment of clinical decision-making, usually in the form of a simulation representing a professional situation and using a case scenario (Van der Vleuten et al., 2008).

In the physiotherapy literature, Rutten et al. (2006) assessed the criteria used for the validity of guideline adherence for non-specific lower back pain by comparing clinical paper-and-pen vignettes and semi-structured treatment-recording forms as indicators of adherence in physiotherapy.

Three vignettes were used and deemed to represent an adequate case-mix; the vignettes described one patient with specific lower back pain, one with non-specific lower back pain and a normal recovery process, and one with non-specific lower back pain and a delay in the recovery process. Thirty-four physiotherapists completed the study. There was a significant correlation between the mean adherence measured by case vignettes and that by semi-structured treatment recording forms, though the effect size was small.

In addition, Franki and colleagues (2014) assessed the validity and reliability of a clinical reasoning-tree tool. This was designed to identify patients' main problems and set goals for children with CP. For validity testing: first, a proposed clinical-reasoning tree was introduced, and then a case study was demonstrated. After this, four expert paediatric physiotherapists were given an assessment of another child and asked to use the approach presented to identify the main problems and treatment goals. The expert therapists identified three key problems and eight treatment goals, which would form the basis for subsequent reliability testing of the decision tree. For reliability testing: 22 physiotherapists completed eight case studies of children with CP and the level of agreement in three main problems defined by therapists was low to moderate. While, in all children, there was logic association between most frequently selected main problems and most frequently selected goals. The decision tree seemed to guide therapist's clinical reasoning in way that specific goals were directly derived from the definition main problems.

3.2.3 Theory-based approach to the application of environmental and personal factors

Understanding how ICF knowledge can be applied in the decision-making process requires an understanding of Paediatric Physiotherapists' (PPTs) attitudes and beliefs about the application of environmental and personal factors in the management of children with CP.

One model that can explain PPTs' behaviour in clinical practice is the Theory of Planned Behaviour (TPB) (Chapparo, 1999). The TPB was developed from the Theory of Reasoned Action and predicts intentions to engage in a particular behaviour at specific times and places (Beck & Ajzen, 1991). The theory seeks to explain all behaviours over which people have the ability to exert self-control (Ajzen, 2006). It identifies two proximal predictors of behaviour, the intention to perform the behaviour and one's perceived behavioural control over that behaviour. Intention itself is predicted by one's attitude towards a behaviour, one's subjective normative beliefs about it and one's perceived behavioural control over that behaviour (Ajzen & Fishbein, 2000). The attitude towards a behaviour refers to the degree to which therapists have favorable or unfavorable evaluations of their decisions. Subjective norms capture perceived social pressures to enact or not to enact specific decisions. The third determinant of intention, perceived behavioural control, refers to a therapist's belief concerning how easy or difficult it is likely to be to implement a decision (Ajzen, 1985).

Three TPB constructs namely: attitudes, subjective norms, and perceived behavioural control can be assessed directly or indirectly via the assessment of corresponding beliefs (Beck & Ajzen, 1991). Attitudes are the product of a belief that certain behaviours will have certain consequences (behavioural beliefs), and the evaluation of these consequences. Subjective norms are determined by the product of one's beliefs about the opinions of a specific referent group (normative beliefs) and the motivation to comply with that group's beliefs.

Perceived behavioural control is determined by beliefs about the presence of factors that may facilitate or impede the performance of specific behaviours (control beliefs) and the perceived power of facilitative and/or constraining factors (Ajzen & Fishbein, 2000).

Relative to the clinical reasoning, Chapparo, (1999) applied the TPB to the clinical experience of two occupational therapists' clinical reasoning. The TPB was proposed to explain how therapists organized their thinking into process of decision making that directed therapeutic behaviour for an 18 year old girl with severe traumatic brain injury. Chapparo, (1999) suggested that therapists are more likely to engage in their therapeutic decision making behaviour and intend to achieved treatment outcomes, if therapists have a positive attitude about therapeutic action that lead to specific outcomes and believe their decision will be successful. Also, therapists experience social pressure, derived either from the child, their mother or from other colleagues, to achieved treatment outcomes.

Two primary empirical studies were conducted in this thesis, one used a cross-sectional design (Chapter Four), the other a longitudinal design (Chapter Six), to identify Saudi paediatric physiotherapists' clinical decision-making, knowledge of the ICF, and their beliefs about the decision making behaviour of applying environmental and personal factors in their treatment plans for children with cerebral palsy. Each study utilized a range of questionnaires including a Theory of Planned

Behaviour questionnaire as well as clinical vignettes and standard measures. These questionnaires were developed by the author (HD) and their development is described in detail below.

3.3 Empirical Study 1: A survey of paediatric physiotherapy management for children with cerebral palsy

This cross-sectional study (Chapter Four) explores how paediatric physiotherapists take into account environmental and personal factors when treating a child with CP. The survey was designed to explore three clinical reasoning phenomena: Saudi PPTs' decision-making, the application of environmental and personal factors during decision-making, and level of ICF knowledge.

Without understanding these fundamental clinical-reasoning processes, it is impossible to explore how paediatric physiotherapists develop treatment plans for children with CP in Saudi Arabia. Three theoretical models are used simultaneously to explore how Saudi paediatric physiotherapists develop treatment plans for children with CP. The ICF model of health outcomes (World Health Organization (WHO), 2007) was used to develop three case scenarios to explore PPTs' decision-making; Bloom's Taxonomy of Educational Objectives distinguished which levels of ICF knowledge are held by PPTs (Anderson et al., 2001); and the Theory of Planned Behaviour (TPB) was used to assess physiotherapists' beliefs about the application of environmental and personal factors during decision making and to predict the application of environmental and personal factors during decision-making while managing children with CP (Chapparo & Ranka, 2008) (see Table 3.1).

Table 3.1. Assessment of Clinical Reasoning

Assessment of Clinical Reasoning	**Measurement**
1- Physiotherapists' decision-making	Three case scenarios based on the ICF-CY framework (WHO, 2007)
2- Application of environmental and personal factors during decision- making	Theory of Planned Behaviour (Chapparo & Ranka, 2008)
3- Objective ICF Knowledge	Bloom's Taxonomy of Educational Objectives (Anderson et al., 2001)

Case scenarios alone cannot fully explain how Saudi paediatric physiotherapists develop treatment plans for children with CP. It is also necessary to take into account PPTs' considerations of children's environmental and personal factors, which are often neglected in the physiotherapy management of children with CP. Clinical vignettes were used to explore how Saudi paediatric physiotherapists develop treatment plans for children with CP. A child's health condition, physical impairments, physical activities, the environment surrounding the child and the child's personal interests were incorporated into case vignettes. Unbiased methods for choosing what ICF domains to include are needed when it is not possible to include all relevant combinations of the five domains (health condition, physical impairment, physical activity limitation, environmental and personal factors) in the vignettes. The protocol used to develop three case scenarios for this research employs an adaptation of the factorial method, combining the explicitness and rigour of the five domains formulated as factors, with the descriptive richness of a storytelling approach. The factorial method involves the creation of vignettes based on a set of predefined factors that describe all or a subset of possible combinations seen in a situation or decision problem (Taylor, 2006).

In contrast, the storytelling method involves the creation of one or more ‘typical’ or ‘illustrative’ scenarios by members of the research team, often based on their own clinical experience (Finch, 1987).

3.3.1 Development and selection of domains and items

The survey instrument thus had seven sections; the content of each section is presented in Table 3.2, below

Table 3.2. Survey Contents for Study One

Section	Subject
1	Three case vignettes.
2	Three items which describe paediatric physiotherapists’ employment details.
3	Six items to identify how paediatric physiotherapists apply environmental and personal factors in their management of children with cerebral palsy.
4	Thirty-two TPB cognitive items to predict behaviour when applying **environmental** factors in the treatment of children with cerebral palsy.
5	Thirty-two TPB cognitive items to predict behaviour when applying **personal** factors in the treatment of children with cerebral palsy.
6	Nine items to identify paediatric physiotherapists’ clinical background knowledge and their levels of ICF knowledge.
7	Five items about personal and demographic information, e.g. age, gender, years since qualification, years working with children and province of practice in Saudi Arabia.

3.3.1.1 *Assessing PPTs’ decision-making using case vignettes*

Three case vignettes were developed to ascertain paediatric physiotherapists’ decision-making vis-à-vis how they develop clinical treatment plans for children with cerebral palsy; the features and treatment-plan options in each case are presented in Table 3.3, below. Each case includes the same information about age, level of spasticity and level of GMFCS. However, the main problem is different in each case; physical impairment is the barrier in Case 1, in Case 2 it is the school environment, while in Case 3 it is the child's interests. The three cases are presented with activity limitations in terms of the child's walking and use of assistive devices. The ICF domains are used as a clinical-reasoning tool to identify the child's problems, assessment and goal-setting.

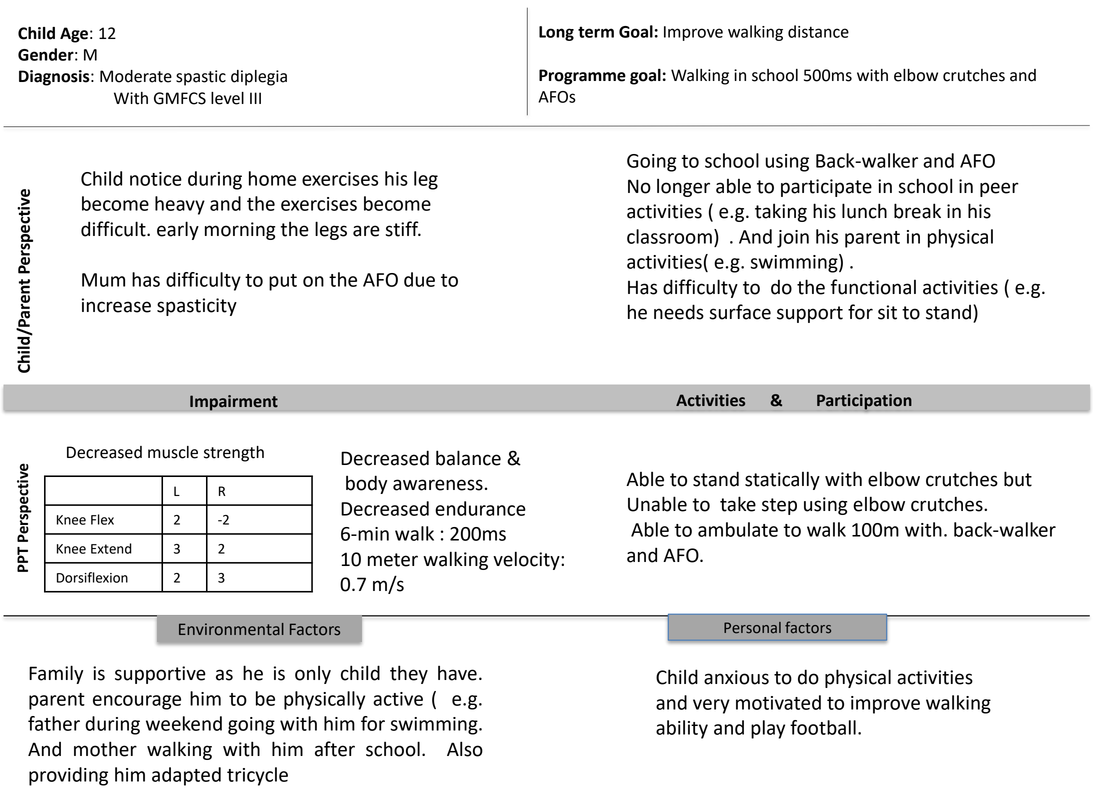
Using the ICF as a clinical-reasoning tool, a procedural explanation of the clinical-reasoning processes used by paediatric physiotherapists could be developed. This could result in a better understanding of how physiotherapists choose their plan treatment-plan preferences, taking into account the clinical situation presented. Five treatment choices, one for each ICF domain, are presented as follows: 1. the child's health condition; 2. the child's physical impairment; 3. practicing physical activities (walking) under paediatric physiotherapist supervision; 4. practicing physical activities (walking) with consideration given to the child's environment; and 5. practicing physical activities with consideration given to the child's interests. PPTs are asked to rank treatment plans based on what is most important from their point of view for best treatment of the child.

Table 3.3. Features of Each Case Vignette and Treatment-plan Options

Case 1: Cause of the problem lies in Impairment of Function	**Case 2: Cause of the problem lies in Environmental factors**	**Case 3: Cause of the problem lies in Personal factors**
Response options for each case: Treatment plan focuses on: 1- Disease as referred to the doctor (disease assessment is needed); 2- Child's physical impairment; 3- Child's environmental factors; 4- Child's personal factors; 5- Practicing activities to improve walking.		

Three case vignettes were designed using the Rehab-Cycle (see Fig. 3.1), which helps in guiding assessment, defining problems and setting goals for the child based on the ICF from the parents' and the child's perspective using a paediatric physiotherapist's standardized assessment (Rundell et al., 2009). Included in this process is consideration and assessment of the child's environmental and personal factors. Three case scenarios were developed based on the ICF model and HD's clinical experience, with assistance from a second supervisor (CS), a practicing physiotherapist and a psychologist with extensive clinical experience, and three rounds of feedback from two supervisors (CS and PA).

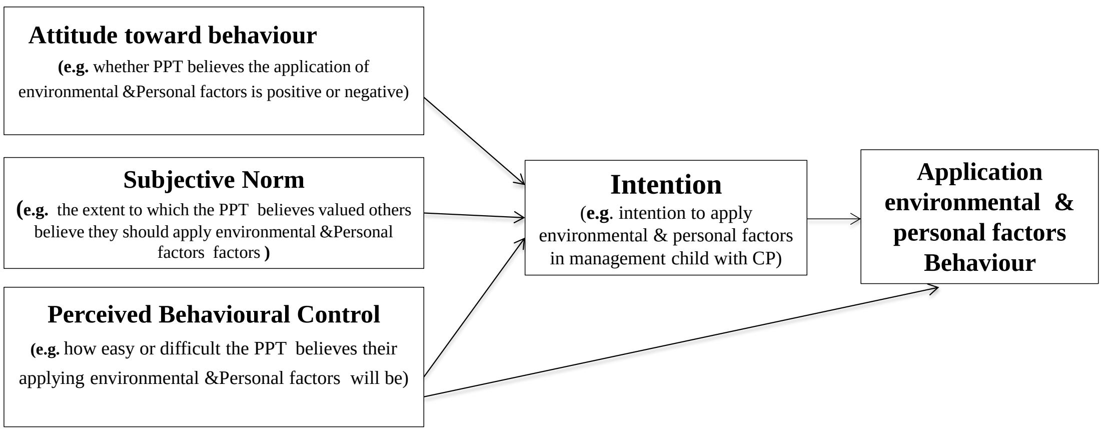
Figure 3.1. Child's Rehab-Cycle (from Rundell et al., 2009)



3.3.1.2 *Saudi PPTs' Decision-making behaviours in the application of environmental and personal factors for the management of children with CP*

Sections 4 and 5 of the survey instrument (Table 3.2) were developed to measure the four main TPB cognitive constructs: intention, attitude, perceived behavioural control and subjective norms, which can predict the behaviour of PPTs in applying environmental and personal factors to the management of children with CP (Fig. 3.2 shows the TPB cognitions). However, the decision was taken to have two separate sections, one for personal factors and one for environmental factors, to minimise therapists' confusion. Section 4 was developed to predict the application of *environmental factors,* and Section 5 to predict the application of *personal factors*.

Figure 3.2. Theory of Planned Behaviour Cognitive Constructs (from Francis et al. 2004)



Two versions of Sections 4 and 5 (Table 3.2) were developed (short form and long form), based on a standard method of developing TPB questionnaires (Francis et al. 2004). The long form contains both direct and indirect (belief-based) measures of each TPB construct. In contrast, the brief version only contains direct measures (Francis et al. 2004). It was recognized that busy PPTs might struggle to complete the long form and thus be deterred from participating in the study. Therefore, a pilot test of the long form of the questionnaire was carried out with clinicians, and their feedback was used to ascertain which version of the questionnaire was most acceptable. Based on the results of the pilot (see 3.4.2, below), the decision was taken to use the short form of the survey.

Sections 4 and 5: The long form measured the TPB with 32 items and the short form with 12 items. The target behaviour in each case was the behaviour of applying environmental/ personal factors in the treatment of children with cerebral palsy. Three items measured intention. Indirect measures of attitude and subjective norm were each determined by the product of four belief items and four corresponding evaluations or motivations to comply with beliefs, respectively.

The in-direct measure of perceived behavioural control was determined by the product of two control beliefs and two control-belief power items. Direct measures of attitude, subjective norms and perceived behavioural control employed three items each (the long-form and short form survey are provided in Appendix 4 (p.291).

3.3.1.3 *Saudi PPTs' ICF knowledge*

Section 6 (Table 3.2) contains questions to identify the respondents' academic qualifications and continuing education status, and whether this educational status is relevant to the management of children with CP. Additionally, this section functioned to ascertain paediatric physiotherapists' self-report ICF knowledge, their application of ICF knowledge in clinical practice, and to assess the objective ICF knowledge they hold.

The evaluation survey of Saudi PPTs' background knowledge and their level of ICF knowledge was developed based on a questionnaire distributed at an ICF workshop in Nottwil, Switzerland (2013), that HD attended. Official permission was obtained from an ICF representative to modify and use the format. The self-report ICF knowledge and its application in clinical practice uses a semantic differential and 7-point response scales, as is customarily suggested (Portney & Watkins, 2009). Nine questions were used to identify and measure physiotherapists' objective ICF knowledge on Bloom's Taxonomy of Educational Objectives, including three questions measuring factual knowledge, three measuring conceptual knowledge, and three measuring procedural knowledge (Anderson et al., 2001). Table 3.4 shows the original questionnaire and the adjustments made for the Saudi version.

Table 3.4. Items selected from original ICF Knowledge Questionnaire before and after adaptation for use in Saudi Arabia

Original ICF Knowledge Questions	Modified ICF Knowledge Questions
Do you have any previous knowledge of the ICF?	Do you have any previous knowledge of the International Classification Functioning Disability and Health (ICF)?
Answer: Yes No	Answer: Yes No
If yes, please rate your knowledge on the following scale:	If yes, please rate your ICF knowledge and use in clinical practice on the following scale:
Answer: used 11-point scale for only ICF knowledge	Answer: used 7-point scale for ICF knowledge and use in clinical practice
No knowledge about the ICF to Very Good knowledge about ICF	For ICF knowledge: No ICF knowledge to Very Good ICF knowledge
Not applicable	**For ICF used in practice: Not used in clinical practice to implemented in clinical practice.**
Objective ICF knowledge:	Objective ICF knowledge:
Answers: True, False, Do Not Know	**Answers: True, False, Do Not Know**
1- The ICF has been developed to be applied exclusively in clinical practice.	1- The ICF classification was developed to describe the patient's functioning only (i.e. not the patient's condition). (Factual Knowledge).

Original ICF Knowledge Questions	Modified ICF Knowledge Questions
2- The umbrella term ‘functioning’ encompasses all body functions, body structures and activities and participation domains.	2- The umbrella term ‘functioning’ encompasses all body functions, body structures and activities and participation domains. (Factual Knowledge).
3- In the integrative bio-psycho-social ICF model, functioning is viewed as a consequence of a health condition rather than a component of health.	3- In the integrative bio-psychosocial- ICF model, functioning is viewed as a consequence of a health condition rather than a functional impairment only. (Factual Knowledge).
4- ‘Capacity’ and ‘performance’ are terms used when referring to environmental factors.	4- ‘Capacity’ and ‘performance’ are terms used when referring to environmental factors. (Conceptual Knowledge).
5- The ICF can be applied in rehabilitation management to assess a patient’s functioning, to assign interventions and to clarify team roles.	5- The ICF model encourages paediatric physiotherapists to assess and treat child’s functioning with consideration to child’s environment and personal factors. (Conceptual Knowledge).
6- Factors in a person’s environment that improve functioning are called facilitators.	6- Environmental and personal factors could be a facilitator or barrier to a child’s functioning. (Conceptual Knowledge).
7- The ICF can be applied in rehabilitation management to assess a patient’s functioning, to assign interventions and to clarify team roles.	7- The ICF framework can be applied in rehabilitation management as a tool to provide a diagnosis of diseases. (Procedural Knowledge).
8- In the code d4500.31, the first qualifier (3) stands for capacity and the second qualifier (1) for performance.	8- The item d4500 is coded for capacity and performance qualifiers in evaluating walking activity. (Procedural Knowledge).
9- Not applicable	9- The code b770 describes the child when moving around in different locations. (Procedural Knowledge).

Sections 2, 3 and 7 (Table 3.2) were developed to describe the characteristics of Saudi PPT respondents, to investigate how demographic, educational and clinical information relate to their clinical reasoning, to compare PPTs’ reporting ICF knowledge to those reporting no ICF knowledge in terms of employment setting, years of experience and practice setting, including items related to assessment tools used in practice, goal-setting and the development of a treatment plan (Portney and Watkins, 2009).

3.3.2 Questionnaire: Preliminary Draft

The long and short versions were sent to three supervisors (PA, CS and DD) to review the documents and identify any problems with questions, including wording organization and flow of questions. Their recommendations were:

1. To move the three case scenarios to Section 1 before asking questions about ICF knowledge to prevent ICF knowledge questions affecting the responses to case scenarios.
2. To order the response scales so that some items require reverse scoring to prevent automatic responses from participants.
3. To add an additional item to section 6 to rate the application of ICF knowledge in clinical practice.

Please rate your ICF knowledge and use in clinical practice on the following scale:								
Not used in clinical practice	1	2	3	4	5	6	7	Implemented in clinical practice

The long and short versions were revised and an Qualtrics online software survey was created using the Qualtrics online survey site. A survey link was sent to three supervisors. A long-version survey link and study information (Appendices 4 & 7 (p.291 & 346) were sent to HD's primary supervisor for the MSc degree at Cardiff University, Ms Karin Visser, who is a paediatric physiotherapist, and CS, who is a physiotherapist, to answer the long-version survey and give feedback regarding content, phrasing and layout. Feedback on the study-information pack and survey content and layout is presented in Table 3.5. After their feedback, a decision was made to pilot the short version in English.

Table 3.5. Panel comments after answering the long version of the survey

1. Length of survey: the paediatric physiotherapists would struggle to complete the long form. Completing the survey took 1 hour, which was too much for clinicians in busy clinics and the therapists would lose attention and motivation.
2. Please rank your plan of treatment for this child from the options below, according to how important you feel each option is to produce the best outcome for him (1 = least important to 5 = most important).
3. Add another choice (other) for item 4 in section 3
   who primarily decides on the goals of treatment for your patient with CP (choose all that apply)?
   - **You**
   - **Parent**
   - **Child**
   - **Other**……………..
4. Order items in section 4 and 5 that **"For me to apply environmental factors in management of child with CP is"** before three items measuring direct attitude **"The application of environmental factors in my treatment plan for the child with CP".**
5. Consistency of the scales that some agree/disagree and some strongly agree/strongly disagree in sections 4 and 5.
6. Section 6 would be best at the beginning of the survey.
7. Item 8 in section 6 add (choose all that apply)
   From where did you get ICF knowledge? (choose all that apply)
   - **Attended ICF workshop or In-service training**
   - **Self-study (On-line, reading book)**
   - **Included in the university curriculum**
   - **During a conference**
   - **Learned on the job**
8. Item 9 in section 6 measures procedural ICF knowledge, and needs an ICF manual to answer
   "The item d4500 is coded for capacity and performance qualifiers in evaluating walking activity"
   "The code b770 describes the child when moving around in different locations"

3.3.3 Questionnaire Translation Procedure

The author of this thesis (HD) translated the survey and information sheet from English into formal Arabic, using the simplest and most basic wording possible (Appendix 4). A further review of the translated text was carried out by three independent bilingual and local reviewers in Saudi Arabia, and then a back translation was undertaken by an independent authorized translation officer in Jeddah

(Harkness et al., 2004). A comparison of the original and back-translated versions was then undertaken by an independent reviewer and a bilingual local supervisor (EA). Arabic items were presented in the same order as those in the English version. The outcome of the review process showed strong similarities between the two versions.

3.3.4 Pilot Testing and Revision

The revised English version of the online survey questionnaire was piloted on five Saudi PhD physiotherapist students in the UK to check the content and validity of the questionnaire's wording, and its clarity, readability and cultural fit (Portney and Watkins, 2009). The five respondents agreed with the wording and clarity of the survey. However, three comments were made:

1. The GMFCS III referred to in the three case scenarios needs a brief explanation.
2. Section 6 needs to come last in the survey.
3. Codes b770 and d4500 in section 6 in item 9 need to be explained.

After correcting these issues in the piloted English version of the online survey, a revised Arabic version (Appendix4 p.314) of the online survey was piloted with three Saudi paediatric physiotherapists who were not part of the main study. The participants confirmed that the questionnaire was clear and readable. However, their comments were that PPTs working in Saudi Arabia usually use English for purposes relating to professional practice and scientific discussion, they rarely using Arabic on such occasions. The decision was to use both the Arabic and English versions online as well as pen and paper to administer the survey, and it would be up to PPTs to decide on their preferred language as well as their preferred medium (online or pen and paper).

3.4 Empirical Study 2 (Physiotherapists and Parents): Impact of learning the ICF framework as a clinical reasoning tool for paediatric physiotherapists working with children who have cerebral palsy

The longitudinal quasi-experimental study in the thesis (Chapter Six) used a pre-post design and was conducted to investigate the impact of an in-service two-day ICF-CY training programme on paediatric physiotherapists' clinical reasoning for children with CP. A specific aim of this study was to describe changes in physiotherapy clinical reasoning following a two-day ICF-CY in-service training delivered by HD. Additionally, to investigate whether the ICF-CY training affected parents' perceptions of treatment a parental survey was designed. Two groups of parents were surveyed: in one group, their children were treated by physiotherapists who had received the ICF-CY in-service training, while the other group had not.

3.4.1 Physiotherapy Questionnaire: Pre- and post-questionnaire for applying the ICF framework as a clinical reasoning tool for children with cerebral palsy

The same questionnaire instrument that was developed for Study 1 was used for pre- and post-ICF training. Section 1 had three case vignettes presented in the pre-and-post questionnaires (see Appendix 4, pre-and-post training section 1 p.320). Three case vignettes were developed following the same procedure as that followed for the case vignettes in Study 1 to minimize learning effects. Section 2 had 12 items to predict behaviour when applying **environmental** factors in the treatment of children with cerebral palsy and section 3 has 12 items to predict behaviour when applying **personal** factors in the treatment of children with cerebral palsy. Section 4 had two items to rate paediatric physiotherapists' ICF knowledge, application of the ICF in clinical practice and 9 items to measure level of ICF knowledge. The sections were ordered differently in the pre-questionnaire and post-questionnaire (see Appendix 4). Pre-and-Post questionnaires distributed during the in-service training utilized the English language version, as it was observed that the participants in Study 1 preferred answering the English version. The two ICF-CY in-service training surveys were also presented in English.

Atkinson & Nixon-Cave (2011) and Resnik & Jensen (2003) argue that the key components of clinical reasoning are not based on therapists' years of experience but are rather closely linked to patient outcomes via collaboration with patients. Parent perspective and parental satisfaction have also been used to assess changes in the child's physiotherapy, which is insightful and provides useful information for both needs assessment and estimating any change in the child's treatment plan (McDougall & Wright, 2009; Palisano et al., 2004).

These methods can help to obtain better communication between parents and therapists, than is seen with traditional and often used impairment-based therapy (Rosenbaum & Stewart, 2004). However, the majority of research examines the application of the ICF in clinical practice from the perspective of the treating health professional; the perspectives of parents and families have largely been ignored (Adolfsson et al., 2010; Allan et al., 2006; de Oliveira Andrade et al., 2011; Jelsma & Scott, 2011; Leonardi et al., 2005; Reed et al., 2008). Therefore, the impact of ICF-CY in-service training was evaluated from the parents' perspective in an attempt to understand whether the ICF-CY, used as a clinical reasoning tool for children with CP. This family perspective is especially important in Saudi Arabian culture in which parents with children with CP are heavily reliant on physiotherapists to develop treatment plans (see Chapter One).

3.4.2 Parent Questionnaire: Physiotherapy management for children with cerebral palsy

Pless et al. (2009) developed a Swedish survey for use by the family, the child and the paediatric rehabilitation team to facilitate adoption of the ICF-CY in practice for assessment, setting goals, prioritizing and intervention planning. Therefore, the Swedish parents' survey was used in this thesis to investigate whether the ICF framework is implemented in the management of children with cerebral palsy. The Parent Survey developed by Dr Mia Pless was originally written in Swedish (See Appendix 5 p.326). Dr Mia Pless was contacted by HD to seek permission to use her survey in the PPTs survey for this thesis (see Appendix 6 p.345). The survey was then translated from Swedish into English to decide whether the contents of the survey match the aims of this study (see Appendix 5 p.327). On reaching a positive conclusion, a second translation procedure followed to translate the survey from Swedish into Arabic.

3.4.2.1 *Parental Questionnaire Translation Procedure*

First, an initial translation was carried out from Swedish into English and reviewed by Dr Gunvor Larsson Abbad (bilingual, with Swedish as her first language) to investigate the contents of the survey and evaluate whether the survey could be used for the aims of Study 2. At this point, the content was confirmed and the decision was taken to use the Swedish parent survey (see Appendix 5, English version). An independent authorized website was used (http://www.translated.net) to translate the survey from Swedish into Arabic, followed by an independent authorized office in Jeddah to back translate the Arabic version into Swedish (Harkness, 2004). A colleague who is bilingual with Arabic as her first language (Dr. Khansa Abdullah) reviewed the two versions.

However, a simple alternative translation for the phrase ‘investigation/survey’ was suggested, i.e. to change it to ‘examination’ (see Appendix 5 p.336, Arabic version).

3.4.2.2 *Parental Survey Design*

The survey content had five sections: section one had five items for demographic information, including the child’s age and gender; the number of years of follow-up in the physiotherapy department, and the child’s main problems from the point of view of a relative of the child (either mother or father). The other four sections assessed, assessment obtained for the child, objectives for physiotherapy sessions, the proposed treatment plan and cooperation with physiotherapy.

In Table 3.6, the original Swedish questionnaire is displayed together with the amendments made for the Saudi parent questionnaire (see Parent questionnaire in Appendix 5, Swedish version and English version p.324 & 327).

Table 3.6. Items selected from the Swedish questionnaire before and after adaptation

Swedish Parent Survey	**Amendments in Saudi Parent Questionnaire**
Section2 **The survey/investigation focused on...**	**Section2** **Physiotherapy assessment focused on…**
1. My child’s physical functioning (e.g. if my child is in pain, if my child has trouble breathing)	1. My child’s physical functioning (e.g. if my child has joint stiffness, if my child has muscle tension, if my child has trouble controlling voluntary movements).
2. My child’s psychological functioning (e.g., how my child thinks and reasons, how my child behaves in different situations).	2. My child’s psychological functioning (e.g. how my child thinks and reasons, how my child behaves in different situations).
3. My child’s body and organs (e.g., malformations, abnormalities).	3. My child’s 5 senses functioning (vision, hearing, taste, smell and touch).
4. Which actions my child can perform (e.g. by asking my child to show or testing what he / she can do.	4. Which actions my child can perform with confidence (e.g. by asking my child to show or by watching what he/she can do e.g. climbing stairs).

Swedish Parent Survey	Amendments in Saudi Parent Questionnaire
5. What my child does at home or in preschool / school (e.g. how my child moves indoors, reads a book ..).	5. What my child is interested in doing at home or in preschool/school (e.g. how my child reads a book or plays).
6. ... What my child does on his / her own initiative in everyday situations.	6. What my child does on his/her initiative in everyday situations.
7. My child's interactions with others in the surrounding area.	7. My child's interactions with others in the surrounding area.
8. How my child's daytime physical environment can help or hinder him/her.	8. How my child's physical environment where he/she lives and conducts his/her life helps or hinders his/her physical activities.
9. Support from and attitudes of people in my child's environment (such as the possibility for his / her grandmother to be available as needed; the capabilities of the child's teachers).	9. Support from the attitude of the people in my child's environment (e.g. his/her brother and/or sister playing with him/her, teacher's knowledge.
Section3 **The objectives have involved ...**	**Section 3** **Physiotherapy objectives have involved ...**
1. ... My child's physical health and development (e.g. ensuring that my child feels well, that my child can swallow food, that my child is able to sleep).	1. My child's physical health and development (e.g. ensuring that my child feels well, my child can eat without choking, my child is able to sleep).
2. ... My child's psychological health (e.g. how my child behaves in different situations, whether my child can concentrate for a long time).	2. My child's psychological health (e.g. how my child behaves in different situations, whether my child can concentrate for a long time).
3. ... My child's body and organs (e.g., ensuring that the joints do not stiffen, ensuring that they do not develop scoliosis).	3. My child's 5 senses, which are vision, hearing, taste, smell and touch (e.g. which sense(s) facilitate/inhibit physical functional activities).
4. ... My child being able to perform tasks - without any connection to everyday situations (e.g. my child being able to lift his or her leg, my child being able to see better).	4. My child being able to perform tasks with or without help in everyday situations (e.g. my child being able to lift his/her leg, my child being able to walk well).
5. My child being better able to cope with different life situations (e.g. my child being able to go to the canteen during breaks, my child being able to wash his or her hands before eating).	5. My child being better able to cope with different life situations (e.g. my child being able to go to the canteen during breaks, my child being able to wash his or her hands before eating).
6. ... My child being involved in the things he / she likes (e.g. my child being able to participate in games or activities that interest him / her).	6. My child being involved in the things he/she likes (e.g. my child being able to participate in games or activities that interest him/her).
7. ... My child's interaction with other people in their environment (e.g. my child interacting better with his / her siblings).	7. My child's interaction with other people in his/her environment (e.g. my child interacting better with his/her siblings).

Swedish Parent Survey	Amendments in Saudi Parent Questionnaire
8. ... Ensuring that the physical environment around my child works (e.g., the classroom being adapted).	8. Ensuring that the physical environment around my child works (e.g. the classroom being adapted).
9. ... Support from and attitudes of people in my child's environment (e.g. teachers having more knowledge about my child's difficulties; my child's grandmother and grandfather devoting more time to him / her.	9. Support from and attitudes of people in my child's environment (e.g. teachers having more knowledge about my child's difficulties; my child's grandmother and grandfather devoting more time to him/her.
Section4 **Measures have been taken concerning** ...	**Section 4** **The treatment plan has considered ...**
1. ... My child's physical health and development (e.g. for my child's pain, breathing).	1. My child's physical health and development (e.g. for my child's joint stiffness, muscle tension, or to help my child to control voluntary movements).
2. ... My child's psychological health and development (e.g. for the development of my child's ability to think and reason, my child's behaviour in different situations).	2. My child's psychological health (e.g. how my child behaves in different situations, whether my child can concentrate for a long time).
3. ... My child's body and organs (e.g., to prevent the development of scoliosis, to increase joint mobility).	3. My child's 5 senses which are vision, hearing, taste, smell and touch (e.g. which senses facilitate/inhibit physical functional activities).
4. ... My child's abilities to do things (e.g. to develop my child's ability to walk or speak).	4. My child's ability to do things with confidence (e.g. to develop my child's ability to walk or climb stairs).
5. ... My child's ability to perform tasks in everyday situations (e.g. for my child to get dressed, for my child to make himself / herself understood by his / her friends).	5. My child's ability to perform tasks in everyday situations (e.g. for my child to be able to go to the canteen during breaks, for my child to be able to wash his or her hands before and after eating).
6. ... My child's active participation in the activities in which he / she is interested at home and in preschool / school.	6. My child's active participation in the activities in which he/she is interested at home and in preschool/school.
7. ... My child's interaction with others in his / her environment (e.g. interaction with classmates to work).	7. My child's interaction with others in his/her environment (e.g. interaction with classmates to work).
8. ... The physical environment around my child at home or in preschool / school (e.g., tools, thresholds, picture aids).	8. The physical environment around my child at home or in preschool/school (e.g. tools, thresholds, picture aids).
9. ... Support from and attitudes of people in my child's environment (e.g. information available for his / her family or the parents of other children, cooperation with pre-school/school).	9. Support from and attitudes of people in my child's environment (e.g. information available for his/her family or the parents of other children, cooperation with pre-school/school).

Swedish Parent Survey	Amendments in Saudi Parent Questionnaire
Section5 **Cooperation**	**Section5:** **Cooperation with physiotherapy...**
1. I actively participate in decisions relating to the survey / investigation of my child.	1. I actively participate in decisions relating to the assessment of my child.
2. I take part in setting objectives for my child and our family.	2. My family and I take part in setting objectives for my child.
3. I take part in adopting measures for my child and our family.	3. My family and I take part in plans being made to help my child achieve his/her goals.
4. I actively participate in and am not just a listener at habilitation planning meetings.	4. I actively participate in, and am not just a listener at, physiotherapy planning meetings.
5. My family and I have access to the knowledge available in the habilitation team.	5. Nil.
6. I think the habilitation plan is worthwhile for our family.	6. I think the physiotherapy plan is worthwhile for my child.
7. I think the habilitation plan provides a clear structure for what is happening for my child and for our family.	7. I think the physiotherapy plan provides a clear structure for what is happening for my child.
8. I think the habilitation plan gives me an overview of the needs of my child and of our family.	8. I think the physiotherapy plan gives me an overview of the needs of my child.
9. I see a common thread between the objectives set and the measures envisaged.	9. I see a common thread between the objectives and treatment plans envisaged.

3.4.2.3 *Piloting the Parent Questionnaire*

The major purpose of the pilot questionnaire was to check the validity of the content, including wording, clarity, readability and cultural fit. The Arabic parent survey and study information (Appendices 5 & 7 p.326 & 346) were trialled by five parents from Saudi Arabia prior to full administration to provide feedback about wording and clarity.

3.4.2.4 *Recruitment Procedure for Piloting the Parent Questionnaire*

The head of department of the Al-Hada Armed Forces Hospital Taif was contacted to help distribute an information sheet to the parents of children with cerebral palsy aged 2 to 18 years old, asking if they would be willing to take part in this pilot study (see Appendices 7 & 9 p.346 & 356). Ten parents of children with CP agreed to take part and arrangements were made for those parents to arrive 30 minutes before their child's physiotherapy session to meet the researcher (HD), sign a consent form and then complete the parent questionnaire. These ten parents were not included in the main study.

3.4.2.5 *Piloting the Study on Parent Questionnaire Procedures*

Each parent, along with his/her child, was taken to a conference room in the physiotherapy department to complete a parent questionnaire, while HD, the researcher, was with them to clarify any issues they might have. The parents first read an information sheet and signed a consent form (see Appendices 7-9 p.346, 353, 356), then the researcher (HD) explained the aims of the study to them and asked them to check the questionnaire's wording, clarity, readability and cultural fit (Portney and Watkins, 2009).

Most of the parents agreed that the parent questionnaire was clear for them to read and understand, as well as relevant to their child's CP health condition. However, three parents commented that the item below was unclear:

"My family and I have access to the knowledge available in the rehabilitation team"

3.4.2.6 *Amendments*

After meeting with three supervisors and discussing the results of the pilot study, the decision was taken to delete the item that was unclear for three parents, and section 6 below, measuring parent satisfaction, was added. The two items were finalised and reviewed, as presented below. The final parent survey was then sent to three supervisors for approval.

Section 6: Please rate degree of your satisfaction with each of the following statements:

I'm satisfied with the treatment my child has received from the physiotherapist over the past three months

☐ Extremely satisfied

☐ Satisfied

☐ Neither satisfied nor dissatisfied

☐ Dissatisfied

☐ Extremely dissatisfied.

I'm satisfied with the progress my child is making since starting physiotherapy treatment over the past three months

☐ Extremely satisfied

☐ Satisfied

☐ Neither satisfied nor dissatisfied

☐ Dissatisfied

☐ Extremely dissatisfied

3.5 Conclusion

The primary aim of piloting the tool used in this thesis was to test the acceptability and content validity of the questionnaires to be used in two empirical studies. Testing a questionnaire is an integral part of its validation process, and piloting of these questionnaires in Saudi Arabia indicated that cultural and social considerations needed to be acknowledged when designing methods for the current research (Portney & Watkins, 2009). Overall, the domains and items were reported to be relevant, clear and suitable, although a few amendments were made in response to participants' feedback and comments.

Since PPTs and parents from Saudi Arabia undertook this pre-pilot study, the participants' views were likely to have been influenced by cultural background, level of knowledge and nature of practice in healthcare settings in Saudi Arabia.

Therefore, the testing procedure involved examining the structure and domains of each questionnaire, and testing the questions for relevance, acceptability, sequence and wording, by piloting them with PPTs and parents of children with CP in Saudi Arabia. The final draft of the PPTs survey, pre-and post-in-service training, and parent questionnaires that were used for the purpose of the two studies are presented in Appendices 4 and 5 (p. 299, 320, 336).

Chapter 4

Saudi Paediatric Physiotherapists' Clinical Reasoning regarding Children with Cerebral Palsy – A Cross-Sectional Survey Using the Theory of Planned Behaviour

4.1 Introduction

The study described in this chapter utilizes a theory-based questionnaire to explore the use of the ICF by Saudi Paediatric Physiotherapists (PPTs) to develop treatment plans for children with Cerebral Palsy (CP). It is necessary to assess the process of clinical reasoning based on theory instead of its outcome (Charlin & van der Vleuten, 2004), to justify the physiotherapist's clinical decision making, determine how the physiotherapist's ICF knowledge might be applied in his/her decision-making, and explain the physiotherapist's behaviour and intention to address environmental and personal factors in the management of children with CP.

This study was designed to ascertain three determinants of clinical reasoning as elaborated in Chapter Three: 1. Saudi paediatric physiotherapists' current clinical decision-making, 2. the levels of ICF knowledge they report, and 3. how well the Theory of Planned Behaviour (TPB) constructs (attitude, subjective norms, perceived behavioural control and intention) were able to predict intention to apply environmental and contextual factors in their clinical decision making. Demographic, educational and clinical variables were also assessed to examine their known association with the three elements of clinical reasoning to be explored (Farrell et al., 2007; Stewart, 2002; Bowling,2008).

4.2 Rationale for the Study

The systematic review described in Chapter Two examined ICF knowledge and clinical reasoning among physiotherapists. However, the reviewed literature was primarily based on physiotherapists working in Europe and North America; it is possible that ICF knowledge and clinical reasoning might be quite different in Saudi Arabia (SA) (See Chapters Two and Three). There is certainly a dearth of relevant research from Saudi Arabia in this area. Also, little information is known about the management of children with CP in Saudi Arabia. Therefore there is a need to understand the use of the ICF as a clinical reasoning tool within the context of physiotherapy practice in Saudi Arabia.

4.3 Aims and Research Question

The impetus for this study was to understand how Paediatric Physiotherapists (PPTs) in Saudi Arabia develop plans of treatment for children with CP by assessing their current clinical decision-making and their knowledge of the ICF. This survey reports the application of the ICF model in decision-making both as a concept and as a health professional behaviour that can be predicted by the Theory of Planned Behaviour. Applying the ICF to clinical physiotherapy practice has produced observed inconsistencies in the application of environmental and personal factors in the management of physiotherapy for children with CP (see Chapter Two). This survey attempted to add clarity to this area by assessing the application of the ICF model in decision-making, and the application of environmental and personal factors in management and treatment children with CP and the ability of PPTs' beliefs to predict their intention to consider contextual factors in their clinical decision making and their actual use of contextual factors in their clinical decision making.

The study posed four research questions, as follows:

1. What is the level of Saudi PPTs' ICF knowledge?
2. Do those PPTs who report ICF knowledge differ from those who do not report ICF knowledge, on demographic and clinical variables?
3. Do those PPTs who report ICF knowledge differ from those who do not report ICF knowledge, in their decision-making in physiotherapy management for children with CP?
4. Does the Theory of Planned Behaviour (TPB) predict PPTs' application of environmental and personal factors in physiotherapy management for children with CP?

4.4 Methods

4.4.1 Study design

A cross-sectional online or paper-based questionnaire was administered to Saudi PPTs as preferred (Appendix4 p.299). The total data collection took place over five months between December 2014 and April 2015.

4.4.2 Participants

All paediatric physiotherapists both qualified and trainees, who were members of the SPTA (Saudi Physical Therapy Association), and listed with profiles and an email address were invited to participate in the study. Three hundred physiotherapists were invited to participate and 33% completed the study. Participants were able to select to complete the study questionnaire online (n=32) or as a hard copy (n=67).

4.4.3 Measures

1. *Demographic and Education Variables*

The socio-demographic variables were grouped and summarized as follows: Age of the PPT: 22-30, 31-40, 41-50, 50yrs or above; gender; province of Saudi Arabia where the PPT practices: central, west, east, north, south; number of years working with children with CP: less than one year, 1-3, 4-6, 7-10, 11 or above; average number of children with CP seen per day by PPT: 1-3, 4-6, 7-10, more than 10 and average number of children with CP seen per day in department: 1-3, 4-6, 7-10, 11-20, more than 20. Whether or not PPTs had undertaken a postgraduate qualification relevant to paediatric rehabilitation was also recorded. PPTs who had undertaken a qualification indicated whether they had fully, partly or not completed each of three types of postgraduate qualification, namely, a postgraduate certificate, a postgraduate diploma and a qualification relevant to management children with CP.

2. *Clinical Variables*

Three features of the current clinical practice of PPTs were assessed in relation to the management of children with CP, namely, what measures were used to assess the child's needs, who primarily decides on treatment goals and whether environmental and personal factors are considered in treatment planning. Environmental and personal factors were defined as follows:

Environmental factors make up the physical, social and attitudinal environment in which the child lives and conducts their lives.

Personal factors are gender, age, self-efficacy (child's level of confidence in being physically active) and the child's interests.

PPTs were asked to indicate if they used an assessment form to identify the child's needs and whether this form was a standard measure (and if so which one) or one developed locally. PPTs who indicated the use of a locally developed assessment form were asked to indicate whether the form included the following: the physical, social and attitudinal environment in which the child lives and conducts their lives, personal factors, neither environmental nor personal factors, both environmental and personal factors. PPTs were asked to indicate who primarily decides on the treatment goals: PPT, parent, child or other. They could choose all that applied. For both environmental and personal factors PPTs were asked if each were applied in their treatment plan for children with CP either all the time, most of the time, sometimes, a few times, or never.

3. *ICF Levels of Knowledge*

ICF Knowledge was assessed by self-report and objectively. Participants indicated whether they had ICF knowledge or not. PPTs who answered that they had ICF knowledge, rated their level of ICF knowledge, its use in clinical practice and answered the nine objective ICF level of knowledge questions listed below.

Self-reported levels of ICF knowledge and its use in clinical practice were each measured by a single item that rated ICF knowledge and its application in practice on a 7-point scale, ranging from No ICF Knowledge indicated lower scores to Very Good ICF Knowledge indicated higher scores, and for application ranging from Not used in Clinical Practice indicated lower scores to Implemented in Clinical Practice indicated higher scores respectively.

The source of their ICF knowledge was measured with a single item, as follows: attended ICF workshop or in-service training; self-study (on-line, reading book); included in the university curriculum; during a conference and learned on the job.

The objective factual, conceptual and procedural ICF knowledge were each obtained by the response to three questions. Correct responses were scored one, incorrect responses were scored zero. Participants could also indicate that they did not know the answer, this response was also scored zero.

The correct answers to each question were as follows:

Three items measuring ICF factual knowledge with the correct answer indicated

1. The ICF classification was developed to describe only the patient's functioning (i.e. not the patient's condition). *False*
2. The umbrella term 'functioning' encompasses all body functions, body structures and activities and participation domains. *True*
3. The integrative bio-psychosocial ICF model, functioning is viewed as a consequence of a health condition rather than a functional impairment only. *True*

Three items measuring ICF conceptual knowledge with the correct answer indicated.

1. **'**Capacity' and 'performance' are terms used when referring to environmental factors. *False*
2. The ICF model encourages paediatric physiotherapists to assess and treat a child's functioning with consideration to a child's environmental and personal factors. *True*

3. Environmental and personal factors could be a facilitator or a barrier to a child's functioning. *True*

Three items measuring ICF procedural knowledge with the correct answer indicated

1. The ICF framework can be applied in rehabilitation management as a tool to provide a diagnosis of diseases. *False*
2. The item d4500 is coded for capacity and performance qualifiers in evaluating walking activity. *True*
3. The code b770 describes the child when moving around in different locations. *False.*

Objective ICF knowledge was measured using the 9 items measuring factual, conceptual and procedural ICF knowledge. A sum of factual, conceptual and procedural ICF knowledge scores gave a score out of 9; the higher the score, the better the objective ICF knowledge was judged to be. Cronbach's α for the objective ICF knowledge measure was 0.8.

4. *Clinical Decision-Making:*

Three case scenarios were used to assess the PPTs' decision-making (full case scenarios are provided in Appendix 4 p.299 short version). PPTs were asked to rank the treatment plans based on their assessment of what they felt were the most important factors to consider in treatment planning (See Chapter Three section 3.4.1). The PPTs' decision-making processes were scored based on the child's main problems (as presented in each case vignette), and the child's physical impairment, activity limitation and the application of environmental and personal factors.

Evidence from the literature (see Chapter Two) has shown that physiotherapists tend to produce treatment plans focused on physical impairment and activity limitation. The PPTs' decision-making processes therefore were scored based on the ICF model, and how the PPTs ranked the plans of treatment, taking into consideration three plans of treatment in the following order:

<table>
<tr><th>Cases</th><th></th><th>Scores</th></tr>
<tr><td>Case 1</td><td>1. First choice: Child's physical impairment as the main problem.
2. Second Choice: Child's walking activities.
3. Third Choice: Child's environmental or personal factors.</td><td rowspan="3">The PPTs' decision-making was scored for each case as follows:
Score 1: if the PPT's first choice was correct.
Score 2: if the first and second were correct.
Score 3: if the first, second and third were correct.</td></tr>
<tr><td>Case 2</td><td>1. First choice: Child's environmental factors as the main problem, affecting the Child's walking activity, and acting as a barrier in the child's school environment.
2. Second Choice: Child's physical impairment.
3. Third Choice: Child's walking activities.</td></tr>
<tr><td>Case 3</td><td>1. First choice: Child's personal factors as the main problem, affecting the Child's walking activity, and acting as a barrier to the child taking an interest in physical exercise and activities.
2. Second Choice: Child's physical impairment.
3. Third Choice: Child's walking activities.</td></tr>
</table>

5. *Clinical Decision Making Behaviour*

Total scores from the three decision-making cases were used to measure the PPTs' decision-making behaviour of applying environmental and personal factors. A sum of Case1+Case2+Case3 gave scores out of 9, and the higher the score, the better the PPT's decision-making was judged to be. Cronbach's α for the decision making behaviour measure was 0.74.

6. *TPB Cognitive Constructs*

The items used to measure TPB constructs and their response scale anchors are shown in Table 4.2. Seven-point response scales were used throughout. Mean scores for each construct were calculated.

Intention: six items measured intention to apply environmental and personal factors in management child with CP and a higher score indicated a greater intention to apply environmental and personal factors in the management a child with CP. Cronbach's α for intention was 0.82.

Attitude: six items measured attitude toward PPT behaviour of the application of environmental and personal factors. Items were reverse scored where necessary so that higher score indicated a more positive attitude. Cronbach's α for attitude was 0.77.

Subjective norms: Subjective norm which reflects the extent to which the PPT believes valued others believe they should apply environmental and personal factors was measured using six items a higher score indicated higher social pressure to apply environmental and personal factors in the management of a child with CP. Cronbach's α for subjective norm was 0.66.

Perceived behavioural control: Perceived behavioural control was measured using six items; a higher score indicated greater perceived control over the application of environmental and personal factors. Cronbach's α for perceived behavioural control was 0.63.

Table 4.1. TPB Items

TPB-Cognitive Variables
Intention
1. I expect to apply environmental factors in my treatment plan for children with CP: strongly disagree/Strongly agree 2. I want to apply environmental factors in my treatment plan for children with CP: strongly disagree/Strongly agree 3. I intend to apply environmental factors in my treatment plan for children with CP: strongly disagree/Strongly agree 4. I expect to apply personal factors in my treatment plan for children with CP: strongly disagree/Strongly agree 5. I want to apply personal factors in my treatment plan for children with CP: strongly disagree/Strongly agree 6. I intend to apply personal factors in my treatment plan for children with CP: strongly disagree/Strongly agree
Attitude
1. The application of environmental factors in my treatment plan for the child with CP is: Worst Practice/ best practice 2. The application of environmental factors in my treatment plan for the child with CP is: the wrong thing to do/ the good thing to do 3. The application of environmental factors in my treatment plan for the child with CP is: Easy for me to do/Difficult for me to do 4. The application of personal factors in my treatment plan for the child with CP is: Worst Practice/ best practice 5. The application of personal factors in my treatment plan for the child with CP is: the wrong thing to do/ the good thing to do 6. The application of personal factors in my treatment plan for the child with CP is: Easy for me to do/Difficult for me to do
Subjective Norm
1. Parents would think that I should NOT consider environmental factors in my treatment plan for the child with CP: strongly disagree/Strongly agree 2. I feel under pressure from colleagues to apply environmental factors in my treatment plan for the child with CP: : strongly disagree/Strongly agree 3. It is expected of me to consider environmental factors in my treatment plan for the child with CP: : strongly disagree/Strongly agree 4. Parents would think that I should NOT consider personal factors in my treatment plan for the child with CP: strongly disagree/Strongly agree 5. I feel under pressure from colleagues to apply personal factors in my treatment plan for the child with CP: strongly disagree/Strongly agree 6. It is expected of me to consider personal factors in my treatment plan for the child with CP: strongly disagree/Strongly agree

TPB-Cognitive Variables
Perceived Behavioural Control
1. I am confident that I can apply environmental factors when managing the child with CP strongly disagree/Strongly agree
2. Whether I apply environmental factors when managing the child with CP is entirely up to me: strongly disagree/Strongly agree
3. For me to apply environmental factors in management child with CP is: Easy/Difficult
4. I am confident that I can apply personal factors when managing the child with CP strongly disagree/Strongly agree
5. Whether I apply personal factors when managing the child with CP is entirely up to me: strongly disagree/Strongly agree
6. For me to apply personal factors in management child with CP is: Easy/Difficult

4.4.4 Procedure

4.4.4.1 *Recruitment Procedure*

The President of the Saudi Physical Therapy Association (SPTA) was contacted in order to send the invitation email to participate in the study to the SPTA member list through of the SPTA server service. Details of the purpose of the study, information regarding participation, what the study entailed, anonymity, data protection information, and a URL link to the online survey were sent via e-mail (See Appendix 9 p. 353). One week later, the participants received the same e-mail, as a follow-up reminder. A second reminder was then sent two weeks after the first. The email had detailed information of HD, the researcher, whom participants could contact if they preferred the hard copy survey format.

4.4.4.2 *Study Procedure*

Online Survey

Participants who decided to take part in the study accessed the online survey using the URL link in the email, and once completed, the survey questionnaire was saved in Qualtrics. Those who did not complete the survey did not have their data saved.

Paper and Pen Survey

Participants who preferred a hard copy survey contacted HD by email or phone. The researcher (HD) provided the participant with a consent form, information sheets, and printed copy of the survey was distributed to the participants in person. After week the researcher (HD) contacted participants by email or phone then visited department to collect the completed survey.

Two weeks later, if a participant had not filled in the survey when the researcher visited, HD arranged with the participant a convenient time to visit to department to collect completed survey.

4.4.5 Data analysis

The SPSS software package (version 23 for Mac) was used to analyse the questionnaire data as follows:

4.4.6 Descriptive Analysis

Mean scores and standard deviations were calculated for each TPB construct and for the decision making behaviour of the application of environmental and personal factors. The clinical decision making scores and cognitive construct scores were not normally distributed, so they were transformed using a natural log function in order to fulfill the normality assumption tested using the Kolmogorov-Smirnov test to restore normality (Field, 2014). Transformed scores were used in subsequent data analysis.

4.4.7 Inferential analysis

Chi-square analysis was used to examine whether reported ICF knowledge differed according to various demographic, clinical variables and their decision making based on three case studies scores. Some of categories were collapsed in some of the variables so that the expected frequencies in each cells was greater than 5. While **Fisher's exact test** was used on 2x2 contingency table when expected frequencies in some of cells was less than 5 (Field, 2014).

Paired samples t-test was used to compare between the PPTs self-report ICF knowledge and the application of the ICF in clinical practice.

Unpaired t-test was used to compare the TPB variables (intention, attitude, perceived behaviour control and subjective norm) and decision-making behaviour of PPTs who having ICF knowledge against the PPTs not having ICF knowledge.

Pearson's Correlation coefficient was used to assess the relationship between TPB constructs, decision making behaviour, objective ICF knowledge and years of PPTs' experience.

4.4.8 Ethical Considerations

Ethical approval from the University of Strathclyde School of Psychological Sciences and Health Ethics Committee was obtained. In addition, local approval and agreement was obtained from the Medical Service of the Ministry of Defence of

Saudi Arabia (where HD had received a scholarship) prior to any data collection procedures (See Appendix 10 p. 356 & 357).

4.5 Results

Three hundred emails were sent through the offices of the SPTA. The number of hard copy and online surveys returned at each stage of contact with PPTs are presented in Table 4.2.

Table 4.2. Numbers of Hard Copies and Online Survey Returned

Emails sent n = 300	**Online Copies Returned**	**Paper-Pen Copies Returned**	**Total returned (n)**	**%**
First time	15	0	15	5
1st Reminder	2	18	20	7
2nd Reminder	15	49	64	21
Total	32	67	99	33

4.5.1 Participant Demographic and Education Information

Table 4.3 describes the characteristics of study participants. In total, 99 PPTs took part in the study. The data of 80 PPTs, who had completed all the measures including the decision making measure, were analyzed. Of those surveyed 30% PPTs reported they had knowledge about the ICF. The majority of PPTs had learned to use the ICF either on-line or from reading about the model, only three PPTs reported attending a workshop or conference to gain such knowledge.

Table 4.3. Demographic Information (N=80)

Demographic variables	N	%
Age		
22-30	23	29.0
31-40	42	52.5
41 or above	13	16.0
50 or above	2	2.5
Gender		
Male	13	16
Female	67	84
Provinces of Saudi Arabia		
Central	19	24
West	47	59
East	10	12
South	2	2.5
North	2	2.5
Years of Experience with children with CP		
Less than one Year	10	12
1-3	20	25
4-6	15	18
7-10	17	22
11 or above	18	23
Average no. children with CP seen/day by therapists		
1-3	40	50
4-6	25	31
7-10	12	15
More than 10	3	4.0
Average no. children with CP seen/days in department		
1-3	16	20
4-6	14	18
7-10	16	20
11-20	9	11
More than 20	25	31
Postgraduate Qualification		
Yes	21	26
No	59	74
Reported ICF Knowledge		
Yes	31	30
No	49	70

Demographic variables	N	%
Method learned about the ICF model		
Attended workshop	3	10
Self-Study (reading a book or on-line)	14	45
Introduced in university curriculum	5	16
Conference	3	10
Learned on the job	6	19

4.5.2 Participant Clinical Information

The PPT's clinical information is presented in Table 4.4. More than half of the PPTs (58%) reported that they were using an assessment developed by the department and 31% of those assessment formats were reported to include provision for consideration of the child's environmental and personal factors. Sixty percent of PPTs reported they involved parents and child in their goal setting. Forty-eight percent of PPTs considered the environmental factors in the child's plan of treatment, and 70% reported consideration of the personal factors in treatment.

Table 4.4. Clinical Summary of Survey Respondents (N=80)

Clinical variables	n	%
Specific Assessment Tool		
No assessment form	10	12
Assessment Developed	47	59
Standard Assessment	23	29
Assessment Developed		
Included EF*	13	28
Included PF*	1	2.0
Included Both EF* & PF	25	53
Neither EF nor PF	8	17

Clinical variables	n	%
Goal-Setting		
PPT	27	34
Parent	1	1.0
PPT & Parent	28	35
PPT & Parent & Child	20	25
Rehabilitation Team	4	5.0
Application of Environmental factors		
All the Time	15	19
Most of the Time	39	49
Sometimes	17	21
A Few Times	6	7.5
Never applied	3	3.5
Application of Personal factors		
All the Time	29	36
Most of the Time	29	36
Sometimes	17	21
A Few Times	2	3.0
Never applied	3	4.0

EF*: Environmental Factors; PF*: Personal Factors.

Q1: Do those PPTs who report having ICF knowledge differ from those who do not report ICF knowledge on demographic and education variables?

Table 4.5 displays the results of the Chi-square analyses that compared the demographic and educational characteristics of participants who reported having ICF knowledge against those who did not. The following factors were found to be significantly associated with knowledge of the ICF: the average number of children with CP seen by the therapist and the average number of children with CP seen by the department.

PPTs were more likely to report ICF knowledge if they worked in a department that saw more CP children each day. Similarly, those PPTs who reported ICF knowledge saw a greater number of children with CP each day compared to those who did not report ICF knowledge.

Table 4.5. Chi-square/Fisher's exact test analysis between Demographic and Education variables and reported knowledge of the ICF

	Self-reported ICF Knowledge				
	Yes (n=31)		No (n=49)		
Demographic variables	**n**	**Row%**	**N**	**Row%**	**χ^2 / P-value**
Age					
22-30	11	35	12	25	$\chi^2_{df=2}$=1.3,p=0.5
31-40	14	45	28	57	
41 or Above	6	20	9	18	
Gender					
Male	4.0	13	9	18	$\chi^2_{df=1}$=1.3,p=0.4
Female	27	87	40	82	
Provinces of SA					
Central	11	35	8.0	17	$\chi^2_{df=2}$=1.3,p=0.5
West	16	52	31	63	
Other provinces	4.0	13	10	20	
Years of Experience with children with CP					
1-3	10	32	20	42	$\chi^2_{df=3}$=1.4,p=0.7
4-6	6	19	9	18	
7-10	7	23	10	20	
11 or above	8	26	10	20	
Average no. children with CP seen/day by therapists					
1-3	10	32	30	58	$\chi^2_{df=2}$=7.0,p=0.03
4-6	15	48	10	25	
More than 7	6.0	20	9	17	
Average no. children with CP seen/days in department					
1-10	8	26	38	73	$\chi^2_{df=1}$=19.1,p=0.00
More than 10	23	74	11	27	

Demographic variables	Self-reported ICF Knowledge				χ^2 / P-value
	Yes (n=31)		No (n=49)		
	n	Row%	N	Row%	
Postgraduate Qualification					$\chi^2_{df=1}$ =0.9, p=0.2
Yes	10	33	11	23	
No	21	67	38	77	
Qualification Relevant to Management of Children with CP					P=0.2[@]
Yes	8	80	8	72	
No	2	20	3	28	

[@] Fisher Exact Test

Q2: Do those PPTs who report having ICF knowledge differ from those who do not report ICF knowledge on clinical variables?

Table 4.6 shows the results of the Chi-square test analysis that compared the components of clinical decision making between PPTs who stated they had ICF knowledge against those who did not. The assessment tool ($\chi^2_{df=2}$=13.5,p=0.01) used by PPTs was found to be significantly associated with knowledge of the ICF. The proportion of PPTs who reported having ICF knowledge and using standard assessment was significantly higher than the proportion of PPTs did not reported ICF knowledge. There was no significant difference between the two groups of PPTs in the involvement of parent and/child in goal setting and in the application of environmental and personal factors in their management of children with CP.

Table 4.6. Chi-Square test analysis between clinical variables and reported knowledge of the ICF

	Self-reported ICF Knowledge				
	Yes (n=31)		No (n=49)		
Clinical Variables	**n**	**Row%**	**n**	**Row%**	χ^2
Specific Assessment Tool					
No assessment form	0.0	0.0	10	21	$\chi^2_{df=2}$=13.5,p=0.01
Assessment Developed	15	48	32	65	
Standard Assessment	16	52	7	14	
Assessment Developed					
Included EF*/PF*	3	20	11	34	NA*
Included EF* & PF*	10	67	15	47	
Neither EF* nor PF*	2	13	6	19	
Goal-Setting					
PPT& Rehabilitation Team	12	39	19	39	$\chi^2_{df=1}$=0.05,p=0.5
PPT& Parent& Child	19	61	30	61	
Application of Environmental factors					
Applied EF	18	58	36	71	$\chi^2_{df=1}$=2.0,p=0.2
Not Applied EF	13	42	13	29	
Application of Personal factors					
Applied PF	20	64	38	74	$\chi^2_{df=1}$=1.6,p=0.3
Not Applied PF	11	36	11	26	

EF*: Environmental Factors; PF*: Personal Factors. NA*: expected frequencies of some of cells less than 5.

Standard Assessment Forms used by PPTs

Half of PPTs who reported having ICF knowledge used a standard assessment as follows: 33% used the GMFCS (Gross Motor Functional Classification System) to characterize the gross motor function of the child with CP, All PPTs used the GMFM (Gross Motor Function Measure) together with another standard assessment form including the PEDI (Paediatric Evaluation of Disability Inventory), 6% of PPT used the FIM (Functional Independent Measure) and 19% of PPTs used the Wee-FIM

(Functional Independent Measure). However, only 9% of PPTs who reported not having ICF knowledge used a standard assessment, 5 of them used GMFM assessment and one PPT used the General Movement Trust to predict CP before the child's 2nd year of age (Table 4.7). The definitions of standard assessment are available in Appendix1 p.286.

Table 4.7. Standard Assessment Forms used by participants in their daily clinical practice

Standard Assessment Form	Participants reporting ICF knowledge n=16	Participants reporting no ICF knowledge n=7
GMFM (Gross Motor Function Measure)	16	5
PEDI (Paediatric Evaluation of Disability Inventory)	1	0
GMFCS (Gross Motor Functional Classification System)	5	0
Primitive Reflexes	0	1
Wee-FIM (Functional Independent Measure Children's version)	2	0
FIM (Functional Independent Measure)	1	0
General Movement Trust	0	1

Q3: Do those PPTs who report having ICF knowledge differ from those who do not report having ICF knowledge in their decision-making in physiotherapy management for children with CP?

Table 4.8 shows the results of the Chi-square analysis that compared number of correct responses for each case study between PPTs who stated they had ICF knowledge and those who did not. The number of correct responses from PPTs who reported having ICF knowledge was significantly greater than those from the PPTs reporting no ICF knowledge for cases 2 and 3.

Table 4.8. Number of correct responses to the case studies by self-reported ICF knowledge & Chi-square test Statistics

	Correct Responses				
	who reported having ICF knowledge (n=31)		**who reported not having ICF knowledge (n=49)**		
Case Study	**n**	**%**	**n**	**%**	χ^2
Case1	12	39	17	35	$\chi^2_{df=1}$=0.03,p=0.5
Case2	13	42	10	20	$\chi^2_{df=1}$=4.2,p=0.04
Case3	20	65	15	31	$\chi^2_{df=1}$=8.9,p=0.003

4.5.3 Self-report and objective Knowledge of the ICF and Self-report use of ICF knowledge

The mean scores for self-report and objective ICF knowledge are shown in Table 4.9. Paired-samples t-test was conducted to compare the mean of self-report ICF knowledge and application ICF in clinical practice. There was a significant difference in the mean scores for self-report ICF knowledge (M=4, SD=1.3) and application in clinical practice (M=3.2, SD=1.7); t (30)=2.5, p= 0.01.

Participants reported higher self-report ICF knowledge than its application in clinical practice. While, mean scores of objective (M=4.0, SD=2.0) ICF knowledge was below the scale mean.

Table 4.9. Mean Scores of Self-Report, Application and objective ICF Knowledge

Variables	Mean (SD)
Self-report ICF knowledge	4.0 ± 1.3
Application ICF in clinical practice	3.2 ± 1.7
Objective levels of ICF knowledge	4.0 ± 2.0

*Maximum scores is 7 and the minim is 1 for self-report ICF knowledge and application ICF in clinical practice. *Maximum scores is 9 and the minim is 0 for level of objective ICF knowledge

4.5.4 TPB cognitive construct and decision making behaviour

Table 4.10 shows the mean score for each TPB construct and the mean score for PPT decision making behaviour of applying environmental and personal factors. These results show a significant difference between two groups decision making behaviour of the application of environmental and personal factors.

While, the mean scores of intention, attitude and perceived behaviour control were above the scale mean for both groups and the mean scores for subjective norm was below the scale mean for both groups.

Table 4.10. TPB-cognitive constructs & decision making behaviour for PPTs Having and Not having ICF knowledge

Variables	Mean (SD)	t (df=78)	p
Intention			
Having ICF knowledge	6.0 ± 0.7	-0.4	
Not having ICF knowledge	5.9 ± 0.9		0.7
Attitude			
Having ICF knowledge	5.6 ± 1.0		
Not having ICF knowledge	5.3 ± 0.9	-0.2	0.8
Perceived Behaviour Control			
Having ICF knowledge	5.1 ± 0.8		
Not having ICF knowledge	5.0 ± 0.7	0.8	0.7

Variables	Mean (SD)	t (df=78)	p
Subjective Norms			
Having ICF knowledge	3.7 ± 0.9		
Not having ICF knowledge	3.0 ± 0.8	0.6	0.8
Decision making behaviour of application of environmental and personal factors			
Having ICF knowledge	4.0 ± 2.4		
Not having ICF knowledge	2.4 ± 2.0	3.7	0.001

*Maximum score is 7 and the minimum is 1 for the cognitive constructs; *Maximum scores is 9 and the minimum is 0 for the clinical decision making behaviour.

Q4: Does the Theory of Planned Behaviour (TPB) predict the PPT's application of environmental and personal factors in physiotherapy management for children with CP?

Table 4.11 presents the correlations between cognitive variables, decision making behaviour, objective ICF knowledge, and previous years of experience in the management of children with CP. Attitude and perceived behavioural control were both positively correlated with intention to apply environmental and personal factors; more positive attitudes and greater perceived control over the application of environmental and personal factors were associated with higher intention.

In contrast subjective norm was negatively correlated with intention; PPTs reporting more normative pressure reported lower intention to apply personal and environmental factors. Objective ICF knowledge was positively correlated with a PPTs' decision making behaviour in the application of environmental and personal factors. However, none of the TPB constructs were significantly correlated with the PPTs' decision making behaviour.

Table 4.11. Correlation of TPB-cognitive variables, Decision making behaviour, objective ICF knowledge and length of professional experience

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1- Intention	1	0.55**	0.55**	-0.44**	0.14	0.14	0.02
2- Attitude		1	0.47**	-0.31**	-0.07	0.30	0.10
3- Perceived Behavioural Control			1	-0.30**	-0.01	0.46	0.05
4- Subjective Norm				1	-0.01	0.9	0.10
5- Decision making behaviour					1	0.35**	0.30
6- Objective ICF knowledge						1	0.8
7- Years of Experience							1

** Person Correlation is significant at the 0.01 level (2-tailed), * Person Correlation is significant at the 0.05 level (2-tailed)

4.6 Discussion

The present study explored how PPTs in Saudi Arabia develop their treatment plan for children with CP. This analysis has compared PPTs who reported having ICF knowledge with those PPTs who reported having no ICF knowledge. Also, it has examined the PPTs' decision-making processes, and the ability of the TPB to predict and explain the decision-making behaviour of applying environmental and personal factors in the management of children with CP. This section summarizes and discusses the main findings, relates the results to the relevant literature in Chapter Two and Chapter Three, presents a methodological critique, and highlights the implications of this study to physiotherapy practice. This study differs from those reported in the literature in three ways. First, previous studies have examined the impact of in-service training on rehabilitation in general. In contrast, the current study focused on the use of the ICF for the rehabilitation of children with CP, within a particular cultural setting. Second the current study utilised a homogenous group of physiotherapists in contrast to previous studies, which included multidisciplinary teams. Third, much of the existing literature examines the relationship between the type of ICF knowledge used in clinical practice and the therapist's decision-making processes. However, this study also explored the ability of the TPB to predict the decision-making behaviour of the application of environmental and personal factors in management of children with CP.

This study integrates theory with a clinically-based approach for the application of the ICF model as a clinical reasoning tool, to examine three clinical reasoning elements: self-reported and objective measures of levels of ICF knowledge, a PPT's decision-making process using three case vignettes, and the TPB to predict the decision-making behaviour to explore using the ICF model as a clinical reasoning tool in the management of children with CP.

4.6.1 Summary and discussion of main findings

This study has identified those PPTs who report having ICF knowledge and have given consideration to environmental and personal factors in their decision-making to develop a treatment plan for a child with CP. The PPTs s objective ICF knowledge was positively correlated with the PPT's decision-making behaviour. Results of this study, however, do not support the TPB constructs as predictors of the decision-making behaviour in the application of environmental and personal factors, as none of the constructs were correlated with the decision-making behaviour.

4.6.2 Demographic and education characteristics associated with reported ICF knowledge

The findings of this study are in part comparable with the survey of Canadian occupational therapists relating their knowledge to the use of the ICF model (Farrell et al., 2007). The overall findings of the present study showed that one third of the participants were PPTs who reported having ICF knowledge. In comparison Farrell et al. (2007) conducted their survey among 587 occupational therapists in Canada to identify ICF knowledge and to assess its use in clinical practice; 70% reported having ICF knowledge, and 30% reported never having heard of the ICF model. Most of the PPTs who worked in Riyadh in the central province reported having ICF knowledge, as most workshops and conferences are held in the capital city, and the opportunity to contact the physiotherapy department in King Saud University is higher than other provinces in S.A.

Also, in Riyadh, and Jeddah, in the western province, physiotherapy departments usually have PPTs from various countries and cultures, which might facilitate the transfer of ICF knowledge among therapists.

Farrell et al. (2007) in the findings of their Canadian Occupational Therapists survey suggested that the number of years of practice could influence a therapist's knowledge and use of the ICF. The results of the current study did not show any significance with regard to the PPTs' years of experience with children with CP. However, analyzing the average number of children seen per day by PPTs in a department was significantly associated with the level of ICF knowledge; those PPTs who reported having ICF knowledge reported personally seeing more than 4 children per day, and their department saw more than 10 children per day. Most of the PPTs were working in PPT teams or rehabilitation teams, which may have influenced the sharing of information among the PPTs. Having a high workload in a busy CP department, and frequent clinical experience of working with CP children, might be an inducement for PPTs to search for a model that was effective in dealing with CP.

4.6.3 Clinical characteristics association with reported ICF knowledge

The findings of the current study are comparable with those reported in other studies on the management of children with CP relative to assessment, goal setting, and intervention techniques (Franki et al., 2012, 2014; Jeglinsky et al., 2014; McDonald et al., 2007; Schenker et al., 2005). Detailed analysis will be further explored below in the components of the management of children with CP.

4.6.3.1 *Assessment of Children with CP*

The most frequently used assessment by PPTs in daily clinical practice was primarily focused on impairments and bodily functions (Schiariti et al., 2014).

In the current study PPTs who reported knowledge of the ICF were more likely to use standard assessment with a focus on the child's physical impairments. In part, this is likely to account for a lack of consideration of the child's personal and environmental factors. It may be that the use of measures that require an assessment of contextual factors would help to promote consideration of the wider social and environmental context of a child with CP. However, the systematic review by Schiariti et al. (2014) stated that no single measure alone fully represented the ICF-CY model, and recommended combining measures that seemed most appropriate to capture all components of the ICF-CY.

4.6.3.2 *Goal Setting for Children with CP*

This survey supported the systematic review results described in Chapter Two, which did not find a difference between PPTs who reported ICF knowledge and those who did not in the likelihood that PPTs involve both the parents and child in goal setting. Results of the systematic review also have shown that physiotherapists are neglecting the personal and environmental factors in setting goals for the child and there is evidence to indicate that this is because PPTs find it challenging to involve both parents and the child.

For instance, focus group interviews in Finland by Jeglinsky et al. (2012) explored rehabilitation planning for children with CP by multidisciplinary rehabilitation teams. The results of all five focus groups showed that involving parents in goal setting was a challenging task. The therapists highlighted that there were internal and external reasons for this dilemma of “the parent’s role” in rehabilitation. The internal reason was the lack of time to guide and inform parents, while the external reason was that parents were too busy to get days off work to come with their children to hospital. However, the Jeglinsky et al. (2012) study showed that the participants were not using the ICF in their rehabilitation planning, and if they had been, that might have influenced the therapist to set goals and involve the parents in the rehabilitation planning. The findings of the current study and that conducted by Jeglinsky et al., (2014) did not provide evidence to support the notion that ICF knowledge could guide therapists in relation to the involvement of the child and their parent in goal setting.

4.6.4 Knowledge of the ICF and use of ICF knowledge

This study assessed whether PPTs reporting ICF knowledge differed from those not reporting ICF knowledge on several features of current clinical practice including, the use of assessment measures, who primarily decided on the treatment goals and whether environmental and personal factors were considered in treatment planning of children with CP and found few difference between the two groups. However, the current study also used case studies to provide a more accurate assessment of the use of ICF knowledge by PPTs and to explore its relationship with ICF knowledge.

This study supports the findings of Franki et al. (2014), in which case vignettes were used to assess the reliability of the use of the ICF clinical reasoning tool to define the main problems and set specific goals for children with CP. The results of the Chi-square test showed PPTs reporting ICF knowledge were more likely to answer case 2 and 3 correctly compared to PPTs who reported no ICF knowledge.

In Case 2, the main problem was the child’s environment as a barrier, and the group of PPTs reporting ICF knowledge were more likely to provide a correct answer than those PPT who reported no ICF knowledge.

Similarly, PPTs reporting ICF knowledge were more likely to respond correctly to Case 3, in which personal factors were the problem that required consideration. This study also, supports the findings of the systematic review in Chapter Two that an ICF knowledge base is required for the actual application of the ICF framework in the decision making process. Results of this study have shown a significant positive correlation between the decision making behaviour and objective ICF knowledge.

4.6.5 Using the TPB to predict the decision-making behaviour of the application of environmental and personal factors in the management of children with CP

At a theoretical level, the findings of this study are only partly consistent with the Theory of Planned Behaviour (TPB) (Ajzen, 2011). The strength of the relationship between the different cognitive constructs varies with different behaviour types and populations (Hardeman et al., 2010). The correlation between attitude, subjective norms and perceived behavioural control and intention were significant. PPTs who had a positive attitude and greater perceived control, reported a higher intention to apply environmental and personal factors in the management of children with CP. Whereas, the value of the beliefs of parents and their colleagues (subjective norm score) was low, compared to attitude and perceived control in the application of environmental and personal factors that was associated with higher intention. Perhaps the PPTs intended to consider contextual factors when making clinical decisions, and their intentions were supported by positive attitudes and a strong sense of personal control. However, they did not feel under any normative pressure to consider contextual factors, and indeed, this social influence was negatively related to intention.

It may be that although PPTs realise the importance of the application of environmental and personal factors in the management of children with CP, parents and colleagues do not traditionally interfere in a PPT's decision-making in Saudi Arabia. One possible explanation for the finding of a statistically significant negative relationship between subjective norm and intention to consider contextual factors when making clinical decisions is culturally specific. In that, the more PPTs in SA feel under social pressure from colleagues or parents, the less they may tend to use contuxual factors. In other words, if PPTs perceive less social pressure from important individuals, their intention to apply contextual factors when making clinical decisions may increase.

Another explanation is that the subjective norm measure was composed of six items that included items pertaining to the influence by colleagues, parents and a general expectancy items. It is possible that normative influence in the cultural context of Saudi Arabia is such the more senior colleagues or heads of department more influential than parents. Indeed, input from parents into treatment decsions is rare and may not be viewed positively. It is possible that these two sources of normative influence intention differently; professional pressure might increase intention whilst parental influence might decrease intention. The fact is that the internal reliability of the subjective norm measure was only moderate at 0.66, which might be an indicator of these discrepance normative influences.

The finding that intention does not predict behaviour has been observed in other studies, including the application of TPB to heath related behaviours (Orbell and Sheeran, 1997). For example, in a study of attendance for cervical screening only one-half of participants, who intended to undergo cervical screening, actually underwent the screening in a one-year period (Orbell et al., 1998).

Also, Ajzen (1991) argues that intentions may not always be converted to actions. In other words, PPTs may have good intentions to consider environmental and personal factors in making decisions, but for many reasons may act on those intentions. Evidance indicated that intentions are more likely to be converted into behaviour where timing and location for action are specificed in detail (Sheeran, Orbell, 1999). In the current study, the timing and location were not spcificed and this might have weaken the ability of intention to predict the consideration of contxual factors in clinical decision making.

Further the application of environmental and personal factors in decision-making in physiotherapy practice is neglected, as described in Chapter Two. Physiotherapist training and routine clnical practice continues to focus on impairment and this impaitment focus in clinical decision making is, thus, likely to become habitual and automatic. Intentions are theoretically construed to be predictive of non-habitual behaviour. Therefore, an explicit intention to consider factors other than impairment may be a poor predictor of what is an automatic behaviour which occurs without effortful processing.

The other explination is that the result revealed that PPTs who reported ICF knowledge had higher decision-making behaviour scores than PPTs not reporting ICF knowledge. The decision-making behaviour scores of both groups were below the scale mean. This might indicate that PPTs reporting ICF knowledge are in an early stage of awareness about the ICF, and are yet to fully transfer their ICF knowledge into their decision-making processes. This might, in part, explain the finding that decision-making behaviour was not correlated with intention, attitude, subjective norm and perceived behavioural control.

4.7 Strength and Limitation of the Study

A number of specific issues were encountered when conducting this study, the key problem being the lack of national statistics on the number of paediatric physiotherapists working in Saudi Arabia with children with CP, as has been explained in Chapter One. It cannot be readily assumed that the sample represents the totality of PPTs working with children with CP in Saudi Arabia. Therefore, it was not theoretically sensible to use a probabilistic sampling method. Sampling procedures must reflect the nature and purpose of the study (Martin, 2008).

In practice, however, it is sometimes difficult to obtain a truly random sample, or to justify the usage of an approach other than random selection. In this particular case, our aim was not to generalise results in Saudi Arabia, but rather to gain insight into the process by which Saudi PPTs manage children with cerebral palsy, exploring their clinical reasoning through their decision making and their decision making behaviour. In addition, it was important to know whether Saudi PPTs had an ICF knowledge base, or on what level of knowledge they base their management of children with CP.

Convenience sampling was the preferred method for this study as it is a non-probabilistic technique that can be used for quantitative studies. Subjects that are easily available to the researcher are more likely to be included, thus, participation is not actually equal for all those qualified to be in the target population. This can skew the data and therefore the study results may not be generalizable to the entire population of physiotherapists working in Saudi Arabia (Bowling, 2009).

The cross-sectional design provided a “snapshot” of a PPT’s view at a particular point in time, and was thus found to be appropriate to the aim of the current study. In addition, the results of this study have used as the basis for developing the protocol for the longitudinal study described in Chapter Six. Information generated by this method covered a wide population, and this would help to identify the perceptions of a larger number of participants in a relatively short time, and bridge the gap of a lack of information on how Saudi PPTs develop treatment plans for children with CP (Martin, 2008).

A potential source of bias in this study arises from the way questionnaires were distributed. Of the PPTs who participated, only those who were members of the SPTA and who had provided their email address were contacted. This may have resulted in a selection bias, in that PPTs working in SA who were not members of SPTA would not have been contacted. However, this also enabled a more homogeneous sample of PPTs focused in same health condition (CP), which shared a common ground of illness severity and perhaps similar potential problems to be studied.

4.8 Conclusion

This survey was designed to explore how PPTs develop their plan of treatment for children with CP, by understanding the difference between PPTs who report having ICF knowledge, and those PPTs who report not having ICF knowledge, in terms of their management of children with CP, including assessment, setting of goals, and plan of treatment that they used in daily clinical practice. The findings of this study indicate that the PPTs having ICF knowledge are considering the ICF model in their plan of treatment. Further research to identify the impact of ICF-CY in-service training on PPT's ICF knowledge; decision-making and behaviour in applying environmental and personal factors in the management of children with CP is presented in next chapters.

Chapter 5

Development of Two Day ICF-CY In-Service Training

5.1 Introduction

This chapter presents details of the development of a two-day training programme. The main aim of this programme was to train Saudi paediatric physiotherapists (PPTs) in how to apply the ICF-CY framework in their clinical work with children who have Cerebral Palsy (CP). The training format was designed and delivered by HD to PPTs in Saudi Arabia (SA). A logic model was used as a planning tool for the content of the training programme

5.2 Development, Design, Delivery and Assessment of ICF-CY In-Service Training

The framework of the training in the ICF/ICF-CY for health professionals and students is already being applied by health professional groups and universities in several countries across Europe, North and South America (Allan et al., 2006; Tempest and McIntyre, 2006; Farrell et al., 2007; Leonardi et al., 2005; Pless et al., 2009; de Oliveira Andrade et al., 2011; Jelsma & Scott, 2011; Jones et al., 2011; Peters-Brinkerhoff, 2016). Previous surveys in North America have, however, shown that the majority of rehabilitation health professionals are unaware of the ICF model, and most universities in the US and Canada that are teaching rehabilitation sciences need to emphasise the ICF model in their curricula (Reed et al., 2008; Farrell et al., 2007; Peters-Brinkerhoff, 2016).

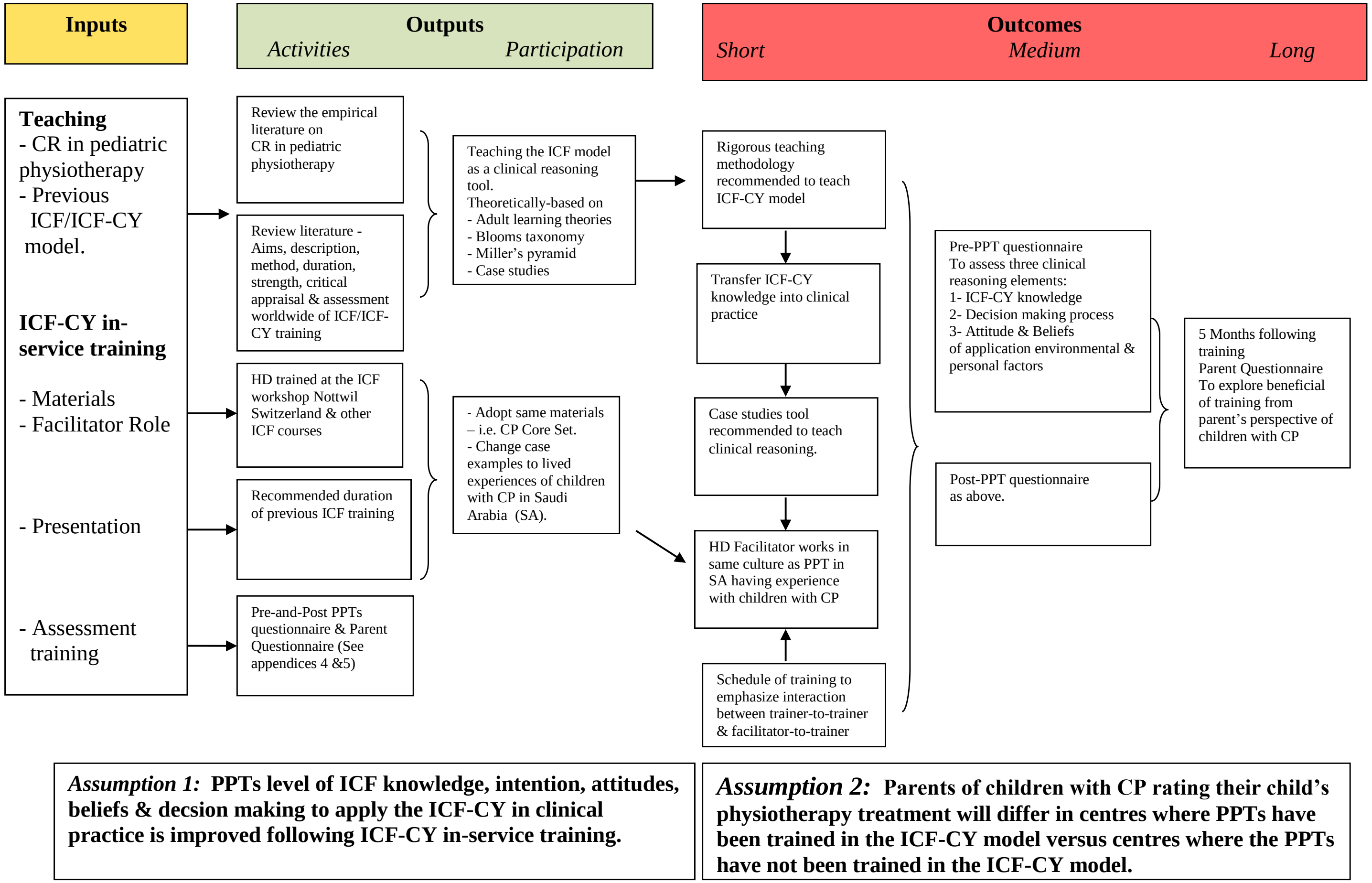
In Sweden, even though employers within rehabilitation services endorse the use of the ICF, the service report system for patient records and routines in team conferences have not yet been fully developed to support the use of the ICF in daily practice (Pless et al., 2009). In Italy, eight years after the release of the ICF, the challenge in understanding the benefits of training remained and how readily the ICF was subsequently incorporated into clinical settings remained unclear (Francescutti et al., 2009). One challenge is the lack of a criterion concerning “Training for what?” and lack of in-depth knowledge and experience of using the framework in ICF in-service training (Farrell et al., 2007; Reed et al., 2008, Pless et al., 2009; Peters-Brinkerhoff, 2016).

The systematic review described in Chapter Two indicated that empirical evidence regarding the application of the ICF model in clinical reasoning is scarce. However, the need for the explicit use of the ICF to demonstrate clinical reasoning has been suggested (Tempest and McIntyre, 2006). Training programmes have been established and these are considered to be an effective way to teach therapists and students in paediatric physiotherapy about the ICF as a clinical reasoning tool (Darrah et al., 2006; Franki et al., 2014, Jelsma and Scott, 2011). There is also scarce empirical evidence concerning the impact of using the ICF model in clinical reasoning. Jelsma and Scott, (2011) stated that that clinical reasoning only seems to occur once a student has begun to use the ICF in their assessments in clinical practice. The ICF framework enhances students’ clinical reasoning by forming links between activity limitations and participation restrictions, and can be used to analyse children’s problems against a full contextual background, taking environmental and personal factors into account.

Meanwhile, evidence of the impact of teaching the ICF/ICF-CY model as a clinical reasoning tool for paediatric physiotherapists is scarce.

Reed et al. (2008) highlighted the importance of thinking carefully about training goals in order to minimise the inherent danger in prematurely 'standardising' training approaches and assessing their outcomes. Therefore, a logic model was created to plan the current ICF-CY in-service training more effectively. A logic model is a systematic way to clarify the processes undertaken before, during and after delivery of ICF-CY in-service training (Taylor-Powell & Henert, 2008). It is a visual way to present relationships between inputs and sources (such as key programme elements required to develop a training programme), activities (including all the actions necessary to develop the training programme) and participation (or reasons for programme activities), before and during the training process. Short-, medium- and long-term intended outcomes were used to measure the impact of training. The sources utilised to inform the development of the training were a review of literature on: training using the ICF model, teaching the ICF model as a clinical reasoning tool, adult learning theories in clinical practice, ICF-CY in-service training materials, ICF-CY in-service training procedures, role of the facilitator, presentation of training and the impact of ICF-CY in-service training on PPTs' clinical reasoning. These elements were considered in order to clarify and pictorially display the process of development; the delivery and assessment of training were undertaken as described in detail below (see Figure. 5.1).

Figure 5.1. Logic Model for the Development, Design, Implementation and Evaluation of Two-day ICF-CY In-service Training for Saudi Paediatric Physiotherapists



CR: Clinical Reasoning, PPTs: Paediatric Physiotherapists

5.2.1 Published Review of Worldwide ICF Training Programme

Over the last 16 years, there had been a growing interest in ICF training in different countries for diverse purposes. The usefulness of the ICF in the education of health professionals had been endorsed in different countries for various purposes (WHO, 2013). Several attempts to devise ICF instruction methodologies have been published, these are summarised in Table 5.1, below.

Table 5.1. Worldwide ICF Training Programmes

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
USA Reed et al. 2008	General aims of three programmes: To emphasise application of the ICF by health professionals in clinical settings. Aims of each programme: 1- To evaluate the impact of instructor-led learning and self-directed learning formats of two groups of occupational therapy graduate students. 2- To provide rehabilitation professional teams with the skills to use the ICF to code clinical cases.	Core training content is the same in all three programmes, and developed by the authors. Training outline: Conceptual overview of the ICF model; anatomy of the ICF; organisation and content of codes; code sets; applying codes to clinical cases; linking clinical assessments to ICF codes; challenges in using the ICF; implementing the ICF. Training method: 1- Instructor-led training or self-directed training module. 2- Instructor-led workshop to practise and discuss coding of clinical cases based on written vignettes and own case examples. 3- Internet-based teaching, five modules. Training provided via online lectures and slideshows, students can discuss ICF concepts online with the	Programme 1: 2 hours for students. Programme 2: 3.5 days of workshops for health professionals. Programme 3: Online Training for students.	Duration and training methods depend on the aims of training: e.g. intensive face-to-face training is more effective than distance learning to teach health professionals how to code real clinical cases.	Three programmes focus on retention of ICF knowledge, not on transferring ICF knowledge into clinical practice.	Programmes 1 & 2: Develop a pre- and post-survey based on Bloom's Taxonomy of educational objectives, and focus on student's knowledge, skills and attitudes related to the ICF. Programme 3: No formal evaluation is used. Rather, students post their comments on the course discussion board, in the same way that discussion is facilitated throughout the course.

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
	3- Implementation of Internet-based teaching modules concerning the ICF.	professor and each other.				
Canada Allan et al. 2006	To ensure students from different disciplines not only acquire expertise in their own area, but also learn skills that allow for cross-disciplinary communication and collaboration.	A workshop was developed by the authors on applying the ICF in medical education for students on the Doctoral Programme in Rehabilitation Sciences. During coursework, teams from different disciplines study the history and development of the ICF, and explore its value as a conceptual framework for healthcare education in many areas of healthcare.	Not mentioned	The context is a course designed to promote interdisciplinary thought processes and to use case studies as a clinical reasoning educational tool.	Levels of ICF knowledge are not explained	Students required to introduce the ICF to a medical education conference in Ontario, Canada. Case presentation to illustrate how the ICF promotes a multidimensional perspective in understanding individuals' complex health concerns, how to become familiar with the ICF model.
Canada Darrah et al. 2006	Describe & develop two models to guide e-student learning at entry level of a master's in physiotherapy. Based on four concepts: theoretical framework to	First model, "Client-oriented Research and Evaluation Leads to Best Practice" includes ICF contextual factors during a child's evaluation and assessment, intervention and outcomes, with consideration that physiotherapy is based on theory and research. A second model, called "Clinical	Development of curriculum for students and faculty.	Processes of models can explain differences in clinical approaches in physiotherapy.	There is no objective assessment of the efficiency of these two models	From the author's experience, the two models provided for faculty and students act as a guide to organise their teaching and learning on the master's programme.

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
	justify clinical intervention, importance of client-centred practice, integrating ICF language into practice & decision-making must be evidence-based.	Decision Making Model", was developed to guide students in collecting information to define problems, set goals and develop treatment plans based on five ICF domains.				
Italy Leonardi et al. 2005	1- ICF-DIN Basic Course To explain to healthcare professionals, educators, social workers, engineers, architects, politicians, administrators, students & people with disabilities and their families the concept of ICF classifications, thus enabling them to communicate using a common language	**ICF-DIN Basic Course** Presentation & discussion covering a brief history of disability and disability classifications; differences in classifying, measuring and assessing; history of the ICF, basic principles, coding structures & application of the ICF in different settings; WHO ICF-based assessment tool; the ICF and children; ethical implications of the ICF's use; the ICF in Italy project, implementation around the world & simple case-vignettes explaining the application of ICF as a coding system.	1- Basic course: 8 hours of presentation and discussion, workshop. 2- Advanced course: 3-day course 3- Distance learning course followed by three months of distance learning and then a final	Before developing ICF basic and advanced training course material, all available material on the ICF was reviewed. Published and unpublished papers, comments and experiences were taken into account. The development of basic and advanced ICF training courses and tools has been discussed in depth with the WHO and	Considering the ICF model as a classification tool for human functioning, and how to use ICF language as a common language in practice. Also, focused on retention of ICF knowledge, not on transfer of ICF knowledge into clinical practice. The outcomes of training not reported in three courses.	Assessment of training in the basic training course not mentioned. Advanced training: Final exam after distance learning, participants are awarded a DIN-ICF certificate.

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
	that captures information on human functioning, in much the same way as the ICD captures diagnostic or medical information. 2- ICF-DIN Advanced Course Training in how to teach the ICF model.	**Three-day course structure:** **Day 1:** Basic principles of health & disability detailed during a basic course, discussed in greater depth. **Task**: In small groups (4-5) participants work on simple clinical cases. The focus is on qualifiers and problems related to ICF component codification. **Day 2**: Explore the ICF checklist & how to use it through coding case vignettes in different settings. **Task:** In small groups (4–5) participants practice coding & back-coding clinical cases provided by teachers. **Third day:** Description and use of WHODAS II as a generic assessment instrument for health and disability across all diseases, including mental, neurological & addictive disorders. Links to the concepts of the ICF model & its application, how to assess,	day on-site for evaluation and an exam.	other groups.		

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
		video cases of interviews with actors, and coding. **Task:** Working in pairs, participants administer the WHODAS II to each other. **Distance Learning:** After the advanced course, each student codes ten pre-assigned cases prepared and tested by DIN, writes three cases with codes, completes five real cases from their professional practice, coded with ICF checklists, WHODAS II & eventually other specific assessment tools.				
Italy Martinuzzi et al. 2008	Explores how ICF can be used by professionals from different healthcare disciplines after a basic training session, and perceived effectiveness of training.	30-40 training sessions were given across the Vento region of Italy. Similar training format to that presented in Leonardi et al.'s (2005) study.	One day.		- The cost of individuals' participation on the course was covered by the institution. - Absence of a comparison group of trainees from other regions and a different learning format.	After each workshop, participants, who reported who/ when/ how professionals can use the ICF, positive aspects and potential problematic aspects envisioned in connection with ICF use, discussed 3 issues. A questionnaire was also distributed to rate the relevance of the topics

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
					- Lack of objective assessment of training.	discussed, and how efficient and effective the training was for participants' practices and attitudes.
Italy Francescutti et al. 2009	Reported training given over 8 years					Only editorial
Brazil de Oliveira Andrade et al. 2011	To assess knowledge related to the ICF and identify the content of assessment items including the ICF code set related to CP.	Training has three modules: **Module 1**: history, concepts and structure of the ICF model. **Module 2**: Methods for development of ICF core sets & an ICF checklist. **Module 3**: Practical activity.	3 hours.	CP ICF code sets developed in this study were used before core sets for CP were published.	Focusing on retention of ICF knowledge.	A questionnaire developed to assess self-reported ICF knowledge.
Sweden Pless et al. 2009 Adolfsson et al. 2010 ICF and ICF-CY in-service training held by Pless and colleagues in 2006.	Study aims: **Pless et al. (2009**): Evaluate the effects of in-service training on use of the ICF and ICF-CY in paediatric rehabilitation teams' self-reported knowledge, understanding &	Training structure: **Day 1**: Introduction including: ICF history, home assignment in rehabilitation plans, pre-reading of ICF material, coding rehabilitation plans according to the ICF, development of the ICF-CY, and of an ICF-CY form. **Day 2**: Application of the ICF and instruments linked to it,	Training was preceded by a 2-hour information session and a home assignment, then two days of in-service training, followed by	The content of training courses was arranged in consideration of how adult learning theories and skills can be transferred to daily work situations. A pilot for this planned in-service training was tested on	Assessment training was based on self-perception of ICF knowledge and skills.	Two studies assessed participants' self-perceptions of their ICF knowledge over time. Pless and colleagues (2009) assessed self-knowledge, understanding and use of what they have learned in everyday work using a quantitative design.

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
	use of learning in everyday work. **Adolfsson et al. (2010)**: Explore how paediatric rehabilitation teams perceive implementation of the ICF following in-service training.	problem-solving models utilising the ICF, discussing development of the ICF-CY form and how it can be filled-in by parents or health professionals.	bi-monthly newsletters.	professionals in rehabilitation services.		Adolfsson and colleagues (2010) used qualitative design to assess perceptions of the implementation of the ICF in rehabilitation practice.
South Africa Jelsma & Scott 2011	The advantages of teaching third-year physiotherapy students to assess children with disability, using the ICF approach, in paediatric clinics.	**Prior to 2008**, students in 2nd year were given lectures on the ICF framework and an assignment where they applied ICF analysis of disability & functioning to a paper patient. In paediatric clinics, they were not actively encouraged to use the ICF framework. **In 2008**, 2nd year physiotherapy students were given lectures on the ICF, but the approach to assessment in theoretical lectures was structured along the lines of the ICF model. Students were given case studies & asked to identify which aspects of the	Lectures on the ICF framework.	Training the ICF framework using clinical reasoning teaching tools. Analysing children's problem based on five ICF domains		

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
		child could be classified under each ICF component, and to analyse the causal & association links between domains. **In 2009**, the students were required to overtly include the ICF framework in assessing & decision-making in the clinic, & use of the model was reinforced in clinical tutorials by a clinical tutor.				
UK Tempest & McIntyre 2006 Tempest et al. 2012 & 2013	Evaluate expert opinions before implanting the ICF framework into a local occupational therapy and stroke service Evaluate the outcomes of implementing an ICF-based clinical tool in practice.	Presentations given to healthcare professionals within stroke rehabilitation regarding the ICF framework and classification. Using an action research approach to learn and think about the ICF whilst implementing it in practice.	Not applicable 26 months	After a presentation the ICF model: Expert thought that ICF could guide to demonstrate goals and interventions in patients. Using an action research approach has enabled the theoretical framework and classification to become a clinical reality within neurorehabilitation.	Potential for bias in the analysis of data as the researcher worked in an institution stroke service at the Royal Free Hampstead NHS Trust, UK.	Thematic analysis was undertaken, data collected from individual interviews, a focus group, questionnaires, email communications, minutes from relevant meetings and field notes.

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
Germany Gutenbrunner et al. 2010	Describe a curriculum of physical and rehabilitation medicine that includes a model of the ICF.	Not reported.	All phases of the curriculum for medical students.			Not examined.
Australia Jones et al. 2011	An ICF online resource was developed to enable students, course designers and teaching staff, across all disciplines, to have access to the ICF model.	Not applicable.			There has been no change in the profile of activity on the site during the two years that this resource has been available to both students and staff. The timing of the high rate of access to the resource is associated with the assessment requirements of the introductory subject in the first semester of the common first year (February to June).	

Country of Origin & Study	Aims of Training	Description and Training Methods	Duration	Strength	Critique	Assessment of Training
ICF workshop **Nottwil, Switzerland** 26–27 Sept. 2013	To convey information about the ICF and its development, basic principles, coding structures and relevance to different settings and uses.	The format of the training was consistent with advanced ICF training programme in Italy, developed by the Disability Italian Network and an instructor-led course.	8 hours per day for 2 days.	Participants from different countries presented experiences of application of the ICF model.	Focused on coding systems and using the ICF red book manual.	Assessment – self-reported ICF knowledge and levels of ICF knowledge.

Standardised criteria had been followed to develop ICF training materials in Italy and the US. In Italy, the WHO, in collaboration with the Italian Disability Network, (DIN) developed two courses; an ICF basic course and an ICF advanced course, followed by a distance-learning (DL) course leading to the award of the DIN-ICF certificate. Leonardi and colleagues (2005) spent over a year discussing and developing these courses taking into account what other researchers were developing in other countries. The development of ICF training tools had been discussed in depth and presented by the WHO and collaborating centres all over the world. Before delivering the training, the materials were assessed by different specialists within the health care sector (Leonardi et al., 2005). Additionally, in the US, Reed and colleagues (2008) developed their Manual and Guide for the Standardized Application of the ICF for the American Psychological Association, in collaboration with the WHO, along with several other health professional associations including; the American Occupational Therapy Association, the American Physiotherapy Association, the American Speech Language Hearing Association, the American Therapeutic Recreation Association and the National Association of Social Workers.

Training courses delivered in the US, Italy, Brazil, Sweden and Switzerland were of different lengths, but did not differ in terms of core topics, although they did vary significantly in terms of depth and details, and the amount of practical experience provided as part of the training.

Depending on course length, training may involve: didactic instruction; discussion and specific application to each clinician’s practice including the development of code sets; practice in coding case vignettes; practice in coding more detailed clinical information including assessment data; and practice in coding clinicians' own cases.

These earlier studies of training in the use of the ICF/ICF-CY (Leonardi et al., 2005; Reed et al., 2008, de Oliveira Andrade et al., 2011) had primarily measured the effect of training on attitudes towards the ICF, knowledge about the ICF, and coding skills outside everyday clinical situations, and most clinical cases and vignettes used as exercises for coding were completed with the ICF checklist. Similarly, in several studies, outcome evaluations were performed directly after training, and focused on health professionals.

In Italy, Martinuzzi et al. (2008) investigated ways that the ICF could be utilised following ICF basic training. A total of 810 health professionals from various disciplines within adult and paediatric rehabilitation practice from the 21 territorial Health Unit Agencies of the Veneto region participated in the programme. The training was delivered in 6 locations, with professionals from 3 – 4 adjacent territorial agencies. After the end of the training sessions, participants were assigned to smaller groups, and each group discussed their prediction for ICF implementation and the perceived effectiveness of the training. The responses given by the various groups were collected and analysed. All participants seemed to understand that the implementation of the ICF might represent a significant opportunity to guide rehabilitation practices.

However, after the one-day ICF-DIN training, 40% of the participants reported a need for further training in order to use the ICF in their clinical practice. A quarter of the participants highlighted the need to change their professional cultural paradigm, and that there was a need to introduce the new language to avoid potential problems at both a personal and team level, in order to adopt the ICF framework in their practice.

In Sweden, studies (Adolfsson et al., 2010; Pless et al., 2009) had analysed the impact of in-service training on staff's self-reported knowledge, understanding and use of the ICF and ICF-CY, and how rehabilitation professional teams perceive implementation of the ICF in their everyday work. The ICF and ICF-CY in-service training (Pless et al., 2006) was developed from the content of the ICF-DIN basic and advanced courses. The content was arranged to suit adult-learner participants, and to transfer ICF knowledge to their daily work. Based on pilot training, the main in-service training was expanded to two full days, preceded by a 2-hour information meeting with a home assignment, and followed by bi-monthly newsletters (Pless et al., 2009).

Leonardi and colleagues (2005) argued that inappropriate use of the ICF leads to incomplete clinical application of the model, especially regarding its coding system. Likewise, in any real-life situation, it is not realistic to promote clinicians' use of the ICF 'red book' in vivo, as searching for codes that might apply to a patient would be likely to disrupt the flow of communication with the patient. In order for the ICF model to be valuable in making point-of-service decisions about care, a rigorous teaching methodology is required.

South Africa and Canada have unique examples of training in the conceptual framework of the ICF as a clinical reasoning tool (Allan et al., 2006; Darrah et al., 2006; Jelsma & Scott, 2011). In South Africa, Jelsma & Scott (2011) presented the advantages of teaching third-year physiotherapy students to assess children with disability using the ICF approach. In 2008, second year physiotherapy students were given lectures on the ICF framework, and an assignment where they were required to apply an ICF analysis of disability and functioning to a case of a child with CP. When they started to practice in paediatric clinics in 2008, they were not actively encouraged to use the ICF framework, and objective assessments of function were not strongly linked to participation limitations. In 2009, lectures were given on the ICF to new second-year students, and the approach to assessment in theoretical lectures was structured along the lines of the ICF model. Students were given case studies and asked to identify which aspects of the described child could be classified under each ICF component. They were then required to analyse the causal and association links between domains. The following year, this group of students were required to overtly include the ICF framework as a basis for assessment and decision-making in the clinic. Also, the clinical educator reinforced students to use the model in clinical tutorials (Jelsma & Scott, 2011).

The Jelsma & Scott (2011) results demonstrated significant differences between students trained on the ICF and students who had not received the ICF based training, in their use of ICF-based assessments carried out during placement periods in schools for children with special needs. Students who had learned the ICF model and were encouraged to apply the ICF in practice, were seen to have linked activity limitations with participation restrictions, analysed children’s problems against a full contextual background, and taken environmental and personal factors into account. In contrast, students without the ICF based training, the quality of their assessments of children were lower in compare to students with the ICF based training. They had loosely applied the ICF concepts, in order to gather information, analyse and plan interventions and produce assessments.

In Canada, the Doctoral Programme in Rehabilitation Sciences at the University of Western Ontario delivers a programme based upon the ICF, the aim being to promote interdisciplinary thinking (Allan et al., 2006). The programme is designed to ensure that students not only acquire expertise in their own area, but also learn skills that enhance cross-discipline communication and collaboration. For example, one of the requirements of the programme was the presentation of a comprehensive paper to peers and Faculty members. This paper explores how the student's area of specialisation can be interpreted within the broader ICF model. Allan and colleagues (2006) stated the consequences of learning the ICF model by using a clinical case study. The clinical case study method, can demonstrate the merits of a bio-psychosocial approach, and specifically the ICF framework. Visual representation of the ICF conceptual framework provides great benefit in the context of education, in particular when the ICF is used to present a highly complex case.

5.2.2 Teaching Application of the ICF/ICF-CY as Clinical Reasoning in Paediatric Physiotherapy

Good clinical reasoning is fundamental to the delivery of high-quality care in paediatric physiotherapy practice (Cutrer et al., 2013). Training paediatric physiotherapy staff to adopt clinical reasoning in their daily practice presents a challenge, as physiotherapists must consider the potential impact of multiple factors, such as the child's family, age, developmental level and environment, in order to develop and deliver a treatment plan appropriately for each child (Wright et al., 2008).

Development of clinical reasoning would benefit from clear guidance in the reasoning process when challenged in clinical practice, and navigating the knowledge base during a patient interaction (Linn et al., 2012). All the evidence presented in Chapters One and two indicated that the ICF appears to be useful as a clinical reasoning tool to guide reasoning processes in paediatric physiotherapy practice, particularly as its focus goes beyond body impairment. The reciprocal relationships between the three main elements, and the role of contextual factors acting as barriers or facilitators could guide and assist therapists in their clinical reasoning (see Figure 1.2, Chapter One p.32).

Darrah et al. (2006) developed two models to guide student learning at entry-level physiotherapy training. The development of a curriculum for students and Faculty is based on four concepts as follows: a theoretical framework to justify clinical intervention, the importance of client-centred practice, that integrating ICF language into practice and decision-making has to be based on evidence-based practice.

The first model, called "Client-oriented Research and Evaluation Leads to Best Practice", includes consideration of ICF contextual factors during a child's evaluation and assessment, intervention and outcomes, with consideration that physiotherapy is based on theory and research. A second model, called the "Clinical Decision Making Model", was developed to guide students in collecting information to define problems, setting goals and developing treatment plans. However, the efficiency of the two models was not evaluated to determine how useful they are.

Jelsma & Scott (2011) stated the importance of introducing ICF training programmes in a way that motivates therapists to apply the ICF model within the context of their clinical practice. This can be achieved by introducing a pictorial representation of the ICF framework. With rigorous multidirectional arrows between five ICF model domains, therapists can understand that they need to assess child patients holistically, and identify the extent of functional problems and activity limitations in a related setting. Thus, learning to use the ICF conceptual model as a clinical reasoning tool can influence the application of the ICF knowledge base when developing decision-making processes.

5.2.3 Clinical and Theory-based Approach for Teaching Application of the ICF/ICF-CY Model in Clinical Reasoning

A variety of educational strategies used to teach and learn clinical reasoning have been described (see Section 1.5.3: clinical-based approach for teaching application of the ICF/ICF-CY model in clinical reasoning p.44), including reflection, case studies, problem-based learning and simulation (Delany & Golding, 2014; Gunn et al., 2012; Neistadt et al., 1997).

Case studies have been most widely used in the application of the ICF/ICF-CY model in clinical reasoning in paediatric physiotherapy to guide physiotherapists using ICF-CY as a clinical reasoning tool, faciliate self-dircted learning in a safe learning environment and to foster PPTs' thinking process (Atkinson & Nixon-Cave, 2011; Darrah, 2008; Franki et al., 2014; Furze et al., 2012; Palisano, 2006). Case studies are one of the teaching tools used in the ICF-CY in-service training, to introduce the importance of a child's environmental and personal factors in the management of children with CP. Learning how to implement the ICF into case work can be practiced, and it is very helpful when learners have some meta-cognitive understanding of its usefulness and the conditions for its application (Tempest et al., 2013).

Although there are many benefits from using case studies in promoting learning of the ICF-CY as a clinical reasoning tool, there are some limitations. These include the possiblity that health professionals may not challenge clinical assessments, as the trainer's clinical reasoning may inhibit their clinical thinking (Sefton et al., 2008). Therefore, it would be desirable to use a variety of educational strategies to avoid monotony in learning due to format repetition. In the current ICF-CY in-service training, three educational strategies were applied to design and evaluate the ICF-CY training programme for PPTs working with children who had cerebral palsy: Bloom's Taxonomy, case studies and Miller's pyramid model for teaching clinical reasoning. Three of Bloom's Taxonomy domains in learning clinical reasoning: cognitive, psychomotor and affective, help in clarifying the appropriate learning activities and learning domains to best develop clinical reasoning skills (Miller, 1990).

Another proposed strategy for teaching clinical reasoning skills is used in Miller's pyramid model (1990) by identifying four stages of development, "knows, knows how, shows how, and does", as the steps of reasoning that the physiotherapist progresses through from acquiring knowledge to performing a task in practice. An adaptation of these steps can be used as a model for teaching the skill of clinical reasoning, which encourages personal reflection and refinement of the physiotherapist's clinical reasoning skills that might improve patient outcomes.

5.2.4 ICF-CY In-Service Training Procedure

In Nottwil, Switzerland (2013), the format of the training was consistent with the advanced ICF training programme in Italy, developed by the Disability Italian Network.

Day 1 topics focused on basics to demonstrate the extent of the ICF's practical applications and potential utilisation in daily practice. Day 2 covered specific modules such as: ICF linking methodology, ICF in rehabilitation management, joint use of ICF with other classifications, disability evaluation, ICF in research and real-life examples of the application of the ICF presented by participants. The ICF workshop was attended by the researcher (HD). Ms. Demyati was privileged to have the opportunity to obtain official permission from the ICF facilitators to use training programme the ICF model. But, the researcher (HD) modified the ICF training package from the workshop material presented in Nottwil. The aim of the 2-day ICF-CY training evaluated in this thesis (Chapter Six) was to explore the impact of learning the ICF-CY as a clinical reasoning tool in the management of children with CP.

The materials used in training were similar to those used in the workshop in Nottwil, although the case examples were modified to accommodate to the real-life experiences of children with CP in Saudi Arabia, focusing on the ICF-CY Core Set. The intention was to further the learners' knowledge, by using different levels of ICF-CY knowledge in their decision-making processes, not simply focusing on the coding system. The ICF-CY in-service training workshop was conducted over two days, providing basic ICF knowledge and facilitating the application of this knowledge to everyday clinical work.

5.2.5 ICF-CY In-Service Training Methods

Reed and colleagues' (2008) employed three similar training programme content but varied the length and intensity of training, to examine group training experiences and practical applications of the ICF by health professionals in clinical settings, in terms of length and intensity. The first programme consisted of a 2-hour instructor-led training or a self-directed training module, to evaluate the variance in impact for occupational therapy graduate students who had the instructor-led teaching, compared to occupational therapy graduate students who had the self-directed learning format. The second programme, 3.5-days of workshops for health professionals, was conducted in nine South African Provinces and sought to provide professional rehabilitation teams with the necessary skills to use the ICF to code clinical cases, and to assist provincial programme managers and the national department in designing implementation strategies at local and national levels. The workshop emphasised practical application of the ICF, and participants had the opportunity to practice and discuss the coding of clinical cases based on written vignettes, as well as their own case examples.

The third programme involved the development and implementation of a series of internet-based teaching modules, concerning the ICF, as part of a distance-learning (online) course on assistive technology for graduate students in rehabilitation counselling. Assessment of learning in programmes 1 and 2 was conceptually based on Bloom's taxonomy of educational objectives, and the assessment of the training focused on actual ICF knowledge, skills and attitudes towards application of the ICF in practice. In programme 1, a comparison of pre- and post-workshop results indicated significant increases in basic ICF-related knowledge. Before the implementation of the training, the instructor-led group answered an average of 66% of the questions correctly and the self-directed group answered an average of 71% of the questions directly correct. After training, both groups answered an average of 87% of the questions correctly.

The results showed significant increases in coding skills after a 2-hour instructor-led training session, but not after participating in a self-directed learning programme containing the same information. Also, both groups showed significant progress regarding the mastery and usefulness vis-à-vis ICF material. In the second programme, comparison of pre- and post-workshop performance indicated significant increases in basic ICF-related knowledge. There were also significant increases in coding skill. Also, once participants had learned about the ICF, they reported a need for ICF-based assessment forms for ICF implementation in clinical practice.

The ICF training programme in Nottwil (Switzerland) attended by HD included an 8-hour instructor-led basic training course, the intention of which was to convey information about the ICF and its development, basic principles, coding structures and relevance to different settings and uses. The decisions related to ICF-CY training delivery in the current programme were based on the literature presented above. The two-day instructor-led format was intended to put emphasis on learning the ICF-CY in order to facilitate a PPT's thought process using ICF knowledge. Online delivery models were also used to allow PPTs to learn the material at their own pace, by providing online links for ICF training to help PPTs learn how to integrate the ICF into their own reasoning and practice.

5.2.6 Adult Learning Theory

Learning and teaching the ICF-CY as a clinical reasoning tool requires deep engagement, and is about reasoning and the adoption of adult learning principles, including self-direction and autonomy; these rely heavily on experiential learning, where learning occurs through activities, particularly in the workplace (Ajjawi, 2009). In this section, the importance of Adult Learning Theory and how this theory has been used to develop the ICF-CY in-service training, as well as the strategies that have been used to deliver this training, are discussed.

Adult Learning (AL) has been defined as the transfer of knowledge which can alter behaviour (Hemmings, 2005). However, Mezirow (1981) states that AL is knowledge that is used to guide future actions or decision-making. AL across all definitions is a multidimensional process that connects new knowledge with previous experiences, a process which has been argued to be one of the keys to retaining information (Merriam, 2008).

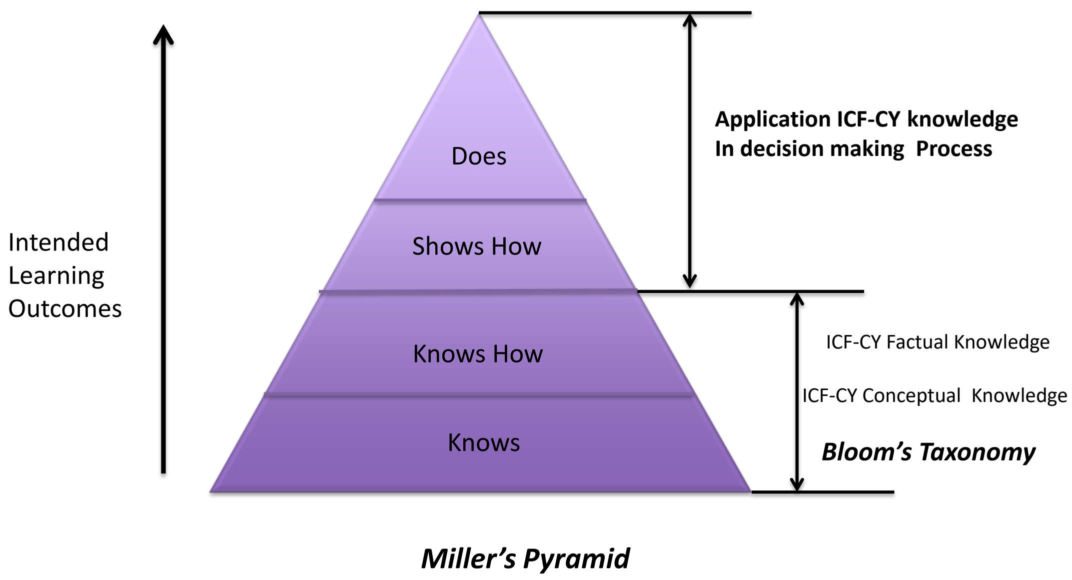
The combination of knowledge acquisition and experience in clinical practice is described in Kolb’s (1984) learning cycle, where an adult learner progresses through the cycle, using concrete experiences as a stimulus for reflection, which then allows the construction of abstract concepts. These can then be used to adapt an approach towards similar concrete experiences the next time they are encountered, thus returning to the beginning of the cycle (McLoughlin & Oliver, 2000).

This learning cycle influences the manner, which ICF knowledge is used as a clinical reasoning tool during the continuous cyclical process that PPTs engage in their day-to-day decision-making processes. These include assessment, identifying problems and setting goals to develop treatment plans. Also, this process relied not only on knowledge and cognition, but also on metacognition and critical reflection to transfer ICF knowledge into clinical practice.

A variety of intended learning outcomes within ICF-CY in-service training were included to transfer ICF-CY theory into clinical reasoning processes in the management of children with CP. Bloom's Taxonomy was used to inform the development of training materials and workshop style (Krathwohl, 2002). The training materials presented the application of both levels of ICF-CY knowledge (factual and conceptual knowledge) in decision-making processes for children with CP. These processes are used when developing a strategy for formulating interaction between ICF-CY domains to define the child's main problems, set goals and finally develop a treatment plan using procedural knowledge. According to this model of cognitive functioning, the learner must master the lower levels of knowledge and application in order to be able to progress to the higher levels. This is based on the notion that the lower levels of learning are somewhat simplistic, requiring the least understanding and experience, from which greater understanding can later be achieved (Forehand, 2002).

Miller's Pyramid of clinical competence outcomes represents knowledge components: "knows" (ICF factual and conceptual knowledge as a basis for the performance of skills), followed by "knows how" (applying ICF knowledge to problem-solving and decision-making by related learned skills) as the two stages of cognition. Then the process moves to exercises and tasks during which ICF-CY training is used to focus on Miller's last two components, which are "shows how" and "does" (applying this skill to develop an ICF patient profile, develop goal-setting and develop a treatment plan by referring to case examples of children with CP as a process of behaviour modification) (Wass et al., 2001) (see Figure. 5.2).

Figure 5.2. Miller's Pyramid (Copied from Miller's pyramid model, 1990)



Dreyfus and Dreyfus (1980) proposed a model in which skills are passed on through a combination of instructions and experiences. As the individual progresses through these stages, they become less dependent on abstract principles and instead increasingly dependent on concrete experiences. These three acquisition skill models fit with Kolb's learning cycle, as described above. Developing or adopting ICF-CY materials is critical to promote programme success (Brnbaumo et al., 2015; Jones, 2011). The procedure followed to prepare and plan the ICF-CY in-service training methodology took into account how ICF training is developed and delivered in other countries. Also, HD attended an ICF workshop to better understand which materials could be used and how to deliver ICF-CY in-service training.

Adults learn through social interactions within the clinical practice setting (Secomb, 2008). Bandura (1971) has highlighted that an adult learner learns either through direct experience or observing the behaviour of others. This theory implies that learner-to-learner and/or facilitator-to-learner interactions may provide valuable insights into learner interactions. This includes learning not only knowledge and cognitive skills, but also the traditions and cultures of the discipline (Stepanyan et al., 2014).

5.2.7 Facilitator Role

The training format was strongly influenced by AL theory, acquisition skills and social learning theory, which conceptualise the role of the educator as a facilitator (Secomb, 2008). However, AL theory emphasises the importance of shared experience for facilitator and learner; in this case, the facilitator and PPTs work in the same culture, and had seen similar situations and had similar experiences with children with CP as those presented during training.

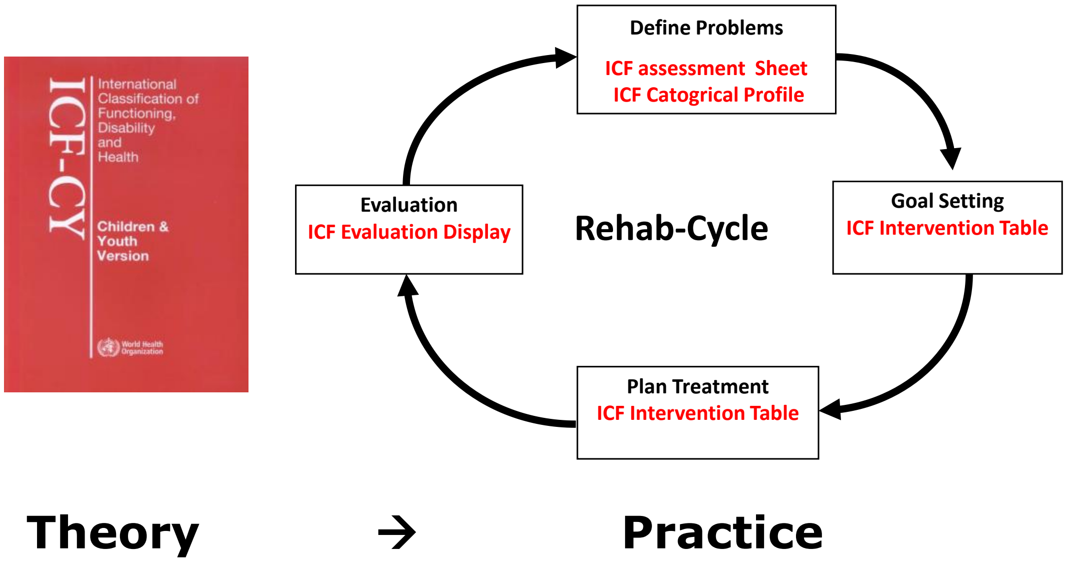
Reed et al. (2008) also highlighted the importance of the facilitator having relevant experience in order to promote best practice. The workshops attended by the facilitator (HD) had offered different unique opportunities to enhance and encourage the transfer of ICF knowledge into paediatric physiotherapy. Thereafter, these skills need to be coordinated within the clinical reasoning process during assessment to gather information, define the problem, set goals and develop a plan of treatment.

For this thesis, when designing ICF-CY in-service training, the Saudi cultural environment was taken into account. The facilitator's (HD) biography is presented in Appendix 11, p.365, HD is a PPT and has worked in Saudi Arabia for many years and become familiar with PPTs there. Additionally, case examples and exercises were taken from real experiences of Saudi children with CP, in order to facilitate engagement between learners and learner-to-facilitator via realistic and culturally specific situations.

5.2.8 Presentation of the Training

Different styles are involved in learning the ICF-CY, the "activists and pragmatists" learning styles were used. The "pragmatists" learning style of transferring theory into practice was used when the participants were given the opportunity to transfer their ICF-CY knowledge into practice (see Figure 5.3). For instance, first, the Rehab-Cycle is implemented to define the child's problem, set goals and develop a treatment plan during ICF-CY in-service training. The "activists" learning style was used to motivate the participants to undergo new experiences, and apply their new ICF-CY knowledge directly to cases that were presented during in-service training. Influencing participants to analyse ICF-CY concepts underlying their practice, as activists and pragmatists, has also been an effective approach to learning (McLoughlin & Oliver, 2000).

Figure 5.3. Applying the ICF-CY in Paediatric Physiotherapy Practice (Copied from Swiss Training Materials)



The training schedule emphasized the interaction between learners and facilitator-to-learner. The training programme schedule was presented in the training Appendices, and showed how the training was approached (Stepanyan et al., 2014). The tools listed below were used to encourage PPTs to use ICF-CY knowledge as a clinical reasoning tool.

1. Audio-visual and internet connection to introduce the assessment profile and how to complete the ICF form online from the ICF research website.
2. Incorporating review tasks by asking participants to break up into small groups to discuss the content.
3. Using a flip chart to write core skills that had been learned after progressing through training.

In-service training included lectures, group work and case presentations that covered the following topics:

- Integrative bio-psycho-social model of functioning and disability
- Structure and codes of the ICF-CY
- How and why the ICF-CY can enhance practice
- ICF-CY Core Sets for children with CP
- Application of the ICF-CY in the evaluation of children with CP
- Integration of the ICF-CY into the clinical reasoning process.

The exercises were given to the participants in groups of four, who then presented to the other groups to familiarise the participants with the ICF model, with a focus on understanding ICF factual knowledge and how it can facilitate the clinical reasoning process. An outline of learning materials and exercises from the two days is presented in Table 5.2. The ICF-CY in-service training and supplementary ICF-CY materials are available via the link https://strathcloud.sharefile.eu/d-s0753768e9b94963a and in the CD of the training materials Appendices.

Table 5.2. ICF-CY Training Programme: Outline of learning materials and 2-day timetable for exercises

Topics	Aims	Exercises
Day 1		
Learning Material 1: Integrative Bio-psycho-social Model of Functioning and Disability; brief explanation of the history of the ICF, differences between the medical model and the ICF and ICF-CY. Why it is important for paediatric physiotherapists to learn the ICF-CY for CP as a health condition.	Facilitate PPTs' thinking beyond diagnosis using different strategies: 1- Introduce functioning and disability, using the ICF-CY conceptualisation, arising from the interaction between the child's health condition and environmental factors, covering the whole span of a person's life. 2- Using case examples to facilitate the thinking of PPTs, two children may have the same health condition but very different levels of functioning. 3- 6 cases of present life experiences of children with CP, with completely different main problems. 4- Explain how the ICF-CY establishes a common language to improve communication across disciplines and sectors. 5- Define the ICF domains and use case presentations to understand what components will fall under each ICF domain.	**Exercise 1:** Become familiar with the components of the integrative model of functioning and disability via a case scenario**. Assign the items for a case scenario under each ICF-CY domain.** **Exercise 2:** Interactions between the components of the integrative model of functioning and disability. Identify potential interactions between the components of ICF domains of a case example of a 12-year-old boy with spastic CP with diplegia. Then, present the results to the group.
Learning Material 2: Structure and Codes of Classification: Structure and codes of classifications, benefits of describing functioning at different levels in the hierarchical structure. Use the ICF-CY book and also an online ICF Web browser, where the classification can be used to search for ICF-CY	Facilitate PPTs' comprehension of conceptual ICF knowledge including the ICF-CY classifications and categories, along with principles, generalisations, theories and models. However, the coding systems are not focused to enable PPTs to recall the structure and codes of classification.	

Topics	Aims	Exercises
categories to understand the ICF-CY coding system (provided by the WHO). http://www.who.int/classifications/icfbrowser		
Learning Material 3: Coding with ICF-CY Qualifiers. Using ICF-CY Qualifiers to rate the extent of the problem in an ICF category and create a functioning profile as a visual presentation to define the child's main problem, set goals and plan treatment using five ICF domains, as well as determine whether the child's environmental and personal factors are facilitators or barriers during physiotherapy management.		
Learning Material 4: Linking health and health-related information to the ICF model. Linking methodology can be applied to: clinical outcome measures, standardised questionnaires/ instruments, self-reports; caregiver reports, health professional reports, clinical assessments (e.g. 6-min. walking test etc.), interventions, targets and qualitative data.	Facilitate PPTs learning to link health and health-related information to the ICF-CY and understanding the benefits of linking information to the ICF-CY.	
Learning Material 5: ICF-CY Core Set The ICF-CY Core Set for children with CP, introduce the creation of a functioning profile for a child with CP.	Let PPTs understand how ICF Core Sets can be applied in physiotherapy management for children with CP, and the differences between the comprehensive Core Set and brief Core Set to develop a functioning profile. End of Day1: encourage participants to summarise what they have learned by asking every participant to write what he/she has learned on a flipchart	**Exercise 3:** Become familiar with the classifications using only the first level of classification: Search the classifications for ICF categories that describe the underlined items in the following case example of a 12-year-old boy with spastic CP with diplegia. b body function; s body structure; d activities & participation; ef environmental factors and pf personal factors **Group discussion:** How to develop a functioning profile using ICF-CY Qualifiers, and how a

Topics	Aims	Exercises
		functioning profile can be created. This gives a description of the complete experience of functioning. Give examples of standard assessments used by PPTs, e.g. GMFM in intervention and Bobath techniques, and ask participants to link them to ICF-CY domains. How to develop an electronic documentation form online on the website: www.icf-core-sets.org.
Day 2		
Recap day 1, focus on the CP Core Set and develop electronic documentation. **Learning Material 6**: Integration of ICF-CY into clinical reasoning, including the following material: Define clinical reasoning, clinical reasoning processes and how to use the ICF-CY in the clinical reasoning process. The ICF procedure and metacognition knowledge are used to show the participant how to use the ICF-CY in the management of children with CP, with an emphasis on the importance of applying environmental and personal factors in the case example presented during the workshop. Introduce forms and use case examples to understand how different forms can be used in the management of children with CP. The forms include: Rehab-Cycle; Paediatrics Physiotherapy Assessment Form used in the Jelsma and Scott (2011) study; ICF Categorical Profile; ICF Assessment Sheet, ICF Evaluation Display and ICF Intervention Table.		**Exercise 4:** Use the Rehab-Cycle form to create an ICF Categorical Profile of a 12-year-old boy with spastic CP with diplegia. **Exercise 5:** Create SMART Goals using the ICF categorical profile **Exercise 6:** Case example with a 6-year-old child with CP and GMFCS level V. The participants in the group create a Rehab-Cycle and categorical profile, then carry out goal-setting. Closing: Discussion on what each PPT has learned, written on a flipchart

5.2.9 Impact of ICF-CY In-Service Training on Paediatric Physiotherapists' Clinical Reasoning Elements

Victor-Chmil (2013) argued that defining clinical reasoning played an important role in providing the foundations for educators to implement their strategies for facilitating the development of clinical reasoning. The definition also guides the development of evaluative measures for recognising clinical reasoning effects in practice. Therefore, a pre- and post-ICF-CY in-service training survey for PPTs was developed based on the definition of clinical reasoning employed in this thesis (see 1.4.1, clinical reasoning definition p.22) to evaluate the ICF-CY knowledge base, clinical decision-making process and intentions, attitudes and beliefs towards the application of environmental and personal factors in the management of children with CP. PPTs attending two day ICF-CY in-service training completed a training workshop survey at the beginning of the first day, and at the end of the second day of training (see Appendix 4: Pre- and Post-training workshop questionnaire).

5.3 Conclusion

The training programme described in this chapter included training methodology delivered while taking into account evidence available for a variety of ICF training programmes, which were delivered in a variety of countries. The impact of the training is described in Chapter Six.

Chapter 6

Impact of Learning the ICF Framework as a Clinical Reasoning Tool for Paediatric Physiotherapists Working with Children with Cerebral Palsy Longitudinal Quasi-Experimental Study

6.1 Introduction

This chapter presents a longitudinal study that evaluates the impact of a two-day ICF-CY in-service training called *Application of the ICF-CY Framework as a Clinical Reasoning Tool for Children with Cerebral Palsy (CP).* The ICF-CY in-service training was developed and delivered based on a carefully chosen combination of the major strengths of worldwide ICF educational programmes and adult-learning theories with consideration of the Saudi cultural context as described in Chapter Five. The training was developed and delivered by Hanan Demyati (HD), in order to train paediatric physiotherapists in the application of the ICF to structure their clinical reasoning in the management of children with CP. In addition, the use of the ICF as an assessment and formulation tool was evaluated from the perspective of the parents of the children with CP.

6.2 Rationale for Study

Across the world, ICF/ICF-CY based educational programmes consistently support the acquisition of ICF-CY knowledge and the ability to apply the ICF to everyday clinical practice within rehabilitation (Adolfsson et al., 2010; Martinuzzi et al., 2010).

ICF training also aims to guide decision-making processes and enhance the professional’s awareness of the role of contextual factors, such as the role of the family’s and child’s interest in addition to the impairment and activity limitations (Jelsma & Scott, 2011; Darrah et al., 2006). However, there is very little published evidence of the impact of ICF training on clinical practice.

The current ICF-CY workshop training for clinical reasoning involved justifying clinical decisions and determining how the therapist’s ICF-CY knowledge could be applied in the management of children with CP. The ICF-CY in-service training development and delivery in the current study is comparable with those reported in Chapter Five (see section 5.2.2), (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Franki et al., 2014; Jelsma & Scott, 2011; Pless et al., 2009; Reed et al., 2008; Allan et al., 2006; Leonardi et al., 2005). The current training programme aimed to build on the positive aspects of earlier training programmes in addition to addressing some of their limitations. It is hoped that the work undertaken in this study will contribute to the body of knowledge on teaching ICF-CY as a clinical reasoning tool among qualified and student physiotherapists.

Prior to delivering the current ICF-CY training, a logic model was created to guide and organise the processes to be undertaken before, during and after the delivery of the ICF-CY in-service training (See Figure 5.1 p.173). Review of previous training was key in establishing the elements and materials necessary as the current ICF-CY in-service training includes a modified version of the materials that have been approved by the WHO (ICF workshop, Nottwill, Switzerland, 2013).

Also, the content of the current training was arranged based on a review of adult learning theories and skills that could help to the transfer of ICF knowledge in clinical practice (Pless et al., 2009).

The current ICF-CY training was supported by previous studies (Franki et al., 2014; Jelsma & Scott, 2011; Allan et al., 2006), which indicate that teaching the ICF model as a clinical reasoning tool requires consideration of operational aspects to transfer ICF knowledge into clinical practice. The ICF-CY training in this current study started by emphasising the importance of the environmental and personal factors in the decision-making processes for the management of children with CP. Six case studies of children with CP were introduced to focus on the importance of the child's environmental and personal factors in their management at different levels starting from the Gross Motor Function Classification System (GMFCS) as well as to emphasise how these factors of physiotherapeutic management are currently neglected in the PPTs' decision-making processes.

A pictorial representation of the relationship between the ICF domains for use in the management of children with CP needs was taught in order to guide physiotherapists in their decision-making processes (Allan et al., 2008). This feature of training will hopefully contribute to a change in perspective for physiotherapists working with CP, specifically in a country such as Saudi Arabia where CP is a common chronic neurological health condition.

Both elements of strengths and limitations within previous ICF/ICF-CY training programmes were considered when the logic model of the current training was created. One of the limitations of previous training programmes was that the ICF model was being taught as a classification assessment tool.

This strategy might lead the PPTs to focus on retention of ICF knowledge, rather than on transferring ICF knowledge into clinical practice (Leonardi et al., 2005).

Furthermore, when the impact of previous training programmes was evaluated, only the heath professional's ICF coding skills were assessed. In contrast, the impact of the current ICF-CY training was evaluated using a series of case vignettes and a theory based questionnaire delivered before and after the training programme (See Appendix 4: Pre-and-post ICF-CY training workshop questionnaire p.320).

Collaboration between the practitioner and the parents and child with CP is a key aspect of the clinical reasoning process and is important in the promotion of successful outcomes (Atkinson & Nixon-Cave, 2011). However, the impact of the previously published ICF/ICF-CY training studies were all evaluated from the health professional's perspective alone (Pless et al., 2009; Martinuzzi et al., 2010; Reed et al., 2008; de Oliveira Andrade et al., 2011; Jelsma & Scott, 2011; Allan et al.,2006). To date there has been no published evaluation of the ICF-CY framework in the management of children with CP from the perspective of the parents of the children with CP.

6.3 Aims and Research Questions

This study aimed to answer the following research questions:

1. What is the impact of a two-day ICF training workshop on paediatric physiotherapists' level of ICF knowledge?

2. What changes are seen in paediatric physiotherapists' decision-making to apply the ICF model to case based vignettes following ICF-CY training?
3. Does the Theory of Planned Behaviour (TPB) predict PPTs' application of environmental and personal factors in the physiotherapy management of children with CP as a result of ICF-CY training?
4. Do the parent's ratings of their child's physiotherapy differ when they are treated within a setting where the staff have received training in the ICF-CY model versus a setting where the staff have not been trained in the ICF model?

6.4 Methods

6.4.1 Study design

A longitudinal evaluation of a two-day ICF–CY in-service training workshop delivered to paediatric physiotherapists was undertaken in two phases:

Phase1: Physiotherapist Questionnaire: a questionnaire measuring ICF knowledge and its application was completed at the beginning and again at the end of the two-day ICF–CY in-service training workshop. (See Appendix 4: Pre-and-Post training workshop questionnaire p.320).

Phase 2: Parental Questionnaire: five months following the workshop, the parents of children with CP who were attending a physiotherapy department for treatment were recruited from two locations and asked to complete a questionnaire that measured their experience of the treatment. In one department the PPTs had attended the ICF-CY training workshop while in the other, the PPTs had not attended the training (See Appendix 5 Parent Questionnaire p.336).

6.4.2 Participants

Phase 1: Physiotherapy Questionnaire: Thirty-six paediatric physiotherapists were registered in one of the two ICF-CY in-service training workshops and agreed to participate in this study. Seventeen PPTs were from the east province, and 19 PPTs were from the west province. Three PPTs from the west province left before the end of the second day for transportation reasons, and therefore did not complete the evaluation. In addition, four PPTs from the east province did not give consent to participate in the study.

Phase 2: Parental Questionnaire: Eighty parents of children with CP completed the parent survey. Forty were attending a physiotherapy department where the physiotherapists had completed the ICF-CY in-service training workshop, and forty were attending a location where the physiotherapists had not received the ICF-CY in-service training workshop.

Inclusion criteria of each stage

Phase 1: Physiotherapy Questionnaire

- All participants of the ICF-CY in-service training workshop who consented to take part in the study were included.

Phase 2: Parental Questionnaire

- Parents of children (aged 2-18 years) with CP, being treated in physiotherapy departments from institutions where one or more paediatric physiotherapists participated in the ICF-CY in-service training workshop.

- Parents of children (aged 2-18 years) with CP, being treated in physiotherapy departments from institutions where none of the paediatric physiotherapists participated in the ICF-CY in-service training workshop.

Exclusion criteria of the two phases:

Other health and social care professionals (i.e. not physiotherapists) were excluded from the study. Parents of children with a health condition other than CP and/or a health condition that had not yet been confirmed to be CP in their referral to physiotherapy were also excluded from the study.

6.4.3 Measures

6.4.3.1 *Phase1: Physiotherapy Questionnaire*

The levels of ICF knowledge, PPTs' performance on the three case vignettes, the measure of clinical decision making behaviour and the TPB construct measures with their scoring systems are described in detail in Chapter Four (section 4.4.3 Measures, p.138).

Each of the levels of ICF knowledge; factual, conceptual and procedural was measured using three items. Twelve items measured TPB constructs, each construct namely: intention, attitude, perceived behavioural control and subjective norm was measured by three items. Three case scenarios were used to assess the PPTs' decision-making performance (full case scenarios are provided in Appendix 4 providing pre-and-post training questionnaires p.320). The PPTs' decision-making scores in each case vignette were generated before and after training. Each case was scored as follows: one if the PPT's first choice was correct and zero if the first choice was incorrect. Two if the first and second were correct, three if the first, second and third were correct. The lowest score was zero and the highest score was 3 for each of the three case vignettes to be judged.

In Case 1 the first choice was the child's physical impairment as the main problem, the second choice was the child's walking activities and the third choice was the child's environmental or personal factors. In Case 2 the first choice was the child's environmental factors as the main problem that affected the child's walking activity, second choice was the child's physical impairment and the third choice was the child's walking activities. In Case 3 the first choice was the child's personal factors as the main problem affecting the child's walking activity, the second choice was the child's physical impairment and the third choice was the child's walking activities.

The score for each of the three case studies were added together to provide a total score that was used as the measure of the PPTs' decision-making behaviour for applying environmental and personal factors. The minimum score is zero and higher score is 9, the higher the score, the better the PPT's decision-making was judged to be.

6.4.3.2 *Phase 1: Reliability of Pre- and Post- PPT Questionnaires*

The internal consistency of the measurement scales for the clinical reasoning elements of a PPT's decision-making, TPB constructs and three levels of ICF knowledge were assessed using Cronbach's alpha (Table 6.1). The reliability was acceptable for all measures except subjective norms post-training, which was low at 0.55. There has, however, been no universal agreement on the minimum acceptable standards for scale reliability. According to DeVellis (2003), subscales for Cronbach's alpha ≥0.7 are considered to be high.

Giving further clarification, Bowling (2009) states that >0.50 is the minimum acceptable level for scale reliability. Thus, although the reliability for post-training subjective norm was lower than preferred it was above the 0.50 criteria of Bowling.

Table 6.1. Reliability of Pre-and-Post Training

Variables	**Items**	**Pre-training N=36 A**	**Post-training N=36 α**
Intention	6	0.88	0.71
Attitude	6	0.88	0.71
Subjective Norms	6	0.61	0.55
Perceived Behavioural Control	6	0.63	0.60
Decision-making Bahaviour	10	0.63	0.73
Factual ICF Knowledge	3	0.72	0.73
Conceptual ICF Knowledge	3	0.71	0.82
Procedural ICF Knowledge	3	0.63	0.73

6.4.3.3 *Phase2: Parent Questionnaire*

The parental questionnaire is described in Chapter Three (3.4.2 Parent Questionnaire: Physiotherapy management for children with cerebral palsy p.127). The questionnaire collected demographic and clinical information including: the child's gender, age, number of years of follow up in physiotherapy and reason the child was receiving follow up in physiotherapy. Items used to measure parental experience of the management of their child are listed in Table 6.2.

Five components of *physiotherapy management* were measured as follows: assessment obtained for the child, objectives for physiotherapy sessions, the proposed treatment plan to help the child achieve his/her goals, cooperation with physiotherapy and Parental satisfaction. These five components were measured as follows:

Assessment: The child's physiotherapy examination component was measured by three items evaluating the child's physical impairments, two items measured the physical activities, two items measured environmental factors, and two items measured personal factors.

Objectives: Nine items measured the child's physiotherapy objective components as follows: two items evaluated child's physical impairments, two items evaluated physical activities, three items evaluated environmental factors, and two items evaluated personal factors.

Treatment Plan: The child's treatment plan components were measured by three items to evaluate the child's physical impairments, two items measured physical activities, three items measured environmental factors and two items measured personal factors.

Cooperation with the physiotherapy was measured with 8 items, namely whether the parents actively participated in decisions relating to the assessment of their child, if the child's family took part in setting the objectives for the child, if the family took part in plans being made to help the child achieve his/her goals, and if the parents actively participated in and not just listened at physiotherapy planning meetings. Whether the physiotherapist's plan was worthwhile for the child's idea of a physiotherapy plan providing a clear structure for what was happening for the child and gave an overview of the needs of the child, demonstrating whether there was a common thread between the objectives and treatment plans.

A five-point verbal response scale was used for all measures of physiotherapy management and co-operation with physiotherapy. Response scales were labelled: not at all/ to a limited extent/ somewhat/ to a large extent/ entirely.

Items with a higher score indicated that the PPTs employed the ICF domain either in assessment or setting treatment objectives, and a lower score indicated that the PPTs had not considered the ICF domain at all. The mean score for each domain was calculated.

Parental Satisfaction: Two items were developed to evaluate the degree of the parent's satisfaction regarding the treatment their child received from the physiotherapist, and the progress the child was making since starting the physiotherapy treatment over the past three months. The response for each item was measured on a 5-point verbal response scale as: extremely satisfied/ satisfied/ neither satisfied nor dissatisfied/ dissatisfied / extremely dissatisfied. Items were reverse scored, so that higher score indicated the greater parent satisfaction.

Table 6.2. Items used to measure parental experience of and satisfaction with the management of their child

1- Physiotherapy examination has focused on
1. My child's physical functioning (physical impairment)
2. My child's psychological functioning (physical impairment)
3. My child's 5 senses functioning (physical impairment)
4. Which actions my child can perform with confidence (personal factors)
5. What my child is interested in doing at home or in preschool/school (personal factors)
6. What my child does on his/her initiative in everyday situations (physical activities)
7. My child's interactions with others in the surrounding area (physical activities)
8. How my child's physical environment where he/she live helps or hinders his/her physical activities (environmental factors)
9. Support from the attitude of the people in my child's environment (environmental factors)

2- Physiotherapy objectives have involved

1. My child’s physical health and development (physical impairment)
2. My child’s psychological health (physical impairment)
3. My child’s 5 senses facilitate/inhibit physical functional activities (physical activities)
4. My child being able to perform tasks with or without help in everyday situations (physical activities)
5. My child being better able to cope with different life situations (personal factors)
6. My child being involved in the things he/she likes (personal factors)
7. My child’s interaction with other people in his/her environment (environmental factors)
8. Ensuring that the physical environment around my child works (environmental factors)
9. Support from and attitudes of people in my child’s environment (environmental factors)

3- The treatment plan has considered

1. My child’s physical health and development (physical impairment)
2. My child’s psychological health (physical impairment)
3. My child’s 5 senses facilitate/inhibit physical functional activities (physical activities)
4. My child’s ability to do things with confidence(personal factors)
5. My child’s ability to perform tasks in everyday situations (physical activities)
6. My child’s active participation in the activities in which he/she is interested (personal factors)
7. My child’s interaction with others in his/her environment (environmental factors)
8. The physical environment around my child (environmental factors)
9. Support from and attitudes of people in my child’s environment (environmental factors)

4- Cooperation with the physiotherapy

1. I actively participate in decisions relating to the assessment of my child
2. My family and I take part in setting objectives for my child
3. My family and I take part in plans being made to help my child achieve his/her goals
4. I actively participate in, and am not just a listener at, physiotherapy planning meetings
5. I think the physiotherapy plan is worthwhile for my child.
6. I think the physiotherapy plan provides a clear structure for what is happening for my child.
7. I think the physiotherapy plan gives me an overview of the needs of my child.
8. I see a common thread between the objectives and treatment plans envisaged

5- Parents satisfaction

1. I’m satisfied with the treatment my child receives from the physiotherapist over the past three months
2. I’m satisfied with the progress my child is making since starting physiotherapy treatment over the past three months

6.4.3.4 *Reliability of Parent Questionnaire*

The reliability coefficients are displayed in Table 6.3. Cronbach's α was ≥ 0.7 for all measures, indicating a high internal reliability (DeVellis, 2003).

Table 6.3. Reliability of Parent Questionnaire Variables

Variables	Items	Training Group N=40 α	No Training Group N=40 α
Physiotherapy Examination	9	0.72	0.72
Physiotherapy Objective	9	0.73	0.84
Treatment Plan	9	0.83	0.87
Cooperation with physiotherapist	8	0.91	0.83
Parent Satisfaction	2	0.73	0.73

6.4.4 Procedure

6.4.4.1 *Recruitment Procedure*

Phase 1: Physiotherapists Questionnaire

Two ICF-CY in-service training workshop announcements were delivered by the SPTA distribution service as an email message to all members on the distribution list. One week before the workshop, all physiotherapists who had signed up to take part in the ICF-CY training received a study invitation email with an information sheet describing the aims of the study in sufficient detail to help them make an informed decision about their participation in the study (Appendix 7 p.348).

Phase 2: Parental Questionnaire

Three months after the ICF-CY in-service training workshops, the head of the physiotherapy department of four institutions where the paediatric physiotherapists had participated in the ICF-CY in-service training workshop, and four institutions where paediatric physiotherapists had not participated in the workshop were contacted. They were asked to distribute an information sheet to the parents of children with CP, inquiring if they would be willing to take part in the study (See Appendix 7 p.347). HD arranged with each head physiotherapist of the eight institutions to meet with those participants who were willing to take part in the study to gain their informed consent prior their child's physiotherapy session, and have them complete the parental questionnaire.

6.4.4.2 *Study Procedure*

Phase1: Those participants who registered for the ICF-CY training were sent an email inviting them to participate in the study. Thereafter, those who agreed to participate were asked to sign the accompanying consent form prior to the workshop. Before each ICF-CY in-service training workshop, participants were provided with folders containing all the necessary online materials (The ICF-CY in-service training link: https://strathcloud.sharefile.eu/d-s0753768e9b94963a). Each folder had a unique code number and the participants were asked to write this number on the pre- and post- training workshop questionnaires to enable the questionnaires to be matched. The ICF-CY in-service training was given in Khobar on May3rd and 4th,, 2015 and in Jeddah on May 9th and 10th, 2015.

All participants completed the pre-training workshop questionnaire at the beginning of the first day, and then completed the post-training workshop questionnaire at the end of day two, at the close of the workshop. At the end of the workshop, those participants who wanted to have additional learning materials online were asked to provide their email address. Thereafter, they were sent the ICF-CY in-service training link for learning materials as requested.

Phase2: Five months after the two ICF-CY in-service training workshops, consenting parents completed the parental questionnaire. Thirty minutes before their child's physiotherapy session, parents signed the consent form and then completed the parental questionnaire (See Appendix 5: Physiotherapy management for children with cerebral palsy p.336). Questionnaires were completed in a private clinic room with support (as required) from the researcher (HD).

6.4.5 Data analysis

The SPSS software package (version 23 for Mac) was used to analyse the questionnaire data as follows.

Descriptive Analysis

A descriptive analysis was performed of the frequency and proportion of responses obtained. In addition, the mean and standard deviation were calculated for intention, attitude, perceived behaviour control, subjective norms, PPT decision-making, and the five components of the parent survey. The descriptive statistics for the variables of the three case scenario scores, TPB cognitive constructs, and levels of ICF knowledge were not normally distributed, so they were transformed using a natural log function in order to fulfil the normality assumption. In phase 2, however, the five components of the parent survey were normally distributed, and were therefore used untransformed.

Inferential Analysis

In phase 1: Physiotherapy Questionnaire

A paired samples t-test was used to compare pre- and post-training self-reported ICF knowledge, self-reported application of ICF-CY knowledge and factual, conceptual and procedural levels of ICF knowledge. The t-test was also used to compare pre- and post-training TPB constructs of decision making behaviour in applying environmental and personal factors in the management of children with CP (intention, attitude, perceived behavioural control and subjective norms). Analysis of the results included the mean (M), standard deviation (SD), and effect size (d) with a small effect being less than 0.20, a medium effect up to 0.80, and a large effect more than 0.80 (Field, 2014).

The sign test was used to compare between pre- and post-training PPT decision making performance for the three case vignettes.

The Pearson's Correlation Coefficient was used to assess the relationship between the cognitive constructs and the decision making behaviour before and after training.

Hierarchical linear regression was used to examine the ability of TPB cognitions (attitude, subjective norms, and perceived behavioural control) to predict intention to apply environmental and personal factors before and after training.

In Phase 2: Parental Questionnaire

Unpaired t-tests were used to compare the parental evaluations of physiotherapy treatment from parents whose children were treated by PPTs who had attended the ICF-CY training and those parents whose children were treated by PPTs who had not attended the ICF-CY training.

The Pearson's Correlation Coefficient was used to assess the relationship between the child's physiotherapy examination, objective, treatment plan, parent's cooperation with physiotherapy and satisfaction of parents whose children were treated by PPTs who had attended the ICF-CY training and those parents whose children were treated by PPTs who had not attended the ICF-CY training.

6.4.6 Ethics

Ethical approval was obtained from the University of Strathclyde Ethics Committee (See Appendix 10). In addition, local approval and agreement was obtained from the Medical Service of the Ministry of Defence, Saudi Arabia from whom HD received a scholarship (See Appendix 10). Local approval was also obtained for the delivery of a workshop in Jeddah and Khobar, Saudi Arabia (See Appendix10 for workshop approval and two ICF-CY in-service training brochures).

6.5 Results

6.5.1 Phase1: Pre-and-Post training PPT Questionnaire

Participants

Thirty-six PPTs provided consent to participate in this study and their data were analysed; 17 PPTs were from the east province (Khobar), and 19 PPTs were from the west province (Jeddah).

What was the impact of the two-day ICF training workshop on the paediatric physiotherapist's level of ICF knowledge?

All questionnaire scores collected pre- and post-training are presented in Table 6.4 below. Following the ICF-CY training, there was a significant increase in self-reported ICF-CY knowledge, ICF-CY application in clinical practice, and conceptual and procedural level ICF knowledge. However, the training did not affect factual ICF knowledge.

Table 6.4. ICF Knowledge, Application of the ICF in Clinical Practice and Levels of ICF Knowledge Pre- and Post-Training

Variables	**Mean ± SD**	**d**	**t (df=35)**	**p**
1- Self Reported ICF-CY knowledge Pre-Training Post-Training	2.7 ± 1.2 5.3 ± 1.8	2.2	-9.5	0.001
2- Self Reported Application of ICF-CY Knowledge Pre-Training Post-Training	2.6 ± 1.8 4.0 ± 2.0	0.7	-3.7	0.01
3- Factual Knowledge Pre-Training Post-Training	2.0 ± 1.0 2.3 ± 0.6	0.3	-2.0	0.06
4- Conceptual Knowledge Pre-Training Post-Training	2.6 ± 0.8 3.0 ± 0.3	0.5	-2.0	0.04
5- Procedural Knowledge Pre-Training Post-Training	1.0 ± 0.9 2.3 ± 0.8	1.4	-8.0	0.00

*The minimum and maximum possible score for the self-report & application ICF knowledge is 1 and 7; and 0 and 3 for levels of ICF knowledge.

What changes were seen in the paediatric physiotherapist's decision-making when applying the ICF model to case based vignettes following the ICF-CY training?

Table 6.5 shows the results of the analysis examining the difference in decision making for each case study between participants before and after training. After training, there is significant median increase in PPT decision making score in three cases as follow (2,1,1 score).

Table 6.5. Sign Test Examining Physiotherapist Performance for each Case Study Pre-and-Post Training

Variables N=36	Median	Difference	Frequencies			P-Value
			Positive Differences	Negative Differences	Ties	
1- Case1						
Pre-Training	1.0	2.0	21	6	9	0.01
Post-Training	3.0					
2- Case2						
Pre-Training	1.0	1.0	24	5	7	0.001
Post-Training	2.0					
3- Case3						
Pre-Training	1.0	1.0	25	5	6	0.001
Post-Training	2.0					

Does the Theory of Planned Behaviour (TPB) predict the PPTs' application of environmental and personal factors in physiotherapy management for children with CP as a result of ICF-CY training?

Mean values for all TPB cognitions pre- and post-training are presented in Table 6.6 below. Following training, there was a significant increase in PPT attitude and perceived behaviour control, intention and decision making behaviour in the application of environmental and personal factors. Training did not affect subjective norms.

Table 6.6. The Impact of Training on TPB Cognitions

Variables	Mean ± SD	d	t (df=35)	p
1- Intention Pre-Training Post-Training	5.6 ± 1.2 6.1 ± 0.7	0.4	-2.9	0.005
2- Attitude Pre-Training Post-Training	5.6 ± 1.1 6.3 ± 0.6	0.6	-3.8	0.001
3- Perceived Behaviour Control Pre-Training Post-Training	4.7 ± 0.6 5.4 ± 0.7	1.0	-5.2	0.05
4- Subjective Norms Pre-Training Post-Training	4.0 ± 0.8 4.2 ± 0.9	0.2	-1.4	0.3
5- Decision-Making Behaviour Pre-Training Post-Training	3.4 ± 1.7 6.1 ± 2.2	1.6	- 7.6	0.04

*The minimum and maximum possible score for the TPB constructs is 1 and 7; and 0 and 9 for the clinical decision making behaviour.

Table 6.7 presents the correlation between TPB variables before and after ICF-CY training. Before training attitude, perceived behavioural control, and subjective norms were positively correlated with the intention to apply environmental and personal factors; a stronger positive attitude, greater perceived control, and more normative pressure over the application of personal and environmental factors were associated with higher intention. After training, attitude and perceived behavioural control remained positively correlated with the intention to apply environmental and personal factors but subjective norms were no longer significantly correlated with intention. However, none of the TPB cognitive constructs were significantly correlated with the PPT's decision making behaviour either before or after training.

Table 6.7. Correlation of TPB Cognitive Constructs & Decision Making Behaviour Pre-and-post training

TPB Cognitive Variables	1	2	3	4	5
1-Intention					
Pre training	1	0.42*	0.64**	0.40**	0.08
Post training	1	0.36*	0.55**	0.11	0.27
2- Attitude					
Pre training		1	0.30	0.15	0.06
Post training		1	0.16	-0.18	0.17
3- Perceived Behaviour Control					
Pre training			1	0.45**	0.25
Post training			1	0.1	0.22
4- Subjective Norms					
Pre training				1	0.26
Post training				1	0.26
5- Decision making behaviour of application environmental and personal factors					
Pre-training					1
Post-training					1

** Person Correlation is significant at the 0.01 level (2-tailed), * Person Correlation is significant at the 0.05 level (2-tailed)

Table 6.8 shows the results of a multivariate linear regression addressing behaviour before and after training. Before training the predictor variables explained 48% of the variance in intention, and the model was statistically significant ($F = 9.9$, $p < .0001$). After training the predictor variables explained 41% of the variance in intention, and the model was statistically significant ($F = 7.4$, $p < .0.05$).

In partial support of the TPB, the standardized regression coefficient before training demonstrated attitude at ($\beta = 0.26$, $p \leq .05$) and perceived behavioural control at ($\beta = -0.50$, $p \leq .01$) were significant predictors of intention. Both attitude and perceived behavioural control remained predictive of intention post-training ($\beta = 0.33$, $p \leq .01$ and $\beta = 0.52$, $p \leq .00$, for attitude and perceived behavioural control respectively). In contrast, subjective norms were not a significant predictor of intention either before or after training.

Table 6.8. Linear Regression of TPB Cognitive Variables Predicting Intention in the application of environmental and personal factors

Predictors of Intention	**R^2**	**F**	**β**	**p**
Before training	0.48	9.9**		0.001
Attitude			0.26*	0.05
Perceived Behavioural Control			0.50*	0.002
Subjective norms			1.0	0.4
After training	0.41	7.4*		0.01
Attitude			0.33*	0.02
Perceived Behavioural Control			0.52**	0.001
Subjective norms			0.02	0.9

*p<0.05 **p< 0.01

6.5.2 Phase 2: Parent Questionnaire

Demographic Data

Demographic information is presented in Table 6.9. The majority of the questionnaires for both groups were completed by mothers. The majority of children were aged 4 years or more and had received 1-3 years of follow up by physiotherapy departments.

Table 6.9. Demographic Information in Phase 2

Demographic Information	Training Group N=40	No Training Group N=40
Survey completed by		
Father	2	4
Mother	37	34
Other	1	2
Child’s gender		
Girl	20	19
Boy	20	21
Child’s Age (Years)		
2 - 3	6	11
4 - 6	19	15
7 - 9	8	9
10 – 12	7	5
Follow-up in Physiotherapy		
7 - 9 Months	4	5
10 - 12 Months	1	0
1 - 3 Years	28	27
4 - 6 Years	7	8

Does ICF-CY training affect parents’ evaluation of physiotherapy management of their child?

Table 6.10 shows the parental evaluation of the physiotherapy management of their child by PPTs who received the ICF-CY training vs those who did not receive training. There were no differences in parental evaluation of the physical examination, objectives, plan of treatment, and cooperation with physiotherapists between the two groups of parents. However, the parents whose child was being managed by an ICF trained PPT reported greater levels of satisfaction than parents whose child was being managed by a PPT who had not undertaken the ICF training.

Table 6.10. t-test Examining Parents' evaluation of the management of their child's physiotherapy

Variables	Mean ± SD	d	t (df=78)	P
1- Child's examination				
ICF Training Group	3.0 ± 0.7			
No Training Group	2.9 ± 0.8	0.1	1.4	0.15
2- Child's objectives				
ICF Training Group	3.2 ± 0.8			
No Training Group	3.0 ± 0.9	0.2	1.4	0.54
3- Child's Treatment Plan				
ICF Training Group	3.0 ± 0.9			
No Training Group	3.1 ± 0.9	0.1	1.0	0.60
4- Child's Cooperation with physiotherapist				
ICF Training Group	3.4 ± 0.9			
No Training Group	3.7 ± 0.9	0.3	2.1	0.15
5- Child's Parent Satisfaction				
ICF Training Group	4.1 ± 0.7			
No Training Group	3.3 ± 0.8	1.2	4.5	0.00

*Maximum score is 5 and minimum scores is 1 for each domain

The parental evaluation of the extent to which their physiotherapist considers their child's physical impairments, physical activities, environmental and personal factors in each management component (physical examination, objectives and plan of treatment) for each group of parents is displayed in Table 6.11. Independent t-tests indicated there were no significant differences in the evaluation of physiotherapy between the group of parents with PPT's with ICF training versus the group with no training.

Table 6.11. t-test Examining Parental evaluation of the use for the ICF in the examination, objectives and treatment planning for their child

Variables	Mean ± SD	d	t(df=78)	p
Child's examination				
Physical Impairment				
ICF Training Group No Training Group	2.8 ± 0.9 3.0± 0.9	0.2	-1.2	0.81
Physical Activities				
ICF Training Group No Training Group	3.1 ± 1.1 2.8± 1.0	0.2	1.4	0.90
Environmental Factors				
ICF Training Group No Training Group	3.1 ± 1.1 3.0 ± 1.2	0.1	1.0	0.50
Personal Factors				
ICF Training Group No Training Group	3.0 ± 1.1 2.8 ± 1.2	0.2	1.6	0.16
Objectives				
Physical Impairment				
ICF Training Group No Training Group	3.1 ± 1.1 3.0 ± 1.2	0.1	1.0	0.36
Physical Activities				
ICF Training Group No Training Group	3.3 ± 1.3 3.0 ± 1.1	0.3	1.6	0.70
Environmental Factors				
ICF Training Group No Training Group	2.9 ± 1.3 2.5 ± 1.2	0.3	1.9	0.06
Personal Factors				
ICF Training Group No Training Group	3.4 ± 1.2 3.3 ± 1.1	0.1	0.75	0.61
Child's Plan of Treatment				
Physical Impairment				
ICF Training Group No Training Group	3.1 ± 0.9 3.3 ± 1.1	0.2	-0.30	0.80
Physical Activities				
ICF Training Group No Training Group	3.3 ± 1.2 3.0 ± 1.3	0.1	1.2	0.24

Variables	Mean ± SD	d	t(df=78)	p
Environmental Factors				
ICF Training Group	2.9 ± 1.2	0.1	0.33	0.73
No Training Group	3.0 ± 1.1			
Personal Factors				
ICF Training Group	3.3 ± 1.2	0.3	0.15	0.34
No Training Group	3.0 ± 1.3			

* Maximum score is 5 and Minimum score is 1 for each domain

Table 6.12 shows the correlation between parental evaluation of physiotherapy management variables and satisfaction, from parents whose children were treated by PPTs who had attended the ICF-CY training, and those parents whose children were treated by PPTs who had not attended the ICF-CY training. Satisfaction of parents whose child was being managed by an ICF trained PPT had significant relationships to the child’s objective and co-operation with physiotherapy items. However, none of physiotherapy management varibles were significant with satisfaction of parents whose children were treated by PPTs who had not attended the ICF-CY training.

Table 6.12. Correlation between parental evaluation items of child's physiotherapy

Variables	Parent Satsification
1- Child's examination	
ICF Training Group	0.20
No Training Group	0.04
2- Objectives	
ICF Training Group	0.33*
No Training Group	-.02
3- Child's Treatment Plan	
ICF Training Group	0.25
No Training Group	-0.15
4- Parental Cooperation with physiotherapist	
ICF Training Group	0.32*
No Training Group	0.037
5- Parent Satisfaction	
ICF Training Group	1
No Training Group	1

** Person Correlation is significant at the 0.01 level (2-tailed), * Person Correlation is significant at the 0.05 level (2-tailed)

6.6 Discussion

This study, over two phases, explored the impact of a two-day ICF-CY training workshop titled *Applying the ICF-CY Framework as a Clinical Reasoning Tool for Children with CP* delivered to physiotherapists in two locations in Saudi Arabia. In phase 1, the analysis examined the effect of the ICF-CY training on PPTs' ICF knowledge base and decision-making behaviour, and the ability of the TPB to predict the decision-making behaviour of involving the application of environmental and personal factors. In phase 2, the impact of the training was examined from the perspective of parents. Parental evaluations of and satisfaction with physiotherapy management of their child were compared between parents whose child was being treated by PPTs who had attended the ICF-CY training and those being treated by PPTs had not attended training. This section summarises and discusses the main findings, presents a methodological critique and highlights the implications of this study for physiotherapy practice.

While introducing a number of novel aspects, this study differs from those reported previously in the literature in three key respects. First, previous studies have primarily focused on the impact of ICF-CY training for rehabilitation teams and physiotherapists in rehabilitation settings in general, whereas the current study focussed on a specific health condition (CP) within a particular cultural context of Saudi Arabia. Second, there is considerable variation in the design and outcome measures used in other studies, making direct comparison difficult compounded by poor description of the content of the trainings. While, two-day ICF-CY training workshop have provided a clear and details description of the training as presented in chapter Five. Third, previous studies have examined the impact of ICF-CY training from the health professional team’s perspective only, no other study focused on the impact of the training from the patient’s or caregiver’s perspective.

6.6.1 Summary and discussion of main findings

The ICF-CY training was found to significantly increase the paediatric physiotherapists’ level of ICF-CY conceptual and procedural knowledge, but not their factual knowledge. Also, the training enabled the physiotherapists to apply their level of knowledge of ICF-CY, and give consideration to environmental and personal factors in their decision-making to develop a treatment plan for a child with CP. The training created a more positive attitude towards, greater perceived control over and a higher intention to consider personal and environmental factors in their clinical decision making. Results of this study partially support the utility of theory of planned behaviour, as intention was predicted by the TPB cognitions of attitudes toward and perceived control over the application of contextual factors, which together accounted for 48% and 41% of the variance in intention before and after training. Subjective norms were only predictive of intention before training. However, none of the TPB constructs were correlated with decision-making behaviour before or after training.

Considering the second phase of this study, the degree of parent satisfaction was significantly higher for the group of parents whose PPTs had an ICF-CY training. In addition, their satisfaction had significant relation on objective of child's physiotherapy and cooperation with physiotherapy items. However, parents' ratings of their child's physical impairment, physical activities, and environmental and personal factors in assessment, goal setting and plan of treatment did not differ between parents whose child was being treated by PPTs trained on the ICF-CY and those whose treating PPT was not trained.

6.6.2 Phase 1: Changes in the Paediatric Physiotherapist's Clinical Reasoning in relation to ICF-CY in-service training

The results of phase one of this study were consistent with previous studies in that training for the use and application of the ICF to enhance clinical reasoning and consideration of environmental and personal factors is effective (Jelsma & Scott, 2011, Darrah et al., 2006, Allan et al., 2006, Tempest & Mclntyre, 2006; Tempest & Jefferson, 2015).

6.6.2.1 *ICF-CY Level of Knowledge*

Earlier studies clearly showed an impact of training on a health professional's perception of ICF knowledge (Adolfsson et al., 2010; de Oliveira Andrade et al., 2011; Pless et al., 2009). The present study also identified increased ICF self-reported knowledge and objectively measured knowledge when evaluating the level of ICF knowledge. Self-perception of ICF knowledge reported by health professionals in Brazil by de Oliveira Andrade and colleagues (2011) was significantly increased after training. In Sweden, Pless and colleagues (2009), one year after training, noted that self-reported knowledge of the ICF-CY and its use among all participants had increased significantly. One year after training, the size of the effect on the use of the ICF was large with 72% of the participants reporting that they were using what they had learned about the ICF-CY. Following the ICF-CY training in the current study, a strong effect of training was also observed on ICF conceptual knowledge. In addition, a large effect of training was observed on procedural knowledge regarding the application of the ICF and conceptual knowledge of the physiotherapy practice.

It appears that training impacted two stages of the PPTs cognition, i.e. "knows" ICF conceptual knowledge as a basis for the performance of skills, followed by "knows how" by applying their ICF knowledge to problem-solving and decision-making using the related learned skills.

6.6.2.2 *Decision making process*

This study was consistent with the "shows how" and "does" components of Miller's Pyramid (Miller,1990). The improved performance on the case studies post-training suggests that PPTs applied the ICF knowledge taught during training to guide them through the inductive reasoning process when answering three case studies after training. This study also supports the findings of previous studies detailed in Chapter Four, that ICF knowledge is associated with the PPTs decision making to consider environmental and personal factors in their plan of treatment for children with CP. Paediatric physiotherapists' decision-making to apply the ICF model also showed a significant improvement post-training, as demonstrated in the correct responses to three case studies were positively increased.

6.6.2.3 *TPB cognitions and decision-making behaviour in the application of environmental and personal factors after training*

Previous studies reported that changes in health professionals attitudes, belief in the application of the ICF/ICF-CY model, and decision-making in everyday work were postive (Adolfsson et al., 2010; Pless et al., 2009; Reed et al., 2008).

This study showed that PPTs' attitudes towards the application of contextual factors and perceived control were strong predictors of intention, before and after training. It was possible, however, that the PPTs who attended the ICF-CY in-service training were keen to obtain ICF knowledge, and might have been aware of the ICF model. This can be deduced because there was no significant change in their ICF factual knowledge after training. It might be that the PPTs pre-read about the ICF-CY model before they attended the training.

Before training, the subjective norm supports the assumption in the theory; a positive significant relationship was found between subjective norm and intention. It is possible that PPTs who attended training would be influential by both professional colleagues and parents to influence their intention to use contextual factors, so the input from parents into treatment decisions is viewed positively. On the other hand, in a previous cross-sectional study in Chapter Four, the PPTs would be influential more by their professional colleagues than parents to influence their intention to use contextual factors. Therefore, the PPTs who attended training might influence by both parents and colleagues to update their knowledge and improve their quality of management of children with CP, so they intended to apply contextual factors in management of children with CP

The findings of this study are in part comparable with the previous study detailed in Chapter Four. The results of this study were consistent with the previous study, that the TPB constructs did not predict the PPT's decision-making behaviour. Decision-making behaviour was not predicted by intention. This gap between intention and behaviour is frequently observed (McEachan et al., 2011). Thus, other factors need to be considered. It is possible that decision-making behaviour that is not wholly determined by cognitions available to self-report. Professional decision-making behaviour may become automatic or a routine cognitive response to ICF-CY knowledge stimulus; therefore, self-reported cognitions might not be expected to fully predict the behaviour

6.6.3 Phase 2: Parent Questionnaire

The results of this study were comparable with those of Adolfsson and colleagues (2010) who demonstrated that health professionals with knowledge of the ICF-CY listened more actively to parents and asked them broader information seeking questions, reflecting their awareness of the importance of evaluating a child's functioning across a broader life situation. The ICF-CY training in the current study was associated with greater parental satisfaction and significant relation on objective of child's physiotherapy and cooperation with physiotherapy. It is possible that ICF-CY knowledge helps PPTs provide parents with a better picture of their child's functioning and limitations using each ICF-CY domain: child's physical impairment, physical activities, and environmental and personal factors. This information may have helped the parents become more aware of the physiotherapy given over the past three months especially in the Saudi Arabian culture where parents rely more on physiotherapists and believe an increased number of sessions might make tremendous changes in their child's physical functioning activities.

The results of the parental questionnaire did not show any significant impact of training on parental evaluation of physiotherapy assessment, goal-setting, and plan of treatment based on the ICF-CY model in general, and on each ICF-CY domain (child's physical impairment, physical activities, environmental and personal factors). Perhaps the institutions where the PPTs worked had not been trained in the ICF-CY. Therefore when evaluating PPTs working within a multidisciplinary rehabilitation team parents answered based on the holistic management their child received by the multidisciplinary team as a whole.

While, the findings from parents' and PPTs' questionnaire results would seem to support the view that implementation of intentions increases the likelihood of a goal intention being enacted (Sheeran & Orbell, 1999). The parental evaluation of physiotherapy objectives and cooperation with physiotherapy were significantly related to the parent's satisfaction whose child was being managed by an ICF trained PPT. It seems that knowledge of the ICF-CY transferred into physiotherapy practice, and further, the PPTs intentions to consider contextual factors in making decision created a strong memory trace that is easily accessed during goal-setting. These findings suggest that the PPTs' intention to consider the application of contextual factors in the management children with CP, can be turned into action by asking them to specify when and where they will do so.

6.7 Strength and limitation of the study

Both benefits and limitations of employing a longitudinal design to collect data on the impact of the ICF-CY in-service training have been observed in this study. When conducting this study, a number of specific issues were encountered, the most strategic being the initial calculation of the number of participants to form an appropriate sample size for this study and the potential for bias. In phase 1, the ICF-CY training was delivered in two provinces of Saudi Arabia to minimise selection bias. The announcement of the two ICF-CY in-service training workshops was sent as an email message to all members on a list provided by the Saudi Physical Therapy Association (SPTA) distribution service. A pre- and post-study design was used, as randomisation and comparison were not possible within the study. Research designs are based on certain assumptions, the key one being that not all PPTs are interested in learning about the ICF-CY model and working with children with CP, therefore recruitment is limited (Portney & Watkins, 2009). In addition, national statistics on the number of children with CP followed up in physiotherapy in Saudi Arabia is lacking (See Chapter One, section 1.3.2 Cerebral Palsy in Saudi Arabia). Furthermore, not all participants that attended the two workshops gave consent to participate in this study. Therefore, the participant group of PPTs was selective. While this gave a larger sample size than would have been possible if random assignment of PPTs to the experimental or control condition had taken place, it was decided that for this study securing the larger sample was the better decision to allow adequate analysis of the effect of the training (Portney & Watkins, 2009). A conclusion made about causality on the basis of current study's design is less definitive than a conclusion elicited by a well conducted randomised controlled trial.

However, as discussed by Portney and Watkins (2009), this study clearly describes how the data were collected and explicitly details the limitations and their influence on the results. The Phase one study employed a before and after design, therefore conclusions of cause need to be interpreted with caution. However, the results of the survey of Saudi paediatric physiotherapists' clinical reasoning regarding children with cerebral palsy presented in Chapter Four support the current results on the impact of the training. The results of the cross-sectional survey indicate that PPTs reporting having ICF knowledge considered the application of environmental and personal factors in their decision making process.

In phase 2, parents of children with CP were recruited from eight paediatric physiotherapy departments in rehabilitation centres or hospitals from the west and east provinces of Saudi Arabia. After 10 parent questionnaires were completed from each department, the recruitment was stopped. In four departments, one or more of the PPTs had ICF-CY in-service training, and in the other four departments none of the PPTs had ICF-CY in-service training. Although this system still faced potential for non-probability bias, it was strengthened by proportionally representing in the sample each parent of a child with CP in each department (Portney & Watkins, 2009).

In phase 1, the performance risk of bias was encountered that the assessment of the ICF-CY training was unblended as HD researcher delivered training and provided pre-and-post questionnaire to the participants. However, The ICF-CY in-service training workshop (lasting two days) was given in two centres organized by the Saudi Physiotherapy Association (SPTA). SPTA follow the Saudi commission for health specialties Executive Rule for the Activities of Continuing Medical Education and Professional Development. In addition, the training was accredited and not given for free; the participants registered for training payed to attend the training (training brochure is presented in p.363). Further, there is a SPTA requirement to evaluate all educational workshops, therefore, the pre and post training workshop questionnaire was acceptable evaluation for this purpose. Not everyone who attended the training gave consent to having his or her data entered into current study. For those who do not, their data only used to provide feedback to SPTA and did not include in the data analysis for current study.

6.8 Conclusion

The impact of ICF-CY training was found to be significant on ICF knowledge on the PPTs cognition and their performance to give consideration to environmental and personal factors in their decision-making. Furthermore, Parents from institutions where PPTs had training were more satisfied with their children's progress and physiotherapy treatment in the five months after training.

More research and follow up are encouraged as guided by these findings relative to the impact of ICF-CY training as a clinical reasoning tool in phase one and two are described in Chapter Seven.

Chapter 7

Summary and Discussion

7.1 Introduction

The impetus for this research came from this researcher's clinical experience in paediatric physiotherapy in Saudi Arabia (SA) and the desire to explore whether training physiotherapists in the application of ICF-CY improves the delivery of physiotherapy practice by taking into account personal and environmental factors when treating children with Cerebral Palsy (CP). Given the limited amount of experience of using the ICF/ICF-CY among the paediatric physiotherapy colleagues of this researcher in Saudi Arabia, the researcher explored this topic in depth. This dissertation explored a new area of research by investigating how Saudi paediatric physiotherapists develop their treatment plans for children with CP. Also, it explored how training paediatric physiotherapists in the ICF-CY model could impact their clinical reasoning ability in formulating treatment plans. In addition, the impact of ICF-CY model training was explored from the perspective of the parents of children with CP. Prior to the primary empirical research (Chapters Four and Six), a systematic review of the existing literature provided an understanding of the utility of the ICF model in clinical reasoning in physiotherapy practice. Three studies were conducted with findings that were consistent with previous literature. These studies also identified a number of potential directions for taking forward and developing the ICF-CY model's educational strategy, 'Teaching the ICF model using a clinical reasoning teaching tool'.

While Chapters Two, Four and Six have discussed the findings of each study in relation to existing evidence; this chapter identifies and discusses many overarching points raised by these studies, as it addresses the key research questions, the study design, and the implications for practice and research.

7.2 Summary of Key Findings

The findings of the systematic review described in Chapter Two showed that there is little current evidence of the ICF being used as a clinical reasoning tool in the physiotherapy decision making process to complete patient evaluations and develop a plan of care. All studies included in this review had clearly identified the aim of integrating the ICF model in the decision making process. In these studies, the ICF/ICF-CY model had been incorporated into clinical reasoning to gather information, formulate assumptions and develop treatment plans. However, only one study showed how the ICF-CY model might be used as a clinical reasoning tool. Integration of ICF knowledge into the cognitive process necessitates the understanding of how the ICF can be applied into clinical practice. Findings have shown that physiotherapists still rely on the biomedical model to capture the impact of a disease on functioning and that their clinical reasoning is most probably derived from the framework of biomedical knowledge. The lack of consideration of the personal and environmental factors in treatment plans show that the biomedical model is still dominant in physiotherapy practice. Often, physiotherapists assume that an intervention focussed on the ICF component of body structure/function will have the desired effect on the patient's physical activity.

This was observed in reviewed literature that indicated the use of the ICF in the decision making process but did not specifically demonstrate consideration of environmental and personal factors in the decision making process.

The cross sectional survey of PPTs in SA reported in Chapter Four, measured several demographic and professional characteristics of PPTs and their ICF knowledge. PPTs self-reporting ICF knowledge differed from those not reporting ICF knowledge on only three characteristics; they treated a larger number of children with CP, worked in a department that treated a greater number of children with CP and employed standard outcome measures in their clinical practice. PPTs who reported no ICF knowledge were more likely to use non-standard outcome measure than PPTs reporting ICF knowledge. The use of standard outcome measures that cover each component of the ICF might be a useful way to support and encourage the wider application of the ICF in clinical reasoning. Whilst, the decision making was measured by self-report, no differences were found between PPTs based on their ICF knowledge in terms of key aspects of clinical decision making, namely, their consideration of environmental or personal factors, and the involvement of the child and their parents in goal setting. However, PPTs self-reporting ICF knowledge performed better on the case study measure of clinical decision making than PPTs who self-reported no ICF knowledge. Based on these results, ICF knowledge appears to provide structured guidance for consideration of contextual factors in clinical decision making for the treatment of children with CP.

Application of the TPB to clinical decision making indicated that therapists who reported a positive attitude and greater perceived control also reported a higher intention to apply environmental and personal factors in the management of children with CP. In contrast, subjective norms were negatively correlated with intention (Ajzen, 2011). One possible reason for this finding is that diverse policies and regulations within the various institutions in the Saudi health system make the application of a standard way of practice a challenging task. In Saudi Arabia, PPTs have somewhat more autonomy to plan treatment for children with CP and PPTs rarely follow guidelines in the management children with CP. If there was a professional culture to follow guidelines, the value of the beliefs of parents and their professional colleagues might be high and positively correlated with PPTs intentions to apply environmental and personal factors in management of children with CP. As discussed in Chapter One, Saudi families mostly rely on the knowledge and information they are given by the PPT in the management of their child with CP.

Therefore, the results of the PPT survey suggest that providing PPTs with training in the ICF and its use has the potential to increase the likelihood that PPTs will consider factors other than impairments in their clinical decision making. Further, the development of an ICF-CY in-service training designed to enable the use of the ICF in decision making to include the application of environmental and personal factors, might provide the means to standardize training of PPTs in SA. This might have a longer-term impact of increasing the professional expectation of the use of the ICF in clinical practice.

Findings from the longitudinal Quasi-Experimental study showed that after training, there was a change in the PPT's application of ICF-CY knowledge and the consideration of environmental and personal factors in the decision-making process. The impact of training was not only reflected in improved PPTs performance on the judgment of the case studies, but it also affected the PPTs cognitions including stronger intention to consider contextual factors, more positive attitudes toward application of contextual factors and increased perceived control over the application of contextual factors. The more positive attitude PPTs had about the application of contextual factors and the more control they felt they had over the application contextual factors, the stronger was their intention to apply contextual factors in the management children with CP.

The findings from the parent survey showed that the degree of parent satisfaction regarding the physiotherapy their child received and the progress their child was making since starting physiotherapy treatment over the past five months were significantly higher when the staff had received training in the ICF-CY model. Also, the parent satisfaction was significant related with parental perspective about child's objectives and cooperation with physiotherapy.

However, the findings did not show the impact of training from parents' perceptions about the use of the ICF-CY by PPTs to provide overall evaluation of their child's functioning and limitations using each ICF-CY domain: child's physical impairment, physical activities, and environmental and personal factors. Perhaps as described earlier, the biomedical model still influences physiotherapist's clinical reasoning. PPTs need to focus on increasing their understanding of the application the ICF model in their clinical practice, which might influence their consideration of environmental and personal factors in their decision making behaviour.

7.3 Discussion of Main Findings

The results shown here provide support for the dedicated training of physiotherapists in applying the ICF model as a clinical reasoning tool (Allan et al., 2006; Darrah et al., 2006; Jelsma & Scott, 2011; Peters-Brinkerhoff, 2016).

There is also a clear rationale for providing such training and for research to evaluate the optimum methods of delivering training and the optimum content. Peters-Brinkerhoff, (2016) explored knowledge and learning experiences provided to Physiotherapy (PT) students by clinical instructors for the five domains of the ICF model. The majority of the students demonstrated their knowledge and understanding of the five domains of the ICF model. However, they had not received clinical training in the use of the ICF or been assessed by their clinical instructors during their clinical rotations on their skills in applying the ICF model. It is of interest to mention that their clinical instructors referred to their own limited knowledge of the ICF model as a barrier to their teaching the ICF. This is most likely due to a lack of education and understanding of the goals and purpose of the ICF model and how to use it in the clinic to assist with assessments and patient care plans. This implies the need for further development of an ICF educational programme as a conceptual framework for clinical reasoning for patient-centered care. Such a framework would help PT clinical instructors teach students how to transfer ICF knowledge into clinical practice.

Historically, the application of the ICF to clinical reasoning was dominated by case studies and a series of study designs associated with development of clinical reasoning tools and aids. These designs were often based on algorithms intended to assist practitioners in making decisions, most often concerning either a diagnosis or treatment using a biomedical model in physiotherapy (Kenyon, 2012).

Much of the literature since then has examined clinical reasoning and the application of the ICF in practice has focused on physical impairment and activity limitation as end results of the decision-making interventions and treatment as discussed in Chapter Two. More recent literature by Franki and colleagues (2014) has expanded the focus to the application of the ICF as a clinical-reasoning tool to define an ambulant child with CP problems and set treatment goals; however, environmental and personal factors have remained relatively neglected. As noted in Chapter Two, the outcome measures have been developed for the aims of specific studies, often involving a single consultation and are often focused on making choices about impairment and activity domains rather than aspects of the whole clinical decision making process using the ICF model.

The most appropriate theoretical and clinically based approach to assess and teach the ICF-CY model was considered in this thesis. This was achieved by developing a rigorous educational programme that would help to transfer ICF knowledge into practice and implement the ICF model for patient-centered care utilizing evidence-based practice. The approaches used were to assess clinical reasoning via the concepts within the ICF, educational concepts and psychological theory; none of which are common in the application of ICF research in general and in Saudi Arabia in particular. Therefore, this research will, hopefully, open the door to future applications of ICF research in Saudi Arabia, which can focus on other components affecting the quality of life of children with disabilities instead of merely focusing on the body and impairment.

7.3.1 Theoretical and clinically-based approaches to the assessment of the application of the ICF/ICF-CY model in clinical reasoning

Clinical reasoning is a vital skill in physiotherapy practice; it helps physiotherapists to avoid making assumptions, reduces unnecessary investigation and helps to provide desirable outcomes that could improve patient satisfaction (Ajjawi & Higgs, 2008). However, as discussed in earlier chapters, the lack of a clear definition of clinical reasoning has made the measurement and implementation of clinical reasoning educational strategies difficult. Clinical reasoning is fundamental to develop clinical skills in the practice of physiotherapy. Holdar et al.'s (2013) definition has been used as a point of reference for this PhD project, as clinical reasoning is a cognitive process based on a therapist-centered process. The clarification of terms for clinical reasoning, clinical thinking and clinical decision-making in Chapter One are particularly important in the context of the present research. Thus, the assessment of clinical reasoning should take PPTs through the process of decision-making to develop a proper treatment plan, and through the assessment of the decision-making behaviour in the application of environmental and personal factors in the management of children with CP. To shift the application from the biomedical model to clinical reasoning using the ICF model requires physiotherapists to have knowledge of the ICF model, and an understanding of how to apply it to treatment planning as well as how to adapt their ICF knowledge to different clinical situations (WHO, 2013).

Bloom's Taxonomy has been adopted in this thesis to analyse how levels of ICF knowledge can be applied in practice (Anderson et al., 2001). It provides an assessment strategy for how an ICF knowledge base can develop physiotherapists' clinical reasoning and provides a promising way to build a model to effectively introduce ICF knowledge and clinical thinking processes together in clinical practice.

Using educational frameworks such as Bloom's Taxonomy offers clinical trainers a more consistent approach to determine the appropriateness of decision-making strategies for different situations and to clearly define how to apply ICF skills in practice. Based on the interaction between the clinical-thinking process and the level of ICF knowledge, it is possible to understand the congruence between the goals of using the ICF, a researcher/clinician's ICF knowledge base, and their assessment of the decision-making process. Following the systematic review in Chapter Two, the adoption of Bloom's Taxonomy plays an important role in providing assessment strategies for the systematic review results, which contribute to the evidence for the interaction between an ICF knowledge base and the clinical-thinking process.

During such an assessment, establishing how ICF knowledge can facilitate clinical thinking in physiotherapy practice would be insightful. In many studies, however, incongruences were found between the objectives of using the ICF in the clinical decision-making process as follows: 1) the clinical aims of the application of the ICF relative to the level of knowledge; 2) in determining the level of the ICF knowledge base that physiotherapists have, and thus the ability to apply ICF knowledge in practice; and 3) whether PPTs are able to apply their level of ICF knowledge to their decision-making processes in this particular situation (Huber et al., 2011; Jeglinsky et al., 2012; McDonald et al., 2007). *Bloom's Taxonomy* showed its utility in identifying the limitations in the previous literature in the use of the ICF as a clinical reasoning tool, particularly in those studies which had neglected environmental and personal factors during the clinical reasoning processes (Franki et al., 2014; Huber et al., 2011; Soberg et al., 2008).

The paediatric physiotherapy survey in this thesis was developed based on theory and a clinically-based approach to assess the cognitive process of clinical reasoning, including the use of clinical case vignettes, Bloom's Taxonomy of Educational Objectives and the Theory of Planned Behaviour (TPB). These were used to investigate the ICF knowledge base, decision making process, and decision-making behaviour in applying environmental and personal factors across PPTs in their management of children with CP.

Measuring actual levels of the ICF knowledge was based on Bloom's Taxonomy, which was used to distinguish which levels of ICF knowledge were drawn on by PPTs as they applied it to their decision-making processes. However, previous literature mostly relied on measuring perceptions of ICF knowledge and its application in practice (Adolfsson et al., 2010; Pless et al., 2009). Reflecting on this, the measurement of self-reported ICF knowledge might not adequately reflect the use of the ICF model in clinical practice. Further, existing literature did not assess the level of ICF knowledge to provide a full understanding of how the ICF model was integrated into clinical practice (Constand & Macdermid, 2014; Jeglinsky et al., 2012).

The need to investigate ‘real life’ clinical reasoning elements is important, as described in Chapter One direct observation is not effective to evaluate the ICF knowledge base, decision-making processes and decision-making behaviours in the application of environmental and personal factors (van der Vleuten et al., 2008). The case vignette was used to expose the PPTs to real life situations and improve their analytical decision making processes.

The ICF model of health outcomes was used to develop the three case scenarios used in chapter three to explore the PPTs’ decision-making processes in how they would manage clinical situations for children with CP. The development of three clinical case vignettes was undertaken within the unique cultural and social context, and based on practices of managing children with CP in Saudi Arabia, in order to explore the PPT’s decision-making in context.

The most crucial aspect of the three vignette cases was the ability to simplify the complex concept of reciprocal interactions within the ICF, and to apply the five ICF domains in the decision making process (assessment, goal-setting and developing a treatment plan for children with CP). Also, case vignettes helped to assess the decision making process between PPTs who stated they had ICF knowledge versus those who did not. The vignettes were also used in the evaluation of the impact of the training on the PPTs’ decision making process before and after training (Chapter Six). The application of the ICF model using case scenarios, to determine the main problems and goal setting of ambulant children with CP was also supported by the literature (Franki et al., 2014).

The three vignette cases elicited information about the decision-making behaviour of PPTs when applying environmental and personal factors to the management of children with CP. Models such as the TPB derived from the literature of psychology, have previously been applied to clinical reasoning (Chapparo & Ranka, 2008). Behavioural models such as the TPB can be used to inform and underpin the understanding of decision-making behaviours and the factors that influence the intention of consideration environmental and personal factors in physiotherapy practice.

This is the first study to use the TPB to predict the PPTs' decision making behaviour of applying environmental and personal factors. Learning to use a new model such as the ICF model might affect the beliefs and attitude of PPTs and cognitions might predict their motivation and behaviour to use ICF model in their practice.

7.3.2 Theoretical and clinical-based approaches for teaching the application of the ICF/ICF-CY model for clinical reasoning

The results of worldwide reviews of the ICF educational programme and the teaching of clinical reasoning discussed in Chapters One and Five clearly highlighted the importance of goals for training in the ICF model, and the development of standardised ICF training programmes (Pless et al., 2009; Reed et al., 2008).

Previous teaching of the ICF model as a clinical reasoning tool was developed to educate physiotherapists and student PTs as described in Chapter Five (Darrah et al., 2006). Evidence has indicated that the impact of learning the ICF as a clinical reasoning tool has been explored among PPTs and PT students in paediatric rehabilitation (Franki et al., 2014; Jelsma & Scott, 2011).

However, what aspects of and how the ICF is taught and practiced is not known. In relation to the two-day ICF-CY in-service training that was given to PPTs in Saudi Arabia, it followed a logic model that had been developed prior to the training to clarify the processes undertaken, during and after the delivery of the ICF-CY in-service training. First, the strengths and limitations of existing educational programmes were considered prior to the development of the training programme. Second, Bloom's Taxonomy and Miller's Pyramid served as a basis for learning and developing the cognitive processes involved in different levels of ICF knowledge. Third, Adult Learning Theory was also used to encourage personal reflection on and refinement of the physiotherapists' clinical reasoning skills. (See Figure 5.1: logic model for development, design, implementation and evaluation of two-day ICF-CY in-service training for Paediatric Physiotherapists in Saudi Arabia p.173).

The main results from Phase 1 on the impact of training make an important addition to the literature on the assessment of PPTs' inductive reasoning processes. This assessment was conducted using clinical case studies to assess a PPTs' decision-making processes, including child assessment, goal-setting and treatment plans based on the child's main problems. This assessment went beyond measuring the knowledge gained to include the two stages (Miller, 1990) of the PPTs cognition;

1. "knows" ICF conceptual knowledge as a basis for the performance of skills, and
2. "knows how" by applying their ICF knowledge to problem-solving and decision-making using related learned skills during training.

Then, at the end of training, a survey was used to evaluate the last two components of Millers Pyramid, which are "shows how" and "does".

The results of phase two, which investigated the implementation of the ICF-CY model from the parents' perspective supported the findings that the implementation of the ICF model to complete the patient evaluation and develop a plan of treatment is still unknown (Peters-Brinkerhoff, 2016). In that, parents with children being managed by PPTs who had undergone the ICF-CY training, although expressing more satisfaction with their child's care, did not differ in their evaluation of the management of their child compared to parents whose treating PPT had not undergone training. It is possible that parents might not have the level of skill required to assess the quality of service provision. Another possible explanation could be that the parents might have been worried that if they were honest about the management of their child it might affect how their child was treated subsequently. Especially,because parents with children with CP in SA are heavily reliant on physiotherapists. However, parents with trained PPT were more satisfied and parental satisfaction is often used as a measure of treatment outcome (Palisano, 2004).

7.4 Implications for Practice

This study is the first to explore the utility of the ICF model in physiotherapy practice in Saudi Arabia. The results suggest that teaching the application of the ICF-CY model as a clinical reasoning tool helps to guide PPTs decision-making behaviours when applying environmental and personal factors in physiotherapy practice for children with CP. There is evidence that therapists need to better understand application of the ICF concept and principles that underpin their role in care, and they should be willing and able to implement the ICF model (Leonardi et al., 2005).

Previous literature on ICF/ICF-CY educational programmes, which focus more on classification and categories than decision-making processes (including coding skills), tend to indicate that coding is emphasised as more central to the application of the ICF in clinical practice (Martinuzzi et al., 2008; Reed et al., 2008). Further, there is a lack of guidance regarding how the ICF might best be used in clinical practice (Congdon et al., 2010). These factors have been demonstrated via practitioners' strong resistance to applying the ICF model because it focuses on the retention of ICF knowledge (Jeglinsky et al., 2012). In addition, it has not been widely explained that the ICF model can be used on various levels, as discussed in chapter two.

Much more work is required to examine ways to help health practitioners understand the ramifications and critical implementation of PPTs to understand and employ the ICF for clinical reasoning and not just focusing into the ICF complex coding system in the context of their practice.

7.4.1 Implications for education and training in the use of the ICF-CY model as a clinical reasoning tool in practice

Physiotherapists who have previous knowledge of the ICF framework could focus on increasing their understanding of the ICF model's application to their everyday work. The ICF-Rehab-Cycle form was used in the ICF-CY in-service training by PPTs and presented in the training appendices (See Figure 3.1 p.117: Child's Rehab-Cycle (from Rundell et al., 2009). This ICF assessment form could enable PPTs to develop a full and complete clinical and contextual profile of the child, including all aspects of children with CP and their functioning, disability and health, as they relate to the five components of the ICF-CY. The goal is to individualize treatment planning and help PPTs effectively use the ICF model to plan treatment decisions that focus on a strategy of adaptation, recovery and/or prevention, as described in Chapter One.

Patient electronic records are becoming common in physiotherapy departments in Saudi Arabia; therefore, future departmental educational strategies for the application of the CP-ICF-Core Set in physiotherapy practice and using the online ICF documentation form to develop the E-Child Functional Profile could facilitate the application of the CP Core Set in physiotherapy practice (ICF Research Branch, 2013). The E-Child Functional Profile was presented in the ICF-CY in-service training (See Appendix 12 p.368).

Parent questionnaire used in this thesis, is currently used in Sweden by health professionals (Pless et al., 2009) and could be used by PPTs to facilitate the adoption of the ICF-CY in practice for assessment, setting goals, prioritizing and intervention planning. Parents could also use the questionnaire to provide useful information regarding their child's needs assessment and for estimating any changes in the child's treatment plan (McDougall & Wright, 2009). These methods can facilitate better communication between parents and therapists (Palisano et al., 2004).

Although PPTs have limited knowledge of the ICF framework, they need to understand the value of application of the ICF-CY model in practice. For example, the ICF-CY model could be used as a clinical reasoning tool and not as it is usually used, i.e. as a complex classification tool. It has been suggested that teaching the interaction between the five ICF domains can facilitate a more holistic application of the model in clinical practice (Allan et al., 2006). From this perspective, PPTs could understand the value of the application of ICF and guide professionals' clinical reasoning skills as well as bridge the gap between cognitive knowledge and interaction in a clinical setting.

Furthermore, a two-day ICF-CY training course was organized by the Saudi Physiotherapy Association (SPTA) to follow the Saudi Commission for Health Specialties executive rule regarding the activities of continuing medical education and professional development. Collaboration with the SPTA is now needed to offer the training in different provinces in Saudi Arabia as a continuing professional educational programme.

Entry-level physiotherapy education is a major determinant of the shape of a therapist's future practice. Physiotherapy education currently remains focused on management of illness and injury (Huggs et al., 2009). Future graduates need to receive relevant education to facilitate the application of both environmental and personal factors in physiotherapy practice. Future collaboration among academic PPTs in Saudi universities is critical. Most importantly, the need exists for a more comprehensive understanding of the Saudi physiotherapy curriculum in terms of course content, structure and teaching strategies to place it more in line with the ICF model. The Saudi curriculum could possibly benefit from the work of Darrah (2006), who developed two models based on the ICF to guide curriculum development and organize students' learning skills and knowledge in an entry-level master's degree programme.

Future delivery of ICF-CY in-service training that focuses on academic staff in Saudi universities and training must address the application of environmental and personal factors in physiotherapy practice. In addition, the findings of this thesis could be presented to increase awareness among academic staff to focus on use the ICF model to teach clinical reasoning that might enhance the application of environmental and personal factors in physiotherapy in practice.

7.5 Implications for Research

This dissertation's findings fill a significant gap in the literature in relation to the utility of the ICF-CY framework as a clinical reasoning tool for physiotherapists who treat children with CP. The findings from this thesis indicate the need to teach the ICF model as a clinical reasoning tool to enhance all PPTs' abilities to consider all ICF domains rather than a sole focus on impairment. Based on the results of the current thesis, the utility of the ICF as a clinical reasoning tool is influenced by many factors, all of which need to be further investigated prior to the design and implementation of any future intervention studies.

7.5.1 Implications for education of the ICF-CY model as clinical reasoning tool in research

The innovative approach used to develop in-service training, as described in Chapter Five, could be published to allow replication and development by others. The logic model presented in Chapter Five (See Figure 5.1: Logic Model for the Development, Design, Implementation and Evaluation of Two-day ICF-CY In-service Training for Saudi Paediatric Physiotherapists p.173) could be potentially modifiable and amendable for teaching the ICF model as clinical reasoning tool to enhance the implementation of ICF in clinical practice.

This longitudinal quasi-experimental study cannot draw any definite causal conclusions about the impact of training on PPTs' clinical reasoning and the implementation of the ICF-CY in the management of children with CP.

Future longitudinal randomized controlled trials are needed to fully evaluate the impact of ICF-CY training on PPTs' clinical reasoning and the implementation of the ICF-CY from the parents' perspective. A longer follow-up assessment period for PPTs' clinical reasoning would provide further insight into the long-term impacts and outcomes of this training (Adolfsson et al., 2010; Pless et al., 2009).

Future research could evaluate the impact of training on the quality of life of children with CP in Saudi Arabia. The Cerebral Palsy Quality of Life Questionnaire (CPQOL) measures CP disease-specific factors, which seems most appropriate to cover the components of the environmental and personal factors (Schiariti et al., 2014).

An action research study design is needed to fully explore the ICF-CY model as a clinical reasoning tool. By involving the ICF researcher, the action research approach, offers PPTs an opportunity to learn and think about the ICF whilst implementing it and helps them identify ways to utilize the ICF in their practice. Additionally, they could reflect on the ICF process as an effective tool during its implementation (Parkin, 2009). Action research could also provide an opportunity to examine whether using the ICF framework is part of a trained PPT's decision-making process.

Two action research projects are currently being undertaken within neuro-rehabilitation in England to evaluate the process and outcome of implementing the

ICF model (Tempest et al., 2012, 2013). However, this research is based on multidisciplinary teams that are not in physiotherapy practice, and it lacks the application of the environmental and personal factors that have been recognized as necessary in the physiotherapy literature, as described in Chapter Two.

In addition, Verhoef et al. (2008) highlighted that the outcome of introducing ICF-based tools should be studied at the level of individual teams to gain a greater understanding of the effects of using the ICF model in practice.

7.5.2 Decision-making behaviour in the application of environmental and personal factors

In the current study a questionnaire design was used to understand PPTs' ICF knowledge and the factors that might influence their clinical decision making. There is a need for a better understanding of the decision-making behaviour of the application of environmental and personal factors in the management of children with CP. Other approaches might be used to further our understanding of PPT clinical decision making. Qualitative designs, such as a focus group study of PPT experts in children with CP might further help in exploring PPTs' decision-making behaviours that are based on physical impairment and activity limitations for children with CP.

Application of other theories, models of behaviour and behavioural changes such as the Theoretical Domains Framework (TDF) to better understanding factors influence PPTs' decision-making behaviours (Tavender et al.,2014). The TDF might also encourage researchers to go one step further and developing an "multi-faceted" intervention to improve PPTs decision making behaviour and influence the application environmental and personal factors in management children with CP (Thomas & Mackintosh, 2014)

Future studies that utilize the PPT questionnaire for different health conditions or in an adult setting to help generalize the ICF education training, particularly when aiming to establish the application of the ICF model in physiotherapy practice, might be helpful. Further testing of a PPT questionnaire on other patient populations would also allow for the comparison of results and validation of what this tool can measure.

7.6 Overall Conclusion

The findings of this dissertation are consistent with the clinical literature and show that the physiotherapy curricula still rely on the biomedical model. The results also indicate that environmental and personal factors are neglected in physiotherapy practice, specifically in the management of children with CP. Therefore, there is ample opportunity for learning the ICF/ICF-CY model as a clinical reasoning model, which will allow the cognitive processes that underlie decision making to become habitual. Once the decision-making behaviour that is applied to environmental and personal factors has become a cognitive 'habit', it could lead to the implementation of the ICF/ICF model in physiotherapy practice.

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Appendices

Appendix 1 Standard Assessment used in Physiotherapy

Standard Assessment Form	Definition
GMFM Gross Motor Function Measure	A clinical tool designed to evaluate change in gross motor function in children with CP. There are two versions of the GMFM - the original 88-item measure (GMFM-88) and the more recent 66-item GMFM (GMFM-66). Items on the GMFM-88 span the spectrum from activities in lying and rolling up to walking, running and jumping skills. The GMFM-66 is comprised of a subset of the 88 items identified (through Rasch analysis) as contributing to the measure of gross motor function in children with CP. The GMFM-66 provides detailed information on the level of difficulty of each item thereby providing much more information to assist with realistic goal setting (Russell et al., 2002).
PEDI (Paediatric Evaluation of Disability Inventory)	A standardised test designed to identify, measure and describe functional impairment in children. The child's current functional performance is measured in the three domains of self-care, mobility and social function. The PEDI includes three measurement scales: 'functional skills', measuring capability to perform tasks; 'caregiver assistance', looking at how much assistance the child typically requires in the same areas; and 'modifications', identifying the equipment used by the child to carry out the tasks. The PEDI is administered by interview using the structured questionnaire provided. The interviewee may be the child's parent/caregiver or a therapist/teacher who knows the child well (Haley et al., 1992).
GMFCS (Gross Motor Function Classification System)	A 5 level <u>clinical</u> classification system describing the gross <u>motor function</u> of people with <u>cerebral palsy</u> on the basis of self-initiated movement abilities. A particular emphasis of the GMFCS scale rests on evaluating sitting, walking, and wheeled mobility. Distinctions between levels are based on functional abilities; the need for walkers, crutches, wheelchairs, or canes/walking sticks; and to a much lesser extent, the actual quality of movement. The expanded and revised version includes an additional age band for young people of 12 to 18 years (Rosenbaum et al., 2008).
Primitive Reflexes	A sign of nervous system development and function. Many primitive reflexes disappear, as the child grows older, although some remain throughout adulthood. A reflex that is still present after the age when it would normally disappear can be a sign of brain or nervous system damage (Styer-Acevedo, 1994).
FIM (Functional Independent Measure)	A measure used to assess the ability of persons needing rehabilitative services to cope independently and perform activities of daily living such as self-care, sphincter control, mobility, locomotion, communication, and social cognition. The FIM measures the type and amount of assistance required for a young person (12 to 18 years) with a disability to perform basic life activities effectively (Msall et al., 1994).

Standard Assessment Form	**Definition**
Wee-FIM (Functional Independent Measure Children's version)	The paediatric version of FIM, it differs only in its scoring processes which take account of a child's developmental stages, and is used for children aged 3 to <12 years. The Wee-FIM measures functional ability and can be used for normally developing children aged 6 months to 7 years, as well as children over 7 years with disabilities and delays in functional development. It is an 18-item performance measurement system documenting self-care, functional mobility, and cognitive abilities. The self-care domain includes 8 items (eating, grooming, bathing, lower and upper body dressing, toileting, bowel and bladder control). The mobility domain includes 5 items (chair, toilet, transfers, walking or wheelchair management and stairs). The cognitive domain includes 5 items (language comprehension, expression, social interaction, problem solving, and memory) (Msall et al., 1994).
Prechtl's Method on the Qualitative Assessment of General Movements (GMT)	Video recorded assessment of quality of general movement in infants from birth to 20 weeks post-term, indicating abnormal movement leading to cerebral palsy (Darsaklis et al., 2011).
Cerebral Palsy Quality of Life-Child (CP QOL-Child)	A condition-specific QOL instrument for children with CP aged 4 to 12 years. The primary caregiver- proxy version was used for parents of children aged 4 to 12 years, and the child's self-report version was used for children aged 9 to 12 years. This instrument is used to assess seven domains of QOL, including social well-being and acceptance, feelings about functioning, participation and physical health, and emotional well-being (Davis et al., 2006).

Appendix 2 Number of Citations in each Database

Database	Years Searched	Numbers of Documents obtained
AMED (Allied and Complementary Medicine	June 2001 to December 2013	320
Academic Search Premier	June 2001 to December 2013	883
	January 2014 to April 2015	32
Psych INFO	June 2001 to December 2013	122
	January 2014 to April 2015	31
CINAHL	June 2001 to December 2013	906
	January 2014 to April 2015	32
Medline (EBSCO)	June 2001 to December 2013	547
	January 2014 to April 2015	49
Embase	June 2001 to December 2013	94
	January 2014 to April 2015	24
@Ovid Journals	June 2001 to December 2013	457
	January 2014 to April 2015	12
Total from June 2001 to December 2013		3,329
Total from January 2014 to April 2015		180
Number of Citations, after removing duplicates, from June 2001 to December 2013		1, 600
Number of Citations, after removing duplicates, from January 2014 to April 2015		81

Appendix 3 Characteristics of Excluded studies

No	Articles excluded	Reasons for Exclusion
1	How are actual needs recognized in the content and goals of written rehabilitation plans? (Jeglinsky et al., 2014)	Retrospective Study
2	A questionnaire survey comparing the educational priorities of patients and medical students in the management of multiple sclerosis (Gibson et al., 2014)	Participants were Medical students
3	Transitional rehabilitation goals for people with spinal cord injury: looking beyond the hospital walls (Wallace & Kendall, 2014)	Secondary Data
4	Implementation of A four Year Rehabilitation Curriculum for Medical Students (Ankam, 2014)	Medical student
5	Exploring use of the ICF in health education (Brnbaumo et al., 2015)	Narrative Review
6	Applications of the International Classification of Functioning, Disability and Health in goal-setting practices in healthcare (Constand & Macdermid, 2014)	Narrative Review
7	Do women with breast cancer report treatment after-effects to healthcare professionals, and who provides the intervention? (Cooney et al., 2015)	Patients report treatment
8	Development of the Occupational Therapy Stroke Arm and Hand Record: An upper limb treatment schedule (Jarvis & Reid, 2014)	Participants were occupational therapists
9	Pediatric neurorehabilitation and the ICF (Martinuzzi et al.,2015)	Reports
10	Evaluating rehabilitation goals of visually impaired children in multidisciplinary care according to ICF- CY guidelines (Rainey et al.,2014)	Secondary Data
11	Intervention Goals Determine Physical Therapists' Workload in the Acute Care Setting (Grill et al., 2010)	Participants were patients
12	An exploration of clients' goals during inpatient and outpatient stroke rehabilitation (Gustafsson & McLaughlin, 2009)	Participants were patients
13	The ICF as a common language for rehabilitation goal-setting: comparing client and professional priorities (Harty et al., 2011)	Focusing into activities and participation domain
14	Impact of using the ICF framework as an assessment tool for students in paediatric physiotherapy: a preliminary study (Jelsma & Scott, 2011)	Retrospective Study Participants were students

No	Articles excluded	Reasons for Exclusion
15	Goals of patients with rehabilitation needs in acute hospitals: Goal achievement is an indicator for improved functioning (Müller et al., 2011)	Participants were patients
16	Well it has to be language-related": Speech-language pathologists' goals for people with aphasia and their families (Sherratt et al., 2011)	Retrospective study
17	Domains of importance for parents, medical professionals and youth with cerebral palsy considering treatment outcomes (Vargus-Adams & Martin, 2011)	Validity Study

Appendix 4 A survey of Paediatric Physiotherapy Management for Children with Cerebral Palsy

(Long Version Section 4 and 5)

Section 4 (Questions will be reordered for the survey to reduce response bias)

Please circle the number that best represents your views:

Each Question in this section refers to THE APPLICATION of ENVIRONMENTAL FACTORS IN MANAGEMENT OF THE CHILD WITH CP

Environmental factors: make up the physical, social and attitudinal environment in which child lives and conducts their lives.

Generalized Intention

1	I expect to apply environmental factors in my treatment plan for children with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
2	I want to apply environmental factors in my treatment plan for children with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
3	I intend to apply environmental factors in my treatment plan for children with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

Direct Attitude

4-6	The application of environmental factors in my treatment plan for the child with CP is…	Worst practice	1	2	3	4	5	6	7	Best Practice
		The wrong thing to do	1	2	3	4	5	6	7	The right thing to do
		Easy for me to do	1	2	3	4	5	6	7	Difficult for me to do

Behaviour Beliefs

7	If I apply environmental factors, I will feel that I am doing something positive for the child	Disagree	1	2	3	4	5	6	7	Agree
8	It causes a lot of concern for parents if environmental factors prevent their child from progressing	Agree	1	2	3	4	5	6	7	Disagree
9	If I apply environmental factors, I will develop a better plan of treatment	Disagree	1	2	3	4	5	6	7	Agree
10	If I apply environmental factors, the treatment session is going to be longer	Agree	1	2	3	4	5	6	7	Disagree

Outcome Evaluation

11	Doing something positive for the child is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable
12	Causing a lot of concern for parents is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable
13	Applying environmental factors to develop plan of treatment of child with CP is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable
14	Making the treatment session longer is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable

Direct Subjective Norm

15	Parents would think that I should NOT consider environmental factors in my treatment plan for the child with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
16	I feel under pressure from colleagues to apply environmental factors in my treatment plan for the child with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
17	It is expected of me to consider environmental factors in my treatment plan for the child with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

Normative Beliefs

18	Parents think I	Should not	1	2	3	4	5	6	7	Should
			apply environmental factors in my management of the child with CP							
19	The child with CP would	Not co-operate with	1	2	3	4	5	6	7	co-operate with
			The treatment plan if I apply environmental factors							
20	My colleagues	Do not	1	2	3	4	5	6	7	Do
			apply environmental factors routinely in managing the child with CP							
21	Health Care management would	Disapprove	1	2	3	4	5	6	7	Approve
			Of me applying environmental factors when managing the child with CP							

Motivation to Comply

22	How much do you want to do what your managers think you should do	Not at all	1	2	3	4	5	6	7	Very much
23	How much do you want to do what your colleagues think you should do	Not at all	1	2	3	4	5	6	7	Very much
24	How much do you want to do what the parent thinks you should do	Not at all	1	2	3	4	5	6	7	Very much
25	How much do you want to do what the child prefers you to do	Not at all	1	2	3	4	5	6	7	Very much

Direct Perceived Behavioural Control

26	I am confident that I can apply environmental factors when managing the child with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
27	Whether I apply environmental factors when managing the child with CP is entirely up to me	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
28	For me to apply environmental factors in management child with CP is	Easy	1	2	3	4	5	6	7	Difficult

Control Belief

29	When I apply environmental factors to develop a plan of treatment for the child with CP, I feel parents do not understand my treatment programme	Agree	1	2	3	4	5	6	7	Disagree
30	Children with CP are uncooperative during physiotherapy sessions	Disagree	1	2	3	4	5	6	7	Agree

Power of Control Belief

31	When I feel parents do not understand the physiotherapy programme, I am	Less Likely	1	2	3	4	5	6	7	More Likely
			to apply environmental factors to develop the plan of treatment							
32	When the child with CP is uncooperative during the physiotherapy session, I am	Less Likely	1	2	3	4	5	6	7	More Likely
			to apply environmental factors to develop my plan of treatment							

Section 5 (Questions will be reallocated for the survey to reduce response bias)

Please circle the number that best represents your view:

Each Question in this section refers to THE APPLICATION of PERSONAL FACTORS IN MANAGEMENT OF THE CHILD WITH CP

Personal factors: gender, age, self-efficacy (child's level of confidence to be physically active) and the child's interests

Generalized Intention

1	I expect to apply personal factors in my treatment plan for children with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
2	I want to apply personal factors in my treatment plan for children with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
3	I intend to apply personal factors in my treatment plan for children with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

Direct Attitude

4-6	The application of personal factors in my treatment plan for the child with CP is…	Worst practice	1	2	3	4	5	6	7	Best Practice
		The wrong thing to do	1	2	3	4	5	6	7	The right thing to do
		Easy for me to do	1	2	3	4	5	6	7	Difficult for me to do

Behaviour Beliefs

7	If I apply personal factors, I will feel that I am doing something positive for the child	Disagree	1	2	3	4	5	6	7	Agree
8	It causes a lot of concern for parents if personal factors prevent their child from progressing	Agree	1	2	3	4	5	6	7	Disagree
9	If I apply personal factors, I will develop a better plan of treatment	Disagree	1	2	3	4	5	6	7	Agree
10	If I apply personal factors, the treatment session is going to be longer	Agree	1	2	3	4	5	6	7	Disagree

Outcome Evaluation

11	Doing something positive for the child is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable
12	Causing a lot of concern for parents is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable
13	Applying personal factors to develop plan of treatment of child with CP is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable
14	Making the treatment session longer is	Extremely Undesirable	1	2	3	4	5	6	7	Extremely Desirable

Direct Subjective Norm

15	Parents would think that I should NOT consider personal factors in my treatment plan for child with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
16	I feel under pressure from colleagues to apply personal factors in my treatment plan for the child with CP	Strongly disagree	1	2	3	4	5		6	Strongly agree
17	It is expected of me to consider personal factors in my treatment plan for the child with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

Normative Beliefs

18	Parents think I	Should not	1	2	3	4	5	6	7	Should
			apply personal factors in my management of the child with CP							
19	The child with CP would	Not co-operate with	1	2	3	4	5	6	7	co-operate with
			The treatment plan if I apply personal factors							
20	My colleagues	Do not	1	2	3	4	5	6	7	Do
			apply personal factors routinely in managing the child with CP							
21	Health Care management would	Disapprove	1	2	3	4	5	6	7	Approve
			Of me applying personal factors when managing the child with CP							

Motivation to Comply

22	How much do you want to do what your managers think you should do?	Not at all	1	2	3	4	5	6	7	Very much
23	How much do you want to do what your colleagues think you should do	Not at all	1	2	3	4	5	6	7	Very much
24	How much do you want to do what the parent thinks you should do	Not at all	1	2	3	4	5	6	7	Very much
25	How much do you want to do what the child prefers you to do	Not at all	1	2	3	4	5	6	7	Very much

Direct Perceived Behavioural Control

26	I am confident that I can apply personal factors when managing the child with CP	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
27	Whether I apply personal factors when managing the child with CP is entirely up to me	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
28	For me to apply personal factors in management child with CP is	Easy	1	2	3	4	5	6	7	Difficult

Control Belief

29	When I apply personal factors to develop a plan of treatment for the child with CP, I feel parents do not understand my treatment programme	Agree	1	2	3	4	5	6	7	Disagree
30	Children with CP are uncooperative during physiotherapy sessions	Disagree	1	2	3	4	5	6	7	Agree

Power of Control Belief

31	When I feel parents do not understand the physiotherapy programme, I am	Less Likely	1 2 3 4 5 6 7 to apply personal factors to develop the plan of treatment	More Likely
32	When the child with CP is uncooperative during the physiotherapy session, I am	Less Likely	1 2 3 4 5 6 7 to apply personal factors to develop my plan of treatment	More Likely

A survey of Paediatric Physiotherapy Management for Children with Cerebral Palsy (Short Version)

University of Strathclyde
Humanities & Social Sciences

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

A survey of Paediatric Physiotherapy Management for Children with Cerebral Palsy

This survey contains seven sections about physiotherapy management for children with CP. The survey focuses on the continuous cyclic clinical decision making process that physiotherapist undertake in their day-to-day clinical work. These include assessment, identifying problems and setting goals to develop a treatment plan. In this survey, the International Classification of Functioning, Disability and Health (ICF) model is a tool used to clarify the clinical reasoning process. (Fig.1).

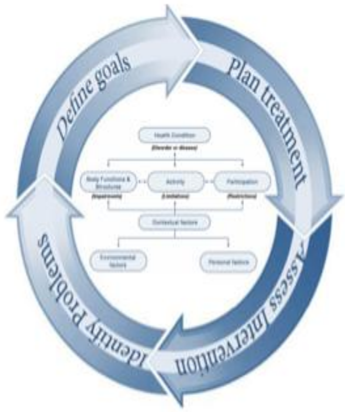


Fig.1; Integration ICF Model into Clinical Decision Making Process

Please read each question carefully, and answer all the questions. There are no correct or incorrect responses.

Section 1: Case Scenarios

You will be presented with three case scenarios, which aim to ascertain your views on how you would manage this clinical situation regarding a child with CP. Please read each case carefully and answer the question that follows.

Case 1

Your colleague went on annual leave and passed her patient on to you. At her first session with you, a 12-year-old girl presented with moderate spastic diplegia cerebral palsy (CP) and was functioning at level III[1] on GMFCS (the Gross Motor Function Classification System). She attended physiotherapy using a wheelchair (you question why her situation is different and why she is not using elbow crutches). Her parent mentioned that from 2 weeks back, she has started going to school using a back-walker and AFOs (Ankle Foot Orthorsis), and she no longer participates at school in peer activities. She has difficulty in doing her regular home exercises; there is resistance during a passive range of motion and she has difficulty in putting on the AFOs.

Her mum has walked with her three times using the back-walker and during the weekend goes swimming with her. The child is stressed about not helping her mum in cooking and preparing the dining table. Her records show that last year she had intensive treatment, botulinum toxin treatment and followed a 6 month-long physiotherapy programme, 3 times a week, with additional home exercises.

Both treatments aimed to improve her walking distance in school is 500m away with elbow crutches and AFOs. This was achieved, and then physiotherapy decreased to once per month. Your assessment identified that her left lower limbs are more affected than her right side; her muscle strength has decreased, especially with regard to her knees and ankle muscles. The spasticity has increased during slow and fast passive stretching, especially in gastrocnemius, hamstrings and iliopsoas, and she has shown decreased body awareness, balance and significantly decreased endurance compared to her previous records. She is able to stand statically with elbow crutches, but is unable to take steps. She walks 200m with the back-walker and AFOs. The child is anxious to do physical activities and to improve her walking ability and capacity to help her mum with cooking and setting the dining table.

1- Level III: Children walk using a hand-held mobility device in most indoor settings. Children may walk up and down stairs holding onto a railing with supervision or physical assistance. When traveling long distances, children use some form of a manual wheelchair.

Please rank your plan of treatment for this child from the options below, according to how appropriate you feel each option is to produce the best outcome for her (1 = most appropriate to 5 = least appropriate).

______ Refer her back to her doctor to assess the effect of the botulinum toxin treatment, and hold off from the physiotherapy until she sees the doctor.

______ Return her to the previous plan of treatment 3 times a week to improve her lower extremities, muscle strength, functional upper limbs activity and increase her cardiovascular endurance (using a static ergo-meter).

______ Change her plan of treatment to twice weekly to improve her functional walking (e.g. increase her walking speed and distance using a treadmill) and practice her functional activities from a standing position and in terms of moving from sitting to standing (e.g. resembling similar activities to those that she used to do in the kitchen and around the dining table, or playing catching ball) to improve her physical activity from a standing position.

______ Focus more on the parent by providing them with a booklet and giving instructions relating to her daughter's condition and explain that CP is long-term illness and that it is their responsibility to do home exercises together with their daughter and to maintain her practicing of functional activities (e.g. asking her to help in the kitchen and in setting the dining table) and to keep her physically active by engaging with her in physical activities (e.g. walking).

______ Increase her motivation and interest in the physical activity that she wants to do (i.e. helping in the kitchen and setting the dining table) and ensure that she understands that playing (in the kitchen) helps to maintain her health and that her general physical abilities will improve with the activities that she is interested in.

Case 2

A 12-year old boy presents with moderate spastic diplegia, Cerebral palsy (CP) and functioning at level III[1] on GMFCS (Gross Motor Function Classification System). The child presented to your clinic using a back-walker for short distances (therapists questioned why he stopped using elbow crutches) and after 1 month did not come for his physiotherapy session since school was started. His mum mentioned that three weeks after he started at the mainstream school, he had difficulty putting on AFOs and in walking with elbow crutches. Since he started school, his father has brought him to the classroom and takes him away in the afternoon; as his classroom is on the first floor, he needs maximum assistance to climb up and down the stairs. He does not participate at school in peer activities and takes his lunch break in his classroom. His goal of treatment has been to improve his walking distance in school to 500m with elbow crutches and AFOs to transfer to the mainstream school, which he achieved. He had intensive treatment physiotherapy for 3 months, 3 times a week and did home exercises. Then, this decreased to once a week and home exercises. You identified that there is no change in his spasticity levels during the passive range of motion with regard to gastrocnemius, hamstrings and iliopsoas. However, his muscle strength has decreased, especially in terms of his knees and ankle muscles. His body awareness, balance and endurance also have decreased compared to levels seen in previous sessions. You manage to put on the AFOs and his walking distance decreased to 300m with elbow crutches. The child is still anxious to do physical activities and to walk further to play with his friends.

1- Level III: Children walk using a hand-held mobility device in most indoor settings. Children may walk up and down stairs holding onto a railing with supervision or physical assistance. When traveling long distances, children use some form of a manual wheelchair.

Please rank your plan of treatment for this child from the options below, according to how appropriate you feel each option is to produce the best outcome for him (1 = most appropriate to 5 = least appropriate).

______ Refer him to the orthotic department to assess his AFOs.

______ Discuss his case with his social worker with regard to school facilities (asking if someone can assist him during his lunch break and peer activities, for example in climbing up and down stairs) and explain to the parent their responsibility to keep him physically active (e.g. discuss this issue with school principal).

______ Ensure that the child understands that climbing up and down stairs helps to improve his physical activities and improve his performance when playing with his friends.

______ Keep him on his previous plan of treatment in order to improve muscle strengthening in his lower extremities, his functional upper limbs activities and to increase his cardiovascular endurance (using a static ergo-meter).

______ Change his plan of treatment, focusing more on practicing functional activities to increase his capacity to climb up and down stairs (using step exercises) and improve his gait functioning (e.g. increase his walking speed and distance using a treadmill).

Case 3

A colleague specialising in private rehabilitation asks your expert opinion on a patient attending physiotherapy using a back-walker who has stopped using elbow crutches. He is a 12-year old boy with moderate spastic diplegia Cerebral palsy (CP), functioning at level III[1] on GMFCS (Gross Motor Function Classification System). His parent mentions that starting 2 weeks back, he has been going to school using a back-walker and an AFOs. The child is a fan of football games but no longer participates as a goalkeeper as he had formerly done. He has replaced playing football by watching football games on TV or playing computer games. His parents took him abroad for intensive treatment in the form of botulinum toxin treatment and he followed a 6-month physiotherapy programme 3 times a week. Both treatments aimed to improve his walking distance in school to 500m with elbow crutches and AFOs. They came back and started physiotherapy following the same goals of treatment. After 2 months of physiotherapy his goal was achieved, then physiotherapy decreased to twice monthly with additional home exercises. At the moment he is doing his home exercises without concentrating on what he is doing. He does not join his father during weekends for swimming, or walking or tri-cycling with his mother. The colleague identified that there was no change in his muscle strength, especially in terms of his knees and ankle muscles, and no change in the spasticity (as the passive range of motion was the same in gastrocnemius, hamstrings and iliopsoas). His body awareness, balance and endurance have not changed significantly compared to the last session. He is able to stand statically with his elbow crutches and walk 100m with elbow crutches and AFOs. His mum is stressed about his deterioration and about the amount of time and money they have spent.

1- Level III: Children walk using a hand-held mobility device in most indoor settings. Children may walk up and down stairs holding onto a railing with supervision or physical assistance. When traveling long distances, children use some form of a manual wheelchair.

Please rank your plan of treatment for this child from the options below, according to how appropriate you feel each option is to produce the best outcome for him (1 = most appropriate to 5 = least appropriate).

______ Send him back to the doctor to re-assess his condition.

______ Return him to physiotherapy twice weekly for 6 weeks on the previous plan of treatment, which focuses on lower extremity muscle strengthening, functional upper limb activities, and increase cardiovascular endurance (using a static ergo-meter).

______ Focus on the parents to remain playing football games with him and to keep him physically active by engaging with him in these games, aiming to improve his physical activity.

______ Ensure that the child understands watching and playing computer games are good strategies to learn different techniques in football games, but practicing playing football helps to improve his performance as goalkeeper and decrease chance of falls. As well as making sure he understands the aims of doing other functional activities (e.g. walking, swimming) – that they will improve his footballing performance

______ Return him to physiotherapy twice weekly for 6 weeks and change his plan of treatment, focusing more on practicing functional activities to increase his capacity to play football games to improve his performance.

Section 2: Your work details

1. How do you work as a paediatric physiotherapist? (choose all that apply)

   ☐ I work alone as an independent practitioner
   ☐ I work alongside other paediatric physiotherapists
   ☐ I work alongside assistant/technician paediatric physiotherapists.
   ☐ I work..........

2. Please estimate on average: how many children with CP you normally treat on a daily basis

   ☐ 1-3
   ☐ 4-6
   ☐ 7-10
   ☐ More than 10

3. Please estimate on average, how many children with CP are treated each day in your department?

   ☐ 1-3
   ☐ 4-6
   ☐ 7-10
   ☐ 11-20
   ☐ More than 20

Section 3: This section asks about how you apply environmental and personal factors to the management of the child with CP.

Environmental factors make up the physical, social and attitudinal environment in which the child lives and conducts their lives.

Personal factors are gender, age, self-efficacy (child's level of confidence in being physically active) and the child interests.

1. Do you use a specific assessment form to identify the child's problems and needs?

   ☐ No (please go to question 4)
   ☐ Yes, an assessment form developed by the department (please go to question 3)
   ☐ Yes, a standard assessment (please go to question 2)

2. If you use a standard assessment, please state which one(s) in the box below:

3. If you use an assessment form developed by the department, does your assessment form include?

   ☐ Environmental factors (Physical, social and attitudinal environment in which the child lives and conducts their lives)
   ☐ Personal Factors
   ☐ Both environmental and personal factors.
   ☐ Neither environmental and personal factors.

4. Who primarily decides on the goals of treatment for your patient with CP? (choose all that apply)

   ☐ You
   ☐ Parent
   ☐ Child
   ☐ Other……………..

5. Do you apply environmental factors in your treatment plan for children with CP? (choose one from below)

   ☐ All the time
   ☐ Most of the time
   ☐ Sometimes
   ☐ A few times
   ☐ Never

6. Do you apply personal factors in your treatment plan for children with CP? (choose one from below)

☐ All the time
☐ Most of the time
☐ Sometimes
☐ A few times
☐ Never

Section 4: Please select the number that best represents your views:

Each Question in this section refers to THE APPLICATION of ENVIRONMENTAL FACTORS IN MANAGEMENT OF THE CHILD WITH CP.

Environmental factors: make up the physical, social and attitudinal environment in which child lives and conducts their lives.

1. I expect to apply environmental factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

2. For me to apply environmental factors in management of children with CP is

Extremely Easy	☐	☐	☐	☐	☐	☐	☐	Extremely Difficult

3. – 5. The application of environmental factors in my treatment plan for children with CP is…

Worst Practice	☐	☐	☐	☐	☐	☐	☐	Best Practice
The wrong thing to do	☐	☐	☐	☐	☐	☐	☐	The right thing to do
Worthless	☐	☐	☐	☐	☐	☐	☐	Valuable

7. I want to apply environmental factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

8. I feel under pressure from colleagues to apply environmental factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

9. It is expected of me to consider environmental factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

10. I am confident that I can apply environmental factors when managing children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

11. Whether I apply environmental factors when managing children with CP is entirely up to me

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

12. I intend to apply environmental factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

13. Parents would think that I should NOT consider environmental factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

Section 5:

Please select the number that best represents your view:

Each Question in this section refers to THE APPLICATION of PERSONAL FACTORS IN MANAGEMENT OF THE CHILD WITH CP

Personal factors: gender, age, self-efficacy (child's level of confidence to be physically active) and the child's interests.

1. I expect to apply personal factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

2. – 4. The application of personal factors in my treatment plan for children with CP is…

Worst Practice	☐	☐	☐	☐	☐	☐	☐	Best Practice
The wrong thing to do	☐	☐	☐	☐	☐	☐	☐	The right thing to do
Worthless	☐	☐	☐	☐	☐	☐	☐	Valuable

5. I want to apply personal factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

6. I am confident that I can apply personal factors when managing children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

7. For me to apply personal factors in management of children with CP is

Extremely Easy	☐	☐	☐	☐	☐	☐	☐	Extremely Difficult

8. I feel under pressure from colleagues to apply personal factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

9. I intend to apply personal factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

10. Parents would think that I should NOT consider personal factors in my treatment plan for child with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

11. It is expected of me to consider personal factors in my treatment plan for children with CP

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

12. Whether I apply personal factors when managing children with CP is entirely up to me

Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

Section 6

This section asks you about your background and your clinical knowledge

1. Do you have postgraduate qualifications relevant to paediatric rehabilitation

   ☐ Yes

   ☐ No (please go to question 4)

2. Please choose the highest option that applies

   ☐ Postgraduate Certificate

   ☐ Postgraduate Diploma

   ☐ Masters Degree

   ☐ Other ____________________

3. Is the above qualification relevant to the management of cerebral palsy conditions?

   ☐ Yes, in part

   ☐ Yes, directly

   ☐ No

4. Did you attend any courses/workshops relevant to the management of cerebral palsy conditions

   ☐ Yes

   ☐ No (please go to question 6).

5. If yes, please specify the course/ workshop title

   ____

   ____

   ____

6. Do you have any previous knowledge of the International Classification Functioning Disability and Health (ICF)?

   ☐ Yes

   ☐ No (please go to question 7)

7. If yes, please rate your ICF knowledge and use in clinical practice on the following scale:

No ICF Knowledge	☐	☐	☐	☐	☐	☐	☐	Very good ICF Knowledge
Not used in Clinical Practice	☐	☐	☐	☐	☐	☐	☐	Implemented in Clinical Practice

8. From where did you get ICF knowledge? (choose all that apply)

   ☐ Attended ICF workshop or In-service training
   ☐ Self-study (On-line, reading book)
   ☐ Included in the university curriculum
   ☐ During a conference
   ☐ Learned in the job.

9. Please answer all of the following questions:

	True	**False**	**Don't Know**
1. The ICF classification was developed to describe the patient's functioning only (i.e. not the patient's condition)			
2. "Capacity" and "performance" are terms used when referring to environmental factors			
3. The umbrella term "functioning" encompasses all body functions, body structures and activities and participation domains			
4. The ICF model encourages paediatric physiotherapists to assess and treat a child's functioning with consideration to the child's environment and personal factors.			
5. In the integrative bio-psychosocial ICF model, functioning is viewed as a consequence of a health condition rather than a functional impairment only.			
6. Environmental and personal factors could be a facilitator or barrier to a child's functioning			
7. The ICF framework can be applied in rehabilitation management as a tool to provide a diagnosis of diseases.			
8. The item d4500 is coded for capacity and performance qualifiers in evaluating walking activity.			
9. The code b770 describes the child when moving around in different locations.			

Section 7:

This section asks general questions about you:

1. Age

   ☐ 22-30
   ☐ 31-40
   ☐ 41-50
   ☐ 50 or above

2. Gender

   ☐ Male
   ☐ Female

3. When did you qualify as a physiotherapist?

   ____________________(Year e.g. 1999)

4. Number of years working with children

   ☐ 1-3
   ☐ 4-6
   ☐ 7-10
   ☐ 11 or above

5. In which Province of Saudi Arabia do you practice?

   ☐ Central
   ☐ West
   ☐ East
   ☐ North
   ☐ South

Thank you very much for taking the time to complete this survey, your help is greatly appreciated.

A survey of Paediatric Physiotherapy Management for Children with Cerebral Palsy (Arabic Version)

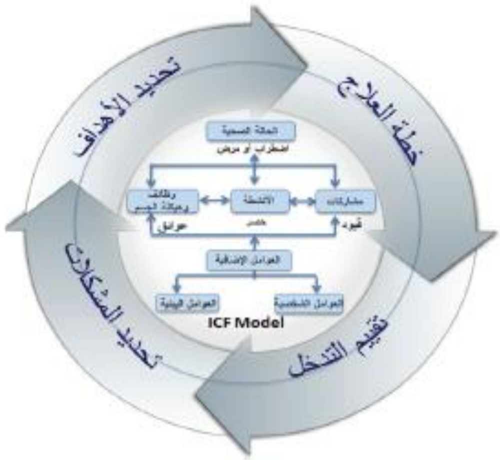
SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

University of Strathclyde
Humanities & Social Sciences

A survey of Paediatric Physiotherapy Management for Children with Cerebral Palsy

مسْح إدارة برنامج العلاج الطبيعي للأطفال المصابين بالشلل الدماغي

يحتوي هذا المَسْح على سبعة أقسام عن إدارة برنامج العلاج الطبيعي للأطفال المصابين بالشلل الدماغي. ويركز المَسْح على عملية التفكير السريرية الدورية المستمرة التي يقوم بها أخصّائي العلاج الطبيعي في عمله السريري اليومي. وتشمل هذه العملية: التقييم وتحديد المشاكل وتحديد الأهداف لوضع خطة العلاج. وفي هذا المَسْح، نجد أن نموذج التصنيف الدولي لتأدية الوظائف والعجز والصحة (ICF) عبارة عن أداة تُستخدم لتوضيح عملية التفكير السريرية. (الشكل ١).



الشكل (١): نموذج التصنيف الدولي لتأدية الوظائف والعجز والصحة (ICF) المتكامل لعملية التفكير السريرية

يُرجى قراءة كل سؤال بدقة والإجابة على جميع الأسئلة. لا توجد إجابات صحيحة أو غير صحيحة.

القسم (١): سيناريوهات الحالات:

سيجري عرض ثلاثة سيناريوهات لحالات تهدف إلى التحقق من وجهة نظرك بشأن كيفية التعامل مع هذه الحالة السريرية التي تخص طفل مصاب بالشلل الدماغي. يُرجى قراءة كل حالة بعناية والإجابة على السؤال الذي يليها.

الحالة (١):

ذهبت زميلتك لقضاء إجازتها السنوية وانتقل علاج الحالة التي كانت تعالجها اليك. والحالة لفتاة تبلغ من العمر ١٢ عامًا تعاني من الشلل الدماغي التقلصي الرباعي معتدل الشدة(CP)، وحسب نظام تصنيف الوظائف الحركية الكبرى (GMFCS) كانت تصنيفها عند المستوى الثالث [١]. وفي جلستها الأولى معك حضرت الطفلة لجلسة العلاج الطبيعي مستخدمة الكرسي المتحرك (ولقد تساءلت أنت عن سبب الاختلاف في حالتها عن ما عرفته عنها مسبقا وسبب عدم استخدامها للعكازات). وقد اخبرك والديها أنه منذ أسبوعين، قد بدأت تذهب إلى المدرسة باستخدام جهاز المشي (back-walker) وجبيرة كاحل القدم (AFOs)، وأنها لم تعد تشارك في الأنشطة المدرسية مع أقرانها. كما انها تعاني من صعوبة في ممارسة التمارين والانشطة الرياضية العادية بالمنزل؛ وان هناك زيادة في درجة التشنج في عضلات الاطراف السفلية ويظهر ذلك من خلال وجود مقاومة اثناء التحريك السلبي لمفاصل الاطراف السفلية و صعوبة في ارتداء جبيرة كاحل القدم (AFOs).

والدتها كانت تمشي معها ثلاث مرات في الأسبوع وذلك باستخدام جهاز المشي (back-walker)؛ وخلال عطلة نهاية الأسبوع، تذهب للسباحة معها. وتشعر الطفلة بالضغط بسبب عدم مساعدة والدتها في الطهي وإعداد مائدة الطعام.

ويشير سجلها الطبي أنها في العام الماضي حصلت على علاج مكثف عبارة عن الحقن بتوكسين البوتولينوم اعقبة برنامج علاج طبيعي مكثف لمدة ٦ أشهر، بواقع ٣ مرات في الأسبوع، بالاضافة الى ممارسة تمارين رياضية وعلاجية إضافية بالمنزل. وكان هذا العلاج يهدف إلى تحسين مسافة المشي، في المدرسة إلى ٥٠٠ مترًا، باستخدام كلا من العكازات وجبيرة كاحل القدم (AFOs). وقد تحقق هذا الهدف ومن ثم تم تقليل جلسات العلاج الطبيعي لتصبح مرة واحدة بالشهر بدلا من البرنامج المكثف السابق .

وعند تقييمك للحالة وجدت أن الجانب الأيسر كان أكثر تأثرًا من الجانب الأيمن؛ وان قوة العضلات للجانبين قد انخفضت ، وخاصة فيما يتعلق بالركبتين وعضلات الكاحل. وقد ازداد التشنج أثناء التحريك السلبي للطرفين السفليين سواء البطيء اوالسريع، وخاصة في عضلات باطن الرجل gastrocnemius وخلف الساق hamstrings والعضلة الامامية لمفصل الفخذ iliopsos ، وأظهر تقيمك ايضا مقارنة بالتقيمات السابقه لها, انخفاضا لدرجة ادراكها بجسمها body awareness، وانخفاض الاتزان الحركيbalance وانخفاض ملحوظ في درجة التحمل endurance . وبالنسبة لمهارة الوقوف فالطفلة قادرة على الوقوف بثبات باستخدام عكازين الكوع، ولكنها غير قادرة على اخذ خطوات المشي بهما ولكنها تستطيع المشي ٢٠٠ مترًا باستخدام جهاز المشي (back-walker) وجبيرة كاحل القدم (AFOs).
ولدى الطفلة الدافع والرغبة لأداء الأنشطة البدنية وتحسين قدرتها على المشي وقدرتها على مساعدة والدتها في الطهي وإعداد مائدة الطعام.

١ المستوى الثالث:
يمشي الأطفال باستخدام أداة تنقل محمولة باليد في أغلب الأماكن.
قد يستطيعون تسلق الدرج بالإمساك بالدرابزين مع الإشراف أو المساعدة.
يستخدم الأطفال أداة تنقل بعجلات عندما يتنقلون لمسافات طويلة وقد يدفعون أنفسهم ذاتيا في المسافات القصيرة.

يرجي ترتيب خطتك العلاجية لهذه الطفلة والتي ستؤدي الى الحصول على افضل نتيجة من الخيارات أدناه، وفقًا لمدى أهمية كل خيار من وجهة نظرك (من ١ = الأكثرأهمية إلى ٥ = الأقل أهمية).

____ الرجوع إلى طبيبها لتقيم تأثير علاج توكسين البوتولينوم والتوقف عن العلاج الطبيعي حتى ترى الطبيب.

____ عودتها إلى الخطة السابقة للعلاج: ٣ مرات في الأسبوع لتحسين أطرافها السفلية وقوة العضلات والنشاط الوظيفي للأطراف العلوية وزيادة تحمل القلب والأوعية الدموية (باستخدام الدراجة الثابتة).

____ تغيير خطة العلاج إلى مرتين في الأسبوع لتحسين المشي الوظيفي (على سبيل المثال زيادة سرعة المشي والمسافة باستخدام جهاز المشي) وممارسة أنشطة وظيفية من وضعية الوقوف وايضا الانتقال من وضعية الجلوس إلى وضعية الوقوف (على سبيل المثال تجميع الأنشطة المماثلة لتلك التي كان تعتاد القيام بها في المطبخ وحول مائدة الطعام أو لعبة مسك الكرة) لتحسين نشاطها البدني من وضعية الوقوف.

القسم (٣): يحتوي هذا القسم عن كيفية تطبيق العوامل البيئية والشخصية لإدارة الطفل المصاب بالشلل الدماغي (CP).

تُشكل **العوامل البيئية** البيئة المادية والاجتماعية والسلوكية التي يعيش فيها الطفل وتعينه على ممارسة حياته.
العوامل الشخصية هي الجنس والسن والكفاءة الذاتية (مستوى ثقة الطفل في ممارسة النشاط البدني) واهتمامات الطفل.

١- هل تستخدم نموذج تقييم معين لتحديد مشاكل الطفل واحتياجاته؟

- ❑ لا
- ❑ نعم، نموذج تقييم من إعداد القسم (يرجى الانتقال إلى السؤال ٣)
- ❑ نعم، تقييم قياسي (يرجى الانتقال إلى السؤال ٢)

٢- إذا كنت تستخدم تقييم قياسي، يرجى ذكر أي تقييم (تقييمات) في المربع أدناه:

٣- إذا كنت تستخدم نموذج تقييم من إعداد القسم، هل يشمل نموذج تقييمك

- ❑ البيئة المادية والاجتماعية والسلوكية التي فيها يعيش الطفل وتجري حياته
- ❑ العوامل الشخصية
- ❑ لا العوامل البيئية ولا الشخصية
- ❑ كل من العوامل البيئية والشخصية

٤- من الذي يقرر في المقام الأول أهداف علاج المريض المصاب بالشلل الدماغي (CP) (اختر مما يلي أدناه)؟

- ❑ أنت
- ❑ أحد الوالدين
- ❑ أنت وأحد الوالدين
- ❑ أنت والطفل وأحد الوالدين
- ❑ أنت والطفل
- ❑ شخص آخر

٥- هل تُطبق **العوامل البيئية** في خطة علاج الأطفال المصابين بالشلل الدماغي (CP) (اختر مما يلي أدناه)؟

- ❑ طوال الوقت
- ❑ أغلب الوقت
- ❑ أحيانًا
- ❑ بضع مرات
- ❑ أبدًا

القسم (٤):

يرجى اختيار الرقم الذي يمثل أفضل وجهة نظر بالنسبة لك:

يشير كل سؤال في هذا القسم إلى تطبيق العوامل البيئية في إدارة الطفل المصاب بالشلل الدماغي (CP).

تُشكل **العوامل البيئية** البيئة المادية والاجتماعية والسلوكية التي فيها يعيش الطفل وتعينه على ممارسة حياته.

١- أتوقع تطبيق العوامل البيئية في خطة علاج الأطفال المصابين بالشلل الدماغي (CP).

	١	٢	٣	٤	٥	٦	٧	
لا أوافق بشدة	❍	❍	❍	❍	❍	❍	❍	أوافق بشدة

٢- بالنسبة لي، تطبيق العوامل البيئية في إدارة الطفل المصاب بالشلل الدماغي هو

	١	٢	٣	٤	٥	٦	٧	
جدا سهل	❍	❍	❍	❍	❍	❍	❍	جدا صعب

٣ - ٥ تطبيق العوامل البيئية في خطة علاج الأطفال المصابين بالشلل الدماغي (CP)...

	١	٢	٣	٤	٥	٦	٧	
أسوأ ممارسة	❍	❍	❍	❍	❍	❍	❍	أفضل ممارسة
الشيء الخطأ الذي لا ينبغي القيام به	❍	❍	❍	❍	❍	❍	❍	الشيء الصحيح الذي ينبغي القيام به
من السهل بالنسبة لي القيام به	❍	❍	❍	❍	❍	❍	❍	من الصعب بالنسبة لي القيام به

٦- إذا طبقت العوامل البيئية، فسوف أشعر بأنني أفعل شيئا إيجابيًا للطفل.

	١	٢	٣	٤	٥	٦	٧	
لا أوافق بشدة	❍	❍	❍	❍	❍	❍	❍	أوافق بشدة

٧- إذا طبقت العوامل البيئية، فسوف تكون جلسة العلاج أطول.

	١	٢	٣	٤	٥	٦	٧	
أوافق بشدة	❍	❍	❍	❍	❍	❍	❍	لا أوافق بشدة

القسم (٥):
<u>يرجى اختيار الرقم الذي يمثل أفضل وجهة نظر بالنسبة لك:</u>

يشير كل سؤال في هذا القسم إلى تطبيق العوامل الشخصية في إدارة الطفل المصاب بالشلل الدماغي (CP).

تُشكل **العوامل الشخصية** هي الجنس والسن والكفاءة الذاتية (مستوى ثقة الطفل في ممارسة النشاط البدني) واهتمامات الطفل.

١- أتوقع تطبيق العوامل الشخصية في خطة علاج الأطفال المصابين بالشلل الدماغي (CP).

	١	٢	٣	٤	٥	٦	٧	
لا أوافق بشدة	○	○	○	○	○	○	○	أوافق بشدة

٢- بالنسبة لي، تطبيق العوامل الشخصية في إدارة الطفل المصاب بالشلل الدماغي هو

	١	٢	٣	٤	٥	٦	٧	
جدا سهل	○	○	○	○	○	○	○	جدا صعب

٣ -٥ تطبيق العوامل الشخصية في خطة علاج الأطفال المصابين بالشلل الدماغي (CP)...

	١	٢	٣	٤	٥	٦	٧	
أسوا ممارسة	○	○	○	○	○	○	○	أفضل ممارسة
الشيء الخطأ الذي لا ينبغي القيام به	○	○	○	○	○	○	○	الشيء الصحيح الذي ينبغي القيام به
من السهل بالنسبة لي القيام به	○	○	○	○	○	○	○	من الصعب بالنسبة لي القيام به

٦- أريد تطبيق العوامل الشخصية في خطة علاج الأطفال المصابين بالشلل الدماغي (CP).

	١	٢	٣	٤	٥	٦	٧	
لا أوافق بشدة	○	○	○	○	○	○	○	أوافق بشدة

٧- جعل جلسة العلاج أطول هو أمر

	١	٢	٣	٤	٥	٦	٧	
غير مرغوب فيه للغاية	○	○	○	○	○	○	○	مرغوب فيه للغاية

القسم (٧):

يحتوي هذا القسم أسئلة عامة عنك:

١- السن:

- ❑ ٢٢-٣٠
- ❑ ٣١-٤٠
- ❑ ٤١-٥٠
- ❑ ٥٠ أو أكبر

٢- الجنس:

- ❑ ذكر
- ❑ أنثى

٣- منذ متى كنت مؤهلًا بصفة أخصّائي علاج الطبيعي؟

.... (سنة على سبيل المثال ١٩٩٩).

٤- عدد سنوات العمل مع الأطفال

- ❑ أقل من سنة واحدة
- ❑ ١ - ٣
- ❑ ٤ - ٦
- ❑ ٧ - ١٠
- ❑ ١١ أو أكثر

٥- في أي منطقة في السعودية قمت بالممارسة؟

- ❑ المركزية
- ❑ الغربية
- ❑ الشرقية
- ❑ الشمالية
- ❑ الجنوبية

شكرًا جزيلًا على الوقت الذي أمضيته في إتمام هذا المسح، فنحن نقدر مساعدتك.

Pre-and-Post Training Workshop Questionnaire (Section1)

Code No:

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

University of Strathclyde
Humanities & Social Sciences

Pre-and-post Training Workshop Questionnaire

Name of school: School of Psychological Sciences and Health
Title of the study: Appling the ICF (International Classification Functioning Disability and Health) framework as a clinical reasoning tool for children with Cerebral Palsy.

Please read each question carefully and answer all the questions. There are no correct or incorrect responses. The information that you provide will remain strictly confidential.

Section 1: Case Scenarios

You will be presented with three case scenarios, which aim to ascertain your views on how you would manage this clinical situation regarding a child with CP. Please read each case carefully and answer the question that follows.

Case 1

Your colleague went on annual leave and passed her patient on to you. At his first session with you, a 7 year old boy presented with minimal spastic left hemiplegia cerebral palsy (CP). His functioning is at level II on GMFCS [1] (Gross Motor Function Classification System) and level II MACS[2] (Manual Ability Classification System) for upper limb. He attended physiotherapy walks with toes on the left striking the ground first with minimal support holding mum hand and without AFO (Ankle Foot Orthosis). (you question why his situation is different and why he is not using AFO). His parent mentioned that from 2 weeks back, he have quite falls and tumbles while walking, he has difficulty climb stairs up and down and has difficulty putting on the AFO. He has difficulty in doing his regular home exercises; there is resistance during a passive range of motion and he has difficulty continuous pedalling his new tricycle that his dad bought for him. His mum has walked with him three times and during the weekend goes swimming with his father. The child is stressed about not continuous pedalling his new tricycle. While, he is independent in daily activities during eating and dressing.
Both treatment aimed to decrease falls and tumbles while walking and climb stairs up and down with AFO. This was achieved and then physiotherapy decreased to once per month.

Your assessment identified his muscles strength has decreased, especially with regard to his left knee and ankle muscles. The spasticity has increased in his left leg during slaw and fast passive stretching in gastrocnemius and hamstrings. There is no change in the upper limb function. He walks 500ms with minimal support and without AFO and 10 meter walking velocity is 1 m/s with support in order to clear toes while walking. The child is anxious to do physical activities and to improve pedalling his new tricycle.

Level II on GMFCS[1]: Children walk in most settings. Children may experience difficulty walking long distances and balancing on uneven terrain. Children walk up and down stairs holding onto a railing or with physical assistance if there is no railing. Limitations in performance of gross motor skills may necessitate adaptations to enable participation in physical activities.

Level II MACS[2]: Children Manual abilities do not usually restrict independence in daily activities. Children handle most objects but with somewhat reduced quality and/or speed of achievement.

Please rank your plan of treatment for this child from the options below, according to how important you feel each option will produce the best outcome for her (1= most important to 5 = least important)

___ Refer him back to his doctor to assess him and hold off from the physiotherapy until he sees the doctor.

___ Return him to the previous plan of treatment 3 times a week to improve his muscles strength, balance coordination and motor planning.

___ Change his plan of treatment to twice weekly to improve his functional walking (e.g. increase his walking speed and distance using a treadmill), and practice functional activities to increase his capacity to climb up and down stairs (using step exercises).

____ Ensure that the parent understanding the important that child has AFO to help him clear his foot and giving instructions relating to his son condition and explain important of practicing functional activities (e.g. walking, stepping).

____ Increase child motivation to be physical active by offering more activities which he likes/ which are chosen by the child (e.g. continuous riding his tricycle).

Case 2

A 7 year old girl presents with minimal spastic left hemiplegia cerebral palsy (CP). Her functioning is at level II on GMFCS[1] (Gross Motor Function Classification System) and level II MACS[2] (Manual Ability Classification System) for upper limb. The child presented to your clinic walks with toes on the left striking the ground first with minimal support holding mum hand and without AFO (You question why she stop wearing the AFO), and after 1 month did not come for her physiotherapy session since school was started. Her mum mentioned that from 2 weeks back has difficulty putting on AFO and she had several falls and tumbles while walking. Since she started school her mum has brought her to the classroom and takes her away in the afternoon; as her classroom is on the first floor, she has difficulty climb stairs in school. She does not participate at school in peer activities and takes her lunch break in her classroom.

Her goal of treatment has been to increase walking distance to 800ms with AFO and decrease falls and tumbles while walking, which she achieved. She had intensive treatment physiotherapy for 3months, 3 times a week and did home exercises, then decreased to twice a month and home exercises. You identified that there is no change in her spasticity levels during the passive range of motion with regard to gastrocnemius, hamstrings. However, her muscle strength has decreased, especially in terms of her knee and ankle muscles compared to levels seen in previous sessions. You manage to put on the AFO and her walking distance decreased to 500m with minimal support. The child is still anxious to do physical activities and playing with her brothers with new tricycle that she got.

Level II on GMFCS[1]: Children walk in most settings. Children may experience difficulty walking long distances and balancing on uneven terrain. Children walk up and down stairs holding onto a railing or with physical assistance if there is no railing. Limitations in performance of gross motor skills may necessitate adaptations to enable participation in physical activities.

Level II MACS[2]: Children Manual abilities do not usually restrict independence in daily activities. Children handle most objects but with somewhat reduced quality and/or speed of achievement.

Please rank your plan of treatment for this child from the options below, according to how important you feel each option will produce the best outcome for him (1= most important to 5 = least important).

_____ Refer her to the orthotic department to assess her AFO.

_____ Discuss her case with her social worker with regard to school facilities (asking if someone can assist her during her lunch break and peer activities, for example in climbing up and down stairs) and explain to the parent their responsibility to keep her physically active (e.g. discuss this issue with school principal).

_____ Ensure that the child understands that climbing up and down stairs helps to improve her physical activities and improve her performance when pedaling her tricycle.

_____ Keep her on her previous plan of treatment in order to improve muscle strengthening in her lower extremities and to increase her cardiovascular endurance (using a static ergo-meter).

_____ Change her plan of treatment, focusing more on practicing functional activities to increase her capacity to climb up and down stairs (using step exercises) and improve her gait functioning (e.g. increase her walking speed and distance using a treadmill).

Case 3

A colleague specialising in private rehabilitation asks your expert opinion on a patient attending physiotherapy walks with toes on the left striking the ground first with minimal support holding mum hand and without AFO. He is a 7 year old boy with minimal spastic left hemiplegia cerebral palsy (CP), functioning at level II on GMFCS[1] (Gross Motor Function Classification System) and level II MACS[2] (Manual Ability Classification System) for upper limbs. His parent mentions that starting 2 weeks back, he had difficulty putting on AFO and he have several falls and tumbles while walking. The child is a fan of riding tricycle but no longer participate with two of his brothers. He has replaced riding tricycle by playing computer games. At the moment he is doing his home exercises without concentrating on what he is doing. He does not join his father during weekends for swimming, or walking or tri-cycling with his mother

His treatments aimed to increase walking distance to 800m with AFO and decrease falls and tumbles while walking. After 2 months of physiotherapy his goal was achieved, then physiotherapy decreased to twice monthly with additional home exercises. The colleague identified that there was no change in his muscle strength, especially in terms of his knees and ankle muscles, and no change in the spasticity (as the passive range of motion was the same in gastrocnemius and hamstrings) compared to the last session. He walks 500ms without support and with AFO and 10 meter walking velocity is 2 m/s with support. His parent is stressed about his deterioration and about the amount of time they have spent.

Level II on GMFCS[1]: Children walk in most settings. Children may experience difficulty walking long distances and balancing on uneven terrain. Children walk up and down stairs holding onto a railing or with physical assistance if there is no railing. Limitations in performance of gross motor skills may necessitate adaptations to enable participation in physical activities.

Level II MACS[2]: Children Manual abilities do not usually restrict independence in daily activities. Children handle most objects but with somewhat reduced quality and/or speed of achievement.

Please rank your plan of treatment for this child from the options below, according to how important you feel each option will produce the best outcome for him (1= most important to 5 = least important).

____ Send him back to the doctor to re-assess his condition.

____ Return him to physiotherapy twice weekly for 6 weeks on the previous plan of treatment, which focuses on lower extremity muscle strengthening, and increase cardiovascular endurance (using a static ergo- meter).

_____ Ensure that child understand practicing ride tricycle will help to improve his performance in continuous pedalling. As well as making sure he understands the aims of doing other functional activities (e.g. walking and swimming) that they will improve his riding tricycle performance.

____ Focus on the parents to remain walking and swimming with him and to keep him physically active by engaging with him in riding tricycle aiming to improve his physical activity.

____ Return him to physiotherapy twice weekly for 6 weeks and change his plan of treatment, focusing more on practicing functional activities to increase his capacity to ride tricycle to improve his performance.

Appendix 5 Parent Questionnaire

Swedish Parent Questionnaire

MÄLARDALENS HÖGSKOLA

CHILD

DEL 1. Kartläggning/utredning

Kryssa i det alternativ som bäst stämmer med Din uppfattning om vad kartläggning/utredning för Ditt barn det senaste halvåret har handlat om

OBS! Det som står inom parentes är bara några exempel, det finns fler. Låt inte de givna exemplen helt styra Ditt svar!

	Kartläggning/utredning har handlat om...	Inte alls	I liten utsträck ning	Till hälften	I stor utsträck ning	Helt och hållet
1	... hur mitt barns kropp fungerar (t ex om mitt barn har ont, om mitt barn har problem med andning)					
2	... hur mitt barn fungerar psykiskt (t ex hur mitt barn tänker och resonerar, hur mitt barn uppför sig i olika situationer)					
3	... mitt barns kropp och organ (t ex missbildningar, avvikelser)					
4	... vilka handlingar mitt barn kan utföra (t ex genom att mitt barn får visa vad han kan göra/ testas)					
5	... vad mitt barn gör hemma eller i förskola/skola (t ex hur mitt barn förflyttar sig inomhus, läser en bok...)					
6	... vad mitt barn gör på eget initiativ i vardagliga situationer					
7	... mitt barns samspel med andra i omgivningen					
8	... hur den fysiska miljö där mitt barn vistas på dagarna kan hjälpa eller hindra barnet					
9	... stöd från och attityder hos personer i mitt barns omgivning (t ex mormors möjlighet att ställa upp vid behov; lärares kunskaper)					

4

MÄLARDALENS HÖGSKOLA

CHILD

ENKÄT TILL FÖRÄLDRAR
Som har kontakt med Barn- och ungdomshabiliteringen

Instruktion vid utlämnande av enkät

Föräldern får enkäten när han/hon kommer 30 min före utsatt tid för möte om Habiliteringsplan. Du stannar kvar medan föräldern fyller i enkäten och samlar in den när den är ifylld.

- Ha med ett exemplar av enkäten med, samt blyertspenna och suddgummi.
- Sitt ned tillsammans när Du ger följande instruktioner:

  ” Nu ska Du få fylla i en enkät. Den handlar om en klassifikation av funktioner och hälsa som Världshälsoorganisationen (WHO) tagit fram, och den version som är till för barn och ungdomar. Det projekt Du och Din familj deltar i undersöker om klassifikationen är användbar inom Barn och ungdomshabilitering. Du kommer att få fylla i exakt samma enkät nästa gång vi ska göra en habiliteringsplan tillsammans. Det blir avslutningen av projektet.”

  ”Enkäten består av fyra delar: - Kartläggning/utredning, - Mål, - Åtgärder, och - Samverkan med habiliteringen. I varje del finns nio påståenden och Du ska välja det svarsalternativ som Du tycker stämmer bäst för Dig. Du kan välja alltifrån ”stämmer inte alls” till” stämmer helt och hållet”. Du tänker då tillbaka det senaste halvåret”

- Be föräldern att först fylla i första sidan (allt utom ”rutan med kod…), läsa instruktionen på andra sidan, och sen titta igenom Del 1-4.
- Fråga sen föräldern om han/hon vill ha hjälp för att läsa eller hjälp för att fylla i enkäten (speciellt gäller detta när Du vet att föräldrar har en ”icke typisk sociokulturell bakgrund”).
- Ge föräldern den hjälp han/hon önskar, men låt föräldern så långt möjligt fylla i svaret själv.
- Föräldern får gärna skriva kommentarer i enkäten.

MÄLARDALENS HÖGSKOLA

CHILD

DEL 2. Mål

Kryssa i det alternativ som bäst stämmer med Din uppfattning om vad de mål som upprättats för Ditt barn det senaste halvåret har handlat om

OBS! Det som står inom parentes är bara några exempel, det finns fler. Låt inte de givna exemplen helt styra Ditt svar!

	Målen har handlat om …	**Inte alls**	**I liten utsträck ning**	**Till hälften**	**I stor utsträck ning**	**Helt och hållet**
1	… mitt barns kroppsliga hälsa och utveckling (t ex att mitt barn ska må bra, att mitt barn ska kunna svälja maten, att mitt barn ska kunna sova)					
2	… mitt barns psykiska hälsa (t ex att mitt barn ska uppföra sig i olika situationer, att mitt barn ska kunna koncentrera sig en längre tid)					
3	… mitt barns kropp och organ (t ex att lederna inte skall stelna, att skolios inte ska utvecklas)					
4	… att mitt barn ska kunna utföra uppgifter - utan att det görs någon koppling till vardagssituationer (t ex mitt barn ska kunna lyfta benet, att mitt barn ska kunna se bättre)					
5	… att mitt barn bättre ska kunna klara olika vardagssituationer (t ex att mitt barn ska kunna gå till matsalen på rasten, att mitt barn ska kunna tvätta händerna före maten)					
6	… att mitt barn ska kunna vara delaktig i de saker som hon/han tycker om (t ex att mitt barn ska vara med i de lekar eller aktiviteter som intresserar honom/henne)					
7	… mitt barns samspel med andra personer i omgivningen (t ex att mitt barn ska samspela bättre med sina syskon)					
8	… att den fysiska miljön kring mitt barn ska fungera (t ex att klassrummet ska vara anpassat)					
9	… stöd från och attityder hos personer i mitt barns omgivning (t ex att lärare ska ha mer kunskap om mitt barns svårigheter; att mormor och morfar ska ägna mer tid åt mitt barn)					

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MÄLARDALENS HÖGSKOLA

CHILD

DEL 3. Åtgärder

Kryssa i det alternativ som bäst stämmer med Din uppfattning om de åtgärder som planerats och genomförts för Ditt barn under det senaste halvåret.

OBS! Det som står inom parentes är bara några exempel, det finns fler. Låt inte de givna exemplen helt styra Ditt svar!

	Åtgärder har riktats mot …	**Inte alls**	**I liten utsträck ning**	**Till hälften**	**I stor utsträck ning**	**Helt och hållet**
1	… mitt barns kroppsliga hälsa och utveckling (t ex för mitt barns smärta, andning)					
2	…mitt barns psykiska hälsa och utveckling (t ex för utveckling av hur mitt barns förmåga att tänka och resonera, mitt barns uppförande i olika situationer)					
3	… mitt barns kropp och organ (t ex för att motverka skolios utveckling, att öka rörlighet i lederna)					
4	… mitt barns förmågor att göra saker (t ex för utveckling av mitt barns förmåga att gå, mitt barns förmåga att tala)					
5	…att mitt barn ska utföra uppgifter i vardagssituationer (t ex för att mitt barn ska klä på sig, att mitt barn ska göra bli förstådd av sina kompisar)					
6	…att mitt barn ska delta aktivt i de aktiviteter hemma och i förskolan/skolan, som hon/han är intresserad av					
7	…mitt barns samspel med andra omgivningen (t ex för att samspel med klasskamrater ska fungera)					
8	…den fysiska miljön kring mitt barn hemma eller i förskola/skola (t ex hjälpmedel, trösklar, bildstöd)					
9	…stöd från och attityder hos personer i barnets omgivning (t ex information till familjen eller andra barns föräldrar, samarbete med förskola/skola)					

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MÄLARDALENS HÖGSKOLA CHILD

DEL 4. Samverkan med habiliteringen

Kryssa i det alternativ som bäst stämmer med Din uppfattning om samverkan med Barn- och ungdomshabiliteringen sedan förra habiliteringsplanen.

	Samverkan	Inte alls	I liten utsträck ning	Till hälften	I stor utsträck ning	Helt och hållet
1	Jag deltar aktivt i beslut om kartläggning/ utredning som rör mitt barn					
2	Jag är med och bestämmer mål för mitt barn och vår familj					
3	Jag är med och beslutar om åtgärder för mitt barn och vår familj					
4	Jag deltar aktivt och är inte bara en lyssnare vid habiliteringsplanering					
5	Jag och min familj får del av den kunskap som finns i habiliterings teamet					
6	Jag tycker att habiliteringsplanen är meningsfull för vår familj					
7	Jag tycker habiliteringsplanen ger en tydlig struktur för det som sker för mitt barn och vår familj					
8	Jag tycker habiliteringsplanen ger mig en överblick av de behov som mitt barn och vår familj har					
9	Jag ser en röd tråd mellan de mål som sätts och de åtgärder som planeras					

Tack för Din samverkan!

7

Parent Questionnaire (English Version)

University of Strathclyde Humanities & Social Sciences

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

Parent Survey

This survey is to investigate your perspectives on the physiotherapy treatment that your child receives. We would therefore like to ask you to answer the following questions about the physiotherapy assessment, objectives and treatment plan, relating to your child's physiotherapy over the past three months, and/or your interaction with physiotherapy.

The survey consists of five parts:

1- An assessment to obtain information about your child's situation, strengths and difficulties; for example, by examining the child and consulting with you.

2- Deciding, with physiotherapists, your child's objectives for the physiotherapy sessions.

3- A treatment plan being produced to help your child to achieve his/her goals. This may involve, for example, walking with your child or practising activities that your child likes to do.

4- Cooperating with physiotherapists concerning your participation in your child's management, deciding objectives, and treatment plans to achieve goals of your child's physiotherapy.

5- Degree of satisfaction.

Demographic Information

Current Date: _____/_____/______ (day/month/year)

Relationship to the child: mother________father_______ other (please specify)______

Child's gender: boy_____ girl________

Child's date of birth: year__________ month_______

Number of years you have had contact with physiotherapy_____

Please describe the main problems that your child experiences (the reason you have contact with physiotherapy):

Part 1: An assessment to obtain information about your child's situation, strengths and difficulties; for example, by examining the child and consulting you.

Please tick the option that best matches your perception of the assessment of your child over the past three months

PLEASE NOTE: Examples written brackets are not exhaustive, other answers can be given. Please do not let the given examples influence your answers.

Physiotherapy examination has focused on………………..

1. My child's physical functioning (e.g. if my child has joint stiffness, if my child has muscle tension, if my child has trouble controlling voluntary movements).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

2. My child's psychological functioning (e.g. how my child thinks and reasons, how my child behaves in different situations).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

3. My child's 5 senses functioning (vision, hearing, taste, smile and touch).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

4. Which actions my child can perform with confidence (e.g. by asking my child to show or by watching what he/she can do e.g. climbing stairs).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

5. What my child is interested in doing at home or in preschool/school (e.g. how my child reads a book or plays).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

6. What my child does on his/her initiative in everyday situations.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

7. My child's interactions with others in the surrounding area.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

8. How my child's physical environment where he/she lives and conducts his/her life helps or hinders his/her physical activities.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

9. Support from the attitude of the people in my child’s environment (e.g. his/her brother or/and sister playing with him/her, teacher’s knowledge.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

Part 2: Deciding, with physiotherapists, your child's objectives for physiotherapy sessions.

Please tick the option that best matches your perception of the <u>objectives</u> established for your child over the past three months.

PLEASE NOTE: Examples written brackets are not exhaustive, other answers can be given. Please do not let the given examples influence your answers.

Physiotherapy objectives have involved………………..

1. My child's physical health and development (e.g. ensuring that my child feels well, my child can eat without choking, my child is able to sleep).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

2. My child's psychological health (e.g. how my child behaves in different situations, whether my child can concentrate for a long time).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

3. My child's 5 senses which are vision, hearing, taste, smile and touch (e.g. which sense(s) facilitate/inhibit physical functional activities).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

4. My child being able to perform tasks with or without help in everyday situations (e.g. my child being able to lift his/her leg, my child being able to walk well).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

5. My child being better able to cope with different life situations (e.g. my child being able to go to the canteen during breaks, my child being able to wash his or her hands before eating).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

6. My child being involved in the things he/she likes (e.g. my child being able to participate in games or activities that interest him/her).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

7. My child's interaction with other people in his/her environment (e.g. my child interacting better with his/her siblings).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

8. Ensuring that the physical environment around my child works (e.g. the classroom being adapted).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

9. Support from and attitudes of people in my child's environment (e.g. teachers having more knowledge about my child's difficulties; my child's grandmother and grandfather devoting more time to him/her).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

Part 3 Treatment Plan

A treatment plan being produced to help your child to achieve his/her goals. This may involve, for example, walking with your child or practising activities that your child likes to do.

Please tick the option that best describes your perception of the <u>treatment planned</u> and implemented for your child over the past three months.

PLEASE NOTE: Examples written brackets are not exhaustive, other answers can be given. Please do not let the given examples influence your answers.

The treatment plan has considered………………..

1. My child's physical health and development (e.g. for my child's joint stiffness, muscle tension, or to help my child to control voluntary movements).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

2. My child's psychological health (e.g. how my child behaves in different situations, whether my child can concentrate for a long time).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

3. My child's 5 senses which are vision, hearing, taste, smile and touch (e.g. which senses facilitate/inhibit physical functional activities).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

4. My child's ability to do things with confidence (e.g. to develop my child's ability to walk or climb stairs).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

5. My child's ability to perform tasks in everyday situations (e.g. for my child to be able to go to the canteen during breaks, for my child to be able to wash his or her hands before and after eating).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

6. My child's active participation in the activities in which he/she is interested at home and in preschool/school.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

7. My child’s interaction with others in his/her environment (e.g. interaction with classmates to work)

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

8. The physical environment around my child at home or in preschool/school (e.g. tools, thresholds, picture aids).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

9. Support from and attitudes of people in my child’s environment (e.g. information available for his/her family or the parents of other children, cooperation with pre-school/school).

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

Part 4: Cooperation with the physiotherapy

Cooperating with physiotherapists concerning your participation in your child's management, and deciding objectives and treatment plan provided to achieve the goals of your child's physiotherapy.

Please tick the option that best matches your perception of your <u>cooperation with physiotherapy</u> since your child's previous physiotherapy plan.

Cooperation with physiotherapy……………….

1. I actively participate in decisions relating to the assessment of my child.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

2. My family and I take part in setting objectives for my child.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

3. My family and I take part in plans being made to help my child achieve his/her goals.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

4. I actively participate in, and am not just a listener at, physiotherapy planning meetings.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

5. I think the physiotherapy plan is worthwhile for my child.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

6. I think the physiotherapy plan provides a clear structure for what is happening for my child.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

7. I think the physiotherapy plan gives me an overview of the needs of my child.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

8. I see a common thread between the objectives and treatment plans envisaged.

   ☐ Not at all ☐ To a limited extent ☐ Somewhat ☐ To a large extent ☐ Entirely

Part 5: Please rate degree of your satisfaction with each of statements following:

I'm satisfied with the treatment my child receives from the physiotherapist over the past three months

- ☐ Extremely satisfied
- ☐ Satisfied
- ☐ Neither Satisfied nor dissatisfied
- ☐ Dissatisfied
- ☐ Extremely dissatisfied.

I'm satisfied with the progress my child is making since starting physiotherapy treatment over the past three months

- ☐ Extremely satisfied
- ☐ Satisfied
- ☐ Neither Satisfied nor dissatisfied
- ☐ Dissatisfied
- ☐ Extremely dissatisfied

Thank you for your collaboration.

Parent Questionnaire (Arabic Version)

University of Strathclyde Humanities & Social Sciences

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

استبيان للوالدين

عنوان الدراسة: إدارة العلاج الطبيعي للأطفال ذوي الشلل الدماغي

الاستبيان يدور حول التحقق من وجهة نظرك بشأن العلاج الطبيعي الذي يتلقاه طفلك. لذلك، نود منك الإجابة على الأسئلة التالية حول تقييمك للعلاج الطبيعي والأهداف والإجراءات المتعلقة بعلاج طفلك خلال الأشهر الثلاثة الماضية، و تعاملك مع العلاج الطبيعي.

يتكون هذا الاستبيان من خمسة أجزاء:

١- التقييم للحصول على معلومات حول حالة طفلك، وقوته البدنية والصعوبات التي تواجهه عن طريق فحصه والتشاور معك.
٢- تحديد أهداف طفلك من جلسات العلاج الطبيعي مع الأخصائي .
٣- الجهود المبذولة لمساعدة طفلك على تحقيق أهدافه. وقد يشمل ذلك، ، ممارسة المشي مع طفلك أو ممارسة الأنشطة التي يحب طفلك القيام بها.
٤- التفاعل مع العلاج الطبيعي عن طريق مشاركتك في التعامل مع طفلك، وتقرير الأهداف والجهود المبذولة لتحقيق أهداف العلاج الطبيعي له.
٥- درجة الرضا عن العلاج الطبيعي الذي يتلقاه طفلك

معلومات شخصية:

التاريخ الحالي ______ / ______ / ______ (يوم / شهر / سنة)

الأم______ الأب_______ آخر______

جنس الطفل. ذكر______ أنثى_________

تاريخ الميلاد سنة___________ شهر________

عدد السنوات التي تراجعين فيها العلاج الطبيعي______

يرجى منك سيدي / سيدتي:

١ـ وصف المشكلة الرئيسية (السبب في تحويل طفلك للعلاج الطبيعي)

٢ـ وضع علامة في الخانه المناسبه لكل جزء من الأجزاء التاليه:

الجزء ١ : التقييم للحصول على معلومات حول وضع طفلك، وقوته والصعوبات التي تواجهه ، عن طريق فحصه والتشاور معك خلال الأشهر الثلاثة الماضية

ملاحظة!

الأمثلة المكتوبة بين قوسين ليست شاملة. يمكن إعطاء إجابات أخرى. لا تدع المثال المعطى يؤثر على إجاباتك!

يركز فحص العلاج الطبيعي على ....

١ـ ... الوظائف البدنية لطفلك (مثل إذا كان طفلك يعاني من تصلب المفاصل، أو إذا كان طفلك يعاني من تشنج العضلات، أو إذا كان طفلك يعاني من صعوبات في السيطرة على الحركات الإرادية.

☐لا على الإطلاق ☐إلى حد ما ☐بعض الشيء ☐إلى حد كبير ☐دائما

٢ـ ... الوظائف النفسية لطفلك (مثل كيف يفكر طفلك والأسباب، كيف يتصرف في حالات مختلفة)

☐لا على الإطلاق ☐إلى حد ما ☐بعض الشيء ☐إلى حد كبير ☐دائما

٣ـ ... وظائف الحواس الخمس (الرؤية، السمع، التذوق، والشم , اللمس)

☐لا على الإطلاق ☐إلى حد ما ☐بعض الشيء ☐إلى حد كبير ☐دائما

٤ـ ....الأفعال التي يتردد طفلك في القيام بها (مثل: الطلب منه فعل بعض الحركات أو تقيمها مثل طلوع ونزول السلالم)

☐لا على الإطلاق ☐إلى حد ما ☐بعض الشيء ☐إلى حد كبير ☐دائما

يركز فحص العلاج الطبيعي على ....

٥- ...الأفعال التي يرغب طفلك القيام بها في المنزل أو في مرحلة ما قبل المدرسة أو مرحلة المدرسة (مثل كيف يقرأ طفلي كتاب أو يلعب)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٦- ..... ردة فعل طفلك في مواقف الحياة اليومية.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٧- .....تفاعل طفلك مع الآخرين في محيطه.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٨- ... أثر العوامل البيئية على طفلك والتي قد تؤثر في حياته أو تعيق أنشطته البدنية.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٩- ... الدعم الذي يلقاه طفلك من الناس في بيئته (مثل شقيقه أو أخته الذين يلعبون معه أومعرفة المعلم بوضعه الصحي)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

الجزء ٢ : تحديد الأهداف الموضوعة لطفلك من جلسات العلاج الطبيعي مع الأخصائي خلال الأشهر الثلاثة الماضية

ملاحظة!

الأمثلة المكتوبة بين قوسين ليست شاملة. يمكن إعطاء إجابات أخرى. لا تدع الأمثلة الواردة تؤثر على إجاباتك!

شملت أهداف العلاج الطبيعي..........

١- ...... صحة طفلك البدنية ونموه (مثل التأكد أن طفلك يشعر بصحة جيدة، طفلك يأكل بدون اختناق، وأنه قادر على النوم)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

شملت أهداف العلاج الطبيعي..........

٢- ... صحة طفلك النفسية (مثل كيف يتصرف طفلك في مواقف مختلفة، وما إذا كان بإمكانه التركيز لفترة طويلة أم لا)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٣- .... حواس طفلك الـخمس:الرؤية، والسمع ، والتذوق، والشم ، واللمس (مثل الحاسة (الحواس) التي تسهل أو تعيق الأنشطة الوظيفية البدنية.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٤- ...... قدرة طفلك على القيام بالمهام مع أو بدون مساعدة في مواقف الحياة اليومية (مثل القدرة على رفع ساقه، قدرة طفلي على المشي بطريقة أفضل)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٥- ... قدرة طفلك علي التعامل مع المواقف المختلفة في الحياة اليومية (مثل قدرة طفلك على الذهاب إلى غرفة الطعام وقت الاستراحة، قدرة طفلك على غسل يديه قبل وبعد تناول الطعام)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٦- ... مشاركة طفلك في الأمور التي يحبها (مثل قدرته على المشاركة في الألعاب التي يحبها)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٧- ... تفاعل طفلك مع أشخاص آخرين في بيئته (مثل تفاعل طفلك بشكل أفضل مع أخوته)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٨- ... التأكد من أن العوامل البيئية في محيط طفلك مفيدة (مثل تعديل الفصل الدراسي)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٩- ... الدعم من الأشخاص المتواجدين في بيئته واتجاهاتهم نحوه (المعلمون الذين لديهم معرفة أكبر بالصعوبات التي تواجه طفلك, جدته وجده اللذان يخصصان المزيد من الوقت له)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

الجزء٣ : الخطط الموضوعة لمساعدة طفلك على إنجاز أهدافه ،مثل ممارسة المشي معه أو ممارسة الأنشطة التي يحب القيام بها خلال الأشهر الثلاثة الماضية.

ملاحظة!

الأمثلة المكتوبة بين قوسين ليست شاملة. يمكن إعطاء إجابات أخرى. لا تدع الأمثلة الواردة تؤثر على إجاباتك!

خطة العلاج الطبيعي وضعت في الاعتبار أن: ....

١ـ صحة طفلك البدنية (مثل تصلب مفاصله، معاناته من الشد العضلي، مساعدته في التحكم في حركاته الإرادية)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٢ـ ... صحة طفلك النفسية (مثل كيف يتصرف في المواقف مختلفة، وما إذا كان بإمكانه التركيز لفترة طويلة أم لا)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٣ـ .... حواس طفلك الـخمس هي الرؤية، والسمع ,والتذوق، والشم ,واللمس (مثل الحاسة (الحواس) التي تسهل أو تعيق الأنشطة الوظيفية البدنية.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٤ـ ...... قدرة طفلك على القيام بالأفعال المختلفة بثقة (مثل تطوير قدرته على المشي أو صعود الدرج)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٥ـ ... قدرة طفلك على أداء المهام في مواقف الحياة اليومية (مثل قدرته على الذهاب إلى غرفة الطعام أثناء فترات الراحة، وقدرته على غسل يديه قبل وبعد الأكل)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٦ـ ... مشاركة طفلك في الأنشطة التي يهتم بها في المنزل وفي مرحلة ما قبل المدرسة أو مرحلة المدرسة.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

خطة العلاج الطبيعي وضعت في الاعتبار أن: ....

٧- ... تفاعل طفلك مع الآخرين في بيئته (مثل التفاعل مع رفقائه)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٨- ...العوامل البيئية لطفلك في المنزل أو في مرحلة ما قبل المدرسة أو مرحلة المدرسة (مثل الأدوات، الصور المساعدة).

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٩- ....دعم الأشخاص واتجاهاتهم في محيط طفلك (مثل المعلومات المتوفرة لأسرته أو والدي الأطفال الآخرين، التعاون في مرحلة ما قبل المدرسة أو مرحلة المدرس)

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

الجزء ٤: التعاون مع العلاج الطبيعي و مشاركتك في تقيم وضع طفلك، ووضع الأهداف والتدابير المبذولة لتحقيق أهداف برنامج العلاج الطبيعي خلال الأشهر الثلاثة الماضية

التعاون مع العلاج الطبيعي ...

١- شاركت بنشاط في القرارات المتعلقة باستقصاء وضع طفلي

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٢- شاركت أنا وعائلتي في وضع الأهداف لطفلي

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٣- شاركت أنا وأسرتي في الخطة التي تُوضع لمساعدة طفلي على تحقيق الأهداف.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٤- شاركت بنشاط ولست مجرد مستمع في اجتماعات تخطيط العلاج الطبيعي.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

التعاون مع العلاج الطبيعي ...

٥- أعتقد أن خطة العلاج الطبيعي لطفلي جديرة بالاهتمام

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٦- أعتقد أن خطة العلاج الطبيعي توفر هيكلا واضحا لما يحدث لطفلي.

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٧- أعتقد أن خطة العلاج الطبيعي تعطيني لمحة عامة عن احتياجات طفلي

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

٨- أرى قاسما مشتركا بين الأهداف المتوخاه والتدابير المقترحة

□لا على الإطلاق □إلى حد ما □بعض الشيء □إلى حد كبير □دائما

الجزء ٥ :

١- درجة الرضا عن العلاج الطبيعي الذي يتلقاه طفلك خلال الأشهر الثلاثة الماضية

□راضٍ تمام الرضا
□راضٍ إلى حد ما
□ راضٍ بعض الشيء
□غير راضٍ
□غيرراضٍ على الإطلاق

٢- درجة تحسن حالة طفلك خلال الأشهر الثلاثة الماضية.

□راضٍ تمام الرضا
□راضٍ إلى حد ما
□ راضٍ بعض الشيء
□غير راضٍ
□غيرراضٍ على الإطلاق

أشكرك على تعاونك معنا!

Appendix 6 Dr Mia Pless Email

From: Mia Pless [mia.pless@lul.se]
Sent: 17 October 2013 12:18 PM
To: Demyati, Hanan Ahmed (PG)
Cc: mats.granlund@hhj.hj.se; Eva Björck-Åkesson; margareta.adolfsson@ltdalarna.se; Nina Klang
Subject: Ang. ICF and ICF-CY Questionnaire
I am please to hear that our article is of interest to you in your work.
You are welcome to use the Questionnaire we constructed as long as you refer to the article Pless et al., (2009) and in the acknowledgement state that we have approved its use.
If you have any questions about the questionnaire you are welcome to ask

Yours sincerely

Mia Pless
FoU-chef
Verksamhetsstöd
Habilitering och hjälpmedel
Landstinget Uppsala län
018-6116236
0762-490878

"Demyati, Hanan Ahmed (PG)" ---2013-10-17 10:47:48---Dear Dr Pless This Hanan Demyati PhD student at Unveristy of Salford and my projct is:

Från: "Demyati, Hanan Ahmed (PG)" <H.A.Demyati@edu.salford.ac.uk>
Till: "mia.pless@lul.se" <mia.pless@lul.se>,
Datum: 2013-10-17 10:47
Ärende: ICF and ICF-CY Questionnaire

Dear Dr Pless

This Hanan Demyati PhD student at Unveristy of Salford and my projct is:

Saudi Physiotherapists' Perspective on Using the ICF-CY in Daily Practice for Children with Cerebral Palsy

I'm wondring could I use ICF and ICF-CY Questionnaire that been used in the study of Pless et al 2009

Evaluation of In-service Training in Using The ICF and ICF version for children and Youth.
I'm waiting for your reply

Kind regards
Hanan

Appendix 7 Participant Information Sheet

Participant Information Sheet Cross-sectional Study

Introduction

My name is Hanan Demyati and I am a PhD student at the University of Strathclyde. I am based in the School of Psychological Sciences and Health, Graham Hills Building, Glasgow G1 1QE. My contact details are: email hanan.demyati@strath.ac.uk or call Hanan Demyati on 0505526294

What is the purpose of this investigation?

The aim of this study is to investigate Saudi paediatric physiotherapists' management of children with cerebral palsy. We are interested to understand how paediatric physiotherapists reach decisions regarding their treatment plans for children with cerebral palsy. We are undertaking this study because we are aware that not all physiotherapists working in this field use the same models of care in clinical practice. This means that patients receive different treatments depending on whom they see, with most emphasis given to impairment and bodily functions at the expense of personal and environmental factors. We are therefore interested in how you deliver clinical care to children with cerebral palsy and in particular what approaches you use. We hope that this information will help us develop a training package for physiotherapists working with children who have cerebral palsy. The study is being organized for my PhD project through the Department of Psychological Sciences and Health at the University of Strathclyde in the UK.

Do you have to take part?

No. Taking part in this study is voluntary. You will be asked to complete an online (web based) questionnaire or a print copy if access to a computer is not possible. At the end of the online questionnaire you will be given an option to either submit or discard your survey. You can therefore withdraw from the study up to this point. However, any data you submit to us will be used in the survey analysis.

What will you do in the project?

If you decide to take part, we will ask you to login to our online survey using the URL link in the email. We will ask you to complete a survey questionnaire within one week of receipt. We will remind you up to two times about the project.

No personally identifiable information is collected in this survey. We will ask you to complete a survey questionnaire about your clinical practice as a paediatric physiotherapist working with children who have cerebral palsy. This should take 45 minutes to complete. The online survey questionnaire asks you about:

1. Dimension of your clinical reasoning and skills. These include three case scenarios, which will be presented to ascertain your views on how you would manage a clinical situation in a child with cerebral palsy.
2. Your work details.
3. What you think about applying environmental factors and personal factors in your management for children with cerebral palsy.
4. Your behaviour toward applying environmental factors in physiotherapy plans of treatment for children with cerebral palsy.
5. Your behaviour toward applying personal factors in physiotherapy plans of treatment for children with cerebral palsy.
6. Clinical background knowledge.
7. Your age and gender, alongside qualifications and experience in paediatric physiotherapy, province of practice in Saudi Arabia.

There are no expenses paid to you for completing the online questionnaire, but if you require a paper copy of the survey, we will enclose a Freepost envelope with the survey for you to return the questionnaire to us.

Why have you been invited to take part?

We are inviting all pediatric physiotherapists registered with Saudi Physical Therapy Association (SPTA) to take part in this study. As you are on this register, we are inviting you to take part.

What are the potential risks to you in taking part?

We do not expect that there are any disadvantages or risks to you by taking part in this survey.

What happens to the information in the project?

The online data collection tool that we use for the survey (Qualitrics) is password protected and only those researchers directly involved in the study will have access to the data. Print copies of the questionnaire will be kept in a locked filing cabinet in our research office in the School of Psychological Sciences and Health. The data collected will be analysed and reported in the PhD thesis of Hanan Demyati. In addition, papers will be prepared for journals. All data collected is anonymous and no personally identifiable information will be collected or reported. Data will be kept for 5 years then destroyed.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?

If you are happy to take part in this study, we will ask you to indicate on the survey that you agree to proceed to the questionnaire. If you do not want to take part, we thank you for taking the time to read this information sheet and you do not need to do anything else.

Researcher Contact Details:

Hanan Demyati
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building (6.54)
40 George Street
Glasgow G1 1QE
Telephone: 0505526294
Email: hanan.demyati@strath.ac.uk

Supervisor Details:

Dr Pauline Adair
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street
Glasgow G1 1QE
Telephone: +44 (0) 141 548 4137
Email: pauline.adair@strath.ac.uk

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee.

Parent Information Sheet (Arabic)

University of Strathclyde
Humanities & Social Sciences

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

ورقة معلومات المشارك (للوالدين)

عنوان الدراسة: إدارة العلاج الطبيعي للأطفال ذوي الشلل الدماغي

مقدمة

انا حنان دمياطي طالبة الدكتوراه في جامعة ستراثكلايد. مقري قائم في كلية العلوم النفسية والصحية، مبنى غراهام هيلز، غلاسكو G1 1QE.
تفاصيل الإتصال الشخصية: البريد الإلكتروني hanan.demyati@strath.ac.uk أو الاتصال على حنان دمياطي0505526294

ما هو الغرض من هذا الاستقصاء؟

الهدف من هذه الدراسة هو جمع المعلومات من أولياء أمور الأطفال الذين يعانون من الشلل الدماغي والمتعلقة بإدارة العلاج الطبيعي للأطفال المصابين بالشلل الدماغي. ونحن مهتمون بماهية إدارة العلاج الطبيعي لطفلك. نأمل أن تؤدي هذه المعلومات إلى التوصيات التي من شأنها تحسين نتائج تدخل العلاج الطبيعي في المملكة العربية السعودية. ويجري تنظيم هذه الدراسة لمشروع الدكتوراه الخاص بي من خلال قسم العلوم النفسية والصحة في جامعة ستراثكلايد في المملكة المتحدة.

هل يتعين عليك المشاركة؟

لا، المشاركة في هذه الدراسة هو تطوعية. سوف يطلب منك استكمال الاستبيانات قبل ٣٠ دقيقة من جلسة العلاج الطبيعي لطفلك، في غرفة هادئة في قسم العلاج الطبيعي، وسوف تساعدك الباحثة حنان دمياطي على استكمال الاستبيانات.وتُعطيك استمارة الموافقة للتوقيع عليها قبل إستكمال الاستبيانات. ومن حقك الانسحاب من الدراسة في أي وقت دون أي التزامات بشأن متابعة العلاج الطبيعي لطفلك. وتستطيع سحب موافقتك في أي وقت دون أي تحيز أو تداعيات. ويجوز لك رفض الإجابة على أي سؤال في الاستبيانات. لن يتم تبادل المعلومات من الاستبيانات التي يكملها الوالدان مع أي شخص. لن تؤثر المشاركة بأي شكل من الأشكال على وضع العلاج الطبيعي لطفلك.

ماذا ستفعل في هذا المشروع؟

إذا قررت المشاركة، سوف يُطلب منك لاستكمال الاستبيانات مع الباحثة حنان دمياطي قبل ٣٠ دقيقة من جلسة العلاج الطبيعي لابنك / ابنتك. لا يتم جمع أي معلومات شخصية تكشف عن الهوية في هذه الاستبيانات. سوف يُطلب منك تقديم وجهة نظرك بشأن التقييم وأهداف جلسات العلاج الطبيعي والتدابير التي تُتخذ لمساعدتك طفلك واستبيان بشأن نوعية حياة طفلك. لا توجد مصاريف تُدفع لك لاستكمال الاستبيانات.

لماذا دُعيت للمشاركة؟

ندعو جميع آباء وأمهات الأطفال المصابين بالشلل الدماغي الحضور إلى مركز العلاج الطبيعي والمشاركة في الدراسة. إذا كنت أب أو أم لطفل مصاب بالشلل الدماغي، فنحن ندعوك للمشاركة.

Participant Information Sheet (Pre-and-Post-Study)

Introduction

My name is Hanan Demyati and I am a PhD student at the University of Strathclyde. I am based in the School of Psychological Sciences and Health, Graham Hills Building, Glasgow G1 1QE. My contact details are: email hanan.demyati@strath.ac.uk or call Hanan Demyati on 0505526294

What is the purpose of this investigation?

The aim of this study is to test the effectiveness of a training workshop for physiotherapists who treat children with cerebral palsy. We are interested in understanding whether learning the ICF (International Classification Functioning Disability and Health) framework as a clinical reasoning tool for children with Cerebral Palsy is helpful in delivering physiotherapy treatments. The study is being organized for my PhD project through the Department of Psychological Sciences and Health at the University of Strathclyde in the UK.

Do you have to take part?

No. Taking part in this study is voluntary. You will be asked to complete a questionnaire at the beginning and at the end of the two-day workshop as required by SPTA. As part of this study, we will also be asking parents of children with Cerebral Palsy to complete two questionnaires regarding their child's quality of life and their view of their child's physiotherapy management to assess the usefulness of the workshop.

If you agree to take part in the study you will be given a consent form to sign at the start of the workshop. You can withdraw from the study at any point during the workshop without any obligation or it affecting your participation in the ICF-CY in-service training workshop. You may withdraw your consent at any time until the completion of the workshop without prejudice or repercussions. You may refuse to answer any questions asked. If you complete the survey, you are also free to request that the information from your completed survey is not used in the analysis of the results for my PhD. Information from the pre-and-post training workshop questionnaire will not identify you and will only be seen by the research team involved in my PhD. Participation will not in any way affect the status of your participation in the ICF-CY in-service training workshop.

What will you do in the project?

If you decide to take part, you will be asked to complete a questionnaire at the beginning and end of the two day workshop. No personally identifiable information is collected in this survey. The pre/post training workshop questionnaire asks about your clinical practice as a paediatric physiotherapist working with children who have cerebral palsy. This should take 30 minutes to complete each time. There are no expenses paid to you for completing pre-and-post survey.

Why have you been invited to take part?

We are inviting all participants registered in the ICF-CY in-service training workshop to take part in this study. As you are participating in the ICF-CY in-service training workshop, we are inviting you to take part.

What are the potential risks to you in taking part?

We do not expect that there are any disadvantages or risks to you by taking part in this survey.

The ICF-CY in-service training workshop will follow Saudi Physiotherapy Association (SPTA) guidelines in Saudi Arabia.

What happens to the information in the project?

No questionnaires will be identified by your name but by a numerical code that will be assigned to you when attending the workshop. All data will be collected will be entered into a secure database which is password protected and only those researchers directly involved in the study will have access to the data. The paper copies of the questionnaires will be kept in a locked filing cabinet in our research office in the School of Psychological Sciences and Health. The consent forms will also be stored securely in a locked filing cabinet in our research office, separately from the questionnaires. The data collected will be analysed and reported in the PhD thesis of Hanan Demyati. In addition, papers will be prepared for journals. All data collected is anonymous and no personally identifiable information will be collected or reported. Data will be kept for 5 years then destroyed.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?

If you are happy to take part in this study, we will ask you to sign a consent form before the in-service training workshop begins. If you do not want to submit your data for my PhD, you are welcome to attend the ICF-CY in-service training workshop without obligation and you do not need to do anything else.

Researcher Contact Details:

Hanan Demyati
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building (6.54)
40 George Street
Glasgow G1 1QE
Telephone: 0505526294
Email: hanan.demyati@strath.ac.uk

Supervisor Details:

Dr Pauline Adair
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street
Glasgow G1 1QE
Telephone: +44 (0) 141 548 4137
Email: pauline.adair@strath.ac.uk

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee.

Appendix 8 Consent Form

Consent Form of Cross-sectional Study

University of Strathclyde
Humanities & Social Sciences

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

Consent Form (for Paediatric physiotherapists)

Title of the study: Applying the ICF (International Classification Functioning Disability and Health) framework as a clinical reasoning tool for children with Cerebral Palsy.

- I confirm that I have read and understood the information sheet for the above project and the researcher has answered any queries to my satisfaction.
- I understand that my participation is voluntary and that I am free to withdraw from the project up to the point of submitting my survey responses, without having to give a reason and without any consequences.
- I understand that any information recorded in the investigation will remain anonymised and no information that identifies me will be made publicly available.
- I consent to being a participant in the project

(PRINT NAME)	Hereby agree to take part in the above project
Signature of Participant:	Date

Parent consent form (Arabic)

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

نموذج الموافقة علي مشروع البحث

عنوان الدراسة:

إدارة العلاج الطبيعي للأطفال ذوي الشلل الدماغي

- أقر بأنني قد قرأت وفهمت ورقة المعلومات للمشروع المذكور أعلاه، وقد أجابت الباحثة عن أية استفسارات طرحتها عليها.
- أدرك أن مشاركتي تطوعية وأن لي الحرية في الانسحاب من المشروع حتى مرحلة تقديمي لردودي على أسئلة الاستبيان دون أن يتعين علي تقديم عذر وبدون تحمل العواقب التي قد تترتب على ذلك.
- أدرك بأن أي المعلومات مسجلة في التحقيقات وسوف تبقى مجهولة الهوية، ولن تُنشر أية معلومات تكشف هويتي إلى العامة.
- أوافق على أن أكون أحد المشاركين في المشروع

الاسم مطبوعا	أوافق بموجبه على المشاركة في المشروع أعلاه
توقيع المشارك:	التاريخ

Pediatric Physiotherapists Pre-and-Post training consent form

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

University of Strathclyde Humanities & Social Sciences

Consent Form (for Paediatric physiotherapists)

Name of school: School of Psychological Sciences and Health
Title of the study: learning the ICF (International Classification Functioning Disability and Health) framework as clinical reasoning tool for children with Cerebral Palsy.

- I confirm that I have read and understood the information sheet for the above project and the researcher has answered any queries to my satisfaction.

- I understand that my participation is voluntary and that I am free to withdraw from the project up to the point of submitting my survey responses, without having to give a reason and without any consequences.

- I understand that any information recorded in the investigation will remain anonymised and no information that identifies me will be made publicly available.

- I consent to being a participant in the project

(PRINT NAME)	Hereby agree to take part in the above project
Signature of Participant:	Date

Sample Email sent for recruitment Procedure

Email sent with Link to Pediatric Physiotherapists

Dear Colleague,

I am Hanan Demyati, a PhD student at the University of Strathclyde in Glasgow, Scotland. About two weeks ago I sent you email about a national survey to identify how Saudi paediatric physiotherapists develop plans of treatment for children with cerebral palsy. If you already responded, thank you for your help and please ignore this email. If you have not had time to respond or if you have lost the pervious email, please take a little time to complete the survey now.

Please read the study information sheet. To complete the survey online, please go to the **URL** below and follow the online survey instructions to complete the survey, then tick on box that you agree to participate in the study in order to submit your questionnaire. Please note that the survey will take about 45 minutes to complete, and you will not be able to save it and return later. This is because no personally identifiable information is requested in the survey; thus, it requires to be completed at one go. If you do not have access to the internet, or prefer to answer the questionnaire on paper, please request a paper survey by sending an e-mail to hanan.demyati@strath.ac.uk or calling 0505526294. We will include a Freepost envelope for its return.

Web address to be inserted here ( )

http://hass.qualtrics.com

If you have any questions, please telephone Hanan Demyati on 0505526294 or email hanan.demyati@strath.ac.uk. I will be happy to answer any questions you may have.

Thank you for reading the information.
Yours Sincerely
Hanan Demyati
PhD researcher
School of Psychological Sciences and Health
University of Strathclyde

Head of Physiotherapy Email

Dear Sir or Madam,

I am Hanan Demyati, a PhD student at the University of Strathclyde in Glasgow, Scotland. I am collecting information from parents of children with cerebral palsy regarding their experience of physiotherapy management for their children. I'm interested in how parents experience their children's physiotherapy management. We hope that this information will lead to recommendations that could improve the training of physiotherapists working with children who have cerebral palsy in Saudi Arabia. I am organizing the study for my PhD project through the Department of Psychological Sciences and Health at the University of Strathclyde in the UK.

Would you mind helping me distribute an information sheet to the parents of children ages 4 to 18 years old with cerebral palsy asking if they would be willing to take part in this study? Thirty minutes before their children's physiotherapy sessions, parents who are willing to participate will meet with me, along with their children, in your department to complete a questionnaire. I will remain with the parents and children during completion and provide assistance if required. I would appreciate it if you would be willing to distribute the information sheet to parents in your department and provide me with a list of the next appointments of children with cerebral palsy whose parents are willing to take part in the study.

The study information sheet provides further details and is attached. I will be happy to answer any questions you may have. Please call me at 0505526294 or email me at hanan.demyati@strath.ac.uk.

Your help and support will be greatly appreciated.

Yours sincerely,

Hanan Demyati

Participants Invitation Email for ICF-CY in-service training

Dear Colleague,

I am Hanan Demyati, a PhD student at the University of Strathclyde in Glasgow, Scotland. As part of my studies, I have developed a training workshop for physiotherapists who work with children who have cerebral palsy and who might be interested in learning about the ICF-CY (International Classification Functioning Disability and Health for Children and Youth) framework. We are interested to see whether being trained in the ICF-CY framework as a clinical reasoning tool for children with Cerebral Palsy is useful in physiotherapy practice. The study is being organized for my PhD project through the Department of Psychological Sciences and Health at the University of Strathclyde in the UK.

I am interested to hear from all paediatric physiotherapists who work with children who have Cerebral Palsy and who wish to attend the ICF-CY in-service training workshop. The workshop will be held over two days at [location] on [date and time]. If you are interested in taking part, you will be asked to complete a questionnaire at the beginning and end of the workshop which will take thirty minutes to complete on each occasion. If you agree to take part in my study, then we will retain your questionnaire data for analysis. If you do not agree then your questionnaire data will be used by SPTA as an evaluation of the quality of the workshop.

The study information sheet provides further details and is attached. If you have any questions, please telephone Hanan Demyati on 0505526294 or email hanan.demyati@strath.ac.uk.

I will be happy to answer any questions you may have.

Thank you for reading the information.

Yours Sincerely

Hanan Demyati

Appendix 9 Studies Ethical Approval

Humanities and Social Sciences Study Approval

(Cross-sectional study)

Type 1 Ethics Application - Approval

Our ref: 472 27-Oct-14

Dear Pauline

Saudi Paediatric Physiotherapists' Clinical Reasoning and ICF (International Classification Functioning Disability and

Health) Knowledge and Competence regarding Children with Cerebral Palsy.

CI Pauline Adair Other Investigator Hanan Demyati Diane Dixon

I can now confirm full ethical and sponsorship approval for the above study.

Regards

Margaret

Margaret Keoghan
Assistant Manager
Research and Knowledge Exchange Team (RaKET)
Level 3, Lord Hope Building
Faculty of Humanities and Social Sciences
University of Strathclyde
141 St James Road
Glasgow
G4 0LT

Tel: 0141 444 8416

Saudi Physical Therapy Association President Approval (Cross-sectional Study)

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

University of Strathclyde Humanities & Social Sciences

Saudi Physical Therapy Association President Permission Request Letter

Name of school: School of Psychological Sciences and Health
Title of the study: A survey of Paediatric Physiotherapy Management for Children with Cerebral Palsy

To: Dr. Sami AL-Abdulwahab
From: Dr. Pauline Adair
Subject: Letter to distribute Survey
Date: 30th Oct 2014

I am writing to confirm that Miss Hanan Demyati is registered at the University of Strathclyde for a PhD programme in the School of Psychological Sciences and Health. Her research proposal has been approved by University' Research Degrees Committee and I am pleased to inform you that her work is well underway and progressing according to the specified plan.

As part of her study, Miss Demyati is required to collect data from Saudi Arabia. The data collected is a significant part of her PhD project about the ability of Saudi paediatric physiotherapists to use the International Classification Functioning Disability and Health (ICF) in developing treatment plans for children with cerebral palsy. Her study is concerned with how paediatric physiotherapists plan treatment for children with cerebral palsy and what influences this.

I would be grateful if you could make the appropriate arrangement for Miss Demyati to distribute the online survey using the Saudi Physical Therapy Association service by sending an electronic mail to invite Saudi physiotherapists members to participate in the study and distribute the electronic survey.
In case you require any additional information please do not hesitate to contact me.

Sincerely,

Dr. Pauline Adair (Primary Supervisor)
School of Psychological Sciences and Health
University of Strathclyde
Room 654c, Graham Hills Building
40 George Street
Glasgow G1 1QE
Tel: +44 (0)141 548 4137
Fax: +44 (0)141 548 4001
Email: pauline.adair@strath.ac.uk

Approved to be published in SPTA web site

11.9.2014

APPROVED

SPTA Saudi Physical Therapy Association

The place of useful learning

UK Entrepreneurial University of the Year 2013/14
UK University of the Year 2012/13

University of Strathclyde Ethical Approval

(Longitudinal Study)

ETHICAL AND SPONSORSHIP APPROVAL
UEC15/21 Adair/Demyati/Dixon: Impact of learning the ICF (International Classification Functioning Disability and Health) framework as a clinical reasoning tool for Paediatric Physiotherapists working with children who have Cerebral Palsy

I can confirm that the University Ethics Committee (UEC) has approved this protocol and appropriate insurance cover and sponsorship have now also been confirmed.

I would remind you that the UEC must be informed of any changes you plan to make to the research project, so that it has the opportunity to consider them. Any change of staffing within the research team should be reported to UEC.

The UEC would also expect you to report back on the progress and outcome of your project, with an account of anything which may prompt ethical questions for any similar future project and with anything else that you feel the Committee should know.

Any adverse event that occurs during an investigation must be reported as quickly as possible to UEC and, within the required time frame, to any appropriate external agency.

The University agrees to act as sponsor of the above mentioned project subject to the following conditions:

1. That the project obtains/has and continues to have University/Departmental Ethics Committee approval.

2. That the project is carried out according to the project protocol.

3. That the project continues to be covered by the University's insurance cover.

4. That the Director of Research and Knowledge Exchange Services is immediately notified of any change to the project protocol or circumstances which may affect the University's risk assessment of the project.

5. That the project starts within 12 months of the date of this letter.

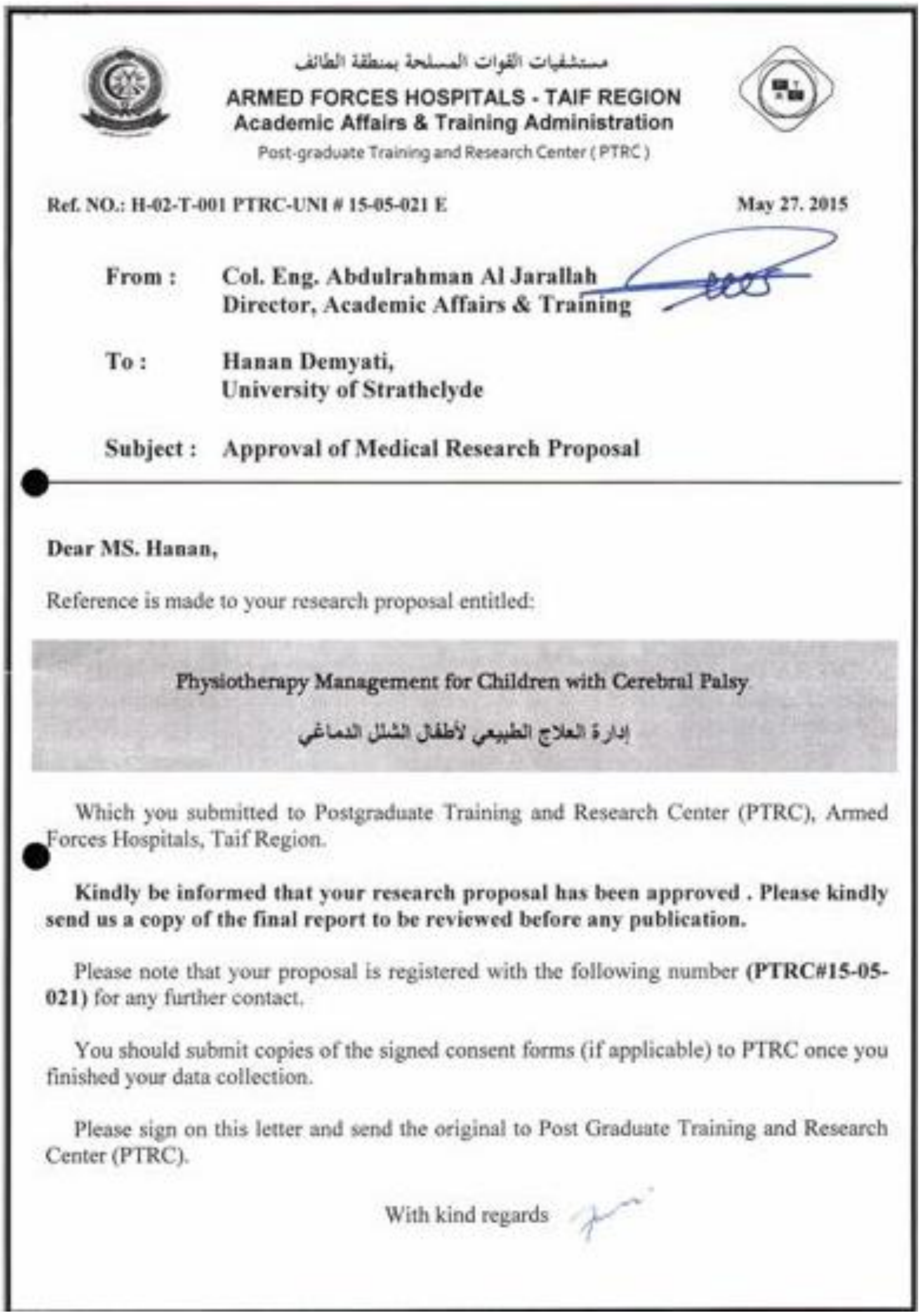
As sponsor of the project the University has responsibilities under the Scottish Executive's Research Governance Framework for Health and Community Care. You should ensure you are aware of those responsibilities and that the project is carried out according to the Research Governance Framework.

On behalf of the Committee, I wish you success with this project.

Kind regards
Angelique

Angelique Laverty

Al-Hada Armed Forces Approval (Longitudinal Study)



مستشفيات القوات المسلحة بمنطقة الطائف

ARMED FORCES HOSPITALS - TAIF REGION

Academic Affairs & Training Administration

Post-graduate Training and Research Center (PTRC)

Ref. NO.: H-02-T-001 PTRC-UNI # 15-05-021 E

May 27. 2015

From : Col. Eng. Abdulrahman Al Jarallah
Director, Academic Affairs & Training

To : Hanan Demyati,
University of Strathclyde

Subject : Approval of Medical Research Proposal

Dear MS. Hanan,

Reference is made to your research proposal entitled:

Physiotherapy Management for Children with Cerebral Palsy

إدارة العلاج الطبيعي لأطفال الشلل الدماغي

Which you submitted to Postgraduate Training and Research Center (PTRC), Armed Forces Hospitals, Taif Region.

Kindly be informed that your research proposal has been approved . Please kindly send us a copy of the final report to be reviewed before any publication.

Please note that your proposal is registered with the following number **(PTRC#15-05-021)** for any further contact.

You should submit copies of the signed consent forms (if applicable) to PTRC once you finished your data collection.

Please sign on this letter and send the original to Post Graduate Training and Research Center (PTRC).

With kind regards

Two-Day ICF-CY In-service Training Ethical Approval

وزارة الصحة
Ministry of Health

مديرية الشؤون الصحية بمحافظة جدة
Directorate of Health Affairs – Jeddah
(202/275) (٢٠٢/٢٧٥)

<u>الى من يهمه الامر</u>

السلام عليكم ورحمة الله وبركاته

بناءا على طلب المبتعثة / <u>حنان أحمد دمياطي</u> ، للإشراف والتنسيق الاكاديمي لدورة :

Appling the ICF (International Classification Functioning Disability and Health) framework as Clinical Reasoning tool for Children with Cerebral Palsy.

والتي ستقام في كل من :

- مدينة الخبر في الفترة (١٤/١٥ رجب ١٤٣٦هـ) الموافق (٣/٤ مايو ٢٠١٥م)
- في مدينة جدة في الفترة (٢٠/٢١ رجب ١٤٣٦هـ) الموافق (٩/١٠ مايو ٢٠١٥)

<u>عليه نفيدكم بأن ادارة التأهيل الطبي بصحة جدة هي المنسقة الاكاديمية.</u>

والله ولي التوفيق ،،،،،

وزارة الصحة
Ministry of Health

مدير ادارة التأهيل الطبي بصحة جدة
د/ ناصر حمود آل ابراهيم

<u>مكتب الادارة:</u> ت ٦٦١٠٠٧٨ <u>فاكس ادارة التأهيل الطبي:</u>٦٦٠٦١١١ تحويلة ١٦٢٨
<u>البريد الالكتروني</u> : <u>rehab.jeddah@hotmail.com</u>

Medical Service Department Approval

(Longitudinal Study-Parent Questionnaire)

المملكة العربية السعودية
وزارة الدفاع
رئاسة هيئة الأركان العامة
الإدارة العامة للخدمات الطبية للقوات المسلحة
إدارة مستشفيات القوات المسلحة بمنطقة الطائف
إدارة الشؤون الأكاديمية والتدريب
مركز الأبحاث والدراسات العليا

الرقم : ٥١٥٦٣
التاريخ : ١٤٣٦/٨/٢٤هـ
المرفقات :
الموضوع : بشأن توزيع استبانة

حنان أحمد دمياطي/ طالبة دكتوراه / رقم سجل مدني ١٠٣٣٤٦٠٤٧/ مبتعثة بجامعة سترالكلايد/إنجلترة

مساعد مدير عام الإدارة العامة للخدمات الطبية
لشؤون التعليم والتدريب والأبحاث/المكلف

السلام عليكم ورحمة الله وبركاته

١. إشارة إلى التعميم الصادر رقم ٨٣/٤/٤/٩ وتاريخ ١٤٣٢/٣/٢٣هـ والمتضمن الإجراءات التي تنظم توزيع الاستبيانات البحثية في مرافق القوات المسلحة .

٢. الإفادة : ترغب الطالبة الموضحة هويتها بعاليه توزيع إستبانة بحثية على أولياء أمور الأطفال الذين يعانون من الشلل الدماغي وذلك لبحثها بعنوان : " إدارة العلاج الطبيعي لأطفال الشلل الدماغي " بقسم العلاج الطبيعي بمستشفيات القوات المسلحة بمنطقة الطائف.

٣. المطلوب : نرفق لكم نسخة من الاستبانة ، تعهّد الباحثة ، خطاب الجامعة ، موافقة اللجنة المحلية ، آملين الموافقة على توزيعها وإجازتها أمنياً .

والسلام عليكم ، ، ،

اللـواء الطبيب

حامـد بن علي الغامدي

مدير إدارة مستشفيات القوات المسلحة بمنطقة الطائف

نسخة إلى :
- مدير إدارة الشؤون الأكاديمية والتدريب
- الصادر العام

Appendix 10 Facilitator (HD) Biography

The Facilitator (HD) worked from 1999-2009 in Al-Hada Armed forces Hospital Taif Saudi Arabia as a paediatric physiotherapist. Being an active member in the Saudi Physiotherapy Association and a national instructor for workshops on functional rehabilitation for children with CP in Saudi Arabia further shaped her formative years. HD has undergone training as follows:

- From 2nd June to 21st July 2014, 8 week online course in Instructional methods in health professional education by University of Michigan on Coursera.
- 8th April 2014, Pre congress workshop Goal setting and treatment planning with the ICF in neuro-rehabilitation in 8th World Congress for Neuro-Rehabilitation, in Istanbul, Turkey
- 3th July 2014, Instructional Course Clinical Application of the ICF-CY for goal setting in rehabilitation and early intervention, in 26th Annual Meeting of the European Academy of Childhood Disability, in Vienna, Austria
- 26-27 Sept 2013, Training in the ICF model in Nottwil, Switzerland.
- 24th -25 June 2011 Global Perspectives on Decision-Making, Measurement and Participation of Children with Disabilities 16th International Congress of World Confederation of Physical Therapy.
- 05 November 2008,Introduction in the ICF&ICF-CY, Partnership in Rehabilitation : The Holistic Approach Symposium, King Fahad medical City, Riyadh, K.S.A

Training Brochure

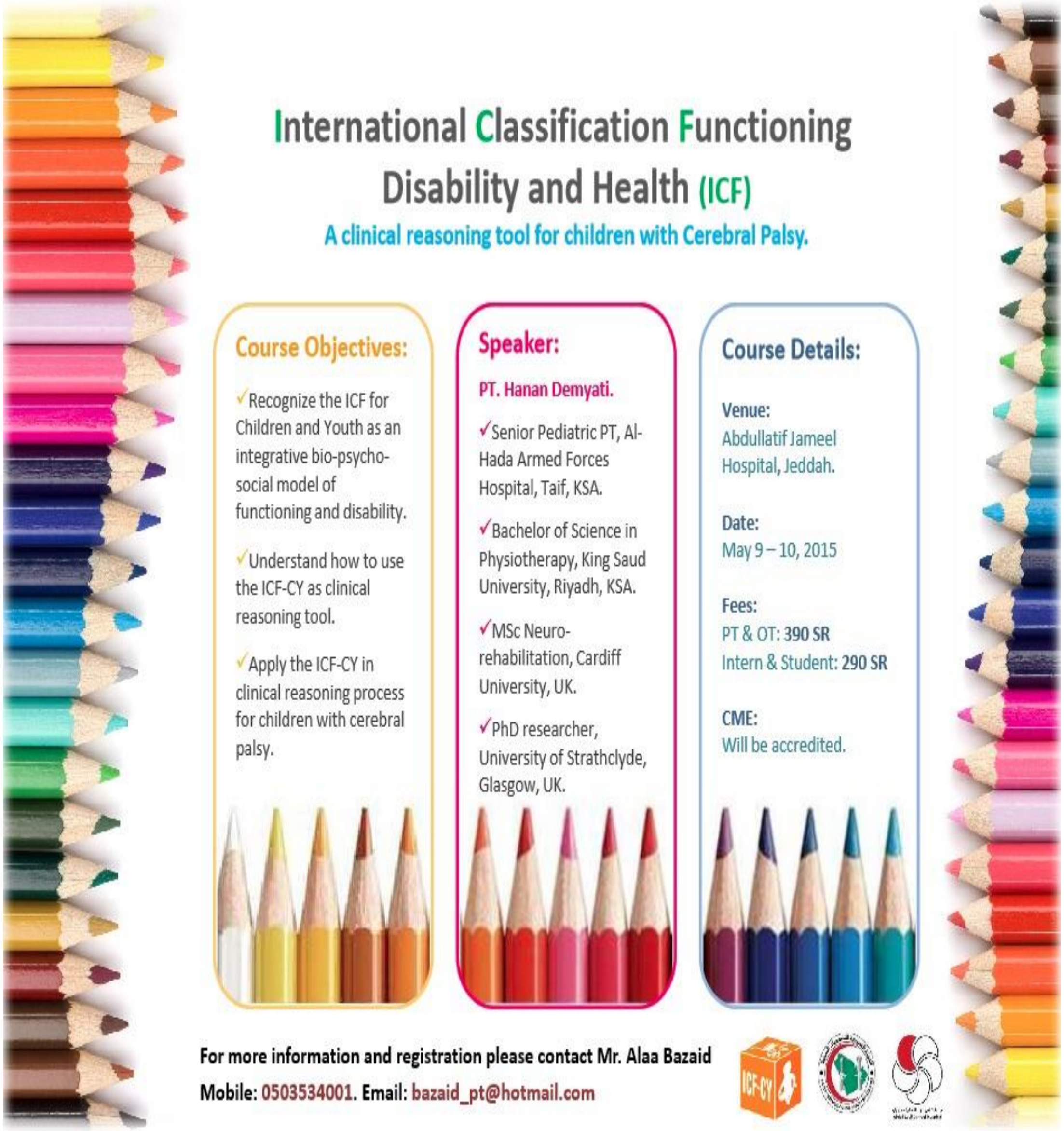
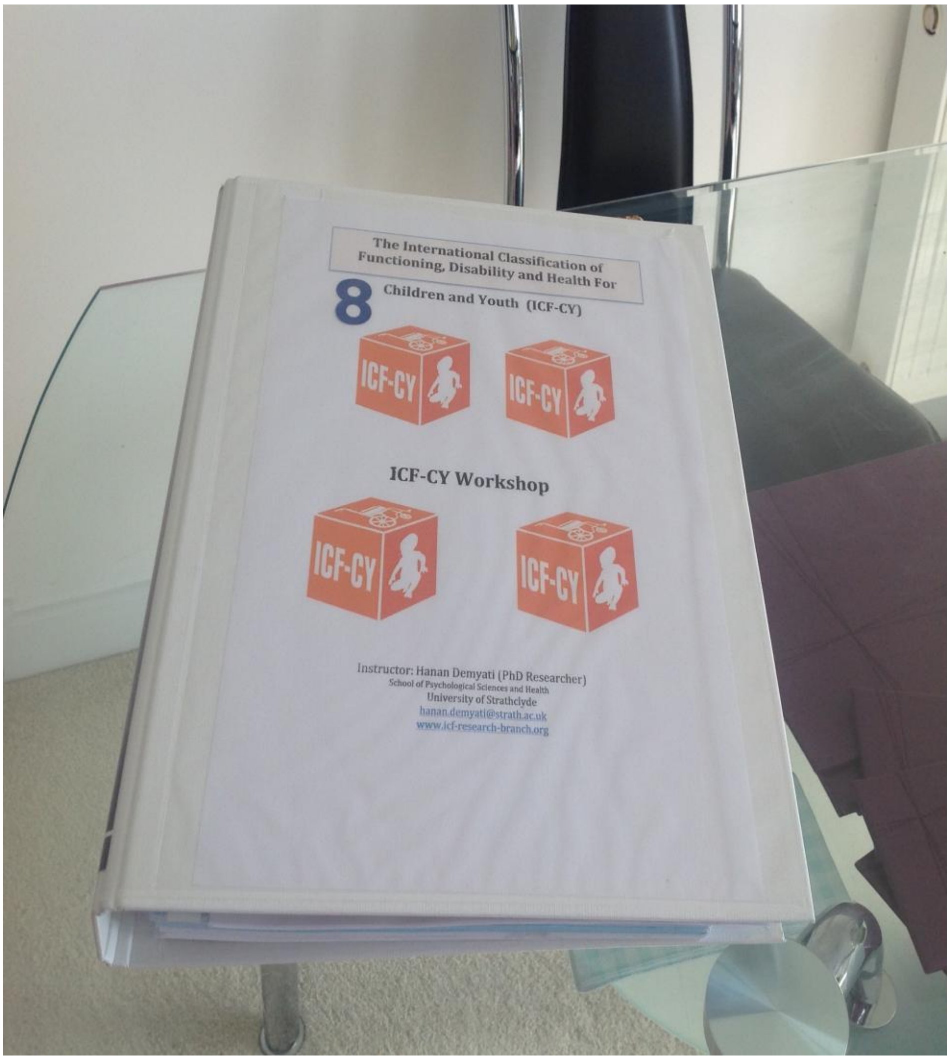


Photo of Folders distributed for ICF-CY in-service Training



Appendix 11 E-Child’s Functional Profile

ICF-CY Categorical Profile - EXAMPLE												
Assessment												
Global Goal: community reintegration												0
Service-Programme Goal: Optimal independence in daily living												0
Cycle Goal 1: Improved mobility												1
Cycle Goal 2: Improved walking												1
Cycle Goal 3: Increased independence in self-care												3
ICF categories		ICF Qualifier									Goal relation	Goal value
						Problem						
						0	1	2	3	4		
b710	Mobility of joint functions										SP	2
b735	Muscle tone functions										1	0
…	….											
d230	Carrying out daily routines										SP	1
d410	Changing basic body position										2	3
d465	Moving around using equipment										2	2
d750	Basic interpersonal interactions										G	3
		facilitator					barrier					
		4+	3+	2+	1+	0	1	2	3	4		
e1201	Assistive products---for personal…mobility…										1	2+
Pf	Positive outlook on life										G, SP	4+

ICF Categorical Profile – ICF Qualifier: rate the extent of problems (0 = no problem to 4 = complete problem) in the components of body functions (b), body structures (s), activities and participation (d) and the extent of positive (+) or negative impact of environmental (e) and personal factors (pf); Goal relation: 1, 2, 3 refers to Cycle Goal 1, 2, 3; SP refers to the Service-Programme Goal; G refers to the Global Goal; Goal value refers to the ICF qualifier to achieve after an intervention. Note: This table only displays an excerpt of the ICF Categorical Profile; only the categories that are associated with a goal and for which a goal value has been identified (i.e. intervention targets) are shown.