CHALLENGES AND PROSPECTS OF COMMUNITY-BASED HEALTH INSURANCE IN BANGLADESH

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Declaration of Authenticity and Author's Rights

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All content presented in the text, which has been previously published by the candidate as the principal author, has been incorporated into the thesis. In the Statement of Conjoint Work, the individual roles of all authors are described in detail in the table below.

Chapters 3 to 7 are based on conjoint work with Professor Alec Morton (AM), Professor Susan Howick (SH), Dr. Abdur Razzaque Sarker (ARS), Dr. Marufa Sultana (MS), Dr. Rashidul Alam Mahmud (RAM), Dr. Sayem Ahmed (SA), Dr. Mohammad Touhidul Islam (MTI), Eunice Twumwaa Tagoe (ETT), Raisul Akram (RA), Nausad Ali (NA), Dr. Jahangir AM Khan (JAM), Dr. Shehrin Shaila Mahmood (SSM), and Dr. Syed Manjoor Ahmed Hanifi (SMAH).

Paper	Chapter	The PhD author	The co-authors
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2	4	• Conceptualized the study design. • Conducted the study, performed statistical analysis, prepared figures, and tables. • Drafted the manuscript and led the submission and revision process for journal publication.	• Conceived and supervised the study: AM and SH. • Contributed to the draft manuscript: AM and SH. • Commented on the draft manuscript: ARS, MS, RAM, SA, MTI, AM, and SH.
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4	6	• Conceptualized the study design. • Developed interview guidelines, conducted pilot and final interviews, and transcribed interview audios. • Analyzed interview data and interpreted results. • Drafted the manuscript and led the submission and revision process for journal publication.	• Conceived and supervised the study: AM and SH. • Contributed to the interview guidelines: AM and SH. • Supported during data coding: ETT. • Contributed to the draft manuscript: AM, SH, and ETT. • Commented on the draft manuscript: AM, SH, JAM, and SSM.
5	7	• Conceptualized the study design. • Developed interview guidelines and conducted qualitative interviews. • Developed qualitative and quantitative system dynamics model. • Developed questionnaire and collected quantitative data. • Analysed quantitative data and parametrised the model. • Conducted analysis and drafted the manuscript and led the submission and revision process for journal publication.	• Conceived and supervised the study: SH and AM. • Contributed to the questionnaire development: AM and SH. • Contributed to develop the model: SH. • Contributed to the draft manuscript: SH and AM. • Commented on the draft manuscript: SH, AM, SSM, and SMAH.

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Abstract

Bangladesh developed a national healthcare financing strategy in 2012 to establish and improve healthcare financing. The strategy proposed social health insurance to attain universal health coverage. Reaching the 56% of the informal sector that has no formal payment system and constantly changes jobs is a huge challenge. This population can contribute to a small amount as a premium, therefore community-based health insurance (CBHI) has been defined as an interim step to plan towards a comprehensive social health insurance system. This thesis examines the need, challenges, and future prospects of voluntary CBHI to contribute to a social health insurance scheme, notably to give financial protection to the informal sector and extend universal coverage. This has been achieved by two quantitative, two qualitative, and one system dynamic research. To determine the need for CBHI for the informal sector and poor, quantitative studies have examined accessibility and financial hardship owing to out-of-pocket healthcare expenditure. Qualitative studies have examined the challenges related to the implementation of voluntary CBHI schemes and ways to overcome them, as well as the political economics barriers to health financing reform in Bangladesh. In addition, a system dynamic study has been carried out to find effective strategies to overcome CBHI implementation challenges and assess their implications.

Our findings show that socioeconomically disadvantaged informal sector workers have difficulties getting government healthcare and due to substantial out-of-pocket healthcare spending, many struggle financially following treatment. The targeted social health insurance system is essential for Bangladesh to achieve universal coverage and meet the healthcare needs of this vulnerable population. Bangladesh's biggest challenge is addressing the informal sector, which employs most of the people. To bring the informal sector under the universal coverage, governments must systematically address CBHI implementation challenges and provide technical and financial support to CBHI schemes, learning from international experiences.

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Dedication

I dedicate this thesis to my father, Md. Esahaque Uddin Sheikh and daughter, Tashia Nur Ohee

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AOR	Adjusted Odds Ratio
ARI	Acute Respiratory Infections
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
BIA	Benefit Incidence Analysis
BMA	Bangladesh Medical Association
CBHI	Community-based health insurance
CC	Community Clinic
CGD	Comptroller General Department
CHCP	Community Healthcare Provider
CHE	Catastrophic Health Expenditures
CHWs	Community Health Workers
CI	Confidence Interval
CSMBS	Civil Service Medical Benefit Scheme
DGFP	Directorates General of Family Planning
DGHS	Directorates General of Health Services
DH	District Hospital
FHCP	Free Health Care Policy
FWA	Family Welfare Assistant
GDP	Gross Domestic Product
GGE	General Government Expenditure
GGHE-D	Domestic General Government Health Expenditure
GOB	The Government of Bangladesh
HCFP	Health Care Fund for the Poor
HCFS	Healthcare Financing Strategy
HEU	Health Economics Unit
HFR	Health Financing Reform
HIES	Household Income and Expenditure Survey
HPNSDP	Health Population and Nutrition Sector Development Program
HSD	Health Services Division
Icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh

IHE	Institute of Health Economics
KII	Key Informant Interview
LMICs	Low- and Middle-Income Countries
MCWC	Maternal and Child Welfare Centre
ME&FWD	Medical Education and Family Welfare Division
MHI	Micro health insurance
MMR	Maternal Mortality Rate
MOF	Ministry of Finance
MOHFW	Ministry of Health and Family Welfare
MOPH	Ministry of Public Health
NCDs	Noncommunicable Diseases
NFE	Non-Food Consumption Expenditure
NGOs	Non-governmental Organizations
OOPE	Out-of-Pocket Expenditure
OR	Odds Ratio
PEA	Political Economy Analysis
PM-JY	Pradhan Mantri Jan Arogya Yojana
PSUs	Primary Sampling Units
RQ	Research Questions
RSBY	Rashtriya Swasthya Bima Yojana
SC&EPI	Satellite Clinic and Expanded Programme on Immunization
SD	System Dynamics
SDGs	Sustainable Development Goals
SFD	Stock Flow Diagram
SHI	Social Health Insurance
SHPS	Social Health Protection Scheme
SHSP	Social Health Security Program
SSEACs	South and South-East Asian countries
SSK	Shasthyo Shurokhsha Karmasuchi
SSO	Social Security Office
THCE	Total Household Consumption Expenditure
THE	Total Health Expenditure
UCS	Universal Coverage Scheme

UH&FWC	Union health & family welfare centre
UHC	Universal Health Coverage
USC	Union subcentre
UzHC	Upazila Health Complex
WHO	World Health Organization
WHS	Medical Welfare Scheme
WOM	Word-of-Mouth

Chapter 1

1. Background

1.1. Healthcare landscape in Bangladesh

Bangladesh, officially known as the People's Republic of Bangladesh, is situated in South Asia and gained its independence from Pakistan through a liberation war in 1971. The nation has emerged as an independent country with a population of approximately 163 million into a relatively small area of 147,570 square kilometres, making it one of the most densely populated countries globally [1]. Since its independence, Bangladesh has been on a trajectory of economic development, achieving substantial growth in its gross domestic product (GDP) with an impressive annual rate of 7.9 percent in 2019 [2]. This economic progress is remarkable considering the limited natural resources, reliance on agriculture, and high population density. This persistent economic progress has led to a significant reduction in poverty. Between 2010 and 2016, approximately 8 million Bangladeshis were lifted out of poverty, resulting in a 25 percent decrease in the poverty rate [3]. However, even with this level of improvement, a quarter of the Bangladeshi population still lives in poverty. Nearly half of those living in extreme poverty struggle to meet their basic needs including health [3]. In addition, the COVID-19 pandemic continued to have devastating effects on the economy. During the lockdown, the poverty rate doubled because it limited domestic economic activity, and low-income individuals suffered the most due to the lack of social security [4,5]. Simultaneously, Bangladesh is struggling with epidemiological challenges, facing a dual burden of communicable and noncommunicable diseases (NCDs). In addition, the country is enduring a demographic shift characterised by an increase in the number of people aged 60 and older; by 2025, Bangladesh and four other Asian nations are estimated to have half of the world's elderly population [6].

Health has been a paramount concern for Bangladesh since gaining independence. This commitment is even enshrined in the Constitution of the People's Republic of Bangladesh, which affirms that every citizen has the fundamental right to health. The government of Bangladesh is constitutionally mandated to ensure the health and well-being of its population, making the provision of healthcare a fundamental responsibility [7]. The country has garnered recognition as a noteworthy achiever of Millennium Development Goal 4, marked by a reduction in child mortality. Moreover, Bangladesh has demonstrated progress in other

health indicators, including life expectancy, maternal mortality, immunization coverage, and the management of certain communicable diseases like malaria, tuberculosis, and diarrhoea [8]. Notwithstanding these achievements, certain challenges persist within the healthcare system. These include weak governance, inadequate coordination among ministries, a scarcity of skilled healthcare professionals, insufficient healthcare funding, high reliance on out-of-pocket expenditure (OOPE), and disparities in access to healthcare services [8].

The health care system in Bangladesh is pluralistic. The Government of Bangladesh (GOB) undertakes a central role, supported by large private sector involvement, non-governmental organizations (NGOs), and contributions from donor agencies. The public sector undertakes responsibility for health policy formation, execution, coordination, and regulation, including healthcare financing and the employment of health workforce. The Ministry of Health and Family Welfare (MOHFW) oversees a dual health structure, consisting of two divisions: the Health Services Division (HSD) and the Medical Education and Family Welfare Division (ME&FWD) [7]. The government offers subsidized public healthcare services through a well-organized three-tiered healthcare system: primary, secondary, and tertiary. Primary-level facilities, situated at the ward, union, and upazila levels (lower tiers of administrative unit), contain healthcare facilities like community clinics, union subcentres, union health & family welfare centres, and upazila health complexes. While upazila health complexes provide both inpatient and outpatient services, most other primary-level facilities primarily deliver outpatient care. Secondary and tertiary-level healthcare facilities offer specialized medical services [9]. Through the Directorates General of Health Services (DGHS) and Family Planning (DGFP) under the MOHFW, the government provides curative, preventive, promotive, and rehabilitative services through a network of 15,782 primary-level and 254 secondary and tertiary-level healthcare facilities. Additionally, the Ministry of Local Government and Rural Development oversees urban primary healthcare services in Bangladesh. Nevertheless, the quality of public healthcare services is constrained by resource shortages, encompassing insufficient healthcare professionals, high absenteeism rates, and equipment shortages [9].

Due to resource constraints and the limited capacity of the government to ensure comprehensive healthcare coverage for the entire population, the private sector and NGOs play a significant role in delivering healthcare services particularly focusing on maternal and child health as well as family planning services. Around 60 percent of healthcare services in

Bangladesh are provided by non-governmental entities, which encompass both for-profit and non-profit organizations, as well as traditional and informal healthcare providers [10]. Urban individuals are more prone to seek healthcare from the private sector due to a wider array of provider choices compared to the public sector. Conversely, rural residents largely rely on public and informal sectors. However, the cost and quality of healthcare fluctuate significantly due to lack of regulation of the private healthcare markets. Donor agencies play a substantial role, contributing to the financing, planning, delivery of healthcare services, and capacity enhancement within the primary healthcare system. Furthermore, the NGO sector is also a significant player in the healthcare domain. These NGOs predominantly deliver preventive and primary healthcare services in underserved areas. They also operate voluntary micro health insurance schemes to provide healthcare services to vulnerable populations in underserved regions.

1.2. Universal Health Coverage and healthcare financing challenges

Universal Health Coverage (UHC) as a target of the Sustainable Development Goals (SDGs) underlines the importance of ensuring equitable access to healthcare services for all citizens, at affordable prices that do not impose financial burdens for them [11]. Lack of financial protection makes UHC challenging for low- and middle-income countries (LMICs) [12]. Likewise, the GOB has embraced UHC as a strategic priority within its healthcare system, aiming to enhance health accessibility, particularly for socioeconomically disadvantaged segments. However, like other nations with limited resources, Bangladesh encounters challenges for UHC, stemming from resource scarcity, heavy reliance on OOPE, deficient sustainable healthcare financing mechanisms, suboptimal resource allocation, and inadequate healthcare infrastructure and human capital [13].

In Bangladesh, the current allocation for the healthcare sector constitutes approximately 5.14 percent of the total budget, which is comparably lower than other countries in the South-East Asia region [14]. In 2015, the Total Health Expenditure (THE) per capita in Bangladesh was recorded at US$37, whereas the World Health Organization (WHO) has set a global benchmark of US$60 per capita per year for functional health systems in low-income countries [15,16]. When examining regional comparisons, India allocates US$61, Nepal US$36, Sri Lanka US$89, Bhutan US$215, Maldives US$410, and Pakistan US$39 per capita for healthcare [16]. Over the period from 1997 to 2015, the average growth of THE in Bangladesh

was 6%. The proportion of THE in Bangladesh's Gross Domestic Product (GDP) was 2% in 1997 and has risen to 3% of GDP in 2015. In contrast, India allocated 4.7%, Nepal allocated 5.8%, Sri Lanka allocated 3.5%, Bhutan allocated 3.6%, Maldives allocated 13.7%, and Pakistan allocated 2.6% of their respective GDP for healthcare during the same period [16].

Despite a general upward trend in the allocation of funds to the government health budget, there has been a notable decline in the proportion of government expenditure to healthcare, with the percentage decreasing from 36% in 1997 to 19% in 2019 [16,17]. As of 2019, the majority of current health expenditure is mostly sourced from out-of-pocket expenses, accounting for approximately 73% of the total [16,17]. The magnitude of OOPE has a significant impact, with an estimated 5 million individuals falling below the poverty line annually [13]. An investigation conducted in 2016 revealed that 24.7% of Bangladeshi households experienced catastrophic health expenditures (CHE) [11]. In addition, a recent empirical study revealed that approximately 43% of households that utilised healthcare services were forced to liquidate their assets, obtain monetary loans, or rely on assistance from their relatives [18].

OOPE on healthcare contribute to the alarming disparities and are a significant factor behind the inequitable utilisation of healthcare services in Bangladesh, especially affecting the poor and vulnerable segments of the population who face barriers to accessing healthcare services [16]. In addition, the private sector's healthcare services are prohibitively expensive, rendering them unaffordable for the majority of the low-income population. On the path to achieving UHC in Bangladesh, the financial barrier to healthcare access continues to be a significant obstacle. Inadequate and unequal health financing, as well as substantial OOPE, are the primary obstacles preventing Bangladesh from meeting its global health commitments. Evidently, achieving UHC objectives necessitates the establishment of a functional healthcare financing system.

1.3. Healthcare financing strategy of Bangladesh

In 2012, in response to challenges such as high OOPE, inadequate government healthcare expenditure, absence of social protection initiatives, and disparities in health financing, the MOHFW of Bangladesh adopted a healthcare financing strategy named "*Expanding Social Protection for Health: Towards Universal Coverage Healthcare Financing Strategy (HCFS)*

2012–2032" [19]. The overarching goal of this strategy was to ensure equitable access to healthcare for the entire population through a sustainable healthcare financing framework. The strategy outlines three strategic objectives to enhance financial risk protection for the population: mobilize additional resources for the healthcare sector, enhance equity and accessibility to healthcare, particularly for economically vulnerable individuals, and optimize the efficiency of budget allocation and utilization [19]. The strategy aims to limit OOPE to 32%, raise government healthcare budget allocation, and extend risk protection coverage to 100% through prepayment schemes within its designated implementation timeframe [19].

Table 1.1. Proposed health care financing strategy to cover different population groups in Bangladesh.

	Population groups	Healthcare financing mechanisms	
Population 152.5 million (2012)	Below Poverty Line (31.5%) 48 million	• Tax-funded publicly financed healthcare • Non-contributory health protection mechanisms (e.g., SSK) part of the Social Health Protection Scheme (SHPS)	**Social Transfer** ↑
	Informal sector (56.2%) 85.7 million	• Tax-funded publicly financed healthcare with user fee retention • **Community-based health insurance (CBHI) initiatives** • **Micro health insurance (MHI)** • **Other innovative initiatives** • Gradual move to Social Health Protection Scheme coverage	
	Formal sector (12.3%) 18.8 million	• Tax-funded publicly financed healthcare with user fee retention • Social Health Protection Scheme • Complementary private coverage	

Source: MOHFW, 2012

The adoption and implementation of a social health protection programme at the national level pose significant challenges for countries such as Bangladesh. These challenges stem from issues such as insufficient revenue collection, limited institutional capacity for tax collection, and a substantial workforce operating in the informal sector [20]. Furthermore, there have been challenges in incorporating those working in the informal sector into the scheme. In recent years, there has been a notable emphasis among LMICs on the

establishment and enhancement of CBHI as a means to broaden healthcare coverage for individuals employed in informal sectors.

Given these constraints, the HCFS has proposed a range of prepayment healthcare financing mechanisms to cover all segments of the population, alongside the existing tax-based financing. Those living below the poverty line will be covered by publicly funded healthcare scheme as part of a social health protection scheme (Table 1.1). A pilot initiative named the Shasthyo Shurokhsha Karmasuchi (SSK) has been executed in line with the HCFS to provide non-contributory healthcare insurance to the impoverished population. Meanwhile, the formal sector, constituting 12.3 percent of the population, is targeted for coverage through a contributory prepaid healthcare scheme within the social health protection scheme. This scheme is supplemented by the existing government healthcare system and complementary private health insurance. A specific scheme has been designed for government employees, and several efforts have been undertaken to serve to employees in the garment sector. It is assumed that the three population groups shown in Table 1.1 are mutually exclusive. However, some individuals may participate in both formal and informal sectors, and informal labourers may be a part of the population living below the poverty line. Those who fall below the poverty line, regardless of employment status, are regarded as members of that group. Individuals who participate in both the formal and informal sectors will be categorised as members of the formal sector group due to the availability of the formal pay-scale system.

The focus of this research will be informal sector workers and their families. Nevertheless, it is important to acknowledge certain limitations, as the conclusions from certain planned studies *(this will be discussed further in chapter 2)* may not be fully pertinent to the targeted population. In sub-studies 1 and 2, we will target informal workers by concentrating on two lower socio-economic groups (poor and poorest, as determined by household assets) on the assumption that informal workers typically lack sufficient income due to the informal nature of their employment. It is possible, that some of these households fall below the poverty threshold, which is one of the limitations of this assumption.

Sub-study 3 will examine the implementation challenges of voluntary CBHI schemes in Bangladesh through the lens of a qualitative study. We will interview personnel from voluntary CBHI schemes, policymakers, and researchers for this study. Typically, voluntary

CBHI schemes are implemented in outlying rural areas where most of the population is employed in the informal sector. Since those schemes focused on a specific region rather than a particular socioeconomic group, individuals employed in the formal sector and those lying below the poverty line are also included within their designated targeted areas. Hence, our results and conclusions may apply to populations residing in the formal sector as well as those living below the poverty line. Finally, in sub-study 5, we will utilise data from a CBHI scheme that focused on a specific geographic area. This scheme has household-level information, allowing us to identify those that were below the poverty line. This information will be considered in our analysis.

Bangladesh faces a significant challenge in reaching its larger informal sector (about 56% of the population) due to the lack of accessibility of conventional employment-based systems. Along with the existing government healthcare system, CBHI and MHI schemes operated by NGOs may be the most practical means of reaching this population group, with a minimal contribution based on their capacity to pay. These schemes will then transition gradually to the social health protection scheme; therefore, prior to implementing such a scheme at the national level, it is essential to assess its feasibility and challenges. Therefore, the HCFS in Bangladesh, a strategic roadmap for achieving UHC, emphasizes the significance of investigating the challenges and prospects of CBHI and MHI among informal sector workers in the country.

1.4. Community-based health insurance

CBHI is a non-profit voluntary MHI scheme that began in the early 1990s in developing countries particularly within the African continent. This type of scheme pools risks and funds for health care through a prepayment mechanism [21]. CBHI schemes are also referred to as mutual health insurance schemes, local health insurance, MHI, and medical aid societies or medical aid schemes. Their primary aim is to cover informal sector and are mostly managed by the local NGOs, hospitals, civil society organizations or organized corporative societies with community participation in their management [22]. Noteworthy instances such as Ghana, Rwanda, Japan, and China embarked on their healthcare journey through the channel of CBHI, subsequently advancing towards the reformulation of their healthcare financing systems by the integration of CBHI systems into their national health insurance scheme. Similarly, countries such as Mali, Senegal, and India are presently engaged in the consideration of

similar strategies for the extended implementation of CBHI [23]. The main features of CBHI scheme are as following:

- ✓ The local community is involved in management.
- ✓ A prepaid mechanism for risk pooling operated at community level mostly for the informal sectors who shared same geographical or occupational characteristics.
- ✓ Participation is voluntary in nature.
- ✓ Premiums for the members are often flat rate for all participants; and
- ✓ The schemes operate on a non-profit basis.

1.5. Healthcare financing system for the informal sector: the Global experience

The tax-based healthcare financing system (the Beveridge model) relies on government revenue to fund healthcare services, while the social health insurance (SHI), also known as the Bismarck model, relies on mandatory payroll-based contributions cover the formal sector workers and their families. Sometimes, coverage of the SHI expanded to include informal sector workers and their families through other models. Both of these healthcare financing models are widely recognized as effective means of achieving UHC by providing sufficient financial protection against healthcare expenses [21]. However, a country's choice between implementing SHI or a tax-based system largely depends on its socioeconomic and political factors, as well as the capacity of its healthcare system [24,25]. The taxation system may not be suitable for countries where tax collection is regressive, as it can result in a partial population coverage, inadequate healthcare benefit design, and disparities in healthcare utilization [21]. On the other hand, transitioning to an SHI system can pose challenges for LMICs, particularly when a substantial rural population engaged in the informal sector remains uninsured [24]. An increasing interest has been growing among the LMICs to find alternative healthcare financing mechanism since a group of population remains uncovered through the recognized SHI and tax-based system. Therefore, some countries adopted different approaches by reforming their existing financing system to extend coverage among the uncovered population. The most challenging is to extend healthcare coverage among the informal sector, therefore countries are still struggling to reach this hard-to-reach population.

Different countries aim to achieve UHC through various strategies by expanding SHI to cover the informal sector. For instance, Vietnam made different arrangements to enable informal workers to voluntarily contribute and join the SHI, as well as non-contributory arrangements

to cover the poor based on tax revenue. In 1992, Vietnam introduced a mandatory national-level SHI scheme that covered formal workers work in both the public and private sectors, retirees, socially supported individuals, and international employees [26]. Subsequently, they introduced a voluntary public insurance scheme targeting the informal sector, self-employed individuals, and students. Additionally, a compulsory government-funded scheme was implemented to provide coverage for the low-income population [27]. Vietnam has achieved health insurance coverage for approximately 90% of its population. In contrast, China and Mexico have introduced separate voluntary insurance schemes for the informal sector [24]. China stands out as a notable example in Asia where health insurance has successfully reached a substantial portion of the population in both rural and urban areas. China's Rural Cooperative Medical System allowed informal sector workers to make subsidized, flat-rate contributions to get insurance coverage, while tax revenues are used to cover the low-income population. Contrary, in Mexico's Seguro Popular scheme, contributions from the informal sector are determined based on their financial capacity to pay [28].

Thailand one the other hand, is the most frequently cited health financing model, having effectively targeted and covered 98% of the population under a pluralistic public financing system [29]. A voluntary health insurance scheme for the informal sector was initiated in 1984, and another scheme known as the Medical Welfare Scheme covers the low-income population [30]. In addition, public sector employees and their families are covered by the Civil Service Medical Benefit Scheme, a non-contributory scheme, and private sector employees are covered by the SHI scheme [29]. Later, the Thai government introduced universal coverage scheme by integrating voluntary schemes for low-income populations and the informal sector.

Some countries have made CBHI a key component of their healthcare financing strategy, despite arguments over how effective it is in achieving universal coverage [31,32]. However, implementation of CBHI alongside other schemes has the potential to reach the informal sector, which is difficult to reach with formal insurance schemes. CBHI schemes have been implemented in several countries, including China, Rwanda, Ghana, Tanzania, Colombia, Ethiopia, Nepal, and India, with China, Rwanda, and Ghana showing particularly encouraging results [33]. Ghana and Rwanda have strengthened their healthcare financing systems by reforming existing CBHI schemes and integrating them into a comprehensive, centralized system [23]. Rwanda, in particular, stands out as a success story in achieving relatively high

coverage through a voluntary CBHI scheme, even though it became mandatory in 2007. Rwanda's CBHI scheme, known as Mutuelles de Santé, began as a pilot scheme in 2003 and now extends coverage to over 80% of the population [34]. In Rwanda, premiums for the poor and vulnerable population were fully subsidized, and partial subsidies were provided for others until 2012.

Ghana, after enacting the National Health Insurance Act in 2003, established a National Health Insurance Scheme by consolidating numerous small and fragmented CBHI schemes. This move has proven successful in terms of expanding population coverage, especially after the scheme was made compulsory by law. Ghana's experience serves as a significant step toward achieving UHC, offering valuable insights for other countries seeking to extend coverage by incorporating CBHI schemes. Ghana also provides subsidies to support the poor and vulnerable populations. In a manner similar to Rwanda and Ghana, Ethiopia initiated pilot CBHI schemes in 13 districts during 2010/2011 and later expanded to encompass 185 districts across four regions [35]. Nepal has also begun implementing a national-level CBHI scheme as part of its social protection program, with the aim of broadening coverage among the informal sector and low-income population groups and mobilizing local resources for healthcare. However, Nepal's scheme remains voluntary, with substantial subsidies—100% for the ultra-poor, 75% for the poor, and 50% for vulnerable populations [36].

Although CBHI schemes are not widely seen as a promising approach towards achieving UHC, their implementation together with other schemes can serve as a transitional step towards attaining UHC. Even though the implementation of CBHI faces challenges, such as adverse selection, limited population coverage, and financial sustainability [37], integrating these schemes into a centralised public system has the potential to extend coverage to individuals in the informal sector and those who have low incomes and currently not covered by formal insurance schemes.

1.6. CBHI in Bangladesh

Historically, since gaining independence in 1971, Bangladesh has primarily relied on a tax-funded healthcare financing system, following the Beveridge model. Health insurance, both voluntary and mandatory, has made only minimal contributions to the country's healthcare financing landscape. While private health insurance does exist in Bangladesh, it remains accessible to a limited portion of the population employed in the formal sector, typically through group health insurance. There is a large informal sector workforce in Bangladesh

consisting of farmers, day labourers, and the self-employed. At present, this segment of the population must rely on government health facilities or extremely costly private healthcare. Private healthcare is inaccessible to this population due to their inability to pay for the costly healthcare offered by the private sector, or even for the subsidised public healthcare. Therefore, the majority of them are struggling to pursue medical care when in need. CBHI have been effective in protecting them from financial barriers by providing an affordable prepayment mechanism for healthcare. In similar socio-economic settings, countries such as Ghana, Rwanda, and neighbouring nations like India and Nepal have found CBHI schemes to be effective in targeting and providing healthcare coverage for this challenging-to-reach segment of the population, which traditional insurance schemes struggle to reach. However, the role of health financing, particularly the potential of CBHI schemes, has not received adequate attention in Bangladesh, despite some limited-scale efforts by NGOs and microfinance institutions.

Health insurance schemes targeting the poor in Bangladesh are primarily administered by NGOs and microfinance institutions [38]. In Bangladesh, CBHI predominantly functions as a MHI model, where beneficiaries are involved to varying degrees in managing the insurance scheme. Within the context of microfinance programs, they have implemented health insurance initiatives for their consumers in an effort to promote and protect their health. As of 2020, Bangladesh has approximately 750 active microfinance institutions and NGOs, with around 400 of them actively involved in healthcare provision [38]. The majority of these organizations focus on delivering primary healthcare services and health education, particularly in rural areas where a significant portion of the population is engaged in informal work [8]. Several of these insurance schemes are linked with microfinance programs, such as Grameen Kalyan, Sajida Foundation, and BRAC. Meanwhile, some schemes, including Gonoshasthaya Kendro, BADAS, Nari Uddug Kendra, and Amader Shasthya, are initiated independently without any direct ties to microfinance programs. However, both voluntary and compulsory participation options are available within the existing CBHI schemes offerings in Bangladesh. These schemes primarily serve to the rural poor, particularly those engaged in the informal sector, aiming to provide financial protection for healthcare expenses and improve healthcare accessibility. Most of these schemes offer subsidies for disadvantaged communities, with a strong emphasis on maternal and child health. They provide primary healthcare services through trained community health workers and general physicians from their own clinics or hospitals and affiliated healthcare facilities. Additionally, they offer

discounts on medications and laboratory tests, although most of them do not have established referral systems.

Literature on the performance of these CBHI schemes are also limited. A study by Sayem et al. demonstrates the impact of CBHI on the utilization of healthcare from medically trained providers and found that, insured informal workers from the organized cooperative societies have utilized more healthcare from trained providers than uninsured informal workers [39]. In another study conducted by Sayem et al. reported similar high healthcare utilization among insured readymade garment workers (semi-formal) and also illustrated less OOPE than uninsured workers [40]. Similar findings also found by Khan et al. that CBHI reduced OOPE among the insured informal workers than uninsured workers [41]. A study by Iqbal et al. found a 20% population coverage within three years of implementation of their scheme, with 38% of renewal rate [42]. From this available literature, it is clearly evident that, CBHI in Bangladesh could increase healthcare utilization among the informal workers and could protect them from financial hardship by reducing the extend of OOPE on healthcare. However, main challenges of the existing CBHI schemes include inadequate enrolment, renewal rate, and high reliance on subsidies due to their less financial sustainability [37].

Bangladesh is the birthplace of microfinance, and microfinance institutions and NGOs have effectively reached the rural poor working in the informal sector. It has a long history of public-private partnerships that have been fruitfully accomplished with the participation of the community. At the grass-roots level, NGOs, cooperative societies, and microfinance institutions have established platforms and garnered trust within the communities they serve. In light of the international experiences discussed in the preceding section, the government's technical and financial assistance along with the collaboration of these entities could amend the accomplishments of the current CBHI schemes.

Chapter 2

2. Research objectives and methods

2.1. Research objectives and research questions

The overarching aim of the thesis is to investigate the need, challenges, and prospects of CBHI schemes in Bangladesh and to generate evidence for policymakers to make decisions for CBHI to provide financial protection for healthcare to the informal sector and the poor, and to extend universal coverage among them. There are three objectives of this dissertation are given below-

Objective 1: The first objective is to identify the need for a prepaid health insurance scheme (e.g., CBHI) due to the shortcomings of the existing healthcare financing system in protecting the informal sector and the poor against the financial burden of OOPE.

Two sub-studies have been conducted to assess the need for CBHI among the informal sector, in accordance with the literature recommendation that the need for CBHI can be justified if there are problems with access to available healthcare and high medical costs lead to households in financial hardship [43]. The two sub-studies are as follows-

- Sub-study 1: Equity assessment of maternal and child healthcare benefits utilization and distribution in public healthcare facilities in Bangladesh: a benefit incidence analysis.
- Sub-study 2: Disease-specific distress healthcare financing and catastrophic OOPE for hospitalization in Bangladesh.

Although, several studies in this setting previously specified the need for health insurance scheme, sub-study 1 and sub-study 2 will contribute to the existing body of the literature as detailed by the research questions below. Moreover, sub-study 1 and sub-study 2 will also provide additional dimensions that existing literature have not explored (this will be discussed further in chapter 3 and chapter 4). The following three research questions (RQ) were the focus of sub-study 1 and sub-study 2 conducted to achieve objective 1-

- RQ 1.1 (sub-study 1): Is there access to subsidized public healthcare benefits for individuals who are socioeconomically marginalized?
- RQ 2.1 (sub-study 2): To what extent does OOPE on healthcare contribute to financial hardships among different socio-economic groups?

- RQ 2.2 (sub-study 2): What are the specific health conditions should Bangladesh incorporate into the proposed SHPS to protect people from the financial hardship?

Objective 2: Secondly, to investigate the barriers associated with voluntary CBHI implementation and the strategies to overcome these barriers from the perspective of national stakeholders. To accomplish this objective, two sub-studies on the implementation barriers of voluntary CBHI in Bangladesh and the political economy context of health financing reform (HFR) in Bangladesh were conducted-

- Sub-study 3: Implementation barriers and remedial strategies for CBHI in Bangladesh: Insights from national stakeholders.
- Sub-study 4: Political economy analysis (PEA) of health financing reform in Bangladesh.

The two research questions listed below were designed to address objective 2-

- RQ 3.1 (sub-study 3): What are the primary barriers associated with the implementation of voluntary CBHI schemes in Bangladesh, as seen from the standpoint of national stakeholders, and what approaches can be adopted to overcome these obstacles?
- RQ 4.1 (sub-study 4): What challenges have been encountered in reforming health financing in Bangladesh, considering the slow progress in the implementation of HCFS, while neighboring countries in the South-East Asian region make strides in ensuring affordable healthcare for their low-income communities?

Objective 3: Finally, to identify feasible policies to overcome the challenges associated with CBHI implementation and assess their effectiveness in addressing these challenges through mathematical modelling. One sub-study has been conducted to address the objective 3.

- Sub-study 5: A system dynamics (SD) model of CBHI system in Bangladesh.

The sub-study 5 was conducted following the Guy Carrin's recommendation for additional research on "*how CBHIs can perform better and what the conditions would be for their replication*" [21]. In order to accomplish the goal of providing financial protection under universal coverage, we have therefore attempted to identify policies that will improve the performance of the CBHI scheme, and the scheme's replicability has been evaluated in terms

of its self-sufficiency. The following three research questions are intended to investigate the third research objective-

- RQ 5.1 (sub-study 5): Can voluntary CBHI schemes be financially sustainable after a considerable population has enrolled?
- RQ 5.2 (sub-study 5): What policies are effective in addressing inadequate enrolment and low renewal for the voluntary CBHI scheme?
- RQ 5.3 (sub-study 5): How long may voluntary CBHI need financial assistance before achieving self-sufficiency, so that it can contribute to the health sector in Bangladesh in accordance with the healthcare financing strategy, particularly with respect to providing healthcare services and financial protection to low-income informal workers?

2.2. Philosophical stance: critical realism

I have chosen critical realism as a philosophical framework for this research. Critical realism provides a robust foundation for understanding the ontological and epistemological dimensions of research, offering a nuanced approach to exploring the intricacies of social phenomena.

Critical realism, rooted in the works of philosopher Roy Bhaskar, asserts that the social world exists independently of human perceptions, but our understanding is mediated through our interpretations and experiences [44,45]. It is a philosophical position that seeks to reconcile the opposing viewpoints of positivism and interpretivism by addressing their dialectical conflict [46]. Positivism's inclination towards quantifiable and observable phenomena receives scrutiny for oversimplifying complex social realities and neglecting qualitative insights. On the other hand, interpretivism, with its emphasis on subjectivity and individual experiences, is criticized for potential lack of generalizability and a tendency to overlook broader structural influences. In response to these critiques, critical realism emerges as a promising alternative. It recognizes a stratified reality, consisting of three interconnected layers: the empirical, the actual, and the real [44]. The empirical layer comprises observable events, the actual layer includes underlying mechanisms and structures that generate these events, and the real layer represents the unobservable, enduring aspects of the social world. Advocates for critical realism argue that it offers a middle ground by acknowledging the existence of an external reality while recognizing the role of interpretation in constructing knowledge. They contend that critical realism facilitates a more nuanced understanding of

social phenomena by incorporating both quantitative and qualitative methodologies [46]. Additionally, it addresses concerns about the neglect of historical and contextual factors in positivism and interpretivism, and it encourages researchers to engage with issues of power, social structures, and emancipation. In essence, critical realism seeks to overcome the limitations perceived in the binary nature of positivism and interpretivism, offering a more integrative and comprehensive approach to social research.

Ontology is the views of existence of reality; epistemology is the generation and justification of knowledge [47]. Ontological paradigm is “the science and nature of being” and refers to the nature of reality [48]. Ontology asks to know “what is the nature of reality” or “what is the world like”. Epistemology is the study of knowledge, and the way to know what constitutes acceptable, valid and reliable knowledge [49]. Epistemological assumptions determine how to obtain and develop knowledge claim, how to evaluate the validity of a true claim, and how to measure these claims beside existing knowledge [50]. Ontologically, critical realism posits a similar view to positivism that social reality is characterized by generative mechanisms that produce events and outcomes [51]. These mechanisms operate within a context and are contingent on specific conditions. Critical realism states that we may partially understand actual [52]. Epistemologically, critical realism differs from positivism and acknowledges the fallibility of human perception but argues for the existence of an objective reality that can be known through theoretical understanding [51]. Critical realist perceives that knowledge is always transitory, historically, and socially constructed. In most cases, knowledge lies with multiple possible sets of explanations within an open and multidisciplinary context [44].

In my perspective, researchers can impartially observe and generate an approximate representation of reality. However, the remaining information is subject to social construction and is subject to change. Hence, comprehending the societal beliefs and principles, alongside the tangible reality, is crucial, given that all knowledge derived from reality is imperfect. So, in my research area of CBHI it is important to acknowledge the existence of generative mechanisms that underlie observable events as well as to acknowledge the multifaceted phenomenon of CBHI influenced by various social, economic, and cultural factors to move beyond mere descriptions of CBHI challenges and prospects, to uncover the underlying structures and mechanisms that drive these phenomena.

From the critical realist perspective, I will utilize a mixed method research design (details of the methods described in the next section). Quantitative methods, such as surveys and statistical analyses, will help me to understand the need of CBHI in Bangladesh and to explore the patterns and trends within CBHI (e.g., enrolment, renewal, healthcare utilization). In addition, quantitative component of my research will provide valuable insights into the prevalence of insurance coverage, factors affecting participation, and the financial aspects of CBHI. On the other hand, qualitative methods, such as key informant interviews, will offer me a deeper understanding of the lived experiences related to the structure of the CBHI system and implementation challenges CBHI schemes in Bangladesh. By exploring the subjective aspects of individuals involved in CBHI, I will explore the social and cultural mechanisms influencing participation, trust, and community engagement. In addition, I will develop a system dynamic model to simulate the complex interactions and feedback loops within the CBHI system by utilizing qualitative evidence as an initial framework for the model.

Claiming knowledge can depend on three ways of reasoning- abduction, deduction and induction [53]. Deductive reasoning starts with a developed hypothesis which is then tested through a research strategy mainly based on quantitative data [54]. Inductive reasoning starts from a set of similar observations from collected data from which a theory or hypothesis is developed. Abduction is the combination of deduction and induction [55]. Abduction starts with an incomplete set of observations and attempts to build new theory or modifies existing theory. The process then ends through a validity test by collecting further data [55]. In my research, empirical evidence is collected that is essential for the development of a simulation model (i.e. to reflect the structure of the system). After the development of that model, it is validated with existing knowledge. I will triangulate data and findings from multiple sources captured by utilizing different methods to enhance the overall validity of the findings. However, from a critical realist view, I believe that knowledge is context dependent meaning that my model and findings are of most use for a particular time and social context.

2.3. Research methods

A mixture of quantitative, qualitative, and SD approaches were utilised to attain the objectives of this dissertation. Under research objective 1, two quantitative studies were conducted using secondary data to assess the need for a prepaid health insurance scheme for the informal sector and the poor. In addition, two qualitative studies were conducted to meet the second objective of the research. Lastly, an SD approach was adopted to identify

effective policies to address the challenges of CBHI and evaluate their effectiveness to meet the research objective 3. Research methods for each sub-study are described in detail below.

2.3.1. Research methods for objective 1

Sub-study 1 and sub-study 2 were conducted to meet the first objective of this dissertation, which was to determine the need for a prepaid health insurance scheme (i.e., CBHI) for the informal sector and the poor. Following the recommendation of the available literature, the need was evaluated by investigating accessibility and financial hardship due to the magnitude of OOPE on healthcare. First, we intended to determine whether marginalised people who work in the informal sector are able to meet their medical needs through subsidised public healthcare, and then we evaluated the financial impact (hardship) after getting healthcare services.

In sub-study 1, a benefit incidence analysis (BIA) of public healthcare services was conducted to determine if socioeconomically marginalised groups have access to the benefits of public healthcare based on their needs (RQ 1.1). To conduct the study, secondary data from a nationally representative survey, Bangladesh Demographic and Health Survey (BDHS) 2014, were utilised to assess the distributional impact of public benefits and to comprehend how public benefits in Bangladesh are currently distributed among socioeconomic groups considering different layers of healthcare facilities. BIA is a technique used to evaluate the distributional impact of public expenditure on healthcare, i.e., to determine which socioeconomic groups receive the most benefit from public subsidies [56]. Public benefits in healthcare should be distributed so that socioeconomically marginalised groups receive a disproportionate share of the benefits; therefore, BIA ultimately evaluates a health system's performance in targeting socioeconomically marginalised populations for public benefits [57]. To conduct the BIA study, we generated five socioeconomic quintiles (poorest, poorer, middle, richer, and richest) using principal component analysis to generate scores based on the durable assets and household characteristics. We estimated healthcare utilisation rates for various healthcare services across socioeconomic quintiles and then calculated benefits in monetary values for each socioeconomic quintile by multiplying utilisation rates and unit cost for healthcare services (obtained from a published source). The total monetary benefit was calculated by summing the benefits received by the five socioeconomic quintiles. Additionally, we compare the percentage share of benefits received to the percentage share of needs across the socioeconomic quintiles.

In addition, we calculated concentration indices and drew concentration curves to assess the disparity in healthcare utilisation across socioeconomic quintiles based on the level of healthcare services and facilities. The concentration curve depicts the cumulative rank proportion of service utilisation by socioeconomic quintiles on the vertical axis and the cumulative rank proportion of the population by socioeconomic quintiles on the horizontal axis. If the curve lies on the 45-degree line from the origin, then there is perfect equity among the socioeconomic quintiles. However, if the curve lies above or below the equity line, then healthcare service utilisation is more concentrated among the poor and the rich, respectively. Nonetheless, the concentration index is double the area between the equity line and concentration curve, which ranges from +1 to -1. A positive concentration index means that healthcare utilisation is more concentration among the rich and negative index means healthcare utilisation is more utilised by the poor, and a zero means perfect equity across the socioeconomic quintiles.

In the sub-study 2, the research questions RQ 2.1 and RQ 2.2 were investigated. Following hospitalisation incidents in Bangladesh, incidences of CHE and distress financing were estimated following the hospitalization. In addition, we investigated disparities in financial risk protection indicators and explored the factors associated with hospitalization-related financial hardship. To conduct the sub-study 2, data from the most recent Bangladesh Household Income and Expenditure Survey (HIES) 2016-17 were extracted. CHE was measured based on two well-known and widely used definitions, one of which is the ratio between OOPE on healthcare and total household consumption expenditure (THCE), and the other is the ratio between OOPE on healthcare and total non-food consumption expenditure (NFE) [13,58,59]. OOPE accounted for all medical and non-medical direct payments made by households, whereas total household consumption expenditure included both food and non-food expenses. THCE was used as a proxy for household capacity to pay rather than total household income, according to the recommendation of the available literature that consumption expenditure more accurately represents household capacity to pay in developing countries than income [58,59]. We defined CHE if a household's OOPE go above 10% of THCE and 25% of NFE. In addition, we defined distress financing as when households manage healthcare costs by selling or mortgaging assets/lands, borrowing money, or receiving assistance from family and friends. We used logistic regression to determine the predictors of CHE and distress financing in Bangladesh due to hospitalisation. Using the same

methodology as described above for sub-study 1, we also calculated the concentration index and sketched concentration curves to measure the disparities among socioeconomic quintiles.

2.3.2. Research methods for objective 2

We conducted sub-study 3 and sub-study 4 to accomplish the objective 2. Sub-study 3 explored the implementation barriers of CBHI in Bangladesh and strategies for resolving these barriers from the viewpoint of researchers, policymakers, and individuals who are engaged in the implementation of CBHI, addressing research question 3.1. Sub-study 4 investigated the political economy barriers of HFR in Bangladesh, addressing research question 4.1. The sub-study 3 and sub-study 4 were conducted using qualitative research methods.

In sub-study 3, we utilised an exploratory case study design to examine, the barriers to CBHI implementation and strategies for overcoming these implementation barriers. In qualitative research, an exploratory case study design approach provides the opportunity to investigate in depth a complex phenomenon (i.e., CBHI) in a particular setting (Bangladesh) [60]. First, for this study, we conducted a literature review to generate a list of voluntary CBHI schemes in Bangladesh, and then we interviewed participants from these schemes. We developed a topic guide and conducted thirteen semi-structured in-depth interviews with the selected key stakeholders. Participants included CBHI schemes administrators, field supervisors, and directors, as well as academic and government officials. The participants' permission to record the interviews was obtained prior to the interview, and then the audio interviews were translated from the original Bengali speech form to English. The qualitative interviews were analysed using a Framework Analysis method, a thematic approach to qualitative data analysis [61]. The analysis procedure consisted of seven steps: translation, familiarisation, coding, the development of a working codebook, indexing, charting, and interpretation. In Chapter 5, the analysis stages are described in detail.

In sub-study 4, we reviewed documents and conducted 10 key informant interviews (among the 18 selected and invited participants) to understand the political economy context of HFR in Bangladesh to identify potential bottlenecks and to recommend a course of action for HFR in Bangladesh. At first, we reviewed various published and unpublished policy documents and official reports from the MOHFW and international organisations to identify the potential key informants (individuals who were directly involved on HFR in Bangladesh). Our study included participants from the government, NGOs, academic institutions, and international organisations. To conduct interviews, we developed an open-structured topic guide; however,

before conducting interviews, we piloted and modified the topic guide based on pilot results. The qualitative interviews have also been analysed using a Framework Analysis method (described above).

2.3.3. Research method for objective 3

Finally, in sub-study 5, a SD approach is used to identify effective policies to overcome the challenges associated with CBHI implementation, which support a sustainable CBHI and to assess their impact on the CBHI. We applied a SD approach to model the complex dynamics of CBHI scheme and to address the research questions (RQ 5.1, RQ 5.2, and RQ 5.3). The decision to adopt the SD technique was driven by its ability to offer a range of opportunities that enable us to explore deeper insight into CBHI system, potential policy interventions, and long-term consequences. We evaluated the CBHI scheme's financial sustainability (RQ 5.1) and observed how long these schemes may need financial support before achieving self-sufficiency (RQ 5.3) using the SD approach, which permits exploration of long-term consequences of a system after incorporation of different policies into the system. CBHI systems involve a multitude of interconnected components, including enrolment, premium structures, renewal, healthcare utilization patterns, members behaviours, and financial aspects. An SD approach captures the interdependencies and feedback loops that characterize complex CBHI systems [31,62,63]. SD is applicable in representing these complex dynamics interactions by modelling the cause-and-effect relationships between different indicators and allowing to replicate system's behaviour over time. In empirical modelling, causality is estimated from a sample data set to explain the variation of a dependent variable with respect to multiple independent variables. Hence, a large sample size is required to get reliable results. In cases where comprehensive data may be lacking, SD allows for the incorporation of qualitative insights and assumptions, enabling the exploration of potential scenarios even with limited data. For instance, service quality, likelihood to join a scheme, perceived service availability, etc., are difficult to model using empirical modelling technique. Moreover, CBHI systems often require adjustment based on market demand and learning as they respond to changing circumstances and feedback. The SD approach allows for the simulation and testing of various policy scenarios in a controlled environment. This is particularly useful in understanding the potential outcomes of different policy interventions on CBHI prior to implementing them in the real world, thus allowing us to answer research question 5.2 (i.e., which policies will be effective in addressing inadequate enrolment and renewal for the voluntary CBHI scheme).

In our study, the modelling process consisted of five interconnected steps. These steps included gaining an understanding of the problem's behaviours over time, conducting a literature scan and interviews with stakeholders to establish the model and policy structures, gathering data, and inputting it into the model, conducting tests to enhance our confidence in the model, and finally, performing simulations and scenario analyses. The model was run for 95 months to replicate the past behaviour of the system (historical data were collected from a case CBHI scheme) and then for an additional 85 months to observe the future behaviour of the system and to evaluate potential policy scenarios. Chapter 7 provides a detailed explanation of the SD modelling procedure.

2.4. Thesis Organization

This thesis is composed of three published papers [37,64,65], one submitted, and one prepared manuscript. Chapter 1 examines the health system landscape of Bangladesh, healthcare financing challenges in achieving UHC, healthcare financing strategy of Bangladesh, an overview of CBHI, global experience of healthcare financing for the informal sector and CBHI in Bangladesh. Chapter 2 outlines the research objectives and research questions, methods, and the organisation of the thesis. As previously outlined, this thesis addresses three overarching objectives through a total of five sub-studies.

Chapters 3 and 4 correspond to sub-study 1 and sub-study 2, which jointly address the objective 1- to identify the need for a prepaid health insurance scheme targeting low-income informal workers and their families. In Chapter 3 (sub-study 1), an investigation utilizing BIA is presented, shedding light on healthcare benefits utilization from public health facilities among socioeconomic groups. Chapter 4 (sub-study 2) entails an assessment of CHE and distress health financing due to the high OOPE on hospitalization in Bangladesh, revealing the segments of the population disproportionately affected by such financial burdens. Chapter 5 and 6 are based on the research objective 2. Chapter 5 (sub-study 3) explores barriers that hinder the successful implementation of CBHI schemes in Bangladesh alongside possible strategies to overcome these challenges. Subsequently, Chapter 6 (sub-study 4), which identifies the political economy barriers of HFR in Bangladesh. In Chapter 7, sub-study 5 was documented which is a part of the objective 3, where a SD model of CBHI has been presented. Finally, a synthesis of the findings and insights derived from the five sub-studies concludes in Chapter 8, which presents the overarching conclusions drawn from this thesis.

A flow diagram illustrating the arrangement of chapters and the connections between study objectives and research questions is depicted in Figure 2.1.

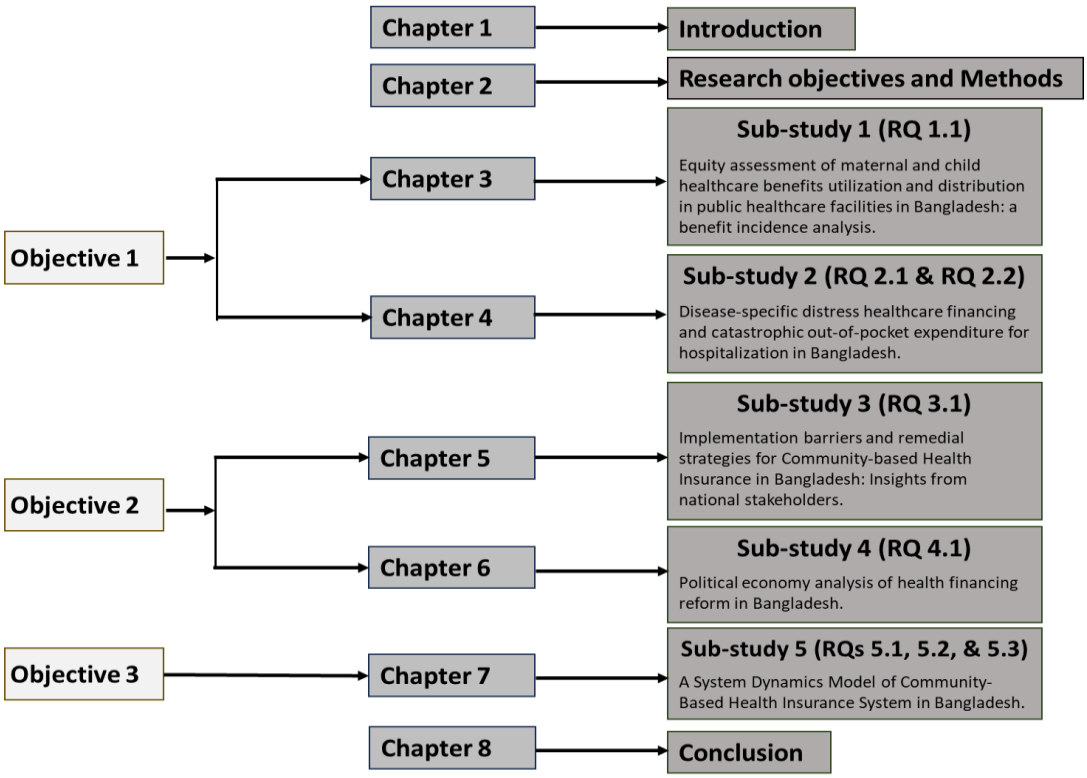

Figure 2.1. Flow diagram of the thesis structure.

Chapter 3

3. Equity assessment of maternal and child healthcare benefits utilization and distribution in public healthcare facilities in Bangladesh: a benefit incidence analysis

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Abstract

Background

The distribution of healthcare services should be based on the needs of the population, regardless of their ability to pay. Achieving universal health coverage implies first ensuring that people of all income levels have access to quality healthcare, and then allocating resources reasonably considering individual need. Hence, this study aims to understand how public benefits in Bangladesh are currently distributed among wealth quintiles considering different layers of healthcare facilities and to assess the distributional impact of public benefits.

Methods

To conduct this study, data extracted from the recent Bangladesh Demographic and Health Survey 2017-18. We performed benefit incidence analysis to determine the distribution of maternal and child healthcare utilization in relation to wealth quintiles. Disaggregated and national-level public benefit incidence analysis was conducted by the types of healthcare services, levels of healthcare facilities, and overall utilization. Concentration curves and concentration indices were estimated to measure the equity in benefits distribution.

Results

An unequal utilization of public benefits observed among the wealth quintiles for maternal and child healthcare services across the different levels of healthcare facilities in Bangladesh. Overall, upper two quintiles (richest 19.8% and richer 21.7%) utilized more benefits from public facilities compared to the lower two quintiles (poorest 18.9% and poorer 20.1%). Benefits utilization from secondary level of health facilities were highly pro-rich while benefit utilization found pro-poor at primary levels. The public benefits in Bangladesh were also not distributed according to the needs of the population, nevertheless, poorest 20% household cannot access 20% share of public benefits in most of the maternal and child healthcare services even if we ignore their needs.

Conclusions

BIA in public health spending demonstrates the efficacy with which the government allocates constrained health resources to satisfy the needs of the poor. Public health spending in Bangladesh on maternal and child healthcare services were not equally distributed among wealth quintiles. Overall health benefits were more utilized by the rich relative to the poor. Hence, policymakers should prioritize redistribution of resources by targeting the

socioeconomically vulnerable segments of the population to increase their access to health services to meet their health needs.

3.1. Introduction

The WHO stresses the importance of equitable health financing and healthcare delivery for a sustainable health system [8]. In the era of SDGs, particularly for the LMICs, equitable access to healthcare is a major priority for health systems pursuing UHC. Being a LMIC, Bangladesh has made remarkable progress in many of its national and global health indicators mostly in maternal and child health over the past few decades [66,67]. For instance, between 2001 and 2016, maternal mortality rate (MMR) declined significantly from 322 to 196 per 100,000 live births, and child mortality from 133 deaths to 46 deaths per 1,000 live births between 1989 and 2014 [66,68]. Despite these progresses in national health indices, Bangladesh remains confronted with obstacles in ensuring an equitable distribution of health resources. Consequently, similar to in many other developing countries, there is a disparity in health outcomes across wealth quintiles.

The health system of Bangladesh is pluralistic in nature. The GOB plays the key role along with the support of large private sectors, NGOs, and the donor agencies [8]. The MOHFW leads the public health systems that includes two divisions- (a) Health Services Division and (b) Medical Education and Family Welfare Division [7]. Bangladesh is one of the few countries that provides subsidised healthcare services through a well-structured health system with three tiers of healthcare facilities-primary, secondary, and tertiary. Primary-level facilities are the lower-level of health facilities located at the ward, union and Upazila levels (lower geographical units) including Community clinics (CC), Union subcentre (USC), Union health & family welfare centre (UH&FWC), and Upazila health complex (UzHC). Upazila health complexes provide both inpatient and outpatient services whereas most of the other primary-level facilities are based on outpatient services. Secondary and tertiary-level healthcare facilities provide more advanced and specialised healthcare services [9]. Primary-level health facilities are inferior to secondary and tertiary-level facilities due to a lack of adequate resources including insufficient health care professionals, high absenteeism, and equipment shortage [9].

OOPE is the major source of health financing in Bangladesh which contributes to the woeful levels of inequity, and is also responsible for unequal healthcare service utilization in Bangladesh [16]. In addition, healthcare services offered by the private sector are costly and consequently inaccessible for most of the poor population, which contributes to disparity in access to healthcare services. The financial barrier for accessing healthcare is a persistent

challenge for Bangladesh towards the UHC. A need-based allocation of direct health subsidies could be a way for reducing wealth disparities in Bangladesh if the poor are able to gain more health benefits from the subsidised public healthcare facilities. Equitable health access for all is vital because it is directly related to productivity, absenteeism, labour force participation, and hence economic growth [69]. Allocation of public health resources should be based on both efficiency and equity to optimise effectiveness of public spending and to meet the global universal health coverage agenda [57]. Therefore, national, and international organizations emphasize the needs of studying the distributional impacts of public health spending.

BIA is an established method to assess the distributional impact of public spending, and to observe which wealth quintiles getting more benefits from public subsidies [56]. The method covers components of supply and demand for public healthcare services and analyses inefficiencies and disparities for public funding [57]. It also addresses the policy concerns about how effectively the health system is performing in targeting socioeconomically vulnerable people for public benefits. BIA has been used widely in many of the developing countries including India, Pakistan, Nigeria, Vietnam, Ghana, and Zambia to generate evidence on how healthcare services or benefits are allocated among wealth quintiles because of its ease of use and interpretation [57,70–73]. A study conducted in Bangladesh has applied BIA to focus on public, private and NGO healthcare services and to address how benefits and the extent of benefits from different providers are distributed across wealth quintiles [74]. That study reported healthcare benefits in Bangladesh are pro-rich particularly for the benefits from private providers. In our study, we focused only on the public health facilities, particularly for the maternal and child healthcare services. However, we would like to explore more about how benefits are utilised across the various levels of public facilities. This facility-level BIA will enable policymakers to make decisions on which level of facilities they should invest more to make equitable health system in Bangladesh in terms of accessibility and affordability.

In case of Bangladesh, a common hypothesis is that poor people utilize more healthcare from public health facilities due to high OOPE in private sectors [75]. Hence, we intended to test this commonly used hypothesis on maternal and child healthcare services by utilizing nationally representative survey data. The objective of this study is to investigate public healthcare utilization pattern on maternal and child healthcare services among wealth quintiles considering different layers of public health facilities to fulfil the literature gaps.

Secondly, we also intended to assess whether or not public benefits are distributed relative to the needs of wealth quintiles. This study will contribute to the literature by generating comprehensive knowledge on public benefits distribution and utilization patterns on maternal and child healthcare in Bangladesh. This study will also demonstrate the efficacy with which the government allocates constrained health resources to fulfil the needs of the poor. The findings of this research will contribute to the reallocation of public resources to health services that mostly benefit the poor.

3.2. Methods

3.2.1. Data sources

This study was conducted based on the secondary data, extracted from the latest available BDHS 2017-18. BDHS is a cross-sectional survey that covers a nationally representative sample of households based on the multistage cluster sampling technique. A total of 20,127 ever-married women age 15-49 were interviewed from 20,250 selected households [76]. Women were asked whether they received any maternal and child healthcare services preceding the survey, and if 'yes', they were asked for places from where they received healthcare. Maternal health-related data were collected three years preceding the survey and child (under-five years old) health (diarrhoea, acute respiratory infection) data were collected two weeks preceding the survey respectively. In this study, we consider only selected public health facilities (primary and secondary level) for conducting BIA. To perform BIA, unit costs of services were extracted from the report of "*The Costs of the Bangladesh Essential Health Service Package: Fourth Health Population and Nutrition Sector Programme*" conducted by the Health Economics Unit (HEU), MOHFW and WHO Bangladesh. This report provides gross and unit costs for Essential Health Service Packages based on healthcare facilities or service delivery channels, with costs calculated using an ingredients-based costing approach [77].

3.2.2. Socioeconomic status quintiles (wealth quintiles)

Socioeconomic status was measured by assets-based wealth index. In BDHS, data related to household assets such as availability of radio, television, mobile phone, refrigerator, almirah [a local item of furniture like a cabinet or wardrobe], water pump, and computer; household characteristics such as sources of drinking water, toilet types, cooking fuel types, and household floor, roof, and wall materials were collected from each of the households. We generated scores using principal component analysis, a statistical method based on the stated durable assets and household characteristics. Households were then categorized into five

equal quintiles- poorest (lower 20%), poorer, middle, richer, and richest (upper 20%) followed by generated scores.

3.2.3. Benefit Incidence Analysis

This study focused on subsided maternal and child healthcare services in Bangladesh. In this study, we included both primary and secondary level of health facilities those are mostly provide maternal and child healthcare services in Bangladesh. Utilizing the BIA, the distribution of maternal and child healthcare benefits utilised by various wealth quintiles have been determined.

The following steps have been involved to perform BIA in our study-

(1) The measures of living standards have been calculated based on asset ownership to segregate people from the lowest to the highest levels of wealth.
(2) Maternal and child healthcare utilization rates across the wealth quintiles have been estimated by types and levels of services at public healthcare facilities.
(3) Unit costs for healthcare services have been gathered from published literature by type of healthcare facility.
(4) Benefits were expressed in monetary values by multiplying unit costs and utilization rates for healthcare service types across the wealth quintiles.
(5) The total monetary value of the benefits of overall maternal and child healthcare services was also calculated by adding all the benefits received by different wealth quintiles.
(6) Finally, we compared the distribution of public benefits on maternal and child healthcare services relative to the needs of the population.

In this study, need is defined as the individual's desire or requirement for health care. In the questionnaire, respondents were asked about whether they had given birth in the past three years and, if so, the method of delivery (i.e., normal, or caesarean section). The percentage of women who gave birth normally and via caesarean section are defined as the requirement for a normal delivery and the requirement for a caesarean delivery, respectively.

3.2.4. Concentration curve and concentration index

Concentration curves were generated for each type of services from the selected public healthcare facilities. The curve helps to explore the pattern and magnitude of inequity among wealth quintiles. The underlying mechanism of constructing concentration curve is that the

curve plots cumulative rank proportion of service utilization on the vertical axis and cumulative rank proportion of population by wealth quintiles on the horizontal axis. If the concentration curve lies above the equity line, then service utilization will concentrate among the poor, meaning that poor people received more benefits from the public facilities. On the contrary, if utilization is more concentrated among the rich people, then curve lies below the equity line. If no inequity exists, then the curve lies on the 45-degree equity line that means perfect equity among the wealth quintiles. The concentration index measures the gap between equity line and concentration curves. The index is twice the corresponding area between the equity line and concentration curve. The value of the index lies between -1 to +1. A positive index indicates that utilization more concentrated among rich people and a negative concentration index indicates utilization more concentrated among poor people. A zero (0) concentration index indicates perfect equity among wealth quintiles for receiving public benefits. We have calculated concentration indices for each of the services according to the facility types.

3.2.5. Equity framework for BIA

An equity framework refers to a structured approach, set of principles, or a systematic methodology used to promote fairness, justice, and inclusivity in various contexts [78]. Equity frameworks are designed to address disparities and ensure that individuals have equal opportunities and access to resources, benefits, and opportunities, regardless of their background, characteristics, or identities. However, a health equity framework is designed to guide efforts in achieving fair and just health outcomes for all individuals, regardless of their background, socioeconomic status, race, ethnicity, or other social determinants of health [79]. The goal of a health equity framework is to eliminate health disparities and ensure that everyone has an equal opportunity to attain their highest level of health. However, a health equity framework within the context of BIA involves assessing the distributional impact of health-related policies and interventions to ensure that the benefits are equitably distributed among different population groups [80]. The goal is to identify and address disparities in health outcomes and access to healthcare services. In this section, we briefly discuss some key components of health equity framework in the context of BIA.

Efficiency in public benefit distribution: Efficiency in public benefit distribution examines how health benefits, such as improved health outcomes or increased access to healthcare services, are distributed across various demographic groups [81,82]. It ensures that resources

are distributed efficiently to address the specific health needs of diverse communities, preventing disparities in access and outcomes. This component analyses whether certain populations are disproportionately benefiting or facing disadvantages in terms of health resources [81]. Efficiency in benefit distribution involves ensuring that efficient allocation of limited public resources corresponds to the specific health needs of communities. By conducting a thorough BIA, policymakers can identify areas where interventions yield the greatest health improvements relative to health spending. We will examine the distribution of public health resources in Bangladesh across all levels of healthcare facilities to determine if they are effectively allocated to ensure that all socioeconomic groups have equitable access [56].

Justice and fairness: Emphasizes the ethical principles of justice and fairness in the distribution of health resources, services, and opportunities [83,84]. This strives to eliminate avoidable and unfair health disparities. From the justice and fairness perspective, public spending on health should distribute in a manner that, lower-income population should get more benefits from it [85]. Hence, our BIA analysis on maternal and child health seeks to evaluate the extent to which public health expenditures are benefiting individuals in lower socioeconomic strata, given their limited access to private sector treatment due to financial constraints.

Socioeconomic factors and vulnerable groups: This component of equity considers the socioeconomic status of individuals and communities to understand how income, education, and other economic factors influence the distribution of health benefits [74,86,87]. Equity frameworks in BIA may also involve a focus on vulnerable or marginalized groups, such as minority populations, individuals with disabilities, or those facing discrimination ensuring that the benefits of public health are effectively reaching those who need them the most [81,83,85]. Our study will conclude whether individuals employed in informal sectors (assessed by socioeconomic quintiles) have access to public resources.

Regional disparities: BIAs may evaluate whether benefits are evenly distributed across different geographical areas [57,88,89]. This addresses disparities in healthcare infrastructure and services across urban and rural areas [56,80,90]. This dimension of equity consideration will also be addressed in our analysis since it focusses on different healthcare facilities from different administrative layers.

Gender Analysis: Gender equity is a critical aspect of many public policies [91]. BIAs may include an analysis of how benefits are distributed among different genders, ensuring that policies contribute to gender equality [56].

Access to preventive and curative services: Evaluates whether different population groups have equitable access to both preventive and curative healthcare services [74]. It examines barriers to access, such as affordability, availability, and cultural appropriateness [92]. Primary healthcare facilities in Bangladesh are mostly focused on preventive healthcare services and secondary facilities are focused on curative healthcare services [74]. We will assess whether there are any disparities in access to both preventive and curative healthcare services in Bangladesh.

Monitoring and evaluation: BIA establishes mechanisms for continuous monitoring and evaluation of the impact of health policies on different population groups [93,94]. It allows for adjustments and refinements based on real-time data and community feedback.

Policy recommendations for equity: The BIA findings derive policy recommendations to address identified disparities and promote health equity [56,57,71,74,80,88–90,94]. They recommend targeted interventions to improve health outcomes for groups experiencing greater health challenges.

3.3. Results

3.3.1. Maternal and child healthcare seeking behaviour

Maternal and child healthcare seeking behaviour varies across the wealth quintiles in Bangladesh (Figure 3.1). Non-utilization of antenatal care (45.3% vs. 2.7%) and home care (23% vs. 13.2%) were higher among the poorest compared to the richest. A higher proportion of those in the poorest quintile received antenatal care from public facilities than the richest quintile (23.2% vs. 15.2%). On the other hand, the richest utilized more antenatal care from private sector (26.2% vs. 13.5%) than poorest. Home deliveries were also prominent among the poorest group compared to the richest (30.3% vs. 8.4%) while the poorest utilized only 12.3% from private sector for normal delivery. On the other hand, C-section deliveries from both public (36.1% vs. 7.6%) and private facilities (36.1% vs. 8.3%) were more utilized by the richest quintile than poorest. Families with a higher socioeconomic status utilised C-section deliveries more frequently than normal deliveries, possibly because they could afford the additional cost associated with C-section delivery. Thus, their greater financial capacity may

lead to an overestimation of the true need for a C-section delivery. The prevalence of not seeking maternal postnatal care (31.2% vs. 7.4%) and postnatal care for child (31.6% vs. 7.7%) were higher among the poorest quintiles compared to richest.

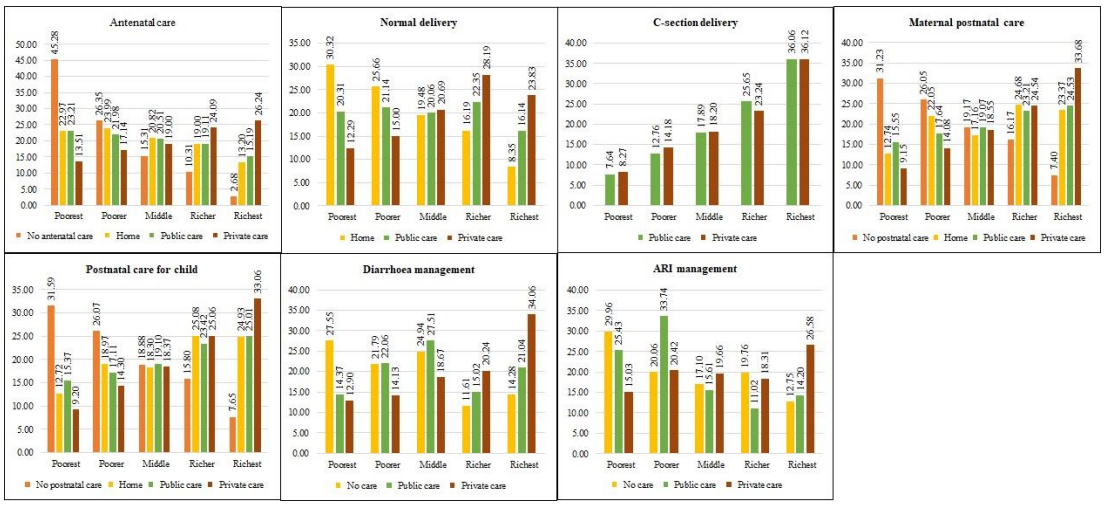

Figure 3.1. Maternal and child healthcare seeking behaviour among socio-economic quintiles.

A similar pattern of health seeking behaviour for diarrhoea and acute respiratory infections (ARI) were illustrated among wealth quintiles. Non-utilization of healthcare for diarrhoea (27.6%) and ARI (30%) were higher among poorest quintile although children from poorest households suffer more from these diseases [10]. Like the maternal care, poorest group sought child healthcare mostly from public facilities (diarrhoea, 14.4% and ARI, 25.4%), whereas rich people received more care from the private sector (diarrhoea, 34.1% and ARI, 26.6%). Finally, we may state that, poorest household considerably seek less maternal and child healthcare and they have limited access to the private health facilities than the richest.

3.3.2. Utilization of maternal and child healthcare from public facilities

Table 3.1 shows the distribution of subsidized maternal and child healthcare benefits utilization from public health facilities across wealth quintiles in Bangladesh. Antenatal care utilization rates from the secondary level of health facilities (district hospitals (DH) and maternal and child welfare centre (MCWC)) were higher among the upper two quintiles than lower two quintiles. On the contrary, antenatal care utilization was higher among the poorest quintiles from the primary level of health facilities (UHC, UH&FWC, SC& EPI outreach, and CC).

Table 3.1. Free and subsidized maternal and child healthcare benefits utilization from public health facilities, by wealth quintiles

Maternal and child healthcare services	Facility type, n (%)						Overall
	Secondary level		Primary level				
	District Hospital (DH)	Maternal and Child Welfare Centre (MCWC)	Upazila Health Complex (UzHC)	Upazila Health & Family Welfare Centre (UH&FWC)	Satellite Clinic and Expanded Programme on Immunization outreach (SC & EPI outreach)	Community Clinic (CC)	
Antenatal care (Per ANC visit)							
Wealth quintiles							
Poorest (n=1042, 20.62%)	33 (15.25)	19 (10.16)	163 (25.34)	84 (27.42)	29 (35.41)	97 (30.83)	425 (24.23)
Poorer (n=1036, 20.51%)	54 (24.55)	17 (9.10)	144 (22.46)	81 (26.43)	19 (23.58)	77 (24.45)	392 (22.35)
Middle (n=969, 19.19%)	43 (19.68)	37 (19.37)	147 (22.85)	59 (19.12)	16 (20.27)	78 (24.84)	380 (21.66)
Richer (n=1018, 20.16%)	61 (27.76)	42 (22.13)	113 (17.51)	56 (18.16)	14 (17.40)	53 (16.87)	339 (19.33)
Richest (n=986, 19.53%)	28 (12.76)	75 (39.24)	76 (11.84)	27 (8.86)	3 (3.33)	9 (3.01)	218 (12.43)
Concentration index	0.006	0.297	-0.117	-0.170	-0.271	-0.243	-0.096
Total	219 (12.49)	190 (10.83)	643 (36.66)	307 (17.50)	81 (4.62)	314 (17.90)	1754
Child-birth delivered normally							
Wealth quintiles							
Poorest (n=1042, 20.62%)	18 (16.97)	6 (8.70)	54 (26.61)	12 (38.72)	-	1 (30.03)	91 (22.3)
Poorer (n=1036, 20.51%)	21 (19.80)	13 (19.10)	48 (24.01)	9 (29.93)	-	2 (69.97)	93 (22.79)
Middle (n=969, 19.19%)	23 (22.10)	10 (14.42)	45 (22.50)	6 (18.90)	-	-	84 (20.59)
Richer (n=1018, 20.16%)	26 (24.81)	20 (30.12)	42 (20.81)	4 (12.46)	-	-	92 (22.55)
Richest (n=986, 19.53%)	17 (16.32)	19 (27.66)	12 (6.06)	-	-	-	48 (11.76)
Concentration index	0.025	0.206	-0.166	-0.368	-	-0.519	-0.074
Total	105 (25.74)	68 (16.67)	201 (49.26)	31 (7.6)	-	3 (0.74)	408
Child-birth delivered by C-section							

Wealth quintiles							
Poorest (n=1042, 20.62%)	8 (9.74)	1 (2.41)	5 (13.25)	-	-	-	14 (8.70)
Poorer (n=1036, 20.51%)	16 (20.07)	4 (9.31)	1 (3.77)	-	-	-	21 (13.04)
Middle (n=969, 19.19%)	15 (18.55)	5 (9.62)	11 (31.15)	-	-	-	31 (19.25)
Richer (n=1018, 20.16%)	29 (36.46)	8 (17.21)	11 (33.78)	-	-	-	48 (29.81)
Richest (n=986, 19.53%)	12 (15.18)	29 (61.45)	6 (18.06)	-	-	-	47 (29.19)
Concentration index	0.120	0.511	0.168	-	-	-	0.156
Total	80 (49.69)	47 (29.19)	34 (21.12)	-	-	-	161
Maternal postnatal care							
Wealth quintiles							
Poorest (n=1042, 20.62%)	27 (14.61)	8 (6.21)	57 (23.35)	13 (34.11)	-	1 (30.03)	106 (17.88)
Poorer (n=1036, 20.51%)	38 (20.54)	17 (13.89)	51 (21.13)	13 (33.07)	-	2 (69.97)	121 (20.40)
Middle (n=969, 19.19%)	36 (19.6)	19 (14.80)	56 (23.24)	6 (15.85)	-		117 (19.73)
Richer (n=1018, 20.16%)	51 (27.75)	31 (24.80)	54 (22.35)	5 (12.90)	-		141 (23.78)
Richest (n=986, 19.53%)	32 (17.51)	50 (40.29)	24 (9.93)	2 (4.07)	-		108 (18.21)
Concentration index	0.063	0.325	-0.092	-0.309	-	-0.519	0.027
Total	184 (31.03)	125 (21.08)	242 (40.81)	39 (6.58)	-	3 (0.51)	593
Postnatal care for child							
Wealth quintiles							
Poorest (n=1042, 20.62%)	25 (12.87)	9 (7.09)	63 (24.28)	13 (38.01)	-	1 (11.06)	111 (17.82)
Poorer (n=1036, 20.51%)	40 (20.47)	16 (12.70)	52 (20.02)	10 (29.69)	-	2 (25.77)	120 (19.26)
Middle (n=969, 19.19%)	39 (19.72)	16 (12.92)	61 (23.53)	6 (18.61)	-	4 (63.17)	126 (20.22)
Richer (n=1018, 20.16%)	59 (29.72)	32 (25.30)	56 (21.64)	4 (13.01)	-	-	151 (24.24)
Richest (n=986, 19.53%)	34 (17.22)	53 (41.99)	27 (10.54)	1 (0.68)	-	-	115 (18.46)
Concentration index	0.082	0.338	-0.093	-0.354	-	-0.182	0.035
Total	197 (31.62)	125 (20.06)	260 (41.73)	34 (5.46)	-	7 (1.12)	623
Diarrhoea management							
Wealth quintiles							

Poorest (n=88, 22.20%)	1 (6.3)	-	5 (17.47)	2 (34.74)	-	-	8 (15.69)
Poorer (n=79, 19.94%)	1 (9.27)	-	7 (27.23)	1 (23.23)	-	1 (50.00)	10 (19.61)
Middle (n=94, 23.85%)	3 (18.21)	2 (61.28)	8 (31.55)	2 (42.02)	-	1 (50.00)	16 (31.37)
Richer (n=56, 14.09%)	3 (23.48)	-	3 (11.33)	-	-	-	6 (11.76)
Richest (n=79, 19.95%)	6 (42.74)	1 (38.72)	4 (12.42)	-	-	-	11 (21.57)
Concentration index	0.383	0.321	-0.056	-0.350	-	-0.138	-0.238
Total	14 (27.45)	3 (5.88)	27 (52.94)	5 (9.80)	-	2 (3.92)	51
Acute Respiratory Infection management							
Wealth quintiles							
Poorest (n=88, 31.62%)	-	-	5 (30.61)	3 (35.53)	-	1 (17.00)	9 (24.32)
Poorer (n=56, 22.13%)	1 (25.00)	-	2 (14.03)	4 (39.28)	-	6 (83.00)	13 (35.14)
Middle (n=40, 15.81%)	1 (25.00)	-	5 (32.13)	-	-	-	6 (16.22)
Richer (n=46, 18.18%)	1 (25.00)	-	2 (10.06)	2 (25.19)	-	-	5 (13.51)
Richest (n=31, 12.25%)	1 (25.00)	1 (100.00)	2 (13.17)	-	-	-	4 (10.81)
Concentration index	0.384	0.877	-0.036	-0.092	-	-0.223	-0.224
Total	4 (10.81)	1 (2.70)	16 (43.24)	9 (24.32)	-	7 (18.92)	37
EPI vaccines (all basic vaccines)							
Wealth quintiles							
Poorest (n=340, 20.26%)	N/A	N/A	N/A	N/A	N/A	N/A	323 (19.97)
Poorer (n=348, 20.74%)	N/A	N/A	N/A	N/A	N/A	N/A	336 (20.8)
Middle (n=321, 19.13%)	N/A	N/A	N/A	N/A	N/A	N/A	308 (19.07)
Richer (n=336, 20.02%)	N/A	N/A	N/A	N/A	N/A	N/A	323 (19.98)
Richest (n=333, 19.85%)	N/A	N/A	N/A	N/A	N/A	N/A	326 (19.71)
Concentration index							0.005
Total							1616

Utilization rates were 25.3% vs. 11.8% from UzHC, 27.4% vs. 8.7% from UH&FWC, 35.4% vs. 3.3% from SC&EPI outreach, and 30.8% vs. 3% from CC among the poorest vs. richest quintiles respectively. Majority of the households from the poorest quintiles received normal delivery services from the DH, UzHC, UH&FWC and CC than the richest quintiles. However, the only exception was MCWC, from where rich people received more services than poor. Household from richest quintile received more C-section delivery care services from the public health facilities DH (15.2% vs. 9.7%), MCWC (61.5% vs. 2.4%) and UzHC (18.1% vs. 13.3%) than the poorest. For maternal postnatal care, the richest utilized more from the DH (17.5% vs. 14.6%) and MCWC (40.3% vs. 6.2%) than the poorest while the poorest utilized more from the UzHC (23.4% vs. 9.9%) and UH&FWC (34.1% vs. 4.1%) than the richest. A similar trend of postnatal care seeking for child were also observed among the wealth quintiles. The majority of the socio-economically well-off families received childhood diarrhoea treatment from secondary level health facilities while poorest sought care mostly from primary level healthcare facilities.

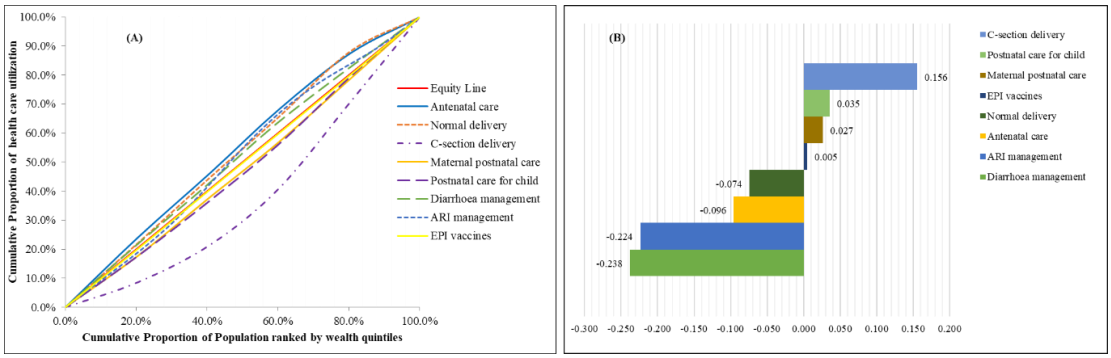

Figure 3.2. National level public healthcare utilization concentration curves and concentration indices

3.3.3. Benefit Incidence Analysis

Figure 3.2 illustrated (A) concentration curves and (B) concentration indices for national-level maternal and child healthcare utilization from public facilities in Bangladesh according to the types of healthcare. Concentration curves for C-section delivery, maternal postnatal care, postnatal care for child, and EPI vaccine utilization went below the equity line revealed that C-section delivery, maternal postnatal care, postnatal care for child, and EPI vaccine utilization were more concentrated among the rich people. In keeping with this finding, concentration indices for C-section delivery, maternal postnatal care, postnatal care for child, and EPI vaccine utilization were found positive which also signify that these four healthcare services were more concentrated among the rich people from public facilities. On the other hand,

concentration curves for normal delivery, antenatal care, ARI, and diarrhoea treatment utilization are above the equity line and are associated with negative concentration indices. That means normal delivery, antenatal care, ARI, and diarrhoea treatment utilization from public facilities were more concentrated among the poor. Hence, we may say that maternal and child healthcare utilization from public facilities is not equitable among wealth quintiles.

Figure 3.3 depicted concentration indices for healthcare utilization from public facilities for maternal and child healthcare services according to the healthcare facilities. This figure provided an in-depth picture of inequity for maternal and child health care utilization. From the figure, it is notable that maternal and child healthcare services utilization are not equitable for either type of healthcare or level of facilities. Benefit utilization from the secondary-level facilities (DH and MCWC) are completely pro-rich that means people from the upper wealth quintiles received more benefits from DH and MCWC compared with the lower quintiles. Concentration indices for all maternal and child healthcare indicators were found positive for DH and MCWC indicated that healthcare utilization from the DH and MCWC were highly concentrated among the upper quintiles.

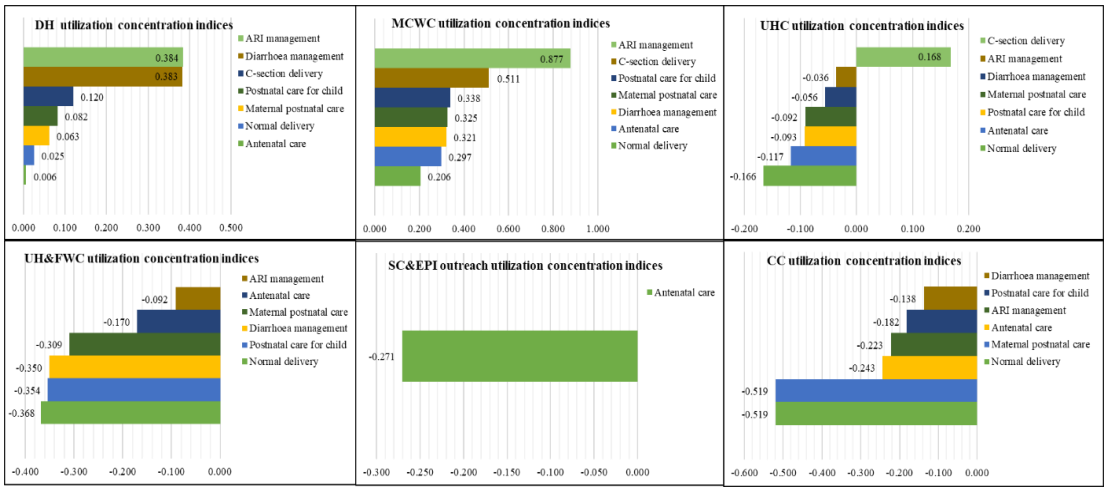

Figure 3.3. Maternal and child health utilization concentration indices, by facility types

On the other hands, maternal and child healthcare utilization from the primary-level facilities (UzHC, UH&FWC, SC&EPI outreach, and CC) are pro-poor, implies that poor household received more maternal and child healthcare services from the primary-level facilities than rich household. Concentration indices for maternal and child healthcare services for primary-level facilities were negative, except for C-section delivery from the UzHC (0.168, indicates a

pro-rich utilization). The monetary amount (in BDT) of total benefits received for each of the maternal and child healthcare services from public facilities according to wealth quintiles presented in Table 3.3. Total benefits in monetary units were calculated based on the unit costs for maternal and child health services (Table 3.2) and utilization rates.

Table 3.2. Estimated unit costs for maternal and child health services in public healthcare facilities (in BDT)

Maternal and child healthcare services	Facility type						Average cost
	Secondary level		Primary level				
	District Hospital (DH)	Maternal and Child Welfare Centre (MCWC)	Upazila Health Complex (UzHC)	Upazila Health & Family Welfare Centre (UH&FWC)	Satellite Clinic and Expanded Programme on Immunization outreach (SC & EPI outreach)	Community Clinic (CC)	
Antenatal care	431.0	259.0	434.7	298.0	154.5	236.5	341.4
Child-birth delivered normally	726.6	823.1	727.9	653.2	-	631.4	677.9
Child-birth delivered by C-section	4451.0	4589.3	4451.0	-	-	-	4453.6
Maternal postnatal care	1221.0	596.3	979.6	203.4	28.8	-	644.3
Postnatal care for child	125.6	136.8	125.5	90.5	-	84.3	107.5
Diarrhoea management	259.3	95.4	255.6	87.8	-	24.6	256.4
Acute Respiratory Infection management	1294.2	250.8	1211.3	36.7	-	34.7	1233.0
EPI vaccines	1923.1	1907.8	1926.8	1907.8	1906.0	1906.0	1873.8

Source: The Costs of the Bangladesh Essential Health Service Package: Fourth Health Population and Nutrition Sector Programme, 2018

Table 3.3. Distribution of total benefits received from public facilities, by wealth quintiles (in BDT)

Maternal and child healthcare services	Facility type						Overall
	Secondary level		Primary level				
	District Hospital (DH)	Maternal and Child Welfare Centre (MCWC)	Upazila Health Complex (UzHC)	Upazila Health & Family Welfare Centre (UH&FWC)	Satellite Clinic and Expanded Programme on Immunization outreach (SC & EPI outreach)	Community Clinic (CC)	
Antenatal care (Per ANC visit)							
Wealth quintiles							
Poorest	431*33=14,221	259*19=4,921	434.7*163=70,851	298*84=25,032	154.5*29=4,479	236.5*97=22,936	341.4*425=145,082
Poorer	431*54=23,271	259*17=4,403	434.7*144=62,592	298*81=24,138	154.5*19=2,935	236.5*77=18,207	341.4*392=133,817
Middle	431*43=18,531	259*37=9,584	434.7*147=63,896	298*59=17,582	154.5*16=2,471	236.5*78=18,443	341.4*380=129,721
Richer	431*61=26,288	259*42=10,879	434.7*113=49,118	298*56=16,688	154.5*14=2,162	236.5*53=12,532	341.4*339=115,724
Richest	431*28=12,067	259*75=19,427	434.7*76=33,035	298*27=8,046	154.5*3=463	236.5*9=2,128	341.4*218=74,419
Child-birth delivered normally							
Wealth quintiles							
Poorest	726.6*18=13,079	823.1*6=4,939	727.9*54=39,307	653.2*12=7,838	-	631.4*1=631	677.9*91=61,689
Poorer	726.6*21=15,259	823.1*13=10,700	727.9*48=34,939	653.2*9=5,879	-	631.4*2=1,263	677.9*93=63,045
Middle	726.6*23=16,712	823.1*10=8,231	727.9*45=32,756	653.2*6=3,919	-	-	677.9*84=56,944
Richer	726.6*26=18,892	823.1*20=16,462	727.9*42=30,572	653.2*4=2,613	-	-	677.9*92=62,367
Richest	726.6*17=12,352	823.1*19=15,639	727.9*12=8,735	-	-	-	677.9*48=32,539
Child-birth delivered by C-section							
Wealth quintiles							
Poorest	4451*8=35,608	4589.3*1=4,589	4451*5=22,255	-	-	-	4453.6*14=62,350
Poorer	4451*16=71,216	4589.3*4=18,357	4451*1=4,451	-	-	-	4453.6*21=93,526

Middle	4451*15=66,765	4589.3*5=22,947	4451*11=48,961	-	-	-	4453.6*31=138,062
Richer	4451*29=129,079	4589.3*8=36,714	4451*11=48,961	-	-	-	4453.6*48=213,773
Richest	4451*12=53,412	4589.3*29=133,090	4451*6=26,706	-	-	-	4453.6*47=209,319
Maternal postnatal care							
Wealth quintiles							
Poorest	1221*27=32,967	596.3*8=4,770	979.6*57=55,837	203.4*13=2,644	-	28.8*1=29	644.3*106=68,296
Poorer	1221*38=46,398	596.3*17=10,137	979.6*51=49,960	203.4*13=2,644	-	28.8*2=54	644.3*121=77,960
Middle	1221*36=43,956	596.3*19=11,330	979.6*56=54,858	203.4*6=1,220	-	-	644.3*117=75,383
Richer	1221*51=62,271	596.3*31=18,485	979.6*54=52,898	203.4*5=1,017	-	-	644.3*141=90,846
Richest	1221*32=39,072	596.3*50=29,815	979.6*24=23,510	203.4*2=407	-	-	644.3*108=69,584
Postnatal care for child							
Wealth quintiles							
Poorest	125.6*25=3,140	136.8*9=1,231	125.5*63=7,907	90.5*13=1,177	-	84.3*1=84	107.5*111=11,933
Poorer	125.6*40=5,024	136.8*16=2,189	125.5*52=6,526	90.5*10=905	-	84.3*2=169	107.5*120=12,900
Middle	125.6*39=4,898	136.8*16=2,189	125.5*61=7,656	90.5*6=543	-	84.3*4=337	107.5*126=13,545
Richer	125.6*59=7,410	136.8*32=4,378	125.5*56=7,028	90.5*4=362	-	-	107.5*151=16,233
Richest	125.6*34=4,270	136.8*53=7,250	125.5*27=3,389	90.5*1=91	-	-	107.5*115=12,363
Diarrhoea management							
Wealth quintiles							
Poorest	259.3*1=259	-	255.6*5=1,278	87.8*2=176	-	-	256.4*8=2,051
Poorer	259.3*1=259	-	255.6*7=1,789	87.8*1=88	-	24.6*1=25	256.4*10=2,564
Middle	259.3*3=778	95.4*2=191	255.6*8=2,045	87.8*2=176	-	24.6*1=25	256.4*16=4,102
Richer	259.3*3=778	-	255.6*3=767	-	-	-	256.4*6=1,538
Richest	259.3*6=1,556	95.4*1=95	255.6*4=1,022	-	-	-	256.4*11=2,820
Acute Respiratory Infection management							
Wealth quintiles							

Poorest	-	-	1211.3*5=6,057	36.7*3=110	-	34.8*1=35	1233*9=11,097
Poorer	1294.2*1=1,294	-	1211.3*2=2,423	36.7*4=147	-	34.8*1=209	1233*13=16,029
Middle	1294.2*1=1,294	-	1211.3*5=6,057	-	-	-	1233*6=7,398
Richer	1294.2*1=1,294	-	1211.3*2=2,423	36.7*2=73	-	-	1233*5=6,165
Richest	1294.2*1=1,294	250.8*1=251	1211.3*2=2,423	-	-	-	1233*4=4,932
EPI vaccines (all basic vaccines)							
Wealth quintiles							
Poorest	N/A	N/A	N/A	N/A	N/A	N/A	1873.8*323=605,237
Poorer	N/A	N/A	N/A	N/A	N/A	N/A	1873.8*336=629,597
Middle	N/A	N/A	N/A	N/A	N/A	N/A	1873.8*308=577,130
Richer	N/A	N/A	N/A	N/A	N/A	N/A	1873.8*323=605,237
Richest	N/A	N/A	N/A	N/A	N/A	N/A	1873.8*326=610,859

Each cell calculated by multiplying unit costs with number of healthcare utilization

National-level benefits for maternal and child healthcare services are calculated by adding all monetary benefits from the each of the healthcare services across the wealth quintiles (Table 3.4). Higher proportion of national-level monetary benefits from DH and MCWC was received by the upper two quintiles (richest 15.8% and richer 31.3% from DH) and (richest 49.8% and richer 21% from MCWCs), compared to lower two quintiles (poorest 12.7% and poorer 20.7% from DH) and (poorest 5% and poorer 11.1% from MCWC). On the contrary, higher monetary benefits was received by the households from poorest quintiles from the UzHC, UH&FWC, SC&EPI outreach, and CC. The proportion of benefits received were 23.3% vs. 11.3%, 29.9% vs. 6.9%, 35.8% vs. 3.7% and 30.8% vs. 2.8% among poorest vs. richest quintiles from the UzHC, UH&FWC, SC&EPI outreach, and CC respectively. However, the overall monetary benefits for maternal and child healthcare services from public facilities was received mostly by the socio-economically wealthier (upper two quintiles) household. The proportion of benefits received by upper two quintiles (richest 19.8% and richer 21.7%) are more than lower two quintiles (poorest 18.9% and 20.1%).

Table 3.4. Distribution of national level total maternal and child healthcare benefits received from public facilities, by wealth quintiles (in BDT)

Wealth quintiles	Facility type, total (%)						Overall, total (%)
	Secondary level		Primary level				
	District Hospital (DH)	Maternal and Child Welfare Centre (MCWC)	Upazila Health Complex (UzHC)	Upazila Health & Family Welfare Centre (UH&FWC)	Satellite Clinic and Expanded Programme on Immunization outreach (SC & EPI outreach)	Community Clinic (CC)	
Poorest	99,274 (12.65)	20,451 (4.95)	203,491 (23.31)	36,977 (29.94)	4,479 (35.80)	23,715 (30.75)	967,735 (18.87)
Poorer	162,722 (20.73)	45,787 (11.08)	162,680 (18.63)	33,801 (27.37)	2,935 (23.46)	19,931 (25.85)	1029,438 (20.07)
Middle	152,934 (19.48)	54,471 (13.18)	216,227 (24.77)	23,440 (18.98)	2,471 (19.75)	18,805 (24.39)	1002,285 (19.54)
Richer	246,012 (31.34)	86,918 (21.04)	191,766 (21.97)	20,753 (16.80)	2,162 (17.28)	12,532 (16.25)	1111,883 (21.68)
Richest	124,023 (15.80)	205,567 (49.75)	98,820 (11.32)	8,544 (6.92)	463 (3.70)	2,128 (2.76)	1016,835 (19.83)

3.3.4. Assessment of distribution of benefits

The percentage share of needs and benefits across the different wealth quintiles by public healthcare services presented in Figure 3.4. Unequal utilization of public benefits among wealth quintiles observed in Bangladesh while distributions of benefits was not even according to their needs. Households from lower quintiles unable to manage private healthcare due to high OOPE but they suffer more from all kind of health hazards because of poor hygiene, less education, lack of awareness, poor housing conditions etc., therefore, public benefits should be allocated concentrating them [95]. Our focus in this part is to assess the distribution of public benefits from the point of lower quintiles because in Bangladesh private care utilization is higher among upper quintiles as they have enough money to seek healthcare privately (Figure 3.1).

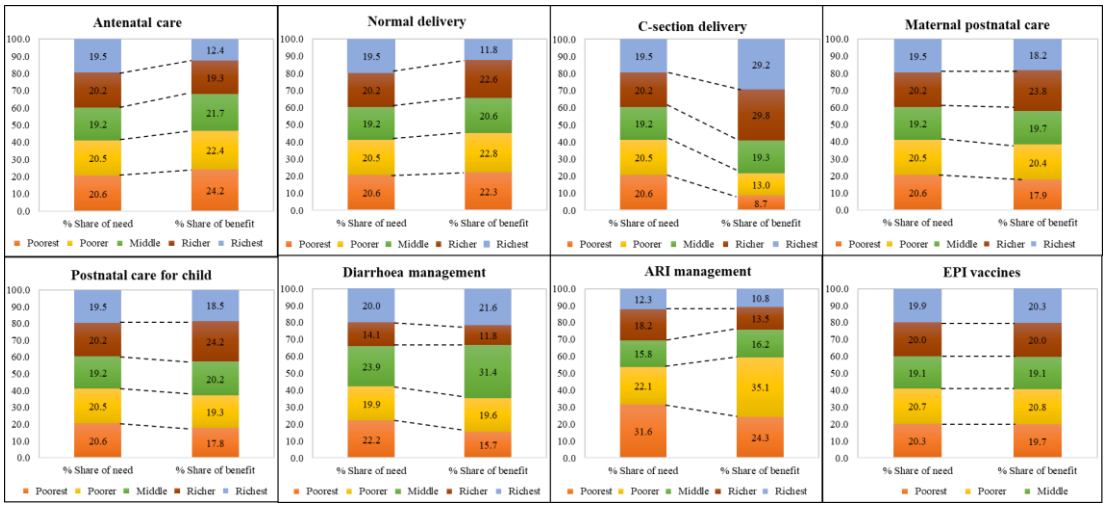

Figure 3.4. Distribution of total benefits in comparison to need for healthcare.

In Bangladesh, although poorest quintile has more health care needs for maternal and child healthcare services, nevertheless, share of benefits were less than their share of needs in most cases except antenatal care and normal delivery. Surprisingly, poorest i.e., lowest 20% household cannot access 20% share of public benefits in most of the maternal and child healthcare services even if we ignore their needs. The percentage shares of needs and benefits among poorest quintiles were (20.6% vs. 8.7% for C-section delivery), (20.6% vs. 17.9% for maternal postnatal care), (20.6% vs. 17.8% for postnatal care for child), (22.2% vs 15.7% for diarrhoea), (31.6% vs. 24.3% for ARI) and (20.3% vs. 19.7% for EPI vaccines). In contrast, for antenatal care and normal delivery, the households from poorest quintile utilized more

public benefits than their needs (20.6% needs vs. 24.2% benefits for antenatal care), and (20.6% needs vs. 22.3% benefits for normal delivery) respectively.

3.4. Discussion

This study intended to assess equity in the distribution of public healthcare benefits across wealth quintiles, particularly in maternal and child healthcare services according to the level of public healthcare facilities in Bangladesh. The study also evaluated whether health benefits are allocated among wealth quintiles relative to their needs of healthcare or not. This study reveals several findings from the BIA based on nationally representative survey data. Study found an unequal distribution of public healthcare utilization and benefits among the wealth quintiles for maternal and child healthcare services across the different levels of public healthcare facilities. In addition, we also observed inefficient distribution of public subsidies in health i.e., resources in the health system were not allocated relative to the needs of the population among wealth quintiles. This type of evidence is vital for efficient allocation of resources in health to achieve universal health coverage in the context of Bangladesh.

This study found that, in general, public benefits from maternal and child healthcare services in Bangladesh are pro-rich, implying that benefits from public facilities were more utilized by the upper quintiles. Previous research has also demonstrated a similar finding that rich utilize more subsidies from public healthcare facilities in Bangladesh [74]. Hence, we may say that allocation of maternal and child healthcare subsidies in Bangladesh are not particularly targeted to the poorest: rather it has consistently been in favour of wealthier. A BIA study by Bowser et al. showed that public healthcare utilization was slightly pro-rich in India [89]. Another study in South Africa also found that lower-income groups do not benefit much from public health services than higher-income groups [96]. Similarly, other BIAs in different countries illustrated the utilization of public subsidies as pro-rich [57,69,71,72,88,97,98]. Moreover, a systematic review of BIA from the 24 developing countries also showed that healthcare benefits in sub-Saharan Africa and Asia-Pacific is pro-rich and highly pro-rich for hospital services [90]. In contrast to the findings of our study in other LMICs, Halasa et al. found that the poorest groups of the Jordanian population were the main users of public healthcare services meaning a pro-poor distribution of health benefits [99]. Similarly, studies in Nigeria and Cambodia also demonstrated that priority public health services were well-targeted to the poorer groups and rural residence [100,101]. The pro-rich distribution of

public benefits in health could be because of lower education, lack of health knowledge, and health-seeking from informal providers among the lower quintiles in Bangladesh [95,102]. OOPE including informal payments and long waiting time in public facilities could be the burdens for poor communities and possibly responsible for not receiving benefits from public facilities.

This study also shows that benefits from both DHs and MCWCs were pro-rich while benefits from UzHC, UH&FWC, SC&EPI outreach, and CC tend to favour the underprivileged groups. This finding indicates that secondary levels of care are mostly concentrated among rich people while at primary levels poor people get more access to healthcare. This result is consistent with a report by Pearson in 2002 which found that the richest mostly utilized more healthcare from the secondary and tertiary level health facilities than poorest, while poorest utilized more healthcare from primary level health facilities in Bangladesh [94]. Recent studies conducted in India and African countries have also illustrated a pro-rich distribution of benefits for higher-level public health facilities but a pro-poor distribution for lower-level public health facilities [89,97,100,103,104]. Secondary levels of health facilities (DH and MCWC) are usually located in urban areas, and services provided by the specialized healthcare providers whereas, primary levels of health facilities are in rural areas at the community level where most of the poor people live in. The pro-rich distribution at secondary levels of facilities can be explained by the financial barriers for the poor because of the high indirect OOPE such as transportation costs, food and accommodation costs for the caregivers, and direct costs such as user fees and medicine costs that are not available at the health facility. However, another reason for the pro-rich distribution at the secondary level facility could be that urban women are more likely to utilize maternal and child healthcare than rural women in Bangladesh [10]. On the contrary, geographical access, short distance from home to the health facility, small amount or no user fees, and lower barriers attributable to indirect health expenditure could be key determinants for pro-poor distribution at primary level health facilities.

Another key conclusion of this study is that the poor have the greatest need for maternal and child healthcare services yet receive the smallest proportion of benefits: even the lowest 20% of households are unable to access 20% share of public benefits. Such findings are consistent with previous studies in India, South Africa, Uganda, and Zambia [72,89,96,97,103,104]. Our

finding is also consistent with the previous study in Bangladesh that the poorest quintiles cannot fulfil their share of needs from public subsidies [74]. That study also found that share of benefits from all type of providers including private and NGOs are highly pro-rich compared to public providers. Due to the high OOPE in the private sector, the rich are more likely to seek healthcare from there because of their higher ability to pay than poor. Therefore, in the view of equity and UHC, it is expected that poorer groups should get more benefits from the subsidized public healthcare services to meet their health needs.

Findings of this BIA study in Bangladesh follows the widely applicable “inverse care law” proposed by Julian Tudor Hart in 1971, which stated that people with more need for healthcare services benefits less than those who need comparatively less healthcare services [105]. The pro-rich distribution of maternal and child healthcare from public health facilities in Bangladesh should draw further attention to the policymakers. It indicates that urgent health financing reforms are required in Bangladesh to provide UHC for the population, especially for the poor. The pro-poor distribution of primary and community-level health facilities illustrates that the GOB has successfully targeted primary and community-level health facilities to reach the poor people, but the overall distribution of health benefits is still pro-rich. Poor accessibility at the secondary level of health facilities implies that user fees of those facilities and indirect transportation costs reduce their access to healthcare compared to the socioeconomically well off. Therefore, burden of OOPE could be the main reason for unequal utilization of health benefits in Bangladesh. However, a greater share of government health spending in Bangladesh is focused on the secondary and tertiary level facility which is not currently accessible for the poor. This study recommends redistribution of health resources where healthcare services are mostly utilized by the poor. To ensure equitable distribution for health benefits government should give more emphasis on lower-level health facilities. At the same time, reform is needed for the secondary and tertiary level health facilities to guarantee the availability and accessibility to meet health needs for the poor. In addition, rapid implementation of pro-poor policies developed under the "Bangladesh Health Financing Strategy" is essential for fair health access and distribution of benefits [19]. Policymakers should concentrate on poverty reduction strategies, relaxation of user fees and social protection schemes such as SHI and CBHI, especially among the poor vulnerable community to increase their access to health.

We used nationally representative survey data; however, this study has several limitations. First, we conducted BIA based on the maternal and child healthcare services and are not able to consider all type of healthcare services available at public facilities. Second, our study is limited to public primary and secondary level of healthcare facility, but private and NGOs also play a strong role in Bangladesh. Third, this study is based on government implementation costs for maternal and child healthcare services but OOPE on health at public facilities could be another interesting dimension for conducting BIA in Bangladesh. Finally, another limitation of this research is that BDHS data may be affected by recall bias, which may have an impact on the absolute numbers given in this study.

3.5. Conclusion

Equitable health access among wealth quintiles and distribution of benefits relative to the needs of the population are the preconditions for achieving UHC. Public health spending should be concentrated more on the poor and vulnerable population to increase their accessibility to health. This BIA study focused on the assessment of the equitable distribution of public subsidies on maternal and child healthcare services among wealth quintiles in Bangladesh. Our study illustrated that public health spending in Bangladesh on maternal and child healthcare services was not equally distributed among wealth quintiles. Overall monetary benefits were utilized more by the rich relative to the poor. Hence, policymakers should focus on redistribution of resources on health by targeting the socioeconomically vulnerable segments of the population, and strategies are needed to reduce OOPE and to increase accessibility of health services among the lower wealth quintiles to meet health needs.

Chapter 4

4. Disease-specific distress healthcare financing and catastrophic out-of-pocket expenditure for hospitalization in Bangladesh

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Abstract

Background

Financial risk protection and equity are two fundamental components of the global commitment to achieve Universal Health Coverage, which mandates health system reform based on population needs, disease incidence, and economic burden to ensure that everyone has access to health services without any financial hardship. We estimated disease-specific incidences of catastrophic out-of-pocket health expenditure and distress financing to investigate progress toward financial risk indicators and investigated inequalities in financial risk protection indicators by wealth quintiles. In addition, we explored the determinants of financial hardship indicators as a result of hospitalization costs.

Methods

In order to conduct this research, data were extracted from the latest Bangladesh Household Income and Expenditure Survey, conducted by the Bangladesh Bureau of Statistics in 2016-2017. Financial hardship indicators in UHC were measured by catastrophic health expenditure and distress financing (sale/mortgage, borrowing, and family support). Concentration curves and indices were estimated to measure the pattern and severity of inequalities across socio-economic classes. Binary logistic regression models were used to assess the determinants of catastrophic health expenditure and distress financing.

Results

We found that about 26% of households incurred CHE and 58% faced distress financing on hospitalization in Bangladesh. The highest incidence of CHE was for cancer (50%), followed by liver diseases (49.2%), and paralysis (43.6%). The financial hardship indicators in terms of CHE (concentration index= -0.109) and distress financing (concentration index= -0.087) were more concentrated among low-income households. Hospital admission to private health facilities, non-communicable diseases, and the presence of chronic patients in households significantly increases the likelihood of higher UHC financial hardship indicators.

Conclusions

The study findings strongly suggest the need for national-level social security schemes with a particular focus on low-income households since we identified greater inequalities between low- and high-income households in UHC financial hardship indicators. Regulating the private sector and implementing subsidized healthcare programmes for diseases with high treatment costs, such as cancer, heart disease, liver disease, and kidney disease are also expected to be

effective to protect households from financial hardship. Finally, in order to reduce reliance on OOPE, the government should consider increasing its allocations to the health sector.

4.1. Background

In 2015, the United Nations declared the SDGs; UHC is one of the key targets of the proposed health-related SDGs [106]. The UHC target states that equitable health access should be available for all citizens at affordable costs without them facing any financial hardship [11]. The absence of financial risk protection in terms of equitable health access has made UHC difficult for many LMICs [12]. Many countries, including Bangladesh, adopted UHC as a priority for their health systems to improve health access for citizens. However, in the absence of proper risk pooling mechanisms, the majority of citizens in LMICs experience high OOPE on healthcare, putting them in financial hardship [107]. As a result, households are forced to borrow money, sell assets, or reach out for assistance from friends or relatives, and they often experience CHE [107].

About 150 million people globally experience CHE each year due to high OOPE while 90% of the people who experienced CHE live in low resource countries [108]. In Bangladesh, THE in 2015 comprised 67% OOPE by households, followed by 23% public funding, with another major source of health financing being development partners [107]. The high OOPE means that approximately 5 million people each year fall below the poverty line in Bangladesh [13]**.** A study found that 14.2% of households in Bangladesh faced CHE at the 10% of THCE threshold based on the national representative HIES 2010 [13]**.** This financial burden of CHE increased to 24.7% of THCE between 2010 and 2016 [11]. Furthermore, according to a recent study in Bangladesh, about 43% of households who used healthcare did so by selling properties, borrowing, or receiving assistance from relatives [18]. Nevertheless, they do not investigate the factors that lead to such high levels of distress financing in that study. Only a few studies have investigated CHE and distress financing related to OOPE in Bangladesh [12,13,109–111].

Moreover, the severity of disease-specific financial burden owing to hospitalization is also rarely addressed in Bangladesh. Developed and developing countries are both experiencing burden from communicable and NCDs, although developing countries are suffering the most as a result of their demographic and socioeconomic transitions [112]. In Bangladesh, NCDs like cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes are on the rise [113]. In addition, communicable diseases like malaria, tuberculosis, acute respiratory infection, and diarrheal diseases are also affecting Bangladesh with an increasing rate [114].

A number of studies in Bangladesh have assessed health expenditures for distinct diseases such as diarrhoea, pneumonia, typhoid, and others [115–117]. Two studies have investigated disease-specific financial burden and its impact on households, but they were limited to specific geographical areas with limited sample sizes [109,110] and thus do not provide a national representative estimate. However, to our knowledge, no studies in Bangladesh have studied disease-specific OOPE on hospitalization considering both communicable and NCDs as well as the impact on households, using a nationally representative survey. In compliance with international and national commitment to SDG-3, health system reform based on population needs, disease incidence, and economic burden is fundamental for the path to UHC. Countries are simultaneously planning health-system reforms based on disease burdens and population dynamics, but Bangladesh has paid little attention to this [110]. As a result, estimating disease-specific OOPE and its financial impact on households may provide policy-driven evidence to adopt reform policies.

Furthermore, seeking healthcare from private facilities was also cited as a significant obstacle since, due to high OOPE and low affordability, it could impose a substantial economic burden on households, particularly low-income households [118]. Nevertheless, studies on catastrophic OOPE do not provide healthcare providers' differential estimates since these were limited to either public or private healthcare providers [109,110,115–117]. We believe that OOPE and its repercussions vary by disease and type of healthcare provider (public or private) in Bangladesh. Inequalities are another major concern for healthcare systems in low resource countries like Bangladesh, where socio-economically disadvantaged populations do not get proper access to healthcare due to their financial inability [119]. However, before adopting new policies to reduce inequalities, it is necessary to recognize which socio-economic groups have less access to healthcare and suffer most from the impact of high OOPE.

The aim of this study is to estimate disease-specific incidence of distress financing and catastrophic OOPE. This will help to assess progress toward UHC financial risk indicators based on hospitalization in public and private facilities in Bangladesh and will also investigate inequalities in financial risk protection indicators through wealth quintiles. In addition, the study explores the determinants of financial hardship indicators as a result of hospitalization costs. Disease and provider-specified estimations are expected to aid policymakers in developing evidence-based policies on alternative financial mechanisms to safeguard

households, allowing them to contribute more to UHC. This will include providing policymakers with an understanding of which diseases should be targeted for coverage under the government's first social health protection scheme, locally known as SSK (a pilot-based healthcare financing scheme for the pro-poor population) [120].

4.2. Methods

4.2.1. Data sources

This analysis utilized data from the latest Bangladesh HIES, conducted by the Bangladesh Bureau of Statistics (BBS) in 2016-2017 [121]. This is a nationally representative survey which followed a two-stage stratified random sampling technique. At the first stage, a total of 2,304 primary sampling units (PSUs) were randomly selected from each of the administrative areas according to probability proportional to size sampling. In the second stage, 20 households from each of the selected PSUs were randomly selected from the prior household lists. Finally, information on income, expenditure and consumption including health expenditures were collected from 46,080 households by trained data collectors. A total of 45,423 household's (31,621 from rural and 13,802 from urban areas) data were included in this analysis after excluding missing and anomalous information from the main data set.

Respondents were requested to provide information relating to hospitalization (defined as an overnight stay) for 365 days preceding to the survey. Data on the place of hospitalization, reasons (diseases) for hospitalization, expenditures, and mode of financing the cost of treatment were also collected followed by hospitalization incidence. Expenditure on hospitalization covers both medical and non-medical expenses. The medical expenses comprised operation cost, consultation/doctor fees, bed/cabin charges, medicines, and medical investigations. The non-medical expenses included transport cost, informal tips, and other formal charges. The OOPE considered both medical and non-medical expenses on hospitalization in this study. In our analysis, we included 22 diseases or reasons for hospitalization such as diarrhea/dysentery, fever, pain, injury/accident, blood pressure, heart disease, cancer, diabetes, etc., as per data recorded in HIES 2016 survey and we then classified these into communicable and non-communicable. In our analysis communicable diseases include diarrhea/dysentery, pneumonia, malaria, jaundice, skin diseases etc., whereas, NCDs include blood pressure, heart diseases, respiratory diseases/asthma, cancer, kidney diseases, liver diseases, etc. We considered injury/accident, fever, pain and mental

health diseases as NCDs [122]. Hospital facilities were likewise divided into two categories: public and private.

4.2.2. Outcome measures

4.2.2.1. Incidence of catastrophic health expenditure

Two established definitions are frequently used for the estimation of CHE. One divides OOPE by THCE and the other divides OOPE by total NFE [13,58,59]. In this study, we used both of the definitions to estimate CHE for hospitalization in Bangladesh. However, there is no single recognized threshold to consider CHE estimation. In this analysis, a 10% threshold of THCE and a 25% threshold of NFE were used to determine CHE in Bangladesh. If a household's OOPE were more than 10% of the THCE and more than 25% of NFE, then this was measured as a CHE incidence for that household. Two dummy variables were created for each of the two thresholds and recoded "yes" if household healthcare expenditure was more than the threshold and "no" otherwise. OOPE is defined as the total of all medical and non-medical direct payments made by households/patients to purchase inpatient healthcare services [107]. In addition, food expenditure data was taken from HIES 2016, which collected data on daily and weekly consumption and classified it into17 food bundles including food grains, pulses, fish, egg, meat, vegetables, etc. Similarly, non-food expenses were divided into 21 categories in HIES such as fuel and lighting, cosmetics, washing and cleaning, education, transport, cloths, footwear etc., and collected based on monthly and yearly consumption. However, since we computed medical expenses separately, we omitted them from non-food expenditure in our analysis. The incidence of CHE was estimated for each of the 22 diseases/reasons for hospitalization, including for communicable and NCDs.

4.2.2.2. Distress health financing for financial difficulties

Another outcome variable is distress health financing due to OOPE on hospitalization. Distress financing defines funding for OOPE by selling or mortgaging household assets/lands, borrowing money from lender/banks/friends/relatives, and by receiving assistance from friends/relatives. If a household incurred OOPE and managed money from any of these sources then a dummy variable was coded "yes" as a measure of distress financing, and "no" otherwise. The incidence of distress financing was also calculated for each of the 22 diseases/reasons for hospitalization, as well as communicable and NCDs.

4.2.3. Explanatory variables

The number of children aged under-five years old, number of female members, number of elderly members (65 years and above), number of members that earn a wage, number of members suffering from chronic illness, number of members hospitalized in the last 12 months, household size, place of residence and wealth quintile were considered as predictor variables in this analysis. These predictors were chosen based on a review of previously published literature [12,13,111,123–125]. The wealth quintile was generated by considering a list of household assets. Scores for each of the households were generated for household assets by using principal component analysis and the scores were categorized into five equal parts from the lowest to highest 20%.

4.2.4. Statistical analysis

This study used descriptive statistics, concentration curve, concentration index, and logistic regression analysis. Proportion, mean, and standard deviation were used to present descriptive data. Concentration curves and indices for the incidence of CHE and distress financing were created for equality analysis. These examine the pattern and severity of inequalities across socio-economic classes measured by asset quintiles. The computational formula for the concentration index is as follows:

$$\mathrm{CI} = \frac{2}{\mathrm{n}^2\bar{\mathrm{y}}} \sum_{\mathrm{i}=1}^{\mathrm{n}} \mathrm{y_i}\, \mathrm{r_i}$$

Where CI is the concentration index which lies between -1 and +1; $\bar{y}$ is the mean of outcome measures (i.e., hospitalization, CHE, and distress financing); n is the number of individuals; and r_i is the cumulative rank proportion of the individual according to wealth index. The concentration index will be negative when concentration curve lies above the equity line which means the outcome is more concentrated among the poor. On the other hand, when the concentration curve lies below the equality line, the concentration index will be positive, which indicates outcome is concentrated more among the rich. The predictors of CHE and distress financing owing to OOPE on hospitalization were investigated using binary logistic regression models, with the results provided as odds ratios (i.e., exponential form of regression coefficient, OR = exp (beta)) and 95% confidence intervals. The regression model can be expressed as-

$$\text{logit}\,(Y_i) = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots\ldots\ldots + \epsilon_i$$

Where Y_i is the dichotomous outcome variables (i.e., CHE and distress financing) with value 0 if household did not experience CHE and distress financing and 1 if household faced CHE and experience distress financing; α is the constant; β_1, β_2…. are the regression coefficients for the corresponding explanatory variables; X_{1i}, X_{2i}…..denote explanatory variables; and ϵ_i is the error term. To build the regression model, we first identified significant explanatory variables from the published literature and explored bivariate relationships between variables. Explanatory variables that were found statistically significant during the bivariate analysis were included in our regression models. In our analysis, we investigated individual-level data to estimate disease-specific hospitalization incidence, length of hospital stays, and disease-specific OOPE, as well as household-level data to estimate CHE and distress healthcare financing.

4.3. Results

This study looked at the data of 183,757 individuals from 45,423 households (Table 4.1). Among the total households, more than one-third had one or more children under the age of five, 18.1% had at least one elder member, and the majority had at least one earning member. Almost one-third of households had one member who had suffered from chronic illness/disability in the 12 months preceding the survey. The majority of the households were from rural rather than urban areas (70% vs. 30%) and were almost equally distributed among the socio-economic quintiles.

Table 4.1. Background and household characteristics of the study participants

Variables	n	%
Individual participants characteristics (n=183,757)		
Gender of the participants		
Male	91,414	49.8
Female	92,343	50.3
Age of the participants		
Children (0-14 yrs.)	58,298	31.7
Working age (15-64 yrs.)	115,883	63.1
Elderly (65 and above)	9,576	5.2
Number of Households	45,423	
Number of individuals	183,757	
Number of hospitalizations	3,220	
Household characteristics (n=45,423)		

Number of female members		
None	310	0.7
One	15,383	33.9
2 and more	29,730	65.5
Number of U5 children		
None	27,820	61.3
One	14,201	31.3
2 and more	3,402	7.5
Number of elder members (65 years & above)		
None	37,192	81.9
One	6,925	15.3
2 and more	1,306	2.9
Number of earning members		
One	34,098	75.1
Two	8,802	19.4
3 and more	2,523	5.6
Number of members suffering from chronic illness/disability in last 12 months		
None	23,423	51.6
One	13,357	29.4
Two	6,676	14.7
3 and more	1,967	4.3
Number of members hospitalized in last 12 months		
None	42,410	93.4
One	2,837	6.3
2 and more	176	0.4
Household size		
1-2	6,288	13.8
3-4	23,877	52.6
5 and above	15,258	33.6
Mean household size (Mean ± SD)	4.1 ± 1.6	
Administrative division		
Barishal	4,234	9.3
Chattogram	7,801	17.2
Dhaka	9,223	20.3
Khulna	7,135	15.7
Mymensingh	2,849	6.3
Rajshahi	5,642	12.4
Rangpur	5,685	12.5
Sylhet	2,854	6.3
Place of residence		
Rural	31,621	69.6
Urban	13,802	30.4

Wealth quintiles		
Lowest 20%	9,332	20.5
2nd	8,824	19.4
3rd	9,069	20.0
4th	9,203	20.3
Upper 20%	8,995	19.8

4.3.1. Incidence of diseases-specific hospitalization rate and length of hospital stay

Table 4.2 shows the hospitalization rate and length of hospital stay for various diseases in Bangladesh. In the 365 days before to the survey, the overall hospitalization rate was 3220 per 183,757 population (i.e., 175 per 10,000 population). The overall hospitalization rate was higher in public health facilities (approximately 59%) and due to NCDs (approximately 53%). Child delivery and pregnancy-related diseases (17.5%) were the most common reason for hospitalization among the 22 diseases/reasons studied, followed by injury/accident (11.5%) and diarrhea/dysentery (10.9%).

Table 4.2. Health care provider specific-hospitalization (12 months prior to the survey) and average length of hospital stay by diseases in Bangladesh

Diseases/reasons for hospitalization	Hospitalization in last 12 months n (%)			Length of hospital stay (in days) (Mean ± SD)		
	Health care provider			Health care provider		
	Public[2]	Private[2]	All[1]	Public	Private	All
Diarrhea/Dysentery	288 (82.1)	63 (17.9)	351 (10.9)	4.0±4.7	2.9±1.7	3.8±4.3
Fever	142 (75.5)	46 (24.5)	188 (5.8)	4.8±3.9	5.3±3.4	4.9±3.8
Pain	171 (63.6)	98 (36.4)	269 (8.4)	9.0±25.2	5.7±10.3	7.8±21
Injury/Accident	260 (70.5)	109 (29.5)	369 (11.5)	9.1±11.6	12.3±20.3	10.1±14.7
Blood pressure	78 (70.9)	32 (29.1)	110 (3.4)	5.7±7.5	4.5±2.8	5.4±6.5
Heart disease	145 (63.9)	82 (36.1)	227 (7.1)	8.0±15.6	9.0±7.9	8.4±13.3
Respiratory Diseases/ Asthma/Bronchitis	146 (69.2)	65 (30.8)	211 (6.6)	6.9±7.2	6.1±5.5	6.6±6.7
Weakness/Dizziness	64 (64.0)	36 (36.0)	100 (3.1)	4.7±5.5	4.4±7.3	4.6±6.2
Pneumonia	96 (73.3)	35 (26.7)	131 (4.1)	5.5±3.5	6.9±5.3	5.8±4.1
Tuberculosis	8 (57.1)	6 (42.9)	14 (0.4)	20.1±20.3	19.8±39.3	20±28.6
Malaria	6 (66.7)	3 (33.3)	9 (0.3)	7.5±7.1	3.7±2.9	6.2±6.1
Jaundice	18 (62.1)	11 (37.9)	29 (0.9)	6.6±7.0	5.8±5.6	6.3±6.4
Female diseases	52 (36.1)	92 (63.9)	144 (4.5)	7.4±9.1	7.2±6.4	7.3±7.4
Child delivery and pregnancy-related diseases	169 (30.0)	395 (70.0)	564 (17.5)	5.5±4.4	5.5±2.7	5.5±3.3
Cancer	25 (52.1)	23 (47.9)	48 (1.5)	28.1±44.1	23.2±37.6	25.7±40.7
Mental health	22 (78.6)	6 (21.4)	28 (0.9)	12.3±13.3	19.3±17.1	13.8±14.2
Paralysis	43 (69.4)	19 (30.6)	62 (1.9)	7.6±7.0	11.2±9.4	8.7±7.9
Scabies/Skin diseases	19 (67.9)	9 (32.1)	28 (0.9)	10.2±13.8	7.8±6.4	9.4±11.9
Kidney Diseases	54 (47.8)	59 (52.2)	113 (3.5)	12.7±17.7	9.4±9.6	11±14.1

Liver Diseases	35 (55.6)	28 (44.4)	63 (2.0)	11±13.1	8.4±8.6	9.8±11.4
Ear/ ENT problems	15 (46.9)	17 (53.1)	32 (1.0)	11.7±18.3	6.1±4.7	8.7±13.1
Eye problem	40 (30.8)	90 (69.2)	130 (4.0)	5.3±4.9	4.9±6.6	5.0±6.1
All diseases	**1,896 (58.9)**	**1,324 (41.1)**	**3220 (100.0)**	**7.3±13**	**7.0±10.3**	**7.2±12**
Communicable	841 (55.3)	679 (44.7)	1,520 (47.2)	5.4±6	5.8±5.5	5.6±5.8
Non-communicable	1,055 (62.1)	645 (37.9)	1,700 (52.8)	8.8±16.4	8.2±13.6	8.6±15.4

[1] Percentages based on column total, [2] Percentages based on row total

The average length of hospital stay in Bangladesh was 7.2 days (SD=12); a similar pattern was observed for both public (7.3 days with SD=13) and private (7 days with SD=10.3) hospitals, whereas NCDs contributed a larger proportion of hospital stays (8.6 days with SD=15.4) as compared to communicable diseases (5.6 days with SD=5.8). The longest length of hospital stay was due to cancer (25.7 days with SD=40.7), followed by tuberculosis (20 days with SD=28.6), mental health (13.8 days with SD=14.2), and injury/accident (10.1 days with SD=14.7).

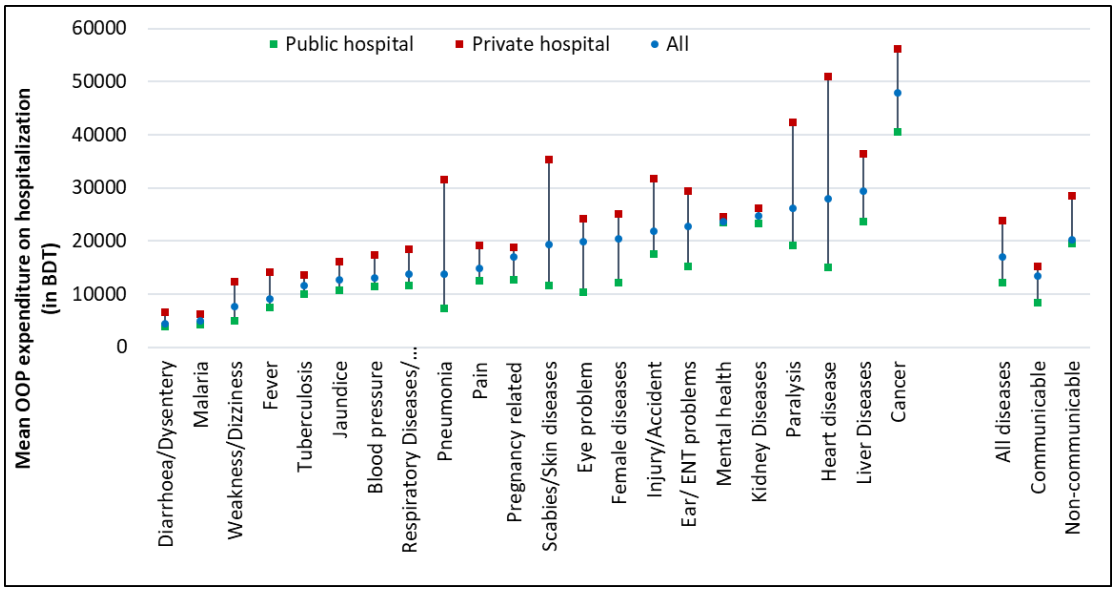

Figure 4.1. Mean OOP expenditure on hospitalization according to diseases/reasons for hospitalization and hospital types in Bangladesh.

4.3.2. Diseases-specific out-of-pocket expenditure on hospitalization

The average disease-specific OOPE on hospitalization by healthcare providers is presented in Figure 4.1. The average yearly OOPE on hospitalization for all diseases was BDT 16985 (SD=29444) (Table 4.3). This study reveals that the average OOPE on hospitalization was almost twice as high in private hospitals (BDT 23899 with SD=36864) than public hospitals (BDT 12156 with SD=21614). At the same time, NCDs had 1.5 times higher OOPE (BDT 20247 with SD=34303) as compared with communicable diseases (BDT 13336 with SD=22266). The highest OOPE was reported for cancer (BDT 47983 with SD=47735), in both public (BDT 40488 with SD=35630) and private hospitals (BDT 56131 with SD=57878), followed by liver diseases (BDT 29328 with SD= 30143), and heart diseases (BDT 27983 with SD=52140) respectively.

Table 4.3. Health care provider specific mean out-of-pocket healthcare expenditure on hospitalization by diseases in Bangladesh

Diseases/reasons for hospitalization	OOPE (in BDT) due to hospitalization in last 12 months		
	Health care provider		
	Public	Private	All
	Mean ± SD	Mean ± SD	Mean ± SD
Diarrhea/Dysentery	3911±4456	6501±4599	4375±4585
Fever	7384±12529	14146±13511	9039±13068
Pain	12522±47866	19074±41124	14909±45557
Injury/Accident	17604±23268	31687±30060	21764±26222
Blood pressure	11393±11658	17295±17157	13110±13674
Heart disease	15037±15751	50875±79458	27983±52140
Respiratory Diseases/ Asthma/Bronchitis	11582±17554	18400±15969	13682±17333
Weakness/Dizziness	5014±5169	12306±17488	7639±11726
Pneumonia	7364±8310	31639±99655	13850±52575
Tuberculosis	10069±9123	13617±14003	11589±11115
Malaria	4267±2674	6200±3811	4911±3005
Jaundice	10776±10213	16040±14370	12772±11993
Female diseases	12146±10573	25149±19268	20454±17760
Child delivery and pregnancy-related diseases	12632±12526	18735±19043	16906±17562
Cancer	40488±35630	56131±57878	47983±47735
Mental health	23467±30268	24517±17707	23692±27764
Paralysis	19068±15778	42328±47969	26196±31101
Scabies/Skin diseases	11689±11622	35378±29571	19304±21819
Kidney Diseases	23326±22836	26168±24188	24810±23490
Liver Diseases	23613±21736	36472±37366	29328±30143
Ear/ ENT problems	15239±26091	29450±21045	22789±24247
Eye problem	10393±10069	24112±34730	19891±30054
All diseases	**12156±21614**	**23899±36864**	**16985±29444**
Communicable	8312±10738	15221±26959	13336±22266
Non-communicable	19560±29962	28467±42495	20247±34303

4.3.3. Financial hardship indicators on hospitalization

Figure 4.2 shows diseases-specific incidences of CHE at 10% of THCE and at 25% of NFE and incidences of distress financing for financial hardship due to hospitalization.

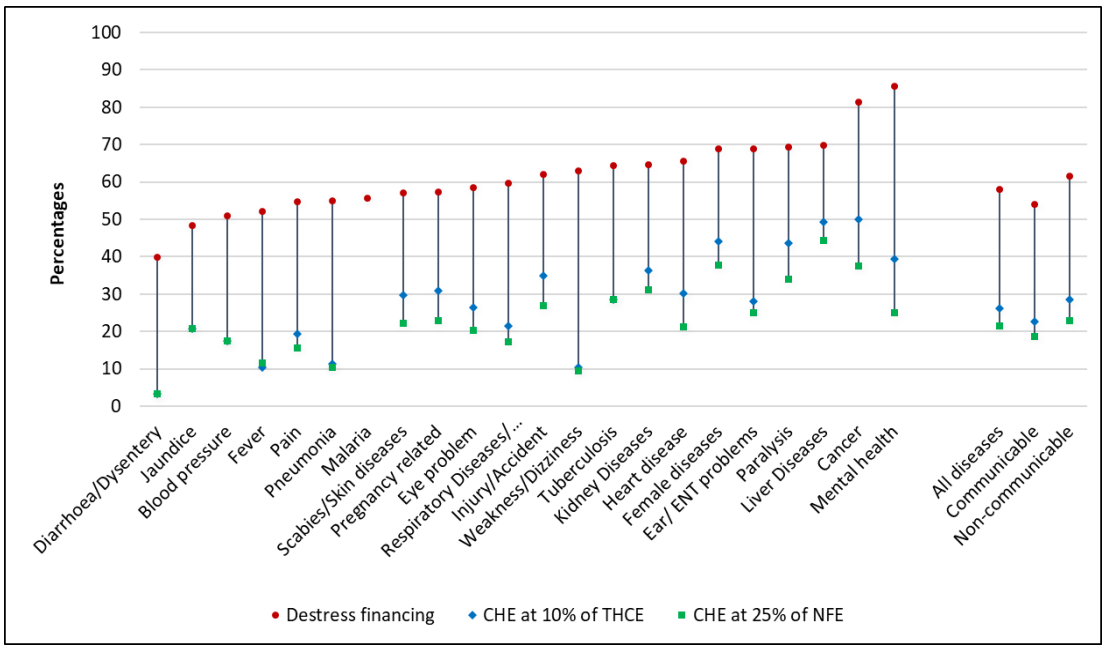

Figure 4.2. Incidence of distress and catastrophic expenditure at 10% of THCE and 25% of NFE on hospitalization in Bangladesh.

Overall, 26.1% and 21.5% of households who had experienced at least one hospitalization in the 365 days prior to the survey, incurred CHE at 10% of THCE and at 25% of NFE respectively (Table 4.4). When household member(s) were hospitalized at private hospitals (36.1% at 10% of THCE and 28% at 25% of NFE) a household experienced a higher level of CHE compared with being hospitalized at a public hospital (19% at 10% of THCE and 16.9% at 25% of NFE). At the same time, hospitalization due to NCDs (28.5% at 10% of THCE and 22.9% at 25% of NFE) incurred a higher CHE as compared to communicable diseases (22.6% at 10% of THCE and 18.6% at 25% of NFE). A similar pattern occurs when looking at either public or private hospitals i.e., CHE was comparatively higher among those who were treated at private rather than public hospitals. The highest incidence of CHE was for cancer (50%), followed by liver diseases (49.2%), and paralysis (43.6%) at 10% of THCE.

Table 4.4. Health care provider specific-catastrophic expenditure and distress financing due to out-of-pocket spending on hospitalization in Bangladesh

Diseases/reasons for hospitalization	Catastrophic health expenditure due to hospitalization						Distress financing due to hospitalization		
	10% of THCE			25% of NFE					
	Health care provider			Health care provider			Health care provider		
	Public	Private	All	Public	Private	All	Public	Private	All
Diarrhea/Dysentery	9 (3.37)	2 (3.03)	11 (3.3)	7 (2.6)	4 (6.0)	11 (3.3)	120 (41.7)	20 (31.7)	140 (39.9)
Fever	11 (8.1)	8 (17.4)	19 (10.4)	15 (11.1)	6 (12.8)	21 (11.5)	73 (51.4)	25 (54.3)	98 (52.1)
Pain	24 (14.5)	23 (29.5)	47 (19.3)	22 (13.5)	16 (19.8)	38 (15.6)	81 (47.4)	66 (67.3)	147 (54.6)
Injury/Accident	72 (29.2)	52 (48.6)	124 (35.0)	57 (23.2)	38 (35.2)	95 (26.8)	158 (60.8)	71 (65.1)	229 (62.1)
Blood pressure	12 (16.0)	7 (20.6)	19 (17.43)	13 (16.9)	6 (18.8)	19 (17.4)	38 (48.7)	18 (56.3)	56 (50.9)
Heart disease	24 (16.7)	44 (53.3)	68 (30.2)	19 (13.4)	29 (34.9)	48 (21.3)	90 (62.1)	59 (72)	149 (65.6)
Respiratory Diseases/ Asthma/Bronchitis	25 (17.2)	20 (30.8)	45 (21.4)	18 (12.6)	18 (26.9)	36 (17.1)	87 (59.6)	39 (60)	126 (59.7)
Weakness/Dizziness	6 (9.7)	4 (11.4)	10 (10.3)	5 (8.2)	4 (11.1)	9 (9.3)	40 (62.5)	23 (63.9)	63 (63.0)
Pneumonia	6 (6.9)	8 (23.5)	14 (11.2)	8 (8.9)	5 (14.3)	13 (10.4)	49 (51)	23 (65.7)	72 (55.0)
Tuberculosis	3 (37.5)	1 (16.7)	4 (28.6)	3 (37.5)	1 (16.7)	4 (28.6)	5 (62.5)	4 (66.7)	9 (64.3)
Malaria	-	-	-	-	-	-	3 (50)	2 (66.7)	5 (55.6)
Jaundice	4 (22.2)	2 (18.2)	6 (20.7)	6 (33.3)	-	6 (20.7)	10 (55.6)	4 (36.4)	14 (48.3)
Female diseases	13 (25.5)	50 (54.4)	63 (44.1)	13 (24.5)	41 (45.6)	54 (37.8)	29 (55.8)	70 (76.1)	99 (68.8)
Child delivery and pregnancy-related diseases	27 (20.9)	134 (35.5)	171 (30.8)	28 (15.6)	99 (26.3)	127 (22.9)	106 (62.7)	218 (55.2)	324 (57.4)
Cancer	11 (44.0)	13 (56.5)	24 (50.0)	8 (32.0)	10 (43.5)	18 (37.5)	19 (76)	20 (87)	39 (81.3)
Mental health	8 (36.4)	3 (50.0)	11 (39.3)	5 (22.7)	2 (33.3)	7 (25.0)	19 (86.4)	5 (83.3)	24 (85.7)
Paralysis	17 (39.5)	10 (52.6)	27 (43.6)	14 (31.8)	7 (38.9)	21 (33.9)	29 (67.4)	14 (73.7)	43 (69.4)
Scabies/Skin diseases	4 (22.2)	4 (44.4)	8 (29.6)	4 (22.2)	2 (22.2)	6 (22.2)	11 (57.9)	5 (55.6)	16 (57.1)
Kidney Diseases	21 (38.2)	20 (34.5)	41 (36.3)	18 (33.3)	17 (28.8)	35 (31.0)	36 (66.7)	37 (62.7)	73 (64.6)

Liver Diseases	19 (54.3)	12 (42.9)	31 (49.2)	18 (51.4)	10 (35.7)	28 (44.4)	25 (71.4)	19 (67.9)	44 (69.8)
Ear/ ENT problems	3 (20.0)	6 (35.3)	9 (28.1)	2 (13.3)	6 (35.3)	8 (25.0)	9 (60)	13 (76.5)	22 (68.8)
Eye problem	7 (17.1)	27 (30.7)	34 (26.4)	5 (12.5)	21 (23.6)	26 (20.2)	25 (62.5)	51 (56.7)	76 (58.5)
All diseases	**336 (19.0)**	**451 (36.1)**	**787 (26.1)**	**298 (16.9)**	**349 (28.0)**	**647 (21.5)**	**1,062 (56.0)**	**806 (60.9)**	**1,868 (58.0)**
Communicable	108 (13.6)	218 (33.6)	326 (22.6)	100 (12.6)	168 (25.9)	268 (18.6)	435 (51.7)	385 (56.7)	820 (53.9)
Non-communicable	230 (22.9)	231 (37.6)	461 (28.5)	192 (19.1)	178 (28.9)	370 (22.9)	627 (59.4)	421 (65.3)	1,048 (61.6)

Numerator: number of households experienced CHE and distress financing, Denominator: number of households experienced at least one hospitalization for the specific diseases/reasons

On the other hand, households reported distress financing due to financial crisis for more than half (58%) of the total 3220 hospitalization cases and the intensity is higher among households who sought care from private hospitals (60.9%) as compared to public hospitals (56.0%). Likewise, this incidence was higher among those who were admitted due to NCDs (61.6%) as compared with communicable diseases (53.9%).

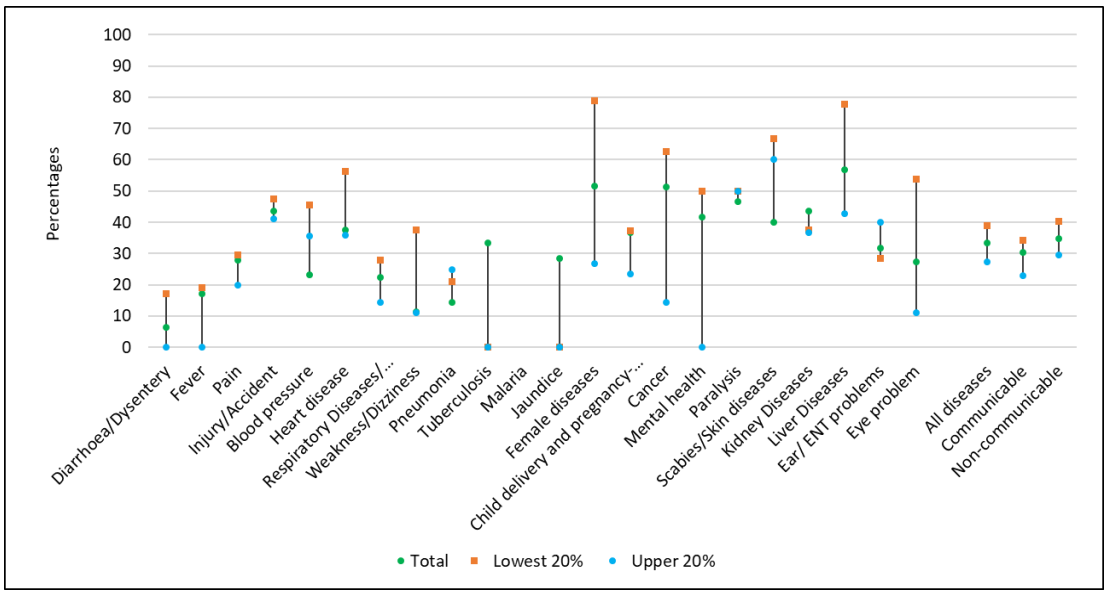

Figure 4.3. Disease specific-destress financing and catastrophic expenditure at 10% of THCE on hospitalization in Bangladesh.

Figure 4.3 depicts the diseases-specific incidence of both distress financing and CHE at 10% of THCE on hospitalization in Bangladesh. Thirty-three percent of households with at least one hospitalized case had to deal with both CHE and distress financing; this intensity is higher for NCDs (35%) as compared to communicable diseases (30%).

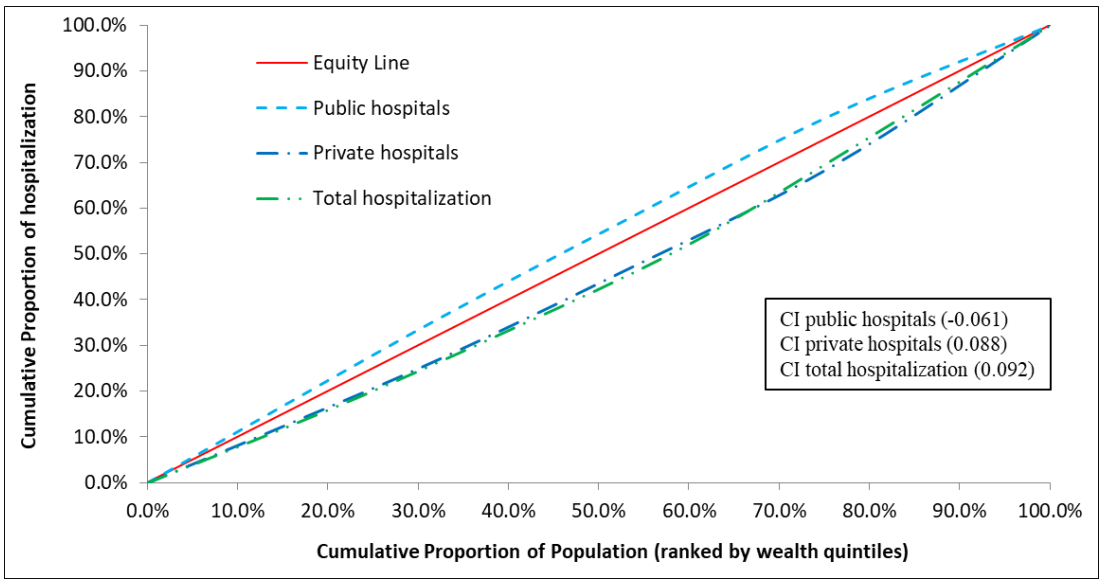

Figure 4.4. Concentration curves and indices for healthcare utilization from the public and private hospitals due to hospitalization.

4.3.4. Equity in financial hardship indicators

Figure 4.4 presents the concentration curves and indices to measure the inequality in access to healthcare on hospitalization among the socio-economic classes. The overall inpatient (hospitalization) healthcare utilization was more concentrated among the rich households compared to poor ones, while the poor have slightly higher access to the public hospitals. Moreover, private hospitals are used more by rich households. This shows that the poor have less access than the rich and have to rely more on public facilities rather than private ones. Additionally, Figure 4.5 illustrates concentration curves and indices for CHE and distress financing on hospitalization. All of the curves are over the equity line and negative concentration indices indicate that low-income households are more concentrated on both financial hardship indicators i.e., they experienced more CHE and distress financing compared with rich households. Furthermore, we identified that low-income households in Bangladesh had proportionally greater financial hardship than wealthy households for the majority of diseases, irrespective of communicable and NCDs (Figure 4.3).

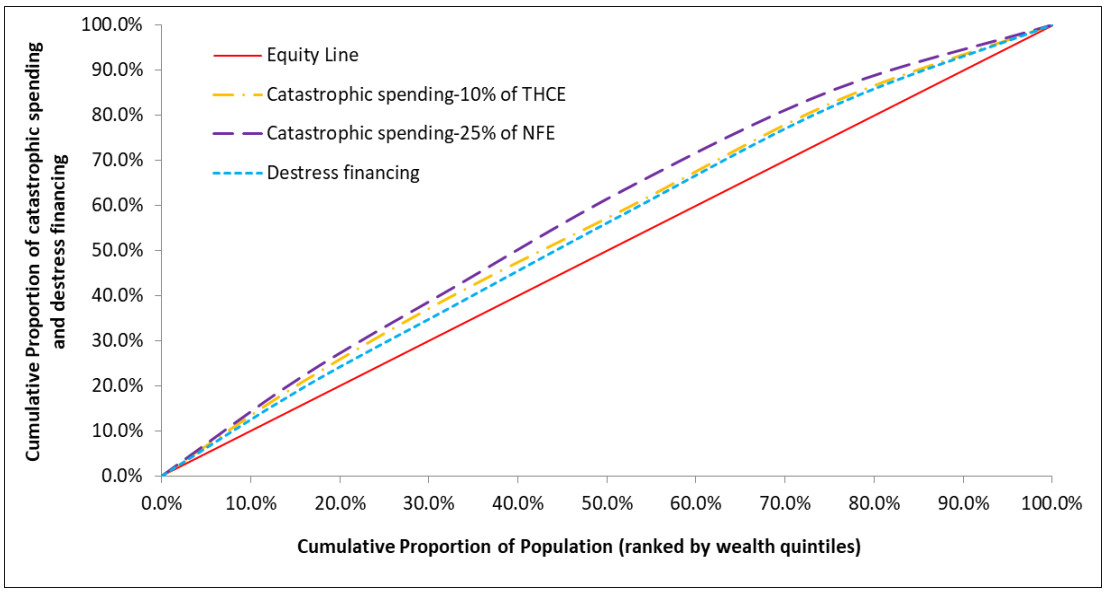

Figure 4.5. Concentration curves and indices for catastrophic spending and destress financing on hospitalization due to OOP healthcare spending.

4.3.5. Determinants of financial hardship

Table 4.5 indicates that statistically significant determinants of CHE due to the OOPE on hospitalization are the number of children aged under 5, number of members earning a wage, number of members suffering from chronic illness/disability, number of members hospitalized in last 12 months, type of hospital providers, diseases type, household size, administrative division, place of residence, and wealth quintiles.

Table 4.5. Determinants of catastrophic health expenditure and distress financing due to out-of-pocket health expenditure on hospitalization in Bangladesh

Variables	Catastrophic healthcare spending		Model C (Distress financing)
	Model A (10% THCE)	Model B (25% NFE)	
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Number of female members			
<2 (ref)	1.00	1.00	1.00
≥ 2	0.92 (0.83, 1.02)	0.95 (0.84, 1.06)	0.93 (0.84, 1.03)
Number of U5 children			
None (ref)	1.00	1.00	1.00
One	1.00 (0.91, 1.10)	1.05 (0.94, 1.16)	1.02 (0.94, 1.11)
2 and more	1.03 (0.90, 1.18)	1.18** (1.02, 1.36)	1.10 (0.98, 1.24)

Number of elder members (≥ 65 years)			
None (ref)	1.00	1.00	1.00
One	0.99 (0.88, 1.10)	0.95 (0.84, 1.06)	0.96 (0.85, 1.07)
2 and more	0.84 (0.68, 1.04)	0.97 (0.78, 1.20)	0.87 (0.73, 1.04)
Number of earning members			
One (ref)	1.00	1.00	1.00
Two	0.81*** (0.73, 0.90)	0.82*** (0.73, 0.92)	0.88*** (0.80, 0.96)
3 and more	0.69*** (0.59, 0.81)	0.56*** (0.47, 0.67)	0.82*** (0.73, 0.93)
Number of chronic illness/disabilities in last 12 months			
None (ref)	1.00	1.00	1.00
One	1.17*** (1.05, 1.31)	1.11 (0.98, 1.25)	1.40*** (1.27, 1.54)
Two and more	0.87 (0.77, 1.01)	0.89 (0.79, 1.03)	1.51*** (1.37, 1.67)
Number of members hospitalized in last 12 months			
One (ref)	1.00	1.00	1.00
2 and more	2.49*** (2.14, 2.90)	2.88*** (2.47, 3.37)	0.73*** (0.64, 0.84)
Health care provider			
Public (ref)	1.00	1.00	1.00
Private	3.03*** (2.78, 3.31)	2.28*** (2.08, 2.49)	1.37*** (1.27, 1.48)
Diseases			
Communicable (ref)	1.00	1.00	1.00
Noncommunicable	1.64*** (1.49, 1.79)	1.52*** (1.38, 1.67)	1.39*** (1.28, 1.50)
Household size			
1-2 (ref)	1.00	1.00	1.00
3-4	0.85 (0.69, 1.06)	0.75** (0.60, 0.94)	0.88 (0.71, 1.08)
5 and above	0.67*** (0.53, 0.85)	0.62*** (0.48, 0.78)	1.00 (0.80, 1.25)
Administrative division			
Barishal (ref)	1.00	1.00	1.00
Chattogram	0.38*** (0.33, 0.44)	0.48*** (0.41, 0.55)	1.35*** (1.18, 1.53)
Dhaka	0.54*** (0.47, 0.63)	0.62*** (0.53, 0.73)	0.69*** (0.61, 0.79)
Khulna	0.53*** (0.46, 0.62)	0.67*** (0.57, 0.79)	1.36*** (1.19, 1.56)

Mymensingh	0.49*** (0.39, 0.62)	0.71*** (0.56, 0.89)	0.91 (0.74, 1.11)
Rajshahi	0.51*** (0.43, 0.60)	0.55*** (0.46, 0.65)	0.78*** (0.67, 0.90)
Rangpur	0.58*** (0.49, 0.69)	0.72*** (0.60, 0.86)	1.43*** (1.21, 1.67)
Sylhet	0.48*** (0.40, 0.58)	0.69*** (0.57, 0.84)	1.08 (0.92, 1.27)
Place of residence			
Rural (ref)	1.00	1.00	1.00
Urban	0.86*** (0.78, 0.94)	0.75*** (0.68, 0.84)	0.74*** (0.68, 0.80)
Wealth quintile			
Lowest 20%	2.78*** (2.39, 3.22)	2.98*** (2.53, 3.50)	3.56*** (3.12, 4.05)
2nd	2.49*** (2.15, 2.88)	2.60*** (2.21, 3.05)	2.11*** (1.88, 2.38)
3rd	2.01*** (1.75, 2.31)	2.64*** (2.27, 3.08)	2.23*** (2.00, 2.50)
4th	1.92*** (1.69, 2.20)	1.94*** (1.67, 2.25)	1.80*** (1.63, 2.00)
Upper 20% (ref)	1.00	1.00	1.00

****5% level of significance, *** 1% level of significance**

The presence of a chronic patient in the household increases the risk of CHE by 1.17 times (AOR=1.17, 95% CI=1.05, 1.31) at 10% of the THCE threshold. The probability of facing CHE from hospitalization at private facilities, as compared to public facilities, increases 3.03 and 2.28 times at 10% of THCE and at 25% of NFE respectively. Similarly, the likelihood of CHE due to non-communicable diseases are 64% and 52% higher than communicable diseases. Moreover, the chances of CHE were 2.78, 2.49, 2.01, and 1.92 times higher for the lowest 20%, 2nd, 3rd, and 4th quintiles compared with the upper 20% of households at 10% of THCE threshold.

Statistically significant determinants of distress health financing are the number of earning members, number of chronic patients, number of members hospitalized in the last 12 months, the type of hospital provider, diseases type, administrative division, place of residence, and wealth quintiles. Similar to CHE, households with one and two or more chronic patients were more likely to expect distress financing by 1.40 and 1.51 times, respectively. In addition, obtaining healthcare from private hospitals and due to NCDs increases the likelihood of distress financing by 1.37 and 1.39 times respectively. The likelihoods of experiencing distress health financing were 3.56, 2.11, 2.23 and 1.80 times higher for lowest four quintiles respectively.

4.4. Discussion

This study was designed to provide disaggregated incidences of hospitalization, and estimates of OOPE, CHE, and distress financing by type of diseases and healthcare providers. In addition,

our research also aims to investigate inequalities in access to hospital care and the impact of OOPE on hospitalization. Several major findings from the nationally representative survey data are revealed in this study. The latest nationwide data observed that NCDs had a greater rate of hospitalization and financial hardship than communicable diseases in Bangladesh. We also found that private hospitals had a higher financial burden on hospitalization than public hospitals. Furthermore, we observed that poor vulnerable households are suffering more from the CHE and distress financing, although they utilized less inpatient (hospitalization) healthcare services than rich households.

The overall incidence rate of hospitalization in our study was 175 per 10,000 population, with higher hospitalization rates due to NCDs rather than communicable diseases. A study also reported higher self-reported incidence of NCDs in rural Bangladesh than communicable diseases [109] and hospitalizations at the district level hospitals were also found to be comparatively higher for NCDs than communicable diseases [126]. Similarly, a study in India (a neighbouring country) also found that hospitalization rates for NCDs and injuries are slightly higher in India than communicable diseases [124]. Our study also found that hospitalization rates in Bangladesh were greater in public health facilities than in private facilities, indicating that public health facilities are still Bangladesh's core health service providers on hospitalization, despite the presence of a large private sector. Our findings, in this regard, were comparable in Nepal, Myanmar, Sri Lanka, and the Philippines, revealing that public facilities are more prevalent for inpatient care [118]. On the other hand, hospitalization in private facilities was found to be significantly higher in India and Pakistan [118].

Not unexpectedly, our study observed that the average OOPE on hospitalization was nearly twice as high in private facilities as it was in public facilities. Our finding on a higher OOPE in private facilities for hospitalization was aligned to those reported in India, Pakistan, Nepal, Sri Lanka, and Myanmar [118]. We also found that, NCDs had 1.5 times higher OOPE than communicable diseases, particularly with cancer having the highest average OOPE, followed by liver and heart diseases. A similar pattern has also been reported in India, Pakistan, Nepal, and Sri-Lanka where the burden of OOPE are significantly higher among households with NCDs [127]. A study based on rural areas in Bangladesh also found a higher intensity of OOPE among NCD patients who were treated from micro-health insurance scheme operated hospitals, particularly for cancer [109]. Similar findings were also reported by another study

based on a metropolitan city in Bangladesh, implying that liver and heart diseases are the leading causes of OOPE [110].

In our study, the estimated incidence of CHE was 26.1% (at 10% of THCE) and 21.5% (at 25% of NFE) on hospitalization. This indicates an increasing burden of CHE in Bangladesh as earlier studies estimated incidences of CHE from the same survey of 24.6% in 2016 and 14.2% in 2010 (at 10% of THCE) by assessing both hospitalization and outdoor services [12,13]. Furthermore, our research found that the incidence of CHE was much greater among patients who received care from private facilities, and who were predominantly treated for NCDs. More precisely, we discovered that cancer had the greatest devastating impact, followed by liver diseases and paralysis. These findings are consistent with studies conducted in rural Bangladesh, India, China, Vietnam, Pakistan, Nepal, and Sri-Lanka highlighting that higher CHE for NCDs in general, with cancer and liver diseases in particular, are associated with higher CHE [109,124,127,128].

However, according to our study, more than half of the hospitalized cases in Bangladesh had distress financing due to financial crisis. Similar to other estimated indicators in this study, distress financing is also higher among those who received care from private facilities, and for NCDs such as mental health, cancer, liver diseases, and paralysis. In addition, we observed that one-third of households with at least one hospitalization had both CHE and distress financing. Liver diseases had the highest level of incidence for both CHE and distress financing, followed by female diseases, cancer, paralysis, kidney diseases, and injury/road accident. A study in a metropolitan city (Rajshahi) in Bangladesh found that hospitalization caused 37% of distress financing [111]. Another study of 40 LMICs found an average of 32% distress financing when both hospitalization and outdoor services were considered [129]. However, the definition of distress financing in those studies does not include aid from friends and relatives, but instead just borrowing and selling assets.

More hospitalization in public facilities could be due to subsidized healthcare, availability of eminent health specialists, and emergency patient management [130], regardless of the fact that perceived quality of service and patient satisfaction are greater in private facilities than public facilities [131,132]. The momentous financial burden of hospitalization in Bangladesh signifies the dependency on OOPE in both public and private facilities, as OOPE in total health expenditure grew from 60% to 67% from 2010 to 2015, while government spending declined from 26% to 23% [107]. The fact that financial hardship was higher in private health facilities

than in public facilities could be attributable to high treatment costs at private facilities as they offer more personalized and quality healthcare with the preference of physicians and modern technologies without having any financial support from the government. Long hospital stays for NCDs particularly for cancer, liver disease, and heart disease combined with high medical treatment costs, as well as indirect costs such as diet, lodging, informal payments, and transportation, result in higher total OOPE that places a greater financial strain on households.

Our research found that having more children under the age of five in a household increases the risk of CHE on hospitalization in Bangladesh. Previous studies also found that having children in the household increases the likelihood of encountering CHE in both inpatients and outdoor health services in Bangladesh [111,123]. This could be due to the fact that children are more susceptible to frequent health hazards, such as diarrheal infections, fever, and respiratory illnesses like pneumonia, which demand regular hospital stays, ultimately resulting in higher OOPE for households [133,134]. Similarly, having chronic patients in the household was also linked to a higher risk of CHE and distress financing, as chronic patients had longer hospital stays and required regular medication and follow-up for longer periods of time. A study in Bangladesh also came to the same conclusion: chronic care can put a household's finances under constant hardship, which might lead to an increase in OOPE, CHE, and may demand distress financing [123]. Larger households, on the other hand, appear to have a lower incidence of CHE than smaller households. This finding could be related with number of earning members; large households may have more earning members (which significantly reduces the risk of CHE and distress financing), as well as more opportunities to have a higher income in total and savings to meet hospitalization expenses. A recent study in Bangladesh also found that large households are less likely to suffer from CHE [12]. A longitudinal study in India, on the other hand, demonstrated that large households are more likely to have CHE than small households [135].

Our research highlights that UHC financial protection indicators are disproportionately concentrated in poor households, implying that poor households are more prone to experience CHE and distress financing during hospitalization than rich households. However, less access to hospital care for poor households indicate the presence of access barriers due to their financial inability. The health spending of rich households has been associated to their higher ability to pay and the quality of treatment they received, as they faced less financial

hardship due to hospitalization. On the other hand, for poor households a small amount of health care spending can push them to CHE, for which they finance by borrowing, selling assets, or seeking assistance from friends or family. Indeed, they may not even seek healthcare at all since they do not have sufficient money to meet healthcare costs.

The extent and severity of financial hardship associated with OOPE on hospitalization, as investigated in this study, strongly implies the need for national-level social security schemes with a comprehensive benefit package to cover all citizens, with a particular focus on the poor. Although putting such a national plan in place is arduous; pro-poor, employment-based, and community-based or micro-health insurance schemes could all eventually lead towards a national social health security system in Bangladesh. More importantly, the government should take the initiative to engage the private sector including NGOs and also need to provide sufficient financial and technical support to them, in establishing a comprehensive social security scheme to ensure better health access for the population and to achieve national goals. Higher financial burdens in the private sector in Bangladesh also bring policymakers' attention to the need to enact regulatory measures for the private sector. At the same time, regular monitoring should be implemented in both public and private facilities to ensure certain quality standards. Specialized healthcare services, particularly those based on new healthcare technologies, which are currently unavailable at the public facilities should be introduced to protect poor households from high OOPE that occurs due to seeking healthcare from private facilities. Furthermore, subsidized programmes targeting diseases with significant treatment costs, such as cancer, heart disease, liver disease, and kidney disease, should be developed to address the growing financial burden of NCDs. At the same time, this study suggests that treatment for those high-cost diseases be incorporated into existing health insurance benefit packages. Finally, in order to reduce reliance on OOPE, the government should consider increasing its allocations to the health sector, since public health expenditure in Bangladesh is significantly lower than other South Asian countries.

4.5. Study limitations

Our analysis was initially limited to inpatient i.e., hospitalization care, which may have underestimated the financial burden of OOPE, CHE, and distress financing. Since HIES has collected healthcare expenditure data for 365 days of inpatient (hospitalization) and 30 days of outpatient services prior to the survey periods, we had two options for making expenditure data uniform: converting either 30 days expenditure to 365 days or 365 days expenditure to

30 days. However, such a conversion may underestimate/overestimate the actual burden of OOPE [12]. Since hospitalization is one of the leading reasons of CHE and distress financing, we chose to confine our focus to hospitalization. Second, we use THCE and NFE as proxy measures of income to estimate CHE; however, in some situations, this may exaggerate CHE for wealthy households whose income is higher than THCE. Third, recall bias is expected to be strong in the 365 days leading up to the survey, which could affect our estimation if participants provide misinformation due to the need to recall information over a long period of time. Finally, another limitation is the fact that our analysis is based on cross-sectional data rather than longitudinal data. Longitudinal analysis would allow for the examination of trends and patterns in OOPE over time. Time series trends would be helpful to identify fluctuations, structural changes, and the impact of policy interventions on individuals' financial contributions to healthcare. This may also shed light on the effects of population aging on OOPE and could bring evidence on the impact of economic growth on OOPE expenditure in Bangladesh. It observed that OOPE rises with an increase in a country's GDP [136–138]. Factors contributing to is often the rise in OOPE with GDP growth may include increasing healthcare costs, inadequate health insurance coverage, and reliance on private sector healthcare. Our findings highlighted that, OOPE is not manageable for families', particularly, poor families experienced more CHE due to the OOPE and the majority of them managed OOPE by selling assets, borrowing money, and receiving assistance from friends and family. This underscores the importance of proactive policy measures to ensure that economic growth translates into improved financial protection and equitable access to healthcare for all citizens. Despite these limitations, according to the authors' knowledge, this study is the first in Bangladesh to provide disease-specific incidence of distress financing and catastrophic OOPE on hospitalization by public and private facilities.

4.6. Conclusion

Our research revealed substantial financial burden in terms of CHE and distress financing due to OOPE on hospitalization. We also found that private facilities had higher OOPE, CHE, and distress financing than public facilities. In Bangladesh, NCDs had a greater financial hardship than communicable diseases when it came to hospitalization. Cancer, heart disease, liver disease, paralysis, accident/injury, and kidney disease, in particular, are causing increased financial hardship. Finally, destitute households are more likely than wealthy households to suffer from CHE and distress financing. These findings present potential barriers to Bangladesh's goal of reaching UHC and highlight the need for a national social health

protection scheme, and to reform current healthcare services in public facilities according to disease burden. This study intended to assist policymakers in Bangladesh in taking the required steps to safeguard households from financial hardship and to prioritize needs in public facilities. Our research suggests that in order to reduce CHE and distress financing, a mixture of alternative healthcare financing channels apart from OOPE should be investigated, as the current financing method has struggled to provide financial protection to lower income households and is insufficient to ensure UHC.

Chapter 5

5. Implementation barriers and remedial strategies for Community-based Health Insurance in Bangladesh: Insights from national stakeholders

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Abstract

Background

Community-based health insurance is a part of the health system in Bangladesh, and overcoming the obstacles of CBHI is a significant policy concern that has received little attention. The purpose of this study is to analyse the implementation barriers of voluntary CBHI schemes in Bangladesh and the strategies to overcome these barriers from the perspective of national stakeholders.

Methods

This study is exploratory qualitative research, specifically case study design, using key informant interviews to investigate the barriers of CBHI that are faced during the implementation. Using a topic guide, we conducted thirteen semi-structured in-depth interviews with key stakeholders directly involved in the CBHI implementation process. The data were analysed using the Framework analysis method.

Results

The implementation of CBHI schemes in Bangladesh is being constrained by several issues, including inadequate population coverage, adverse selection and moral hazard, lack of knowledge about health insurance principles, a lack of external assistance, and insufficient medical supplies. Door-to-door visits by local community-health workers, as well as regular promotional and educational campaigns involving community influencers, were suggested by stakeholders as ways to educate and encourage people to join the schemes. Stakeholders emphasized the necessity of external assistance and the design of a comprehensive benefits package to attract more people. They also recommended adopting a public-private partnership with a belief that collaboration among the government, microfinance institutions, and cooperative societies will enhance trust and population coverage in Bangladesh.

Conclusions

Our research concludes that systematically addressing implementation barriers by including key stakeholders would be a significant reform to the CBHI model and could serve as a foundation for the planned national health protection scheme for Bangladesh leading to universal health coverage.

5.1. Background

Developing nations are increasingly interested in exploring alternative healthcare financing systems to improve health coverage, accessibility, and financial protection to achieve UHC. In the early 1980s, many developing countries introduced alternative cost recovery public health financing via a user fee system [139]. However, user fees limit healthcare-seeking ability, particularly for those living in the countryside. Many commentators, therefore have been calling for an effective prepaid health financing mechanism to eliminate financial barriers associated with healthcare access [140]. Health insurance has been proven effective at increasing access to healthcare and protecting individuals and families from catastrophic health expenditures. The underlying modality of health insurance allows beneficiaries to pay for healthcare in advance to avoid out-of-pocket expenditure at the point of care. SHI is a form of health insurance usually provided by a central government and sometimes by NGOs at a community level [141]. SHI in LMICs which rely heavily on taxes may face implementation barriers due to inadequate tax collection, low institutional capacity to collect taxes, and a large informal sector workforce. Another form of health insurance is CBHI which proliferated throughout developing countries, especially in Africa in the early 1990s [21]. CBHI schemes are also referred to as mutual health insurance schemes, local health insurance, micro-health insurance, and medical aid societies or medical aid schemes [31]. These insurance schemes are typically managed by local NGOs, hospitals, civil society organizations, or organized cooperative societies with community participation in their management [22]. The primary objective of CBHI schemes is to mobilize local resources to provide quality healthcare services and increase healthcare accessibility in deprived areas [142]. Ghana, Rwanda, Japan, and China started with CBHI and then reformed their health financing system by integrating CBHI schemes into national health insurance; however, their journey to form national health insurance from the CBHI schemes was not straightforward [23,31,143,144]. Mali, Senegal, and India are exploring a similar CBHI scaling-up strategy [23].

Historically, Bangladesh had a tax-based healthcare system; however, the dearth of government capacity and financial protection schemes has resulted in a severe burden of OOPE [19]. In Bangladesh, CBHI exists mainly as a form of MHI initiated by microfinance institutes, NGOs, and hospital/healthcare providers. CBHI in Bangladesh is mainly affiliated with microfinance institutes, where microfinance operators launched health insurance for their borrowers to ensure their well-being. In the late 1990s and early 2000s, microfinance institutions began offering health insurance to their borrowers [8]. The pioneer organizations

for CBHI are Gonoshasthaya Kendra, Ad-din, Grameen Kalyan, Bangladesh Rural Advancement Committee (BRAC), Diabetic Association of Bangladesh, Sajida Foundation, Dhaka Community Hospital, Shakti, Nari Uddug Kendra, Dushtha Shasthya Kendra, Integrated Development Foundation, Society for Social Services and International Centre for Diarrhoeal Disease Research Bangladesh [8,145]. We might broadly categorize CBHI based on the types of insurance providers: (i) provider-based model, in which private health facilities commence health insurance and offer healthcare from their health facilities; (ii) microfinance-based model, where microfinance organizations manage insurance programs for their borrowers; and (iii) non-microfinance-based model, where NGOs launch health insurance for the organized community or specified geographic areas without any link with microfinance [145]. In a provider-based model, private health facilities act as both insurers and providers, similarly, most microfinance institutions also use their health facilities to provide healthcare [43,145]. Non-microfinance NGOs most often buy health care from private healthcare providers, but some also buy insurance packages from insurance companies [145]. The insurance company then provides health care from its contracted health facilities [38]. Enrolment is generally compulsory in a microfinance-based model for their borrowers, whilst provider-based and non-microfinance-based models allow voluntary enrolment. Most CBHI schemes treat the family/household as an enrolment unit. CBHI offers discounts for poor and vulnerable communities and has a greater emphasis on maternal and child healthcare. However, most of these schemes are highly dependent on external funding and/or provide cross-subsidies to recover fund gaps although some of these schemes are evidence to cover a certain amount of operational cost [8]. They also offered discounts on medicine and pathological tests, however, most of them do not have referral systems. CBHI has been shown in several studies to enhance healthcare utilization among the rural poor and lessen out-of-pocket healthcare spending in Bangladesh [39–41].

Although CBHI schemes offer financial protection against healthcare costs to a group of people, the literature indicates that such a financing strategy is not much effective in the advancement of achieving UHC goals [142]. The key grounds for this argument are adverse selection, moral hazard and heavy reliance on external subsidy challenge scheme implementation [21,142]. Major barriers of CBHI relate to conventional health insurance, including a small risk pooling, limited technical and organizational knowledge, low service coverage capacity, poor quality of care, and inadequate service providers [21].

Although there is substantial literature on CBHI in Africa and Asia, there are few studies in Bangladesh [43]. Most of the Bangladeshi literature focuses on the impact of CBHI on healthcare access and out-of-pocket spending and investigates the factors that influence enrolment and renewal [42,146,147]. Hence, this study aims to explore the implementation barriers of CBHI in Bangladesh, and strategies to overcome these barriers. Bangladesh is behind other countries in the journey to UHC and the adoption of CBHI as a mechanism of financing for healthcare. The GOB plans to reform healthcare financing, and CBHI is an integral part of the adopted healthcare financing strategy 2012-2032 [19]. To secure healthcare for the massive informal sector, the government strategy relies heavily on CBHI. In this context, it is crucial to understand CBHI's implementation barriers since this will benefit policymakers in their efforts to implement a healthcare financing strategy, particularly targeting the informal sector.

5.2. Methods

5.2.1. Study design

This case study was conducted in Bangladesh using in-depth interviews to investigate (i) barriers to CBHI implementation and (ii) strategies to overcome these barriers from the perspective of researchers, policymakers, and individuals directly involved in the operation of CBHI. We employed a case study design as the approach offers an opportunity to perform a thorough examination of the complex phenomena—CBHI—occurring in a particular environment, in Bangladesh [60].

5.2.2. Participant selection and recruitment

We compiled a list of seven CBHI schemes with voluntary membership from the published literature. Only three of these schemes were operational during the data collection period, but we also wanted to look at the lessons learned from significant CBHI efforts that are no longer active. Fifteen key informants were purposively identified based on their experience and involvement in the seven CBHI schemes. Participants were selected based on who could provide the best information, using a method referred to as judgmental sampling or expert sampling. Interviews were conducted with the managers, field supervisors, and directors of the CBHI schemes due to their knowledge of the barriers to implementation. Email invitations that included the study information and consent form were sent to the fifteen potential interviewees. Nine people consented to participate in the study. These participants were from the Gonoshasthaya Kendra, International Centre for Diarrhoeal Disease Research, Bangladesh,

BRAC, Grameen Kalyan, WHO, World Bank, and the University of Dhaka. Seven participants actively participated in the implementation of CBHI schemes, while the other two were health financing policy experts and researchers. The seven participants engaged in a discussion regarding the obstacles encountered during the implementation of their insurance schemes, which represented five separate schemes. Given that our participants were from various schemes, it is likely that the obstacles to implementation may vary among these schemes. Nevertheless, we categorised the obstacles to implementation by focusing on the fundamental feature of these schemes, that is, voluntary membership. In addition to these nine participants, four officials from the MOHFW were also interviewed to gain policymakers' views on CBHI schemes. There is widespread controversy regarding the ideal sample size for qualitative research, but most experts agree that data saturation is the most vital factor to consider in determining sample size for qualitative research [148–152]. In our study, we interviewed two groups of individuals. We covered implementation experiences from five of the seven recognized CBHI schemes in Bangladesh and ceased reaching out to additional participants once we assumed that no new information was being provided by our participants. We also interviewed two researchers to justify data saturation, i.e., to determine whether we missed any information on implementation barriers in addition to the information provided by our seven participants, but they did not provide any further insights. Then, we interviewed policymakers for our research to obtain their perspectives on CBHI. Similarly, once we understand that our interviewees have offered no new information, we stop recruiting new policymakers.

5.2.3. Data collection

We conducted thirteen semi-structured personal interviews (including four government officials), using a topic guide (appendix 5.1), which was developed from a prior literature review conducted for this study. All study authors reviewed the guide for completeness and appropriateness of topics. Our participants were the CBHI implementers and researchers/policymakers. Therefore, to get maximum benefit the interview guide was piloted with a healthcare financing researcher who has experience in CBHI implementation. Interviews were conducted between March and June 2021. Seven interviews were conducted through online-based one-to-one interactive sessions and six were face-to-face with strict adherence to social distancing and COVID-19 protocols. Face-to-face interviews took place at the participants' workplace, either in an enclosed meeting room or in the participants' room to avoid interruptions during the interviews. Interviews commenced with the interviewer

explaining the study's objective, and issues to be discussed and seeking verbal consent to audio record the conversation. The interviewer has prior experience in conducting in-depth interviews in Bangladesh. Participants were asked to describe their role and expertise and provide an overview of their schemes, including premiums, benefits packages, and enrolment procedures. The interviewer used an interview topic guide to know the barriers to CBHI implementation and probes to elicit more detailed information from the participants. The duration of the interviews ranged from 30 to 50 minutes. The interviews were carried out in Bengali and then translated into English.

It should be noted that the interviewer had a prior working relationship with the interviewees. This relationship may have influenced how questions were asked, reactions to interviewee responses and data analysis, making it challenging to be entirely objective, to listen solely from a researcher's perspective and to take an outsider's perspective. The interviewer, however, was conscious of the need to maintain objectivity throughout the interview by reserving his own opinions and responses.

5.2.4. Data analysis

Data were analysed using the Framework Analysis method, which includes seven steps [61]. First, we translated the audio interviews from the exact form of speech in Bengali to English. Secondly, at the familiarization stage, the researcher read interview transcriptions repeatedly to gain more insights. Thirdly, in the coding phase, two researchers (NS and ETT) independently coded the same two randomly selected interviews based on the initial deductive codes identified from the literature review [42,147,153–156]. This led to the development of inductive codes by revising deductive codes from the two coded interview transcripts. In the fourth step, we developed a comprehensive working codebook framework based on the revised codes (Table 5.1) and applied this to the remaining eleven transcripts at the indexing (fifth) stage. Then, we developed a framework matrix using a spreadsheet with rows for interviewees and columns for codes and applied this to all interview transcripts to summarize data at the charting (sixth) stage, where each cell contained summarized data. The framework matrix was circulated to all researchers for review. It was subsequently updated in response to their suggestions. All researchers eventually reached a consensus on the final version of the framework matrix. The last step involved interpreting the matrix based on the study objectives.

Table 5.1. Codes and description

Codes	Description
Inadequate population coverage	Barriers as a result of low enrolment and low renewal rates, or the voluntary nature of scheme.
High claim rate	Significant rate of healthcare consumption due to adverse selection and moral hazard.
High startup and administrative cost	Regular advertising campaigns, transportation, claim processing, staff salaries, infrastructure, and so on all incur costs.
Scheme design	Barriers due to benefit package design, premium amount, co-payment rate, etc.
Competitive healthcare market	In the catchment areas, the influence of informal providers such as village practitioners, traditional healers, and drug sellers, as well as professional providers.
Inadequate knowledge on health insurance principle and CBHI	Community's perception on health insurance modalities.
Quality of care and trust	Barriers related to inadequate health care supplies e.g., healthcare providers and drugs availability, quality of drugs, healthcare providers behaviours, etc. and barriers to trust on management due to less community or government engagement or due to earlier bad experiences.
Distance to health facility	Distance to a health facility creates barriers in the form of transportation and time costs for users.

5.3. Findings

According to the codes indicated in Table 5.1, the study participants' thoughts on CBHI implementation barriers and strategies to overcome these are described in this section.

5.3.1. Inadequate population coverage

In Bangladesh, a lack of population coverage hinders the successful implementation of CBHI schemes. Due to the voluntary enrolment approach, a limited number of people were interested in enrolling in these schemes, and even fewer were interested in renewing their membership after their insurance periods had expired. All thirteen participants identified inadequate population coverage as a major impediment to the successful implementation of CBHI. A researcher specified that,

"*… The greatest difficulty is convincing and enrolling a sufficient number of individuals. [Inadequate] enrolment and renewal challenges will arise specifically for small community-based insurance schemes due to their approach of voluntary membership*" (**Participant 9**)

Interviewees mentioned that membership renewal might be influenced by healthcare benefit consumption and their frequency of healthcare utilization during the membership tenure, satisfaction with the quality of care, and the availability of substitute healthcare choices in their community. According to a majority of participants, members who were unable to acquire enough healthcare benefits from the scheme after purchasing a membership package are unlikely to renew their membership. One participant explained,

"*Several reasons might act behind it [membership renewal]. Maybe they might not have had the opportunity to utilize healthcare…. Moreover, are they happy with the service? or, did they get any alternate option?"* (**Participant 1**)

To encourage more individuals to join health insurance, participants advised door-to-door visits by community health workers (CHWs), health education sessions, campaigns, and financial assistance to destitute families. In this regard, a monetary incentive for CHWs depending on their performance could incentivize them to visit more households to increase the number of insured members. One respondent mentioned a plan to aggregate funds from the local elite to support struggling families, which may have stimulated their interest in joining the scheme. According to a participant in the CHWs incentive,

"*We set an insurance target [to enrol new members] and if a community health worker can achieve that target, we will reward them, they [community health worker] get motivated and incentivized to achieve the target for the reward*" (**Participant 2**)

Two interviewees also mentioned that including non-health benefits in the benefits package such as savings opportunities, discounted training programs and grocery items could motivate membership renewal. According to an interviewee,

"…*members were able to buy some grocery items at a discount rate. We listed the regularly needed items and provided them 10% to 30% discount. This step encouraged the members to renew*" (**Participant 5**)

5.3.2. High claim rate

High benefit consumption, according to six interviewees, is another potential barrier to the implementation of CBHI in Bangladesh. CBHI schemes, like other health insurance, face moral

hazards and adverse selection. Beneficiaries tend to overuse benefits, with some even claiming insurance before they had legitimate needs. Some of the participants stated that since their insurance relies significantly on primary healthcare, particularly maternal health services, those who are pregnant or planning to become pregnant are likely to purchase a membership to receive insurance benefits. One interviewee expressed that,

"*When there is a pregnant woman in a family, if we try to convince them they become interested in the insurance to get the benefits*" (**Participant 2**)

A similar tendency was also noticed by insurance providers that offer secondary and tertiary level care, who found that consumers are keen to join health insurance before needing healthcare service. In this regard, an interviewee noted that,

"*We observed that only those [ready-made garments] workers were willing to join who needed some complicated or major operation. Because if they give only 300 BDT [as premium], the treatment cost for them will reduce by 50%...*" (**Participant 3**)

One of the policymakers suggested group health insurance and mandatory enrolment as a way to overcome the obstacles of moral hazard and adverse selection. According to the interviewee-

"*It would be useful if a group-based CBHI strategy could be established and made mandatory by the government to overcome these barriers"* (**Participant 11**)

5.3.3. High startup and administrative cost

Seven interviewees discussed high start-up and administrative costs and limited or unavailable financial support from the government or donor agencies as barriers. Despite CBHI schemes being generally managed by NGOs as a not-for-profit service, participants said they could not cover operating costs with insurance revenue. A participant expressed that,

"*We are trying to recover the total cost, but we can manage to recover around 80% of it through healthcare [insurance scheme]. Our head office provides the rest of the 20% as subsidies*" (**Participant 4**)

CBHI insurers must undertake routine advertising and awareness activities, and manual procedures, typically involving a significant amount of work in record keeping, premium collection and depositing in the bank, and claim processing, all of which drive up administrative costs. At the same time, a substantial initial investment necessary for such an

insurance program was explained as a barrier to starting an insurance initiative. An interviewee said,

"*We planned to create a cashless system for the service providers, and we did it.… but the claim management and claim verifications were tough…. staff from different programs…backed this insurance program but if any organization wants to start this program fresh, the administrative cost will be higher with the hassle."* **(Participant 7)**

To minimize administrative workload and premium collection costs, one participant recommended adopting an automated computerized system and mobile banking payment systems such as bKash, Nagad, and Ucash. During the initial stage, interviewees also emphasized the need for financial assistance from the government or donor agencies as startup capital. One interviewee stated that,

"*At the very first moment, seed money is needed from the donor or the government for 2 years as the premium collection is not enough in the first phase. After running for 2-3 years, then a large pool can be created, and it can sustain in the long run.*" (**Participant 5**)

Similarly, another respondent emphasized the necessity of government financial and technical assistance. The interviewee further underlined the importance of referral support from government health facilities for the successful implementation of CBHI. According to the interviewee-

"*We need both financial and technical support from the government. We need financial backup as well as referral support from government health facilities*" (**Participant 3**)

5.3.4. Scheme design

Members' decisions to join health insurance are also influenced by benefit package design, premium amount, and copayment rates. Four participants discussed scheme features as the implementation barriers in Bangladesh. One participant noted the necessity of including medicine in the benefits package because medicine accounts for the largest share OOPE in Bangladesh. This may help to increase insurance attractiveness; otherwise, it may be difficult to attract members. Our respondent identified scheme features as a barrier because such insurance typically was targeted and designed to reduce the burden of healthcare expenses on socioeconomically disadvantaged families. According to an interviewee,

"When rich people get to know that this scheme is targeted for the poor population and the coverage is low, they do not feel interested anymore" (**Participant 7**)

Another interviewee cited high copayment rates as a deterrent to enrolling in health insurance. Respondents also stated that, while insurance only provides primary healthcare, members are less likely to purchase their policy because they can seek healthcare from public facilities and get medicine from a pharmacy rather than paying an insurance premium and copayment to consult with a doctor. One researcher described the issue of copayment as,

"The benefit they get from it [insurance scheme] is not much helpful for them…. patient pays for 80% cost while the insurance scheme bears only 10-20% of the total expense." (**Participant 8**)

The interviewees suggested the use of research-based evidence in constructing an appealing health insurance scheme. They also talked about research on implementation costs to distinguish how much money they would need to collect from their members and how much assistance they would require from the government or donor agencies. Respondents discussed designing a scheme that includes opportunities to consult both public and private healthcare practitioners, which could enhance the likelihood of health insurance. According to a participant,

"The choices of healthcare provider should be increased. Both the public and private providers should be included in the program" (**Participant 1**)

5.3.5. Competitive healthcare market

Growing informal healthcare professionals, such as village practitioners, traditional healers, and drug sellers, affect health insurance according to the three interviewees. According to one participant, local informal providers do not want their scheme to be popular; therefore, they try to discredit the scheme doctors by spreading rumours about them in the community. An additional hurdle identified by one respondent is that people are accustomed to seeking healthcare from local pharmacies, which prescribe antibiotics to increase profits. This also ensures that patients recover quickly. One interviewee described the issue of informal providers as,

"…*the doctors of our project would not do that [prescribe antibiotics] and, in that case, the recovery might take a few more days. The informal doctors try to grab that chance to create confusion among the village people."* (**Participant 1**)

Our participants did not provide any detailed strategies to address the barrier of a competitive healthcare market.

5.3.6. Inadequate knowledge of health insurance principles and CBHI scheme

All thirteen interviewees identified inadequate knowledge of health insurance principles as a major barrier for CBHI in Bangladesh. They claim that people in their community are not familiar with health insurance concepts, making it more complex to enrol the socio-economically disadvantaged segments as they do not have sufficient health education. A participant described that,

"*The challenge persists from the population perspective in terms of acceptance. The marginalized people think that why do they give money before the service or they think that they are in sound health condition, why do they need to pay for insurance."* (**Participant 3**)

Another interviewee discussed this barrier and compared it with micro-credits and savings. According to the interviewee,

"*Insurance as a concept is very unfamiliar in the community. People understand credits and savings. If you start making them understand the health-related uncertainty and the concept of the premium, they will get it for now but when they do not get the premium amount back if they do not get sick, they will not accept the concept because the total practice of insurance is unknown in our community."* (**Participant 6**)

Our interviewees proposed making door-to-door visits by engaging the services of community health workers who are already familiar with their community to promote the health insurance scheme. One participant recommended organizing health education sessions by involving influential local personnel so that the community may understand more about health insurance. One of the participants stated,

*"We organize weekly group sessions among different professional groups or in different villages so that they can learn about this scheme and join***"** (**Participant 5**)

In Bangladesh, micro-finance institutions are well known among the lower socio-economic clusters. They know more about microfinance procedures than health insurance. The common practice for this community is to receive loans from the NGOs and then pay back the loan by instalment. One participant quoted the micro-finance initiative taken by BRAC, which goes by the name "Medical Treatment Loan". Under this initiative, an NGO will provide medical loans instead of asking for advance premiums for health insurance. According to the participant,

"*…a borrower of BRAC microfinance scheme or anyone from his family gets sick, then... with BRAC slip they will get a 50% discount for consultation, and the estimated cost of treatment will be written on the other side of that slip. Then the patient will go back to the BRAC microfinance office with the slip, and it will be appraised for how much loan he/she might get. We saw a huge response in the first year of piloting and the recovery rate was 98.5% ….*" (**Participant 6**)

5.3.7. Quality of care and trust

Seven participants talked about how the quality of healthcare services and trust in insurance providers are two factors that make health insurance more difficult to implement. The availability of healthcare providers or drugs could also impact health insurance implementation in the long run. According to one of the interviewees,

"…If the doctor remains absent when she [insured member] visits the hospital, then that family will lose their interest in our insurance. If we can ensure the quality of our service and increase the efficiency of our staff, then insurance [member enrolment and renewal] becomes very easier." (**Participant 2**)

Similarly, if pharmacies or enrolled drug stores remain closed during patients' visits, member satisfaction and trust in insurance providers will be affected. Participants also noted infrastructural and workforce constraints on both the health and management areas as hurdles to their scheme. Health workforce shortage was brought up by one of the participants,

"*…under each regional office, there are 10-12 health centres. At least 2 doctors should be there in each region but there are less than 12 doctors in 12 health centres*" (**Participant 4**)

Participants also talked about the barriers they face regarding healthcare providers' behaviour. They claim that providing poor quality services and misbehaviour by clinicians with patients from insured families will reduce community acceptance and may lead to patients not continuing with the scheme. Furthermore, informal providers have been working in rural areas for a long time and are well-liked in their community; trust is most important to health insurance when replacing informal providers' roles in the community. According to one of the participants,

"*In the rural areas, people often seek healthcare from village doctors, quacks, pharmacies etc. In that case, when we want to divert them, then there is a trust issue*" (**Participant 1**)

Our interviewees proposed several ways for overcoming barriers linked to care quality and trust. Two of our participants advocated for the use of more paramedics to enhance the supply of healthcare professionals, or even paramedics who could relieve physicians from some of their burdens so that they can see more patients that are most in need. They also recommended telehealth services and online consultations to increase accessibility and build trust within the community. An interviewee explained that,

"When the doctor is absent… but the patient demands the doctor's consultation, the paramedics establish the connection with the doctor through skype. If anyone wants to utilize this option, he/she can contact the doctor even after hours and in that case, he can directly call the doctor through skype. In this way, we are trying to build trust." (**Participant 1**)

They also talked about the importance of securing the supply of high-quality drugs and providing incentives for healthcare providers to ensure that members receive high-quality care. This problem was explained by one participant as follows,

"*Controlling this issue seemed quite difficult to us because the agenda of the medical practitioner is different…might not think himself accountable to consult with the cardholder patients on priority basis as he does not have any additional benefit for this. It is necessary to design a proper mechanism for this issue such as to incentivize the medical practitioners*" (**Participant 6**)

5.3.8. Distance to a health facility

Three of our interviewees noted distance to a health facility as an implementation barrier for health insurance because it is connected with additional travel and time costs from the user's perspective. They stated that the distance between a health facility and a member's house reduces the likelihood of being insured. As one participant described it,
"…a village a bit far away from here [health facility] …One will need 150-200/- [Bangladeshi taka] to come here from that place! But if he [she] wants to visit the government hospital, it will cost him [her] only 10/- [Bangladeshi taka] …" (**Participant 2**)

One of our interviewees proposed implementing satellite clinics because this approach helped to get the elderly population insured in their scheme. As stated by the participant,

"We started a satellite clinic in the rural areas. Every week the satellite clinic covered different village areas……[they] liked this service very much and the elderly group was also coming to the satellite clinic" (**Participant 5**)

5.3.9. Views of policymakers on CBHI

Our interviewees from the representative of CBHI schemes explained the need for technical and financial support from the government. In this section, we will discuss the policymakers' views and plan for the CBHI schemes.

Four of our policymakers acknowledged that the government is eager to provide technical and policy-related assistance to CBHI initiatives. In addition, they mentioned that the government is currently providing technical assistance to several privately initiated health insurance. According to a policymaker-

"*We are indirectly involved with a few of them, including an insurance scheme for ready-made garment workers and another for tea-garden workers. The Ministry of Health and the Health Economics Unit are collaborating to provide technical support to those who want it*" (**Participant 10**)

The policymakers also specified the ongoing government plan for CBHI schemes. They discussed the significance of the small CBHI schemes that are currently functioning in Bangladesh and the necessity to centralize their administration. A policymaker told as-

"Most country's [insurance] initiatives were taken on a small scale before being pooled together under a single platform. Since integrating everyone under one umbrella takes time, small initiatives should be undertaken in the meantime" (**Participant 12**)

All policymakers expressed the necessity for a separate government entity to facilitate healthcare financing initiatives, including CBHI schemes. Therefore, they discussed continuing activities for the formation of the National Health Security Act and the National Health Security Office. According to an interviewee-

"*The act [National Health Security Act] is now being designed and already incorporates CBHI. The concept of cooperatives [CBHI] has existed here for a very long time. Until it is governed by a central authority, it will not be effective*" (**Participant 13**)

5.4. Discussion

Our research examines the barriers to implementing CBHI in Bangladesh and stakeholders' views on strategies to overcome these barriers. One of the key issues of CBHI schemes discussed by our participants is insufficient population coverage. Low enrolment and renewal rates were also noted as barriers to the successful implementation of CBHI, which they believe is due to the voluntary nature of membership. CBHIs are often small in size because they are designed to target a specific geographic area. Such schemes are more prone to implementation issues since they have limited risk diversification opportunities due to small membership pools. Previous studies indicate that awareness and understanding of the CBHI concept, trust in scheme management, perceived quality of care, and socio-demographic characteristics all play a role in households' decision to join and stay in the scheme [42,147,154,155].

To encourage individuals to join CBHI, our interviewees suggested door-to-door visits, health education sessions, campaigns, and financial assistance to the destitute. Previous studies have discovered that door-to-door visits, health education sessions, and campaigns have an effective influence on increasing enrolment and renewal [157–165]. Similarly, providing some form of financial assistance to disadvantaged households could make it more affordable for them to join CBHI [153,157,158,160,166,167]. Our stakeholders also talked about providing additional performance-based monetary incentives to CHWs to motivate them to visit more households and recruit new members. Previous research in Bangladesh has shown that monetary incentives positively impact CHW's retention and intervention success [168,169]. Our interviewees also suggested incorporating non-health benefits in the benefits package to encourage their membership renewal. In Bangladesh, several schemes have attempted to implement non-health benefits in CBHI among informal workers [39] and ready-made garment workers [170]. However, the impact of non-health benefits is yet undetermined in Bangladesh. According to a study in Vietnam, the inclusion of non-health benefits did attract more individuals and stimulated the expansion of the social health insurance scheme [27]. Similarly, another research suggested that countries must push beyond the health sector to achieve UHC, and social health insurance schemes may need to incorporate non-health benefits to get maximum insurance coverage [171]. The inclusion of non-health benefits may serve as an incentive for Bangladeshi informal workers to join and renew CBHI memberships.

Moral hazard is a recognized threat that leads to high benefit consumption and obstructs voluntary CBHI implementation in Bangladesh. Due to the voluntary nature of the schemes, they are sensitive to adverse selection, in which high-risk and sick people are more likely to purchase health insurance than low-risk and healthy people [172]. Adverse selection is a threat to financial viability because it limits the potential for risk-sharing from healthy to sick people, forcing insurers to raise premiums to adjust costs when they face high claims. Low-risk persons are more likely to leave a scheme as a result of the increased premiums due to the expected low healthcare costs relative to their CBHI contribution, resulting in further adverse selection [32]. Adverse selection has been documented in CBHI schemes in India [173], China [174], and Africa [172]. Participants also emphasized the moral hazard problem, which states that once people are insured, they are more prone to overuse medical services. This might be due to either a lack of concern for one's health after joining a scheme or deliberate deceitfulness by consumers. Introducing group coverage, mandatory membership, and waiting periods are recognized techniques to overcome the problem of adverse selection; however, claim limits and copayments could lessen moral hazard [175]. Further research is suggested to explore the effectiveness of those strategies on moral hazard and adverse selection.

Our interviewees noted that the progress of CBHI schemes is significantly impacted due to high startup and administrative costs. The establishment of CBHI is costly as it necessitates new infrastructure, staff recruitment, and the development of procedures and regulations before receiving significant premiums, making it difficult to recoup expenses. Studies conducted in Bangladesh stated that none of the CBHI with voluntary membership could recover their operating costs and heavily rely on subsidies [38,145]. Stakeholders stated that CBHI requires regular marketing and awareness campaigns and efforts to collect premiums, creating additional administrative and financial barriers. The most costly administrative task of CBHI in Tanzania was revenue collection comprising marketing and registration activities [176]. Interviewees also acknowledged how they are challenged by the absence of additional monetary assistance from the government or donor agencies. Since premium and co-payment arrangements are insufficient, the financial viability of such schemes is a major concern.

The economic effect from the pandemic has strained global financial resources, leading to a shift in priorities and increased competition for funding. As governments and donor agencies

cope with the escalating costs of pandemic response measures, funding for non-emergency health initiatives like CBHI is at risk of being deprioritized. This underscores the urgent need for innovative financing solutions, increased local resource mobilization, and adaptive scheme designs to navigate the evolving landscape and ensure the continued effectiveness of CBHI in providing essential health coverage to vulnerable populations. Interviewees advised adopting an automated computerized system and a mobile banking payment system to reduce workload and administrative costs. In the health insurance market, new technology and innovation, such as automation [177] and mobile money payment [178] are very effective in decreasing manual workload, time, and transition costs, but we see no evidence that this can entirely obviate the need for external financial support. Our participants also highlighted the need for a risk fund allocation for CBHI and the need for seed money to get a CBHI off the ground.

Our study found that scheme features, i.e., benefits package, could be a challenging factor to attract the target population. Due to a limited risk pool and inadequate population coverage, most benefit packages are not adequately designed to cover all medical expenses. As a result, insured members frequently have to spend a large amount of out-of-pocket money for medical diagnostics and medication as a co-payment. Our interviewees discussed the importance of including medicine in the benefits package and designing the benefit package to meet people's healthcare needs and preferences. The scheme should be affordable to the poor while also appealing to the wealthy, cover both inpatient and outpatient services, and provide a choice of public and private providers. The benefits packages which can address the needs of a community, are equitable, and provide outpatient services are likely to increase enrolment [179–181]. On the other hand, low membership is attributed to chronic disease exclusion [182], a high premium amount [182], and limited disease coverage [179]. Our participants advised that benefit packages be designed using research-based knowledge to attract more customers.

The majority of individuals are reluctant to enrol in a CBHI scheme due to their lack of understanding of health insurance concepts. According to our study, the community's awareness of health insurance, socio-cultural beliefs, social norms, and healthcare-seeking patterns could impede CBHI implementation. The concept of health insurance is unfamiliar in Bangladesh, particularly among the disadvantaged rural population. Low enrolment in CBHI appears to be a strong sign that the targeted rural populace does not realize the value of an

advance payment, i.e., purchasing a specific measure of assurance against an unpredictable future event. A review article on CBHI articulated that proper understanding of the concept and principles of health insurance has a positive impact on enrolment and renewal in different countries such as Afghanistan, Cameroon, China, Ghana, Guatemala, India, Kenya, Nigeria, the Philippines, Tanzania, and Uganda [155]. Interviewees suggested a promotional campaign, awareness-building activities such as door-to-door visits, and health education sessions in the community with the involvement of local community health workers and influential personnel to promote the insurance scheme by educating people.

Moreover, medical treatment loans mentioned by our interviewee could be a feasible variation of community health insurance in Bangladesh. Microfinance scheme borrowers can apply for medical loans for themselves and their family members who have medical needs. The microfinance institute will allow them to pay the debts in instalments. Further research is needed to explore the community's response, acceptability, and the prospect of a medical loan-based micro health insurance scheme.

Trust in insurance providers and consumer satisfaction, influenced by perceived healthcare quality, were mentioned by respondents as barriers to CBHI implementation. The availability and efficiency of healthcare personnel, their attitude or engagement with patients, and health facility features all play a role in how people perceive healthcare quality [154]. Low-quality healthcare because of insufficient or unavailability of healthcare professionals and drug supplies during patients' visiting hours, infrastructural features, and health professionals' negative attitudes were identified as significant barriers to CBHI implementation in our study. Low-quality healthcare and healthcare providers' inefficient technical proficiency were barriers to enrolment and membership renewal in Rwanda [183]. Another study in Benin reported that approximately 30% of members drop out of a scheme due to the providers' negative attitudes and behaviours [161]. Most of the stated reasons for dissatisfaction were long waiting queues, providers' negative attitude and efficiency, reimbursement rates, membership fees, drug quality, and treatment variation among socio-economic classes [154]. The capacity to provide high-quality healthcare services based on the needs of enrolees would boost their satisfaction and build trust over time. Our interviewees suggested paramedics, telehealth services, and online consultation to improve the healthcare supply. Incentives and training are proposed to motivate health professionals and the provision of high-quality medicines to ensure consumer satisfaction and trust.

The distance between a household and a health facility is an important indicator of inequality in terms of healthcare accessibility. A long distance has been cited as a barrier to implementing CBHI in Bangladesh, potentially discouraging the target population from participating. According to studies, low enrolment has been linked to high travel costs due to great distances [161,183]. A study in Bangladesh also found that households close to health facilities were 2.7 times more likely to renew their membership [42], which could be due to the information gap and travel expenditure to access healthcare services. To solve the issue of long distances, one of our participants suggested setting up a satellite clinic; however, satellite clinics are only effective for outpatient healthcare services. Collaboration between public and private providers could open up possibilities to receive healthcare from nearby facilities, making healthcare more accessible. Although our study gathers experience from Bangladesh, our findings, broader discussion, and suggested strategies apply to other low-resource contexts and are useful to policymakers.

5.5. Limitations

Although the study was qualitative, it may have benefited from quantitative insights as well as scheme beneficiaries' participation. However, it was challenging to explore the beneficiaries' perceptions of CBHI because of COVID-19 restrictions. Secondly, our study only included health insurance schemes whose information was available in the literature, which could be a source of bias given that successful schemes are more likely to be documented [43]. Furthermore, we may have lost some information because some of the interviews were disrupted due to a poor internet connection. Despite these limitations, we believe this study provides a comprehensive understanding of the implementation barriers of CBHI in Bangladesh.

5.6. Conclusion

This qualitative study examines the barriers to implementing CBHI in Bangladesh from the viewpoints of insurance providers, researchers, and policymakers, including respondents from several active and recently closed schemes, as well as researchers and policymakers. The key barriers to CBHI implementation are insufficient population coverage, adverse selection, moral hazard, high startup and administrative costs, lack of knowledge of health insurance modalities, inadequate healthcare supplies, insurer trust, and the distance to travel to health facilities.

The CBHI in Bangladesh could serve as a foundation for the planned National Health Protection Scheme towards UHC. Bangladesh is the birthplace of microfinance, and we have seen several integrations between health insurance and microfinance schemes. However, public-private partnership initiatives are necessary to reach a significant portion of the target population. Microfinance institutes and cooperative societies working at the grassroots level in Bangladesh can be prospective partners because they already have a well-organized and trusted platform. Our findings strongly suggest that policymakers should support CBHI schemes in technical and financial aspects and establish a distinct body to investigate the efficacy of public-private (i.e., NGOs, microfinance institutions, and cooperative societies) partnered approaches to CBHI in Bangladesh.

Chapter 6

6. Political economy analysis of health financing reform in Bangladesh

Currently submitted as:

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Abstract

Bangladesh has a strong record of technical and institutional innovation to support the health of poorer communities. In recent years, however, neighbouring South and South-East Asian countries have pulled ahead in ensuring that poorer populations have access to affordable healthcare, and there are now many good practice models to learn from. These include India, Vietnam, and Thailand's establishment of a government-funded national health insurance to provide healthcare to lower socioeconomic communities. In contrast to these countries, Bangladesh is implementing a pilot pro-poor social health protection scheme. However, the expansion of the scheme and implementation of a healthcare financing strategy are not progressing. What have been the challenges to health financing reform in Bangladesh? This political economy analysis identifies potential bottlenecks and a recommended course of action. We conducted ten interviews with policymakers and academics on health policy. Also, we reviewed published and unpublished policy documents and reports from the ministry of health and family welfare and international organisations. We used both inductive and deductive approaches to analyse data. Our research demonstrates that the political economy context in Bangladesh serves as a driving force for the acceleration of health financing reform. We found that the major political challenges include vetoes from the medical association and health professionals; ownership conflicts between bureaucrats, a neutral stance from the ministry of finance; and funding and ownership politics among donor agencies and international development partners. Bangladesh has strong fundamentals: a youthful population at a time when much of the world is ageing; demonstrated capacity for sustained economic growth; world-leading local institutions, and a culture of strong local community organisations. The challenge for health policy in the country is to capitalise on these fundamentals and push through reforms – this will require strong leadership skills, political commitment, and perseverance to adopt and implement health financing reforms aimed at UHC.

6.1. Introduction

Low-and middle-income countries are persistently struggling to address their health financing challenges due to their limited resources for health. Key challenges include, but are not limited to, determining who would contribute; how resources would be pooled; how effective purchasing can be ensured; what kinds of services ought to be included in benefit packages. To address health financing challenges, LMICs are currently adopting and implementing health financing strategies [184]. Health financing strategy design, adoption, and implementation often require system modifications and transformation: in other words, reform. WHO acknowledges that HFR is a successful approach to increasing access to health care, which is necessary to achieve the target of UHC [140,185].

Bangladesh is lagging on its HFR compared to neighbouring South and South-East Asian countries (SSEACs), who have pulled ahead in ensuring that poorer populations have access to affordable healthcare. We review the HFR experiences of four SSEACs: India, Nepal, Vietnam, and Thailand, to gain insight into how these countries allocate and use their resources and how they intend to put these highly political decisions into action to implement their reform aimed at achieving UHC. We chose these four countries because they successfully implemented or/and are implementing their reform activities and have made significant strides toward UHC, and Bangladesh could benefit from their experiences.

India

In India, financing through compulsory/voluntary risk pooling is insufficient, and SHI coverage is restricted to a few people [186]. Between 2007 and 2018 the state and central governments of India implemented government-funded health insurance and demand-side financing schemes [187]. These programmes are confined to specific geographic regions and offer only inpatient healthcare services. At the national level, the Indian government initiated and launched the Rashtriya Swasthya Bima Yojana (RSBY), a national-level health insurance programme to provide healthcare for those living below the poverty line [187,188]. The aim of RSBY, was to provide coverage for hospital-based healthcare services to 300 million low-income individuals. Beneficiaries of RSBY had access to healthcare from both public and private providers; benefit claims were handled by private insurers. In 2018, the Central Government of India launched the Ayushman Bharat to replace RSBY with increased benefits and coverage due to low enrolment rates, restrictions to cover only inpatient services, and inadequate risk protection [187]. The programme has two interconnected components. First,

the government converted 150,000 sub-centres and primary health centres into health and wellness centres to provide comprehensive primary healthcare services. The second component is the Pradhan Mantri Jan Arogya Yojana (PM-JY), also known as "*Prime Minister's People Health Program*". PM-JY is the world's largest government-funded health insurance programme, providing healthcare coverage of Rs. 500,000 (US$ 6038) per household per year to 107.4 million low-income and disadvantaged households i.e., approximately 500 million people [189]. The scheme covers most secondary and tertiary level healthcare services offered in public and private hospitals participating in the programme.

Healthcare financing reforms in India have made notable progress in enhancing the accessibility and affordability of healthcare services, although certain challenges and gaps persist. The PM-JAY initiative has expanded insurance coverage and safeguarded individuals from substantial health expenses. By 2021, more than 270 million beneficiaries had enrolled in the program [189,190]. Public and private sectors have actively participated in India's HFR. However, OOPE still account for a significant portion of healthcare spending, pushing many individuals into poverty. The quality of health services varies, and there are regional disparities in access to care. Additionally, the availability of healthcare infrastructure and human resources needs further improvement, particularly in rural and remote areas. While HFR in India have expanded insurance coverage and enhanced access to care, achieving comprehensive UHC remains an ongoing endeavour.

Nepal

In Nepal, a government-funded CBHI scheme was introduced in 2002, primarily in two districts; in 2005/2006, this scheme was expanded to four additional districts. The country's health financing system underwent two significant reforms: First, the Free Health Care Policy (FHCP) and the safe motherhood policy known as the Ama programme, both are small-scale free healthcare schemes [191]. In 2006, FHCP was implemented by eliminating user fees for primary healthcare services at public health facilities with a motto that every citizen has the right to get free basic health services. The Ama programme was implemented as a maternal incentive scheme, providing universal free childbirth services and a transport allowance to mothers [36]. The second reform initiative is the Social Health Security Program (SHSP), a social protection programme launched in response to an urgent need for population-level intervention to mobilise financial resources for health through prepayment and risk pooling

methods [192]. The primary goal of the programme was to promote UHC by expanding equitable access to high-quality healthcare services.

The government of Nepal established the Social Health Security Development Committee (Health Insurance Board) in 2015 to implement the social protection scheme. Before that, in 2014, the government of Nepal approved a National Health Insurance Policy. The SHSP was initially implemented in three districts in 2016, with an intention to expand to all districts [193]. All age groups are eligible for coverage under the SHSP, and enrolment is entirely voluntary. Additionally, the government subsidises the annual premiums for low-income families (100% for ultra-poor, 75% for poor, and 50% for vulnerable families [36]. Enrolled families (up to five members) have access to emergency, outpatient, predefined inpatient, select drugs, and diagnostic services in participating public and private hospitals.

Nepal's CBHI program has engaged NGOs in health financing and service delivery, leveraging their expertise and resources. This collaboration has played a crucial role in extending healthcare access to remote and underserved areas, where government infrastructure is limited [194–196]. Nepal has made efforts to improve health infrastructure and strengthen the health workforce. Investments have been made in building healthcare facilities and training healthcare professionals, particularly in rural and remote areas, to enhance service delivery and accessibility. Still OOPE remain a burden for many individuals, and affordability of health services, sustained funding and effective governance of health financing mechanisms are ongoing challenges for the journey towards UHC.

Vietnam

In 1992, Vietnam launched the process of establishing national-level SHI, and in 2008, it enacted a health insurance law [197]. The mandatory SHI scheme designed to protect individuals from the burden of OOPE by providing financial protection to formal sector employees from both government and non-government sectors, retirees, socially benefited individuals and international employees from different organizations [26]. The premium was 3% of the formal sector employee's salary, of which the employer contributed 2% and the employee contributed 1%. The scheme was implemented across all provinces by provincial health insurance agencies under the supervision of provincial health departments [198]. Moreover, in 1995, Vietnam introduced voluntary public health insurance schemes to cover farmers, self-employed individuals, and students. However, only 11% of the target population was covered by the voluntary scheme, the majority of which were students [26].

In 2003, the Vietnamese government launched a mandatory government-funded Health Care Fund for the Poor (HCFP), a scheme for the poor, ethnic minorities, and people in remote areas across the country. The scheme was modified in 2005 and incorporated with the earlier SHI scheme for the formal sectors [27]. In accordance with the 2005 Law on Education, Health Care, and Protection of Children, the government introduced a second mandatory non-contributory health insurance scheme to cover children (<6 years old). The children's scheme covered 11% of the population, while SHI covered 9% and HCFP covered 18% [26].

The HFR in Vietnam, have been successful in expanding population coverage, ensuring financial protection, and improving health outcomes. Vietnam's focus on expanding benefits, developing health infrastructure, and achieving high population coverage has contributed to significant advancements in healthcare access and affordability. Vietnam covers a large proportion of the population, including formal sector employees, self-employed individuals, and those living in poverty. However, challenges related to quality of care still need to be addressed to further strengthen the health financing system in Vietnam.

Thailand

Thailand is frequently cited as a model for the successful implementation of a universal coverage scheme (UCS) [199]. Thailand provided complete financial protection to its population, and three public health insurance programmes covered 98.5% of the population in 2015 [199,200].

Thailand's journey toward UHC began in 1975, low-income families have been covered by a low-income programme called the Medical Welfare Scheme (WHS) [30], administered by the ministry of public health (MOPH) [199]. Later, a tax-funded programme was expanded to include coverage for children (<12 years old), the elderly (>60 years old), individuals with disabilities, and health volunteers in the village. In addition, the MOPH administered a voluntary health insurance programme for the informal sector that was initiated in 1984. Public sector employees and their dependents are covered by a non-contributory programme known as the Civil Service Medical Benefit Scheme (CSMBS). CSMBS is also a tax-funded, non-contributory scheme administered by the Comptroller General Department (CGD) of the ministry of finance (MOF). CSMBS is a fee-for-service model in which CGD reimburses panelled healthcare providers for health services. In contrast, private sector employees are covered by the SHI scheme, launched in 1990 and administered by the Social Security Office (SSO) under the Ministry of Labour [199]. The SSO pays an annual capitation fee to the listed

public and private healthcare facilities for their health services. Later, in 1992, the Thai government began subsidising families at a rate of 50%; this programme provides health coverage for a full year [201]. After that, Thai government launched UCS in 2002 by combining voluntary health insurance programme and WHS, and for individuals who were not covered by other schemes [30]. Three insurance programmes protect the entire Thai population: 9% under the CSMBS, 16% under the SHI, and 75% under the UCS [201].

The HFR in Thailand, have been highly effective in achieving UHC, reducing OOPE, and improving health outcomes. The emphasis on primary healthcare, health promotion, and a well-trained workforce has further strengthened the healthcare system. Challenges persist, but Thailand's experience serves as a valuable example of successful HFR with comprehensive coverage, equitable access, and improved health outcomes.

Table 6.1. Comparison of economic, health and health financing indicators in five countries in South and South-East Asia

Indicator	Year (s) measured	Countries name and World Bank income classification				
		Low middle income country				Upper middle-income country
		Bangladesh	India	Nepal	Vietnam	Thailand
Economy						
Population million[a]	2019	163.0	1366.4	28.6	96.5	69.6
GDP per capita US$[a]	2019	1846	2115	1198	3442	7816
GDP growth (%) [a]	2019	7.9	3.7	6.7	7.2	2.2
Health Expenditure						
Current Health Expenditure as % of GDP[b]	2019	2.5	3.0	4.4	5.2	3.8
Current Health Expenditure per capita US$[b]	2019	46	64	53	181	296
GGHE-D as % Current Health Expenditure[b]	2019	19	33	25	44	72
GGHE-D as % GGE[b]	2019	3.0	3.4	4.0	10.1	13.9
OOPE as % of Current Health Expenditure[b]	2019	73	55	58	43	9
Human resources for health						
Doctors per 10,000 population[c]	2012/20	6.7	7.4	8.5	8.3	9.5
Nurse and midwifery per 10,000 population[c]	2012/20	4.9	17.5	33.4	14.5	31.5
Health coverage and outcomes						
UHC service coverage index[c]	2019	51	61	53	70	83
Life expectancy at birth (years)[c]	2019	74.3	70.8	70.9	73.7	77.7
Under 5 mortality rate (per 1000 live births)[c]	2020	29	33	28	21	9

Maternal mortality ratio (per 100,000 live births)[c]	2017	173	145	186	43	37
Financial protection (% of population with >10% THCE on health)[c]	2012/20	24.4	17.3	10.7	8.5	1.9

GDP- gross domestic products; GGHE-D- domestic general government health expenditure; GGE- general government expenditure; UHC- universal health coverage.

Sources: [a]International Monetary Fund, World Economic Outlook Database, October 2022; [b] Global Health Expenditure Database, World Health Organization, October 2022; [c] Global Monitoring Report on Financial Protection in Health, World Health Organization and The World Bank, 2021.

Table 6.1 presents a comparison of the economic, health, and financing indicators of Bangladesh, India, Nepal, Vietnam, and Thailand. This provides insight into the impact of public financing on health and health outcomes. Except for Thailand, the other countries had low to moderate levels of public health financing, a moderate to a high level of OOPE incurred by households, a lack of financial protection, and despite a moderate to severe shortage of health workforce and their skill-mix, they scored between 51 and 70 on the UHC coverage index. Consistently, the GDP of all five countries has improved between 2010 and 2019 (Figure 6.1). Bangladesh had the highest GDP growth in 2019, but its current health expenditure as a percentage of GDP and domestic general government health expenditure (GGHE-D) as a percentage of current health expenditure were much lower than those of the other four countries. Figure 6.1 depicts the yearly fluctuations of several of these indicators. Bangladesh had the highest OOPE as a percentage of current health expenditure among the five countries, with this increasing from 67% in 2010 to 73% in 2019. Comparatively, Bangladesh has a severe shortage of health professionals relative to the other four countries, and a quarter of the population lacks financial protection. Despite having the lowest government health expenditure, Bangladesh has achieved higher life expectancy compared to India, Nepal, and Vietnam, as well as lower under-five mortality than India and lower maternal mortality than Nepal. This can be attributed to the impact of a robust primary healthcare infrastructure and the involvement of NGOs and CBHIs, since they are primarily focused on maternal and child healthcare service delivery in Bangladesh.

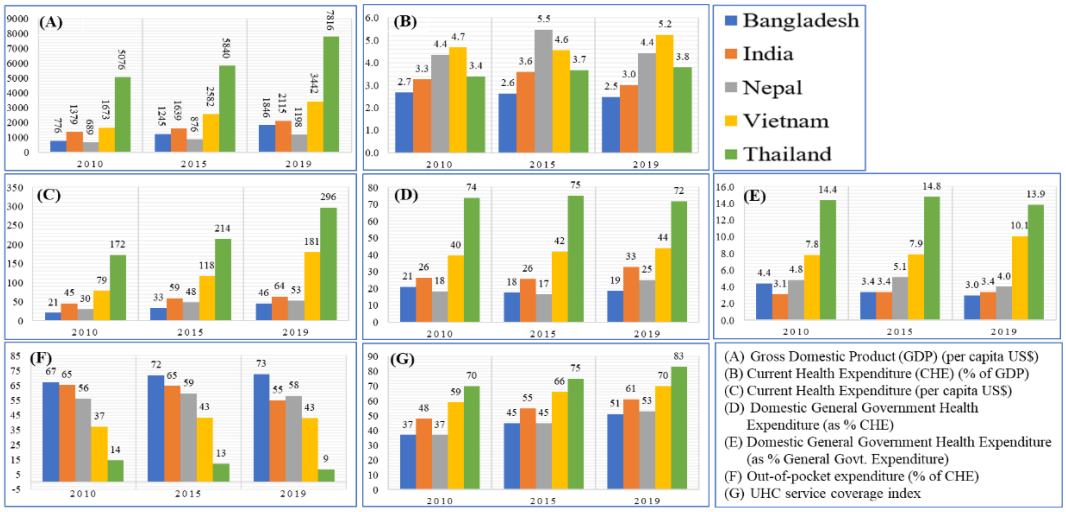

Figure 6.1. Trends of economic and health financing indicators in five countries in South and South-East Asia.

Bangladesh initiated its first HCFS in 2012 and is implementing a pilot pro-poor social health protection scheme. After a decade of reform, the expansion of the scheme and implementation of HCFS is not progressing. The country acknowledges the SDGs and is aiming to achieve UHC. However, with the current health financing system, individuals and households will continue to experience catastrophic health expenditure and the country is likely to miss the UHC target by 2030. Therefore, it is of the utmost importance to analyse and identify the potential bottlenecks impeding the implementation of HFR in Bangladesh.

Implementation of HFR at the national level is not always easy to adopt and can be affected by the country's socioeconomic status, cultural beliefs, administrative structure, external actors' position, and historical and political circumstances [202]. HFR is inherently a political initiative that requires a reorganisation of authorities and responsibilities within and beyond the health system [203]. PEA and management of political aspects of reform are therefore recommended to incorporate into the reform process.

This study uses PEA to help policymakers to develop strategies to manage political factors from the experience of HFR in Bangladesh. PEA is a method for analysing and comprehending the political features of a given context, and recognizing the complex interaction, conflict and power management between structures, organisations, and players [204]. Hence, studying the PEA of HFR will help to understand the role of stakeholders and potential barriers to policy implementation [203]. This also helps to identify where to target strategies to overcome challenges during policy design, adoption, and implementation. PEA is also useful for evaluating the feasibility of adopted reform by assessing the power and roles of key policy actors.

Bangladesh has rarely taken the political economy aspect of policy procedures into consideration and there is still a dearth of research on PEA for the HFR. This paper will: (1) highlight the group of stakeholders involved in the HFR process and their roles, (2) explore strategies taken to address critical political economy factors and (3) identify potential bottlenecks and a recommended course of action to overcome the challenges of HFR in Bangladesh.

6.2. Methods

Qualitative methods have been adopted, specifically document review and key informant interviews (KIIs) to understand the political economy context of HFR in Bangladesh [205]. Firstly, published and unpublished policy documents and official reports from the MOHFW

and international organisations were reviewed, and then emerging themes from the literature review were coded and used to inform the design of a question guide for the KIIs. Second, key informants were selected according to their expertise and level of involvement at both the design and implementation stages of HFR in Bangladesh. Initially, 15 interviewees were selected based on their involvement during HFR; then, using a snowball sampling technique [206], 3 additional interviewees were recruited. Interviewees were from the government sectors, non-governmental organisations, academic institutions, and international organisations. They include current and former government policymakers, policy analysts, researchers, academicians, and donor agencies.

A total of 18 potential informants were identified and invited to participate in the study through email invitations. These invitations were then followed up through telephone calls and text messages. A participant information form containing the interview process and purposes of the study was circulated among the participants. Once interviewees were not providing any new information, no further participants were invited. Of the 18 invited participants, 10 agreed to participate including 5 government policymakers from MOHFW, 3 health financing researchers from academic institutions, and 2 policy analysts from donor organisations. Open-structured question topics were used as a guide to conduct qualitative interviews (appendix 6.1). A pilot interview was also administered to finalize the interview questionnaire/guideline. Average interview duration was approximately 50 minutes. After taking prior approval from the interviewees, conversations were recorded to minimise the likelihood of missing significant insights. Interviews were conducted in the native language (Bengali) and then translated into English. The interviews were conducted between February and April 2021.

This study used the Framework Analysis method, a thematic approach to qualitative data analysis using a matrix structure to analyse data [207]. The method comprises five interconnected steps: familiarisation; identifying a framework; indexing; charting; and mapping and interpretation. During the familiarisation stage, all interviews were transcribed verbatim, from Bengali into English. Carefully reading transcripts, two researchers applied prior codes from the document/literature review, while maintaining an open mind to identify other emerging issues. They followed an open coding technique for the same two transcripts and then elaborated/amended earlier predefined codes. A thematic framework consisting of themes and sub-themes was then developed by accommodating prior themes/codes and

emergent themes/codes, to efficiently manage data for further analysis. The thematic framework was systematically applied to all interview transcripts i.e., all the transcripts were coded following an indexing system. In the charting stage, a matrix containing headings and sub-headings (i.e., themes and sub-themes) in the columns and participants in the rows was developed, allowing a comparison of findings across themes and interviewees. Finally, links were established between the main findings and research objectives and conclusions, interpretations, and recommendations were based on the participants' experiences and opinions.

6.2.1. The political economy framework

Six categories of stakeholder groups are most likely to affect health policy reforms: interest group politics, bureaucratic politics, budget politics, leadership politics, beneficiary politics, and external actor politics [203]. In this study, this widely recognized political economy framework was used to explain the political economy context for HFR in Bangladesh.

Interest group politics includes various stakeholders such as healthcare provider associations, professional unions, insurance providers, private health facility owner associations, pharmaceutical companies, and medical technology firms. They are likely to use their relationship with politicians and policymakers to influence any stage of the policy circle to maximise their gains from policy reforms.

The role of **bureaucrats** is vital during the implementation stage of HFR. This group focuses on interdepartmental relationships among multiple government implementing agencies. Different government agencies wish to regulate reforms by establishing their authority, interest, budget, and workforce. Bureaucratic competition arises between and within departments which could influence strategies and actions regarding adopted policy. Relationship and power conflicts often occur between authorities at the national and sub-national levels.

Budget politics includes mobilisation and allocation of budget among the national and local-level administrations. One of the key challenges for developing countries is the lack of a sufficient budget and inefficient distribution of financial resources during implementation. This is an opportunity to mobilise the health budget from the MOF through validated technical evidence. The budget politics emphasises a constructive relationship between the ministry of health and MOF. This also includes tax administration, fiscal devolution, public

finance management, deciding and disbursing budgets. Therefore, the relationship between finance and the health ministry is a decisive factor for HFR.

Strong **political leadership** and commitment are prerequisites for the successful adoption and implementation of policies. Moreover, the success of health policy reform depends on strategic vision, technical knowledge, and political skills of the leader [202]. Policy reform in health financing needs commitment from the top-level management and decision makers. Thus, effective reform often depends on the ability to manage top-level political decision makers.

From the beginning of policy reforms, **beneficiaries** need to be involved to understand their perception, preference, and acceptance on adopted reforms. Some beneficiaries may see their interests limited or some may perceive their benefit increased because of the reform. They may influence either positively or negatively during policy implementation. In some instances, if they were not informed earlier about a new policy, it could result in less utilisation during the implementation stage.

External actors are the bilateral and multilateral agencies, international financial institutes, as well as non-government not-for-profit organisations. They may have a conflict of interest with the objectives of an adopted policy, and they could try to establish their authority by taking financial control. Although their participation seems like an opportunity, in many cases, they could try to push their agenda instead of the country's priorities.

6.3. Results and Discussion

6.3.1. Health financing strategy in Bangladesh

No major structural reform on a large scale in health financing had taken place in Bangladesh to address UHC. While an overall reform had not taken place; several key milestones had been achieved such as the creation of the Health Economics Unit, development and approval of the country's first HCFS and piloting a pro-poor social health protection scheme (i.e., SSK) as an implementation phrase of the HCFS. The HCFS was intended to accomplish both national and global targets. In May 2011, at the 64th World Health Assembly, the current Prime Minister of Bangladesh, committed to achieve UHC [208]. The vision of UHC, the Health Population and Nutrition Sector Development Program (HPNSDP) 2011-2016, and the National Health Policy 2011 were the primary drivers for Bangladesh to design and adopt a

comprehensive HCFS [8]. The HCFS was designed just one year following the implementation of the National Health Policy 2011.

6.3.2. Key stakeholders and their roles

HCFS development and implementation should be directed by a reform team and involve a large group of stakeholders, including those from outside the health sector to amass a multitude of interdependent decisions [209,210]. Management of stakeholders is a crucial component of developing a health financing strategy. Generally, the Ministry of Health is responsible for selecting stakeholders and allocating tasks among them [211]. Table 6.2 includes the list of key actors, political economy factors, and strategies to overcome these with direct quotes from the KIIs. Throughout the circle of HCFS design and implementation, six groups of stakeholders that were mentioned above in the political economy framework were engaged. Some of these stakeholders participated in the strategy development phrase, while others participated in the SSK piloting phase. The interest group was represented by the Bangladesh Medical Association, Bangladesh Nursing Council, Private Medical College Association, insurance corporations, and pharmaceutical companies. The bureaucrats included several interconnected government agencies including MOHFW, HEU, DGHS, DGFP, local government administration, government hospitals administration, Ministry of Planning, and Ministry of Public Administration. The MOF was also involved in this process. Central-level political leaders, such as the Minister and State Minister from the MOHFW, as well as a parliamentary committee and politicians from the district and sub-district levels, also participated in the reform process to enhance design, adoption, and implementation.

Table 6.2. Summary of political economy analysis for Bangladesh's health financing strategy 2012-32 with quotes from the KIIs.

Political economy dimension	Main policy actors	Political economy factors	Strategies used by reform team
Interest group politics	Bangladesh Medical Association (BMA), Bangladesh Nursing Council, Private Medical college Association, Insurance companies, Drug companies, government hospitals and medical colleges, and others	Indirect opposition from health professionals on SSK implementation due to additional workload. "*The community of health professionals was not interested in getting involved with the scheme because implementing the SSK pilot scheme would create additional workload for them.*" **Participant 1** "*They [hospital administrator] raised concerns about an essential factor, particularly the facility's preparedness in terms of the availability of physicians, medications, and other equipment.*" **Participant 7**	The reform team hired third parties to settle claims to minimise their workload and tried to manage incentives for the healthcare professionals for their additional labour. "*The scheme operator is one of our major stakeholders. They administer the administration for the SSK programme, reducing the workload of hospital authorities.*" **Participant 5** "*We devised seating arrangements for physicians, and we arranged for extra staff through outsourcing, including cleaners, security guards, staff members, etc. Additionally, we are attempting to offer them incentives.*" **Participant 4** "*The reform team will have more success in overcoming these obstacles if they are able to convince the minister and the secretary. No one will oppose the reform if the minister or secretary desires its implementation.*" **Participant 3**
Bureaucratic politics	Health Economics Unit, Ministry of Health and Family Welfare, Local government administration, Directorate General of	Ownership conflict between Health Economics Unit and Directorate General of Health Services. "*Although it was designed by the HEU,*	The team involved them in the early process of the reform and always incorporate their recommendations into actions. "*We always take an inclusive approach to our work. We attempted to include everyone regardless of their perception. We will solicit their input. We*

	Health Services, Directorate General of Family Planning, Ministry of Planning, Ministry of Public Administration, and others	*the HEU has been referred to as a policy support unit. It was to be carried out by the DGHS. It was observed that the DGHS representatives did not adequately assume stewardship of the Health Economics Unit programme."* **Participant 2** "*The coordination between the implementing agency [IHE] and DGHS was unsatisfactory. The response from DGHS was not particularly robust. The implementation authority, DGHS, did not develop any ownership."* **Participant 7**	*attempted to incorporate their suggestions into our programme if it was compatible with the programme. It was our primary strategy."* **Participant 4**
Budget politics	Ministry of Finance and Ministry of Health and Family Welfare	Ineffective involvement from the Ministry of Finance due to fiscal concerns. "*I do not see any indication that the finance ministry is directly involved, except for some dedicated fundings."* **Participant 1** "*We sincerely desired effective participation from the ministry of finance, but different individuals attend*	The reform team conducted evidence-based analysis to negotiate with the Ministry of Finance. "*Institute of Health Economics (IHE) collaborates with HEU; they provided the required technical assistance. When we want to make a technical change, we organise consultation workshops with these organisations. So that we might provide facts and discuss about what happened in other countries.*" **Participant 6**

		separate meetings. Therefore, we did not receive a commitment from their [Finance Ministry] end." **Participant 3**	
Political leadership politics	Prime Minister, Minister, and State Minister from the MOHFW, Local politician from the district and Upazila (sub-district) level, and Health-related Parliamentary committee	Commitment from the highest-level political leaders. The Prime Minister was persuaded and supported to incorporate SSK piloting on the national political agenda. "*The government was politically committed to implementing SSK and HCFS thanks to the prime minister's assurances.*" **Participant 5** "*We have political support for this project from the highest levels, and even on the ground, where this project is being carried out.*" **Participant 10**	The Director General from the HEU convinced top level political leaders through his leadership capacities. "*Due to the strong commitment of the Ex-Director, HEU has gotten to this level because of his passion. This is one of the most advantageous points for the implementation of this scheme.*" **Participant 1** "*The DG [Ex. DG] of HEU took ownership of this idea and pushed it up to the higher level.*" **Participant 7**
Beneficiary politics	Local elites, influential personnel, journalists' associations, civil society organisations, and others	Inadequate knowledge on newly adopted healthcare financing mechanisms among the beneficiaries. "*Beneficiaries were less aware of the services; beneficiaries must be aware in order to take benefit*	The team arranged several sub-divisional level workshops to orient beneficiaries, and also distribute leaflets and posters to create awareness among the community. "*They [reform team] included local leaders with the programme. Through leaflets and posters, they also raised awareness in the community.*

		of the services." **Participant 8** "*The beneficiaries of scheme areas were not persuaded by the services, so initially, there were a small number of registrations.*" **Participant 2** "*Beneficiaries complained to the provision of inpatient services to a limited population (those living below the poverty line) constituted one of our one of the primary challenges.*" **Participant 4**	*They formed a management committee and organised workshops for subdivisions.*" **Participant 2**
External actor politics	World Bank, World Health Organization, USAID, KFW-German Development Bank, GIZ, Institute of Health Economics, icddr'b, WaterAid, BRAC, and others.	-Ownership conflict among the donor agencies and international development partners. "*There were some ownership issues among the donor agencies. There were disagreements regarding ownership, the funding percentage, the split percentage, and how much ownership they might have, etc.*" **Participant 1** -Initially, donor agencies and development	Leadership strategy to provide equal weights to all agencies and contemplate their feedbacks. "*Our strategy was to give each DP the same attention while implementing SSK. We invited them to visit the SSK setting because it is essential to understand the entire situation before reaching an opinion. So, our reformation team handled it admirably.*" **Participant 10**

		partners raised concerns about the SSK pilot scheme. "*Some DPs expressed concern regarding the SSK benefit package and supply-side readiness; they prefer a scheme that includes both inpatient and outpatient services with involving private sector providers.*" **Participant 9**	

However, throughout the strategy development phase, international and national-level NGOs worked substantially alongside the HEU. The World Bank, WHO, the German Development Bank-KFW, USAID, WaterAid, GIZ, the Institute of Health Economics, icddr'b, and BRAC are among these external actors. Moreover, representatives from beneficiary groups (e.g., local elites and influential persons, journalist associations, civil society organisations, etc.) were also engaged in the consultation workshop at divisional and sub-divisional level. However, during early stages of HCFS design, involvement of stakeholders such as healthcare providers from district/sub-district levels and beneficiaries was limited.

At each iteration of the policy cycle, the presence and roles of the stakeholders evolved. At the beginning, when the concept papers and project plans were developed, international contributors such as USAID, World Bank, WHO, German development bank-KFW, and GIZ stepped up as essential stakeholders and collaborated with the government. Once the pilot project was ready to be initiated beneficiaries, local administration, local elites, civil society, journalists, doctors, Community Healthcare Provider (CHCP), Family Welfare Assistant (FWA), healthcare service providers, and insurance operators were engaged with the scheme. After the preliminary stages of design and planning, the project was handed over to the government to take control. The HEU provided considerable support for SSK initiation and ongoing operation. In a sense, the reform process has different layers and on each layer of the process there were a different set of stakeholders, and their expertise was used to drive progress. Most interviewees identified HEU, MOF, and international aid agencies as primary

stakeholders whereas, DGHS, legislative committees, and municipal or local government played secondary roles.

6.3.3. Political economy factors and related strategies

6.3.3.1. Interest group politics

Bangladesh adopted HCFS targeting UHC in 2012 and planned to cover all the population under a pre-paid SHI scheme. However, reform team has only piloted SSK for the below-poverty population so far. This reform encountered indirect opposition from interest group politics, specifically from the medical association and public hospital providers (Table 6.2). The medical association is a very influential stakeholder for health policy reform in Bangladesh, they expressed doubts about the adaptability of beneficiary hospitals in terms of beds, health personnel, and medical equipment (such as medicine, diagnostic tools, etc.). SSK pilot scheme was viewed as an additional burden on service providers of the beneficiary hospitals, and they were not rewarded for the added obligation. Opposition by interest groups politics over health policy are nothing new in Bangladesh. In 1982, Bangladesh Medical Association was opposed to the Bangladesh Drug (Control) Ordinance reform of pharmaceutical policy [212]. In Bangladesh, nearly half of health professionals, primarily doctors from public facilities, are dissatisfied with their jobs, owing to insufficient supplies, infrastructure, and administrative bottlenecks [213]. The HCFS implementation has the potential to impact service providers' daily activities; however, their lack of participation in the HCFS design and implementation phases, as well as their increased workload, contribute to their discontent and resistance [211].

In certain countries, health policy reforms have provoked resistance from interest groups. For instance, in India, the medical association and health professionals attempted to thwart the country's health workforce policy reform because they feared new policy would restrict their power over the health sector [214]**.** Similarly, the medical association protested pharmaceutical policy reform in Sri Lanka [212]**,** and the hospital authority and health professionals repudiated mandatory health insurance scheme reform in Hong Kong since hospital authorities would not obtain direct government allocation due to the reform [215]**.**

The reform team managed high-level political commitment from the health minister and secretary, primarily addressing opposition from the medical association and hospital providers. When high-level decision-makers desire to adopt and implement reform activities,

other stakeholders typically do not oppose this, despite potential conflicts of interest. However, persistent dissatisfaction among health professionals may diminish the effectiveness of the HCFS. The reform team attempted to address the issue by contracting a third party to settle benefit claims to reduce the workload of health professionals. The funds allocated for SSK scheme may only be used for SSK-related activities; there is no provision for providing incentives to health professionals. HEU is still negotiating with the MOF to arrange incentives for doctors. However, they arranged a different set up for the healthcare providers who are providing services for the SSK beneficiaries, established a pharmacy for the SSK scheme, and employed extra workforce such as cleaners, security, and other support staffs through outsourcing to support the hospital authority.

6.3.3.2. Bureaucratic politics

Design and implementation of the HCFS are also stymied by bureaucratic politics, notably ownership conflicts between the HEU and DGHS. The HEU is a regulatory unit that assists the government in the form of policy advice and recommendations for the health sector. The HEU oversees the design, adoption, and implementation of the SSK scheme, but the implementing hospitals and health workforce under the control of DGHS. It was alleged that HEU is a policy advocacy agency and not liable for policy implementation; DGHS is responsible for implementing the SSK scheme. Although the reform team experienced passive engagement from the DGHS, where delegates from DGHS did not carry ownership during the planning and implementation phases; nevertheless, after the successful initiation of pilot scheme, DGHS is now interested in acquiring ownership.

To achieve long-term benefits from the reform, ownership should be shared among stakeholders, particularly government agencies that are intertwined with each other [216]. At the initial stages of the reform process, the reform team ought to consider bureaucratic politics and determine how to overcome bureaucratic politics to ensure the sustainability of reform [217]. Ownership conflicts between the bureaucratic entities can hinder the implementation of the reform activities targeting UHC. Bureaucrats may have different perspectives, priorities, and objectives based on their respective roles and responsibilities. These divergent perspectives and priorities can create ownership conflicts that may hinder the implementation of the newly adopted reform policies. For example-HEU primarily focus on economic aspect of healthcare i.e., health financing, healthcare expenditure, and may want to ensure financial protection, efficient and sustainable use of resources, while DGHS

are more focused on healthcare service delivery, and they may want to prioritize service quality, infrastructure development, and healthcare workforce management. Furthermore, competing interests and influences from external stakeholders, such as healthcare provider associations, insurance companies, and pharmaceutical companies, can also contribute to ownership conflicts. However, by promoting communication, coordination, and collaboration, and by fostering a shared understanding, these conflicts can be mitigated, leading to successful implementation reform activities. The Bangladeshi government's reform team endeavoured to overcome bureaucratic politics by involving bureaucratic actors at the outset of policies and incorporating recommendations from different government agencies into action. Involvement of bureaucratic actors in the early phases of reform created a clear communication channel for understanding their concerns. Then, the reform team provides factual information, case studies, and success stories from other contexts to allay their concerns and foster confidence in the reform process, as well as to develop a shared vision that aligns their interests with the broader reform agenda.

6.3.3.3. Budget politics

At the HCFS design phase, overall engagement of the MOF was limited, and the reform team could not secure financial commitment from the MOF. Limited fiscal space due to low government revenue in health, less prioritising in health among SSEACs, declining development aid, lack of fiscal space, lack of new sources of healthcare financing particularly targeting large informal sectors, and inefficiencies in health are the key reasons for this neutral stance from the MOF [218].

Similar budgetary policies also prevailed in other Asian nations. In Afghanistan, the MOF was neutral during the reform on basic health package design [219]**.** Likewise, during the policy adoption of India’s RSBY, the plan for proposed state-level health insurance has been obstructed because it was not supported by the MOF [220]. The transformation of Turkey's health-care system has also been stymied by opposition from the MOF as they alleged the reform would generate larger public deficits [221]. To get approval, strategies need to be developed in collaboration with the MOF and parliamentary committees. However, in Bangladesh, the reform team conducted research-based analysis to generate evidence to negotiate with the MOF. They presented facts and stories from the neighbouring countries to the MOF, moreover, they also utilized political support to convince MOF. The use of research-based evidence enabled the reform team to support their proposals and negotiations with

the MOF. These analyses strengthened the reform team's position and increased their credibility in discussions with the ministries. They also influenced the MOF's understanding of the reform's potential outcomes and persuaded them to allocate resources or support particular policy measures that are consistent with the evidence.

6.3.3.4. Political leadership politics

Leadership politics is one of the cornerstones of the political economy framework [202]. HFR aimed at achieving UHC requires the support and commitment of the top political actors. The reform team in Bangladesh has attempted to incorporate reform strategies into the country's political agenda by securing the approval of the country's highest political leaders. Additionally, the team worked to establish good relationships with political leaders to engage them in the reform process. The HEU leadership was enthusiastically devoted to the achievement of reform and collaborated with the reform team to carry out the reform agenda. The leadership of the Ex-Director of HEU was viewed as a pillar of strength and the driving force behind the successful adoption and implementation of Bangladesh's HCFS. His enthusiastic and skilful leadership was largely credited with securing the commitment from the health minister and ultimately the prime minister to own, support, and adopt reform initiatives. In the end, the SSK scheme for people living below the poverty line has become a political priority and election manifesto of the ruling party, where they reaffirmed their commitment towards health protection for the people. The reform team found it easier to manage other political factors, such as interest group politics, bureaucratic politics, and budget politics, after receiving the commitment of the prime minister. When the highest-level political leaders authorised and supported the reform team, there was no conflict of interest as severe as in the past. Relationships and trust between the reform team and political leaders are widely acknowledged as paramount for the effective execution of HFR [219–222]. In Bangladesh's HFR, the leadership of Ex-Director HEU served as a bridge to develop strong relationships between the reform team and politicians. He organised several workshops, seminars, and policy dialogues with high-level decision makers, research institutes, and other key stakeholders with the help of development and research partners and presented case studies and success stories from other countries to make political leaders aware of HCFS and SSK. The successful adoption of India's RSBY help to gain high-level political support for adopting and implementing HCFS, in particular to implement SSK. Moreover, the worldwide commitment to UHC was also the impetus for the political leaders to endorse HCFS as a national political priority. Despite obtaining political commitment from the prime minister,

Bangladesh's implementation of HCFS and expansion of the SSK stalled, even with the same prime minister in power. Bangladesh's sluggish development may be attributable to limited health sector resources, lack of healthcare infrastructure, a dearth of medical supplies, inadequate health workforce, health sector inefficiencies, frequent changes of government officials, lack of donor supports, and COVID-19 pandemic. Despite the necessity of political commitment, addressing these circumstances necessitates substantial investments, capacity development, and coordination with a wide range of stakeholders, which can exceed the scope of political commitment alone.

Parallel leadership dynamics have also been documented in other countries. The primary healthcare reform team's principal coordinator is recognized for leveraging his influence with the chief minister to convince the prime minister to adopt and execute the reform in Pakistan [222]. The commitment of India's prime minister to adopt health insurance was also regarded as a key enabling factor for HFR in India [220]. The political experience of HFR differs from nation to nation. For instance, political parties resisted the reform of health financing in Hong Kong [215]**.** However, support from the highest political authorities is also identified as a political economy factor facilitating UHC reform in Thailand [200] and health insurance coverage expansion in Rwanda [223].

6.3.3.5. Beneficiary politics

The political economy framework suggests that it is also crucial to meticulously consider beneficiary politics [202]. The major challenge for the implementation team was the lack of health insurance knowledge among SSK beneficiaries. Beneficiaries of the newly implemented SSK scheme voiced concerns regarding eligibility conditions and benefits packages. Currently, only families living below the poverty line are eligible for the SSK, government hospitals are the only providers, and insurance cards are only usable for inpatient services. All these factors have contributed to the beneficiaries' confusion. Nevertheless, the reform team has attempted to address these concerns. The team organised several workshops at the sub-district level to acquaint beneficiaries with the SSK scheme, and household visits were conducted to issue SSK cards to beneficiaries. Home visits to distribute cards were also exploited as social mobilisation techniques. The reform team also involved community leaders, such as local political figures and influential individuals such as teachers and religious leaders, in the implementation of the SSK scheme. They established a local

management committee to engage these leaders and distributed leaflets and posters to raise awareness among the beneficiaries.

Throughout Bangladesh's HFR process, the voices and presence of beneficiaries were largely ignored. The representatives of the beneficiaries of SSK scheme were not involved in the planning process; rather, their presence was secured at the sub-district level workshop. For better progress, it is highly recommended that the beneficiaries be present and actively engaged from the outset of the reform.

6.3.3.6. External actor politics

Bangladesh lacks the necessary health resources and skills to adopt and implement HFR. This deficit allows external players, such as donor agencies and experts, to make monetary and technical contributions. In LMICs, it is evident that support from international partners can result in weak government ownership, which might threaten the long-term sustainability of the reform [224]. The presence of prominent NGOs, such as BRAC, icddr,b, WaterAid, etc., were supportive. However, the design and implementation of HCFS encountered external actors' politics mainly from the financial contributors. The reform team experienced ownership conflicts among the external actors. Concerns were raised by external players over the funding allocation between the government and themselves (i.e., how much of the share the project donors will fund and how to split the shared percentage among different donor agencies). They also voiced concerns about the SSK model's design, specifically regarding the healthcare structure, large population, partial healthcare service (since SSK covers only inpatient healthcare) and supply-side readiness. Rather, they suggested to design a scheme that will provide comprehensive healthcare services by collaborating with the private sector providers as well. But, due to a dearth of financial and institutional capacity, and human resources, it was not attainable for the reform team to take such a significant move. Hence, although SSK was intended to be implemented immediately following the adoption of the HCFS in 2012, but its implementation was delayed due to external actor politics and budgetary issues. These external actor politics is prevalent in countries where international aid also contributes to health financing. For instance, Afghanistan witnessed a dramatic departure of development partners during the reformation of their basic health services package [219].

6.4. Conclusion

This retrospective analysis of the HFR experience in Bangladesh investigates political economy factors that have a significant impact on the reform processes. The study also identifies the types of stakeholders involved in the design and implementation of the strategy, as well as their roles.

Our study found that, stakeholders from all six groups were engaged at different stages of HFR in Bangladesh. However, their presence and roles change with different stages of the policy circle. This study emphasises the significance of PEA in facilitating reform teams and leaders to negotiate complex political economy factors. The experience of Bangladesh demonstrates that the political economy context in Bangladesh serves as a driving force for the acceleration of HFR. The first significant barrier for HFR in Bangladesh voiced by the medical association and health professionals since they viewed this reform as an additional burden for them. Throughout the reform periods, MOF was mostly neutral due to their low budgetary capacity, limited fiscal space, and lack of new financing sources. However, the reform team achieved political will and support from both local and national levels. Beneficiaries of the SSK scheme have also raised concern due to their lack of knowledge on SSK scheme since they were not included from the beginning of the reform process. Moreover, the reform team also experienced politics around funding and ownership among donor agencies and international development partners.

Several approaches have been considered by the reform team to address these political factors. Our analysis demonstrates that strong leadership is one of the most effective ways of obtaining the support of the political leaders and of incorporating the reform agenda into the political agenda rather than only being the health sector's priority. To combat bureaucratic and external actor politics, the reform team established a strategy of transparency and inclusivity, involving as many stakeholders as possible and distributing ownership among them all. In addition, reforms were bolstered by research-based evidence and political patronage for negotiations with the MOF and various government agencies. These strategic political approaches permit the design, approval, and implementation of a HFR in Bangladesh, although progress has not been satisfactory because of insufficient government resources, high turnover among government employees, and insufficient funding from outside sources.

6.4.1. Lessons learned and implications for future reform efforts

The political economy aspect of HFR in Bangladesh provides valuable lessons on the challenges and opportunities associated with implementing reforms in the healthcare system. Successful HFR in Bangladesh require active engagement and collaboration among various stakeholders, including government officials, healthcare providers, civil society organizations, and the beneficiaries. Lessons learned suggest that involving these stakeholders from the beginning helps build consensus and ensures the reform process is inclusive and transparent. Political commitment and strong leadership are critical for driving HFR. Political leaders should prioritize the health sector agenda and allocate sufficient resources for reform initiatives. Additionally, sustained commitment is necessary to overcome resistance and navigate potential obstacles during the implementation phase. The involvement of the private sector, including NGOs, could be an effective strategy for reducing supply-side barriers to the implementation of a health insurance scheme in Bangladesh. Creating public awareness on HFR is important to garner support and facilitate the implementation process. The reform team should invest in public education campaigns, engage with communities, and involve civil society organizations to ensure citizens understand the benefits and actively participate in the reform initiatives.

Bangladesh has strong fundamentals: a youthful population at a time when much of the world is ageing; demonstrated capacity for sustained economic growth; world-leading local institutions and a culture of strong local community organisations. The challenge for health policy in the country is to capitalise on these fundamentals and push through reforms – this will require strong leadership skills, political commitment, and perseverance to adopt and implement HFR aimed at UHC.

Chapter 7

7. A System Dynamics Model of Community-Based Health Insurance System in Bangladesh

Presented at the IHEA congress 2023 and prepared to submit as:

Sheikh N.[1,2], Howick S.[1], Mahmood S.S.[3], Hanifi S.M.A.[3], and Morton A.[1,4]. A System Dynamics Model of Community-Based Health Insurance System in Bangladesh

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Abstract

Community-based health insurance has been defined as interim measures to pave the way for the establishment of a comprehensive national health insurance system in Bangladesh, particularly for informal sector workers and their families. However, there are barriers to implementing sustainable CBHI including slow growth in membership due to low enrolment and renewal, and a lack of self-sufficiency and overcoming these obstacles is a policy priority for Bangladesh. Therefore, the goal of this study is to identify appropriate policies which support a sustainable CBHI and to assess the impact of these policies over the time.

A System Dynamics approach is used to build a model, simulate, and evaluate policy scenarios. Historical data was collected from a case CBHI scheme in Bangladesh for 95 months, and a simulation was run for the same period to replicate the data and projected for the following 85 months. In addition, the model was parameterized using data from the literature, primary data collected from the scheme operator, and expert opinion. We conducted a series of formal tests to build confidence in our model. In our model, four policies were evaluated: door-to-door visits, the addition of non-health grocery benefits to the benefit package, financial assistance for low-income households, and increasing service availability by providing telehealth and online consultation, discount on medicines, and providing healthcare by paramedics.

After assuming various financing strategies and policy targets, the scenario analysis demonstrates that the best-performing scenarios achieve 33% to 88% population coverage and recover 50% to 55% of the total cost through premium revenue. In addition, we determined that medical service costs are the single largest contributor to the total costs. Therefore, in the scenario analysis, we investigated the sustainability of CBHI by highlighting the significance of risk sharing among insured members. If 20% to 32% of insured members use healthcare benefits once during the duration of their coverage, and approximately 2% use healthcare benefits multiple times, the scheme will become sustainable approximately four years after its implementation from the baseline period.

7.1. Background

Bangladesh adopted a national healthcare financing strategy in 2012 that outlined a framework for establishing and enhancing healthcare financing in the country. The strategy identified and described a planned SHI as the path to achieve UHC [147]. It proposed various approaches to encompass the entire population under the intended SHI, advocating for a non-contributory health insurance scheme for the below poverty-line population and a contributory health insurance scheme for the formal sector [19]. However, reaching the 56% of the population engaged in the informal sector who do not have a formal salary system and frequently switch their jobs, has been regarded as a major barrier to any financing approach [225]. This group of people have the ability to contribute a small amount as a premium, therefore, CBHI and MHI have been defined as interim measures to pave the way for the establishment of a comprehensive national SHI system. The financing strategy also suggests exploring the potential of CBHI within the context of Bangladesh, where community-driven initiatives like cooperative societies and microfinance institutions have been successfully embraced and adopted by the informal sectors.

CBHI is a type of voluntary health insurance scheme introduced mainly in developing countries to ensure healthcare utilization from formal healthcare providers and to provide financial protection against healthcare costs to the low-income individuals working in the informal sector [21]. It is also known as mutual health insurance scheme, local health insurance, medical aid societies, and micro-health insurance scheme [21,31]. In Bangladesh, CBHI schemes began in the late 1990s and early 2000s, where microfinance institutions initially offered health insurance for their borrowers, and later, other NGOs started providing healthcare services through a CBHI scheme mechanism [37]. Most of these schemes provide health insurance to rural marginalized people who work in the informal sector, and NGO-run schemes typically offer voluntary membership and rely heavily on external funding and/or cross-subsidies [37].

The challenges of voluntary health insurance are reasonably persistent in all settings and include low membership enrolment, high departure rates, and financial sustainability [37,42,147]. In Bangladesh, the concept of health insurance and risk sharing during illness is unfamiliar, and people are reluctant to pay insurance premiums in advance before seeking medical care. Therefore, introducing, and enrolling individuals in a voluntary CBHI scheme to provide financial protection during illness is challenging. We also identified several other

obstacles to implementing CBHI in Bangladesh by conducting a qualitative study (details of which have been published elsewhere), including inadequate population coverage due to low enrolment and renewal rates, a high benefit utilization rate, high startup and administrative costs, a lack of understanding of health insurance concepts, and a lack of external and government support [37]. The purpose of this study is to identify policies that will support a sustainable CBHI by addressing the challenges of low population coverage and to assess their impact on the CBHI system. This modelling study was designed to respond to three research questions –

1) Can voluntary CBHI schemes be financially sustainable after a considerable population has enrolled?
2) What policies are effective in addressing inadequate enrolment and low renewal for the voluntary CBHI scheme?
3) How long may voluntary CBHI need financial assistance before achieving self-sufficiency, so that it can contribute to the health sector in Bangladesh in accordance with the healthcare financing strategy, particularly with respect to providing healthcare services and financial protection to low-income informal workers?

Although CBHI has been demonstrated to increase healthcare utilization among the rural poor and to reduce the burden of out-of-pocket healthcare expenditure, the scope of such a financing strategy is restricted in terms of achieving UHC due to limited risk pooling, low service coverage capacity, and insufficient healthcare supplies [19,37,142]. Nevertheless, in the context of Bangladesh, CBHI could play a crucial role in familiarizing people with health insurance modalities and serve as a stepping-stone towards the planned SHI by bringing together informal workers into a collective insurance mechanism.

7.2. Methods

7.2.1. Modelling approach

In this study, a SD approach has been applied to model the complex dynamics of a CBHI scheme. SD is a policy-oriented analytical modelling approach originally developed by Jay Forrester in late 1950's [226]. SD is a simulation modelling approach used to understand the dynamics of complex real-world phenomena [227]. SD uses both qualitative and quantitative models to understand the structure of a system through the relationships among different system components [228]. It seeks to highlight balancing and reinforcing feedback loops that form the structure of the system and which influence its over time behaviour [229].

Interventions can then be identified which target the feedback loops in an attempt to alter the behaviour of the system.

Since the late-1950s, SD has been effectively implemented in sectors such as engineering, military, economics, public policy, environment and industry, and its implementation in the health sector began in the 1970s [229]. Since then, SD has been applied to a variety of health-related challenges, including the dynamics of disease epidemiology, healthcare resource management, service delivery and its effects, evaluation of health policies, community-based care, queues, emergency care, healthcare demand, workforce planning, and disease screening [228–239]. However, there have been relatively few applications of SD in health insurance. In 2005, Grösser developed a SD model to examine the efficacy of sustainable health policies in the management of health insurance funds within the German health insurance system [62]. In a study conducted in 2021, Kurnianingtyas used SD to reset the premium amount and develop a sustainable financial strategy for the Indonesian national health insurance system [63,240]. Similarly, Zou and Chen recently constructed a SD model that captures demand for voluntary private health insurance in Hong Kong [241]. Our research adopted an SD approach to understand the structure and behaviour of a CBHI system, allowing us to then identify policies that will improve the performance of the system.

7.2.2. Model formation

The SD approach in our study includes- understanding the problem behaviour, undertaking a literature review, and conducting interviews with the managers, field supervisors, and directors of the CBHI schemes to develop the model and policy structures, data collection and processing to populate the model, performing tests to build confidence, and simulation and scenario analysis.

7.2.2.1. Problem behaviour

The current paper analyses a case CBHI scheme in Bangladesh called "*Amader Shathya*," which translates to “our health”. This scheme was chosen based on the implementing partner’s willingness to collaborate in the study. The scheme was launched in 2012 by icddr,b, an international research organization, with the aim to comprehend the community's understanding and attitudes regarding CBHI concepts, enrolment, and renewal [42]. The Amader Shathya scheme has been implemented in Chakaria, a remote rural subdistrict in the southeast coastal region of Bangladesh, with a target of 25,513 potential households. The scheme provides both inpatient and outpatient healthcare services with three insurance

packages: outpatient, special outpatient (subsidized for low-income households), and inpatient. A household is the membership unit for all three packages, and a maximum of five individuals from a household can receive benefits during the twelve-month coverage period.

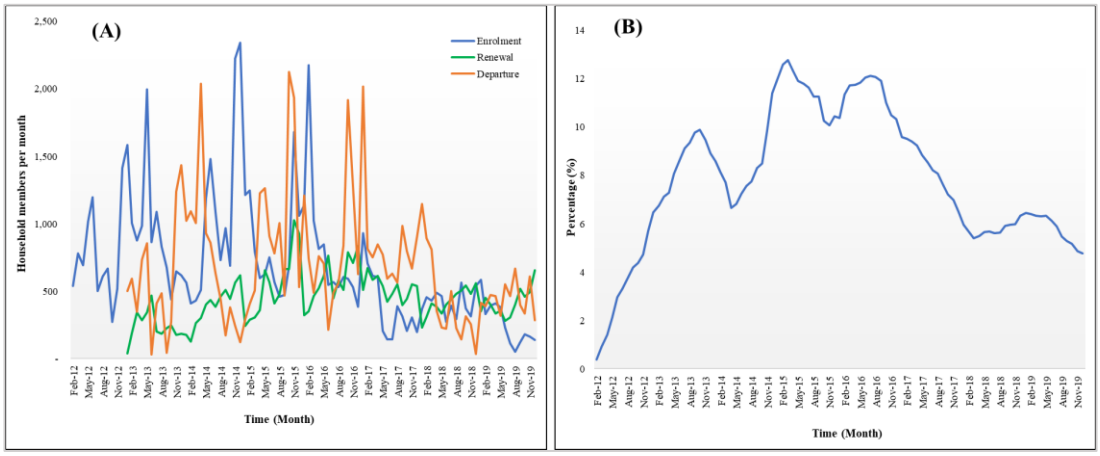

Figure 7.1. (A) Trend of membership enrolment, renewal, and departure; (B) population coverage for the CBHI scheme in Bangladesh.

The challenges of our case CBHI are consistent with the literature and our previously conducted qualitative study on CBHI in Bangladesh. The scheme has difficulty in attracting new members and retaining existing members after the initial year of their coverage. Over the first three years of implementation, the total number of enrolled members was 20% of the target population [42]; however, if we subtract those who departed from the scheme, the coverage falls to approximately 12%, predominantly due to low renewal rates. Figure 7.1A illustrates the membership enrolment, renewal, and departure for household members between February 2012 and December 2019. The figure indicates highly fluctuating membership enrolment with a gradual increase during the first four years of implementation, followed by a sharp decline. Membership renewal was relatively low, whereas members departure was generally higher. A previous study reported that only 38% of households renewed their membership within three years of implementation [42]. Due to low enrolment, low renewal, and high departure, population coverage was typically below 10% of the targeted population (see figure 7.1B), when departed members were excluded. The scheme achieved its highest level of coverage after three years of implementation, with an increasing trend up to the fourth year of implementation. However, after four years, coverage declined.

The capacity for the CBHI to be self-sufficient, i.e., its ability to cover total costs, including medical costs for beneficiaries, operational costs, marketing and advertising costs, and others, was significantly limited. In Bangladesh, the majority of CBHIs are severely reliant on external funding and are rarely able to recoup their operational and medical expenditures [145]. The scheme was unable to secure enough premiums due to inadequate population coverage; consequently, they did not recover all their costs. It is expected that higher population coverage will result in increased premium collection and better self-sufficiency, despite concerns that more members will lead to more medical cost, but also a higher chance of risk sharing and lower operational cost per members [242]. Slow growth in membership due to inadequate enrolment and renewal, and higher departure and a lack of self-sufficiency have been identified as the main threats to the successful implementation of the scheme.

7.2.2.2. Model development

7.2.2.2.1. Qualitative model

The structure of an SD simulation model can be created by developing a Stock Flow Diagram (SFD). This diagram provides a visual representation of the causal relationships between components of a system. Stocks are then identified to represent physical units of resource inventories at a given time, with flows (rates) also identified to describe the rate at which a stock changes from one unit of time to the next. A stock encompasses both incoming ("inflow") and outgoing ("outflow") flows, and the accumulated stocks represent the net flow at a given time. Other variables of interest are identified, and arrows are used to represent interconnections between these variables. The ''+'' or ''–'' symbols are used at the arrowheads to indicate the direction of change. The use of ''+'' means that when one variable changes, the other variable changes in the same direction. For example, an increase in premium collection leads to a corresponding increase in premium availability, while a decrease in premium collection results in a decrease in premium availability. In contrast, a ''–'' sign at an arrowhead signifies that the variables change in opposite directions. For example, rising total costs will reduce the availability of premium (premium availability), while a drop in total costs will enhance the availability of premium (premium availability).

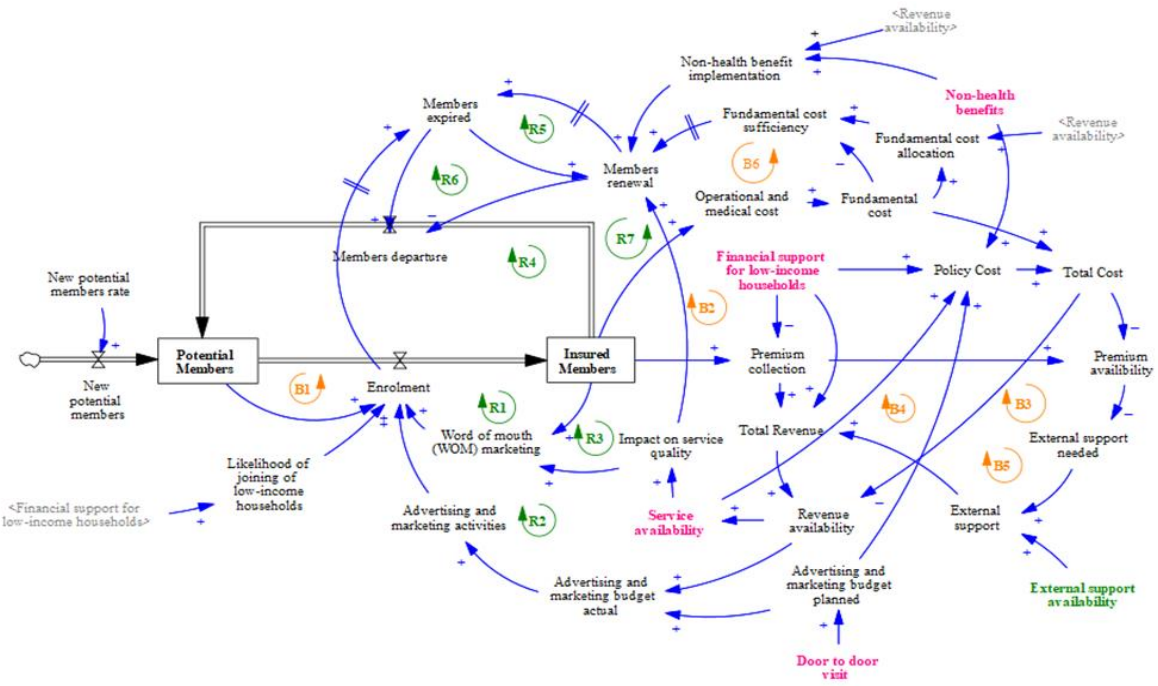

Figure 7.2. Simplified SFD with feedback loops

A SFD highlights two different types of feedback loops: reinforcing (denoted by 'R') and balancing (denoted by 'B') loops [227]. Figure 7.2 is a simplified version of the SFD for the CBHI system which focusses on the key stock and flow and feedback structures contained in the model. The elaborated SFD shown to highlight the feedback loops including financial structures are provided in appendix A7.1. Figure 7.2 shows two key stocks: potential members and insured members. The stock of potential members increases with the rate of new potential members and then depletes as potential members become insured members following the rate of enrolment. Figure 7.2 also demonstrates that enrolment is predominantly driven by advertising and marketing activities and word-of-mouth (WOM) marketing. Enrolment from advertising and marketing activities is contingent upon the advertising and marketing budget actual, directed by the revenue availability and advertising and marketing budget planned. Enrolment from WOM marketing is influenced by the number of insured members and the impact on service quality due to the policy of service availability (variables with pink text are policies, which are described in policy structure section). In addition, the likelihood of joining of low-income households is affected by the financial support for low-income households, including a discount on premiums offered to low-income

households as a part of policy intervention, which enhances the likelihood of their participation.

Membership expiration takes place every twelve months and members renewal, and members departure are influenced by impact on service quality (see figure 7.2). Total cost comprises operational and medical cost and the implementation of policies (i.e., door-to-door visits, non-health benefits, and service availability). Premium collection is the main source of revenue generation (revenue availability) for the scheme. If premium availability is not sufficient to cover total cost, the amount of external support needed will increase and will bridge the gap between premium collection and total cost by supplementing external support to revenue availability. External support will bring equilibrium between premium collection and the total cost, thereby ensuring the fulfilment of all operational and medical services and implementation of policies. External support may include contributions from donors, local communities, and other avenues. Figure 7.2 also illustrates several key feedback loops including reinforcing (loops R1, R2, R3, R4, R5, R6, R7, and R8) and balancing loops (loops B1, B2, B3, B4, B5, B6, and B7). The description of loops shown in figure 7.2, is explained in box 7.1 (1 to 8 are the reinforcing loops in box 1, while 9 to 15 are the balancing loops).

Box 7.1. Description of loops illustrated in figure 7.2

Feedback loops:

1. Reinforcing loop, R1 specifies that, the increase (decrease) of insured members due to the enrolment will lead to increase (decrease) of the WOM marketing and ultimately will affect to increase (decrease) the enrolment.
2. Similarly, loop R2 explains that more insured members will lead to higher amount of premium collection and better revenue availability and the scope of allocating more fund on advertising and marketing budget actual that will push to increase enrolment.
3. Loop R3 shows, the increase in insured members due to the increased enrolment will lead to better revenue availability through higher premium collection, that will create the scope to increase service availability, positive (increased) impact on service quality, WOM marketing, and will affect the increase in enrollment.
4. Loop R4 presents how the impact on service quality due to the increased service availability affects insured members. The higher revenue availability due to the increased insured members and higher premium collection will increase members renewal and will decrease members departure.
5. Loop R5, the increase in members expired will affect the increase in members renewal and increased members renewal affects the increase in members expired with a delay of twelve months coverage periods.

6. Loop R6 shows that increase in insured members affects the increase in premium collection, revenue availability, service availability, members renewal, members expired, members departure, and potential members. Increasing potential members has an impact on increasing enrolment.
7. Loop R7 specifies that an increase in insured members will increase operational and medical costs as well as fundamental costs, with an increase in fundamental costs decreasing the fundamental costs sufficiency and the renewal of insured members (members renewal). A decrease in members renewal will increase members' departure and increase the number of potential members.
8. Loop R8 indicates that an increase in fundamental cost because of an increase in insured members, operational and medical costs will result in an increase in fundamental cost allocation, fundamental cost sufficiency, and members renewal. An increase in member renewal will reduce members' departure.
9. Balancing loop B1 shows that an increase in potential members will affect the increase in enrolment, members expired with a delay, and members renewal. Increased members renewal will affect the decrease in members departure, potential members, and enrolment.
10. Loop B2 illustrates that the increase in insured members will affect the increase in operational and medical cost, fundamental cost, and total cost. Increased total cost will affect the decrease in revenue availability, service availability, impact on service quality, and WOM marketing. Decreased WOM marketing will affect the decrease in enrolment and insured members.
11. Loop B3 shows the increase in premium availability due to the higher insured members and premium collection will contribute to decrease the external support needed, external support, total revenue, revenue availability, advertising and marketing budget actual, advertising and marketing activities, enrolment, and insured members.
12. Loop B4, the increase in service availability will contribute to increasing policy cost and total cost and an increased total cost will affect the decrease in revenue availability and service availability.
13. Loop B5 presents the impact of decreased external support on enrolment. An increase in service availability will contribute to increasing policy costs and total cost. An increase in total cost will decrease premium availability and will increase external support needed, external support, total revenue, and revenue availability.
14. Loop B6 shows that an increase in insured members will affect an increase in operational and medical cost, and fundamental cost. An increased fundamental cost will affect a decrease in fundamental cost sufficiency and members renewal. A decrease in members renewal will affect an increase in members departure.
15. In loop B7, an increase in insured members will increase operational and medical cost, fundamental cost, fundamental cost allocation, fundamental cost sufficiency, and members renewal. An increase in members renewal will result in a decrease in members departure, potential members, and enrolment.

In the elaborated SFD provided in appendix A7.1 (see diagram A7.1.1), we categorized enrolment into two flows, enrolments who use benefits and enrolments who do not use benefits. This enables the total number of members using benefits to be identified and to be able to calculate the cost of medical services. Insured members are also separated into stocks of insured members use benefits and insured members do not use benefits. In addition, we identified separately the number of members who use benefits for the first time and the number of members who use benefits multiple times (i.e., individuals who use benefits more than once). The categories were made to represent reality and with a thinking that financial sustainability of the scheme may depend on the proportions of benefit use versus not use, and first-time use versus multiple time uses. The 'Insured members use benefits' stock comprises members who use benefits first time and then add to the members using multiple benefits. These two categories of members follow identical procedures for membership expiration, renewal, and departure. The first time visit for benefits and members using multiple benefits (subsequent visits), signifies the total members using benefits i.e., overall count of healthcare services provided by the scheme (see the diagram A7.1.1 in the appendix A7.1). A higher rate in this regard indicates a greater number of individuals accessing healthcare services, and it also suggests that a larger proportion of higher-risk individuals have enrolled in the scheme. Similarly, we separated operational and medical cost into operational cost and cost of medical services (see the diagram A7.1.2 in appendix A7.1). The cost of medical services is comprised of fixed medical treatment cost, cost of outdoor medical services (including cost of 20% discount on medicine), and cost of hospitalization. Operational cost also includes operational fixed cost and costs related to advertising and marketing activities calculated using operational variable cost and advertising and marketing budget.

7.2.2.2.2. Policy structure

There are several activities indicated as 'policy actions' which have been implemented during the historical period covered by the model. These actions were implemented in the scheme to increase enrolment and renewal. These include door-to-door visits, enhanced service accessibility through paramedics, medicine discount, and telehealth service, and financial assistance for low-income households. As part of the confidence building process for the model, the baseline simulation included the historical policy implementation to be able to compare the output of the model with real data from the scheme —*see baseline simulation section*. The formulation of policy structures, along with their corresponding variables, has been established through multiple consultations with scheme operators and experts,

supplemented by relevant literature. Policy structures are also provided in appendix A7.1 (see diagrams A7.1.3 to A7.1.5)**.** After running the baseline simulation, further scenarios were implemented in the model where the level of each policy was increased in addition to adding a new policy to provide non-health benefits. However, policy implementation is heavily related to the financial situation i.e., revenue availability. To maintain the scheme and to implement policies at their increased level, the scheme will require sufficient funds; revenue generated from the premium collection might not be adequate to fund these activities. Hence, we considered several financing strategies for the scheme to carry out the policy activities. Thus, the policy simulation will be the combination between the policy targets and financing strategies, that has been explained in the later section.

Policy 1: Door-to-door visits

Conducting door-to-door visits is a component of the advertising and marketing activities. This advertising and marketing strategy seeks to share knowledge about the scheme among potential members, thereby increasing their awareness and interest in joining [157–165]. The door-to-door policy is anticipated to drive enrolment growth; however, its implementation would necessitate an additional budget allocation for advertising and marketing, consequently leading to an increase in policy cost and total cost (see figure 2). In the model, we incorporated that, the mechanism for enrolling individuals through advertising and marketing activities is based on converting the advertising and marketing budget actual into the number of enrolments using the acquisition cost per member (see the diagram A7.1.1 in appendix A7.1). In the model, the door-to-door policy was recognized through an increase in advertising and marketing budget, leading to an increase in enrolment.

Policy 2: Increase service availability

The increase in service availability includes providing services from paramedic staff, providing discounts on medicine, and providing telehealth service. Service provision from paramedic staff will alleviate the workload on physicians and reduce waiting times for members accessing benefits [153,182]. This initiative is designed to enhance the impact on service quality. Enhanced impact on service quality is expected to improve members satisfaction for those using healthcare services, subsequently leading to an increase in members renewal, enrolment through WOM marketing, and insured members (see figure 2).

However, the inclusion of additional paramedics as a part of the service availability policy will also increase policy cost and total cost, therefore sufficient revenue is needed to implement this policy. The cost associated with additional paramedics is contingent upon their number and their corresponding salaries, which is integrated into the cost of baseline paramedics (see the diagram A7.1.3 in appendix A7.1).

Medicine discount will allow insured members to get medicines at a discounted rate. It is assumed that providing discounts on medicine will influence the impact on service quality, members renewal and enrolment through WOM marketing. However, this would also increase policy cost and total cost. Furthermore, the incorporation of telehealth services will enhance the accessibility of healthcare. This enhancement in accessibility will subsequently influence the quality of services, thereby impacting the members' renewal and the enrolment through WOM marketing. This will be achieved by increasing members' satisfaction among those who use telehealth services.

Policy 3: Non-health benefits

Non-health benefits refer to the provision of services or advantages beyond healthcare, aimed at sustaining members' renewal. The process of non-health benefits is different from health benefits since, the use of healthcare benefits only impacts insured members who use benefits (healthcare), but non-health benefits will impact insured members who use and do not use healthcare benefits. The implementation of non-health benefits entails offering insured members discounts on groceries from local stores in collaboration with the scheme operator. The costs associated with this policy are limited to the monitoring and coordination processes with the local stores (this is shown as communication cost with local stores; see the diagram A7.1.5 in appendix A7.1); the scheme operator does not have to cover or reimburse the discounts offered to insured members by these stores. The effects of this policy include an increased likelihood of members renewal.

Policy 4: Financial support for low-income households

The financial support policy impacts premium collection and enrolment (see figure 2). It provides a discounted premium to low-income households which reduces the amount of premium collected per person but also increases their likelihood of joining the scheme. As stated previously, the scheme offers three different membership packages including indoor package, outdoor package, and a special outdoor package. Only the special outdoor package

is offered discounts to low-income households and therefore applicable for a reduced premium (see the diagram A7.1.4 in appendix A7.1). The scheme currently offers a 36.5% discount on premiums for low-income households.

7.2.2.3. Data collection and input

This study utilized data from multiple sources. Initially, we conducted a literature search and qualitative interviews to develop the structure of the SD model. We constructed SFDs and policy structures by drawing on insights from the literature and qualitative discussions with relevant stakeholders. The historical data pertaining to enrolment, renewal, departure, and healthcare utilization were obtained from the *Amader Shathya* scheme, covering February 2012 to December 2019. We used multiple sources of data to parametrize variables used in our model. The values of several variables were derived from published literature with others being collected through structured interviews with scheme personnel and other experts. The source and value of the variables are provided in appendix A7.2.

7.2.2.4. Building confidence in the model

The confidence building process of our SD model involved a series of formal tests. These tests included structural assessment, extreme conditions, dimensional consistency, and behaviour reproduction [227]. Examples of the outputs of these validity tests are given in appendix A7.3. As the model seeks to replicate reality, it is essential that the causal relationships depicted in the conceptual models correspond to real-world cause-and-effect links.

The structural relationships in the feedback loops were established based on insights shared by scheme operator, supplemented by relevant literature. We conducted literature review and qualitative interviews and collaborated closely with the scheme operator to develop the model. Additionally, we shared insights from the literature review with scheme operators to ensure a shared understanding and trust in the structure of the model. The SFDs and policy structures underwent multiple rounds of revisions and simplifications, guided by feedback from experts and scheme operators.

The extreme condition test was conducted on several key variables, such as advertising budget to test the impacts of a large advertising budget on potential members (stock), medical cost per member to test the effects of significant medical costs per member on insured members (stock), and so on. Finally, the model output was compared to historical

data from the scheme and insights from literature. We employed statistical tests, including t-tests and Theil's inequality statistic, to assess how well the model fit historical data.

7.3. Model results

7.3.1. The baseline simulation

The model output was compared to the historical trends in the real data for members enrolment, renewal, departure, insured members, population coverage, and utilization of benefits within the CBHI system in the baseline model. We employed t-tests and computed Theil's inequity coefficients to evaluate the compatibility between our simulated and historical data. The t-tests revealed no statistically significant differences between the simulated and historical patterns. This signifies that our simulated data corresponds well with the historical trends, although our simulated data was not capable of matching point-by-point with the historical data, demonstrated in the behaviour reproduction tests outlined in appendix A7.3 (see A7.3.3). Moreover, the calculated Theil's inequity statistics for the main variables were 1, indicating that there are no inequities (differences) between simulated and historical trends (see the behaviour reproduction tests in appendix A7.3). The model simulated from February 2012 to December 2019 (95 months) based on the availability of historical data, and then simulated for an additional 85 months to observe future behaviour. As previously stated, the baseline model encompassed the door-to-door visits policy, increase service availability policy, and financial support policy for the low-income households. Therefore, these baseline policies have already been integrated into our baseline model given in box 7.2**.**

Box 7.2. Policy targets/levels for baseline simulation and scenarios analysis

Policy targets/levels for baseline simulation:

- ✓ **Paramedics:** Two paramedics personnel have been actively engaged in the scheme.
- ✓ **Discount on medicine:** A discount of 20% on medicines was offered for insured members.
- ✓ **Telehealth services:** The monthly allocation for telehealth services was approximately 3,000 Bangladeshi taka (BDT).
- ✓ **Door to door visits:** The monthly budget for door-to-door visits was around 15,200 BDT, while the advertising budget was approximately 5,000 BDT.
- ✓ **Financial assistance:** Low-income households were offered a 40% discount on premium for the special outdoor package.

Increased policy targets/levels for scenarios analysis:

- ✓ **Paramedics:** Increase paramedic staff from 2 to 4 staff on 100th month ahead.
- ✓ **Discount on medicine:** Increase medicine discount from 20% to 40-50% in the 100th month ahead.
- ✓ **Telehealth services:** Increase telehealth budget from 3,000 BDT/month to 10,000 BDT/month on 100th month ahead, and gradually reach to 15,000 BDT/month on month 136th.
- ✓ **Door to door visits:** Increase door to door policy budget from around 15,200 BDT/month to 52,000 BDT/month; and increase advertising cost from around 5,000 BDT/month to 25,000 BDT/month.
- ✓ **Financial assistance:** Increase financial support for special outdoor members from 54 BDT/people/year to 74 BDT/people/year in the 100th month.
- ✓ **Non-health benefits:** Apply non health benefit (offering discounted groceries from local shops) for 100% coverage on 100th month ahead.

Figure 7.2 shows that total costs include operational and medical activities and policy activities. Hence, for the model output we divided the total cost into two parts- fundamental cost and policy implementation cost. The fundamental cost included *operational cost*—fixed cost and variable cost for building, vehicle, equipment, non-medical human resources, monthly expenses, advertising and marketing cost excluding door to door visit cost—and *medical cost*—hospitalization claim, and physician's salary. The policy of providing services by paramedic staff, providing 20% discount on medicine, telehealth services, door-to-door visits, and providing financial assistance to low-income households were regarded as policy activities in the baseline run, and the costs associated with these activities were labelled as baseline policy implementation costs. In our baseline model, we assumed that revenue was allocated for the fundamental activities first, then any remaining revenue was spent on baseline policy activities. The model also was run under the assumption that external support was available until the 50th month after consultation with the scheme operator. Subsequently, the scheme relied solely on revenue generated from premium collection, without further external support.

From the baseline simulation we observed that population coverage will continue to follow a declining trend after the historical period. The highest population coverage was approximately 12% on 43rd month, within the historical period and subsequently will decrease to 3.4% at the end of the simulation time (see figure 7.3A). This decrease was predominantly driven by low enrolment and members' renewal (following an increasing trend

up to the 40th month) as well as high members departure compared with enrolment and renewal (see figure 7.3B).

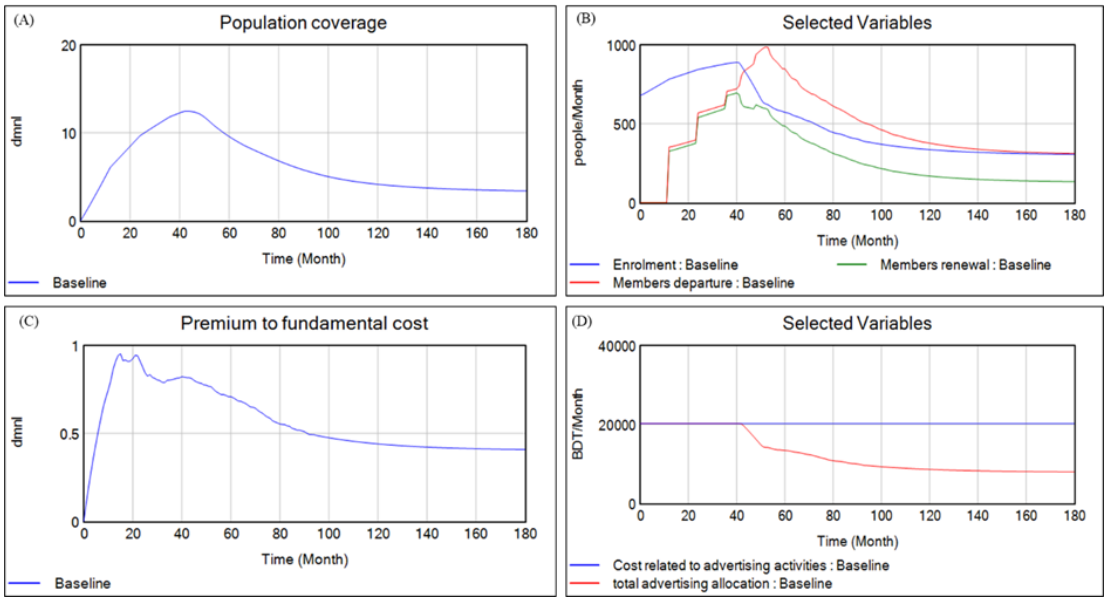

Figure 7.3. Findings from the baseline simulation- (A) population coverage; (B) enrolment, members renewal, and departure; (C) premium to fundamental cost ratio; and (D) cost related to advertising activities and total advertising activities.

Furthermore, the baseline model reveals that the revenue generated through premium collection failed to recover fundamental cost to perform fundamental activities throughout the historical periods and will follow a decreasing trend after the historical period (see figure 7.3C). This resulted in a diminishing trend of fundamental cost recovery over time, with the highest recovery rate observed at around 95% on 14th month, gradually declining to 41% by the end of simulation. This means by the end of 180 months; premium collection is only recovering 41% of fundamental cost. As a result, external support was essential to enhance revenue availability for total cost coverage. Additionally, our findings demonstrated a substantial shortfall in the total allocation for advertising activities compared to the actual requirements after the termination of external support (cost related to the advertising activities, see figure 7.3D). This issue was created from inadequate premium collection, which failed to adequately fund the fundamental activities. As a result, all cost categories experienced proportionate reductions, and prevented their fulfilment at 100%. This disruption adversely affected the effectiveness of fundamental and baseline policy activities. The inadequate advertising budget contributed to insufficient enrolment by minimizing advertising activities. Further, the inability to implement all baseline policy activities affected

service quality, therefore members renewal and enrolment through WOM marketing declined and ultimately resulted in a decline in population coverage.

7.3.2. Policy and financing strategy simulation

Figure 7.2 represents the scope of policies pertaining to non-health benefits, financial support for low-income households, door-to-door visits, and increasing service availability through additional paramedic staff, medicine discounts, and telehealth services. These policies were intended to improve the scheme's performance; for instance, offering non-health benefits will increase the likelihood that insured members will renew their membership after their coverage period expires. Providing financial assistance to low-income households will also increase their likelihood of joining the scheme. Door-to-door visits will accelerate advertising and marketing efforts and will contribute to increase enrolment. In addition, the policy to increase service availability will improve the quality of services, which will increase enrolment through WOM marketing and increase members renewal. However, based on the baseline analysis, it became apparent that the existing baseline policy activities (level of policies) were insufficient to address the problematic system behaviour—which was caused by revenue insufficiency. Thus, we sought to revise the pre-existing policies to improve the performance of the scheme. We aimed to examine the effect of increasing policy levels, such as increasing the budget allocation for door-to-door visits, incorporating additional paramedics, and expanding medicine discounts relative to the baseline, as well as introducing non-health benefit policy after the historical period. Increasing the policy levels will not be effective to increase the scheme performance (renewal and enrolment) unless there is enough financial capacity to cover total cost, since all the policy implementation (increase service availability, non-health benefits, and door to door visits) depend on revenue availability. The implementation of the increase service availability policy, non-health benefit policy, and door-to-door visits policy will increase the policy cost and total cost; the increase in total cost will decrease revenue availability; and the decrease in revenue availability will impact the implementation of the policies (see figure 7.2). Similarly, financial assistance to low-income households will contribute to a decline in the revenue availability by resulting in the collection of less premium and total revenue. So, it is essential to have enough revenue availability to implement the policies to enhance the performance of the scheme. Hence, financing strategies become equally important as increasing the policy levels and for this purpose we propose three financing strategies to implement different policy levels. Effect of policy implementation was assessed with different combination of policy levels i.e., either same

policies with the same policy levels as baseline model or adding additional non-health benefit policy with baseline policies or increasing levels of all policies. The combination of policy levels and financing strategies are shown in table 7.1.

Table 7.1. Scenario descriptions under the three financing strategies

Scenario	Financing strategy	Policy targets/levels
Baseline	External support will remain as usual, with a reduction occurring between months 40 and 50, gradually decreasing from 100% to 0%.	Two paramedic staff; 20% discount on medicine; 3,000 BDT per month for telehealth services; monthly budget for door-to-door visits 15,200 BDT, and advertising budget 5,000 BDT; financial support for special outdoor package 54 BDT annually per member.
Scenario 1	External support for policy implementation started on 100th month	Two paramedic staff; 20% discount on medicine; 3,000 BDT per month for telehealth services; monthly budget for door-to-door visits 15,200 BDT, and advertising budget 5,000 BDT; financial support for special outdoor package 54 BDT annually per member; and start non health benefit policy for 65% coverage on 100th month ahead.
Scenario 2	External support for policy implementation started on 100th month	Increase paramedic staff from 2 to 4 staff on 100th month ahead; increase medicine discount from 20% to 40-50% on 100th month ahead; increase telehealth budget from 3,000 BDT/month to 10,000 BDT/month on 100th month ahead, and gradually reach 15,000 BDT/month on month 136th; apply non health benefit for 100% coverage on 100th month ahead; increase financial support for special outdoor member from 54 BDT/people/year to 74 BDT/people/year on 100th month; increase door to door policy budget from around 15,200 BDT/month to 52,000 BDT/month; and increase advertising cost around 5,000 BDT/month to 25,000 BDT/month
Scenario 3	Continued external support for baseline activities and policy implementation*	Two paramedic staff; 20% discount on medicine; 3,000 BDT per month for telehealth services; monthly budget for door-to-door visits 15,200 BDT, and advertising budget 5,000 BDT; financial support for special outdoor package 54 BDT annually per member.

Scenario 4	Continued external support for baseline activities and policy implementation*	Two paramedic staffs; 20% discount on medicine; 3,000 BDT per month for telehealth services; monthly budget for door-to-door visits 15,200 BDT, and advertising budget 5,000 BDT; financial support for special outdoor package 54 BDT annually per member; and start non health benefit policy for 65% coverage on 100th month ahead.
Scenario 5	Continued external support for baseline activities and policy implementation*	Increase paramedic staff from 2 to 4 staff on 100th month ahead; increase medicine discount from 20% to 40-50% on 100th month ahead; increase telehealth budget from 3,000 BDT/month to 10,000 BDT/month on 100th month ahead, and gradually reach 15,000 BDT/month on month 136th; apply non health benefit for 100% coverage on 100th month ahead; increase financial support for special outdoor member from 54 BDT/people/year to 74 BDT/people/year on 100th month; increase door to door policy budget from around 15,200 BDT/month to 52,000 BDT/month; and increase advertising cost around 5,000 BDT/month to 25,000 BDT/month
Scenario 6	Re-allocation strategy: 80% premium revenue allocated to baseline activities and 20% for policy implementation	Two paramedic staff; 20% discount on medicine; 3,000 BDT per month for telehealth services; monthly budget for door-to-door visits 15,200 BDT, and advertising budget 5,000 BDT; financial support for special outdoor package 54 BDT annually per member; and start non health benefit policy for 65% coverage on 100th month ahead.
Scenario 7	Re-allocation strategy: 80% premium revenue allocated to baseline activities and 20% for policy implementation	Increase paramedic staff from 2 to 4 staff on 100th month ahead; increase medicine discount from 20% to 40-50% on 100th month ahead; increase telehealth budget from 3,000 BDT/month to 10,000 BDT/month on 100th month ahead, and gradually reach 15,000 BDT/month on month 136th; apply non health benefit for 100% coverage on 100th month ahead; increase financial support for special outdoor member from 54 BDT/people/year to 74 BDT/people/year on 100th month; increase door to door policy budget from around 15,200 BDT/month to 52,000

		BDT/month; and increase advertising cost around 5,000 BDT/month to 25,000 BDT/month
Scenario 8 *(assumed risk sharing between low risk and high-risk population)*	External support will remain as usual, with a reduction occurring between months 40 and 50, gradually decreasing from 100% to 0%.	Two paramedic staff; 20% discount on medicine; 3,000 BDT per month for telehealth services; monthly budget for door-to-door visits 15,200 BDT, and advertising budget 5,000 BDT; financial support for special outdoor package 54 BDT annually per member; and start non health benefit policy for 65% coverage on 100th month ahead.
Scenario 9 *(assumed risk sharing between low risk and high-risk population)*	External support will remain as usual, with a reduction occurring between months 40 and 50, gradually decreasing from 100% to 0%.	Increase paramedic staff from 2 to 4 staff on 100th month ahead; increase medicine discount from 20% to 40-50% on 100th month ahead; increase telehealth budget from 3,000 BDT/month to 10,000 BDT/month on 100th month ahead, and gradually reach 15,000 BDT/month on month 136th; apply non health benefit for 100% coverage on 100th month ahead; increase financial support for special outdoor member from 54 BDT/people/year to 74 BDT/people/year on 100th month; increase door to door policy budget from around 15,200 BDT/month to 52,000 BDT/month; and increase advertising cost around 5,000 BDT/month to 25,000 BDT/month

*External support will experience a rise from 0% to 100% for both baseline activities and policy implementation during the period spanning from month 96 to month 100.

1. **External support for policy implementation:** This strategy involves the continuation of external support following the historical period. However, the support would exclusively be allocated for policy implementation and not for fundamental activities. The external support for policy implementation is depicted in figure 7.4, and corresponding feedback

loops are described in box 7.3. External support for policy implementation will increase policy budget sufficiency, the advertising and marketing budget, and advertising and marketing activities, including door-to-door visits, which will contribute to enroll new members. Similarly, external support will assist in implementing the policy on service availability, and the implementation of the policy will increase service quality, WOM marketing, enrollment, and member renewal. In addition, external support for policy implementation will help in the implementation of non-health benefit policy by increasing the policy budget (policy budget sufficiency), and the implementation of non-health benefit policy will increase members' renewal. Consequently, the financing policy of external support for policy implementation will aid in enhancing the scheme's performance. The external support will enhance enrolment and renewal rate and will create scope to generate more revenue by collecting premiums. After implementing policies with increased levels, we will assess the efficacy of the policies through simulation, as well as whether or not the scheme will achieve self-sufficiency after a certain period of time.

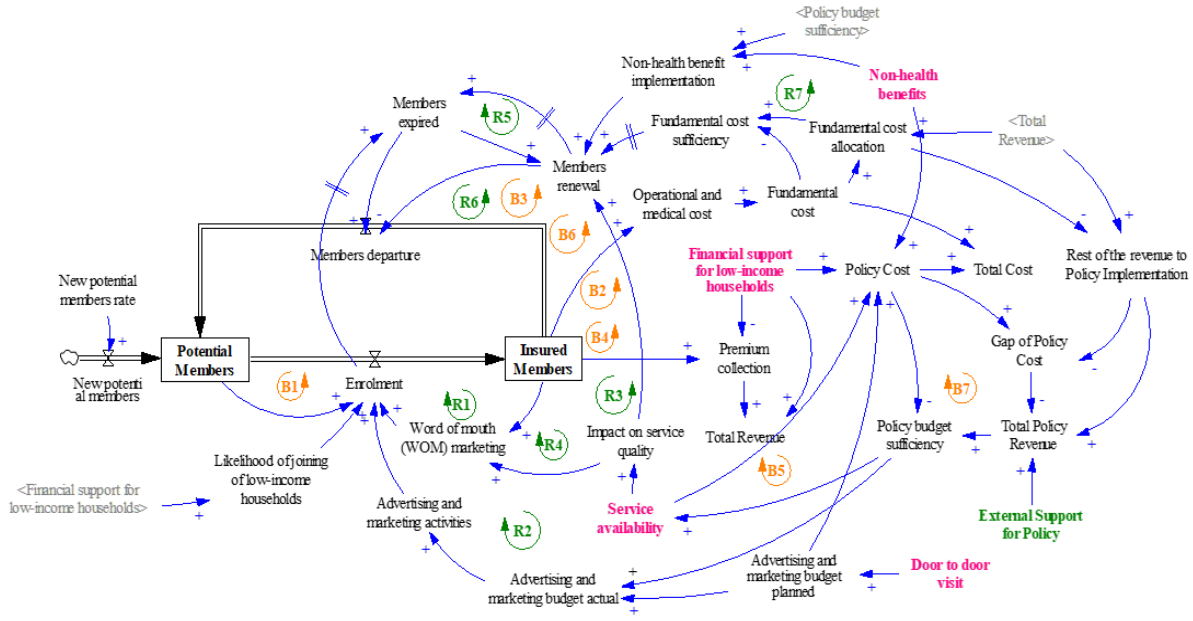

Figure 7.4. SFD for the external support for policy implementation.

2. **Continued external support for fundamental activities and policy implementation:** This strategy involves the continued availability of external support following the historical period, covering both fundamental activities and policy implementation. Given our

observations from the baseline simulation, declines in enrollment, renewal, and population coverage were explained by insufficient budget for fundamental and policy activities—largely due to reduced external support. We anticipate that an increase in fund availability through external support will positively influence the performance of the system. This assumption will allow us to observe the impact of increased policy levels since due to the fund insufficiency policy activities were interrupted. This assumption is grounded in the belief that extra financial resources will contribute to improving implementation of both fundamental activities and policies. We assumed that, after a certain point, when the scheme will be able to collect enough premium to manage total cost, the need for external support will decrease because the scheme will have enough insured members, premium collection, and premium availability to manage these costs without external support (see the figure 7.2 and corresponding loops in box 7.1). The simulation analysis will figure out whether the scheme can become self-sufficient and, if so, how long it may take to do so.

Box 7.3. Description of loops illustrated in figure 7.4

Feedback loops:

1. Reinforcing loop, R1 specifies that, the increase (decrease) of insured members due to the enrolment will lead to increase (decrease) of the WOM marketing and ultimately will affect to increase (decrease) the enrolment.
2. Similarly, loop R2 explains that more insured members will lead to a higher amount of premium collection and better revenue availability and the scope of allocating the rest of revenue to policy implementation. Increased revenue to policy implementation will increase total policy revenue, policy budget sufficiency, advertising and marketing budget actual, advertising and marketing activities that will push to increase enrolment.
3. Loop R3 shows the increase in insured members due to the increased enrolment will lead to higher premium collection, and higher total revenue. An increase in total revenue will create the scope to allocate more revenue to implement policy (rest of revenue to policy implementation), and will affect to increase total policy revenue, policy budget sufficiency, and service availability. An increase in service availability will affect in increase service quality, members renewal and decrease in members departure.
4. Loop R4 presents that an increase in insured members will affect to increase in premium collection, total revenue, rest of revenue to policy implementation, total policy revenue, policy budget sufficiency, service availability, service quality, WOM marketing, and enrolment.

5. Loop R5, the increase in members expired will affect the increase in members renewal and increased members renewal affects the increase in members expired with a delay of twelve months coverage periods.
6. Loop R6 shows that the increase in insured members affects the increase in premium collection, total revenue, fundamental cost allocation, fundamental cost sufficiency, members renewal. An increase in members renewal has an impact on decreasing members departure.
7. Loop R7 specifies that an increase in insured members will increase premium collection, total revenue, rest of revenue to policy implementation, total policy revenue, policy budget sufficiency, non-health benefit implementation, and members renewal.
8. Balancing loop B1 shows that an increase in potential members will affect the increase in enrolment, members expired with a delay, and members renewal. Increased members renewal will affect the decrease in members departure, potential members, and enrolment.
9. Loop B2 illustrates that the increase in insured members will affect the increase in operational and medical cost and fundamental cost. Increased fundamental cost will affect the decrease in fundamental cost sufficiency and members renewal. Decreased members renewal will affect the decrease in members expired with a delay, members departure, potential members, and enrolment.
10. Loop B3 illustrates that the increase in insured members will affect the increase in operational and medical cost, fundamental cost, fundamental cost allocation, fundamental cost sufficiency, and members renewal. Increased members renewal will affect the decrease in members departure, potential members, and enrolment.
11. Loop B4, the increase in insured members will affect the increase in premium collection, total revenue, fundamental cost allocation, fundamental cost sufficiency, members renewal. Increased members renewal will decrease members departure, potential members, and enrolment.
12. Loop B5 presents the impact of service availability on policy budget sufficiency. An increase in service availability will increase the policy cost and will decrease the policy budget sufficiency. A decrease in the policy budget sufficiency will decrease service availability.
13. Loop B6 shows that an increase in insured members will affect an increase in premium collection, total revenue, rest of revenue to policy implementation, total policy revenue, policy budget sufficiency, service availability, service quality, and members renewal. An increase in members renewal will affect a decrease in members departure, potential members, and enrolment.
14. In loop B7, an increase in insured members will increase premium collection, total revenue, and the rest of revenue to policy implementation. An increase in revenue allocation to policy implementation will minimize the gap of policy revenue. A decreased gap of policy revenue will increase total policy revenue, policy budget sufficiency, service availability, service quality, and members

renewal. An increase in members renewal will affect the decrease in members departure, potential members, and enrolment.

3. **Reallocation strategy:** In the reallocation strategy, external funding does not continue after the historical period. Instead, a portion of revenue collected from premium would be allocated to policy implementation with the remaining revenue being allocated to the fundamental activities defined in the baseline model. However, due to budgetary constraints, this strategy of reallocating funds for policy implementation would result in a reduction in funding for fundamental activities. On the SFD for reallocation strategy (see figure 7.5 and corresponding loops' explanation in box 7.4), total revenue generated from premium collection is allocated for two activities; fundamental activities (fundamental cost) and policy implementation (policy cost). Both affect the members renewal and advertising and marketing activities that lead to renewal and enrolment, thereby impacting insured members. This will then feedback into premium revenue. Therefore, even although a reduction in fundamental activities may lead to a reduction in insured members, an increase in policy implementation is expected to increase the number of insured members. Whether the combined impact results in an overall increase or decrease in insured members will depend upon the strengths of each impact and can only be assessed through simulation.

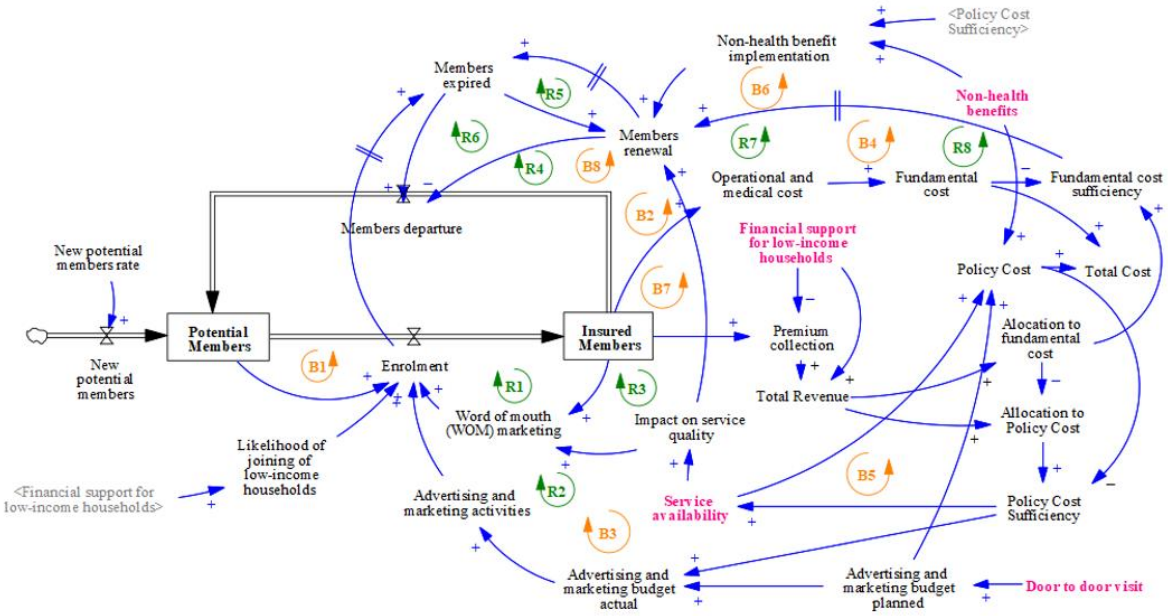

Figure 7.5. SFD for the reallocation strategy

7.3.3. Scenario analysis

As stated earlier that, in scenario analysis, we have intended to explore the effect of increasing policy levels. The increased policy levels are provided in box 7.2. The assumptions of increased policy levels are based on the scheme operator's interview that their policy level can be increased to a maximum of twice the present level — policy implementation in baseline.

Box 7.4. Description of loops illustrated in figure 7.5

Feedback loops:

1. Reinforcing loop, R1 specifies that, the increase (decrease) of insured members due to the enrolment will lead to increase (decrease) of the WOM marketing and ultimately will affect to increase (decrease) the enrolment.
2. Similarly, loop R2 explains that more insured members will lead to higher amount of premium collection and total revenue and the scope of increasing allocation to policy cost. Increased allocation to policy cost will increase policy cost sufficiency, advertising and marketing budget actual, advertising and marketing activities that will push to increase enrolment.
3. Loop R3 shows the increase in insured members due to the increased enrolment will lead to higher premium collection, and higher total revenue. An increase in total revenue will create the scope to allocate more revenue to policy cost, and will affect to increase policy cost sufficiency, and service availability. An increase in service availability will affect in increase service quality, members renewal and decrease in members departure.
4. Loop R4 presents that an increase in insured members will affect the increase in premium collection, total revenue, allocation to policy cost, policy cost sufficiency, service availability, service quality, and members renewal.
5. Loop R5, the increase in members expired will affect the increase in members renewal and increased members renewal affects the increase in members expired with a delay of twelve months coverage periods.
6. Loop R6 shows that increase in insured members affects the increase in premium collection, total revenue, revenue availability, service availability, service quality, members renewal, members expired, members departure, potential members, and enrolment.
7. Loop R7 specifies that an increase in insured members will increase operational and medical cost and fundamental cost. An increase in fundamental cost will decrease fundamental cost sufficiency and members renewal. A decrease in members renewal will affect the increase in members departure, potential members, and enrolment.
8. In loop R8, the increase in the insured members will increase premium collection, total revenue, allocation to fundamental cost, fundamental cost

sufficiency, members renewal, members expired, members departure, potential members, and enrolment.

9. Balancing loop B1 shows that an increase in potential members will affect the increase in enrolment, members expired with a delay, and members renewal. Increased members renewal will affect the decrease in members departure, potential members, and enrolment.
10. Loop B2 illustrates that the increase in insured members will affect the increase in operational and medical cost and fundamental cost. Increased fundamental cost will affect the decrease in fundamental cost sufficiency and members renewal. Decreased members renewal will affect the decrease in members expired with a delay, members departure, potential members, and enrolment.
11. Loop B3, the increase in insured members will affect the increase in premium collection, total revenue, allocation to fundamental cost. Increase allocation to fundamental cost will decrease allocation to policy cost, policy cost sufficiency, advertising and marketing budget actual, advertising and marketing activities, and enrolment.
12. Loop B4 illustrates that the increase in insured members will affect the increase in premium collection, total revenue, allocation to fundamental cost, fundamental cost sufficiency, and members renewal. Increased members renewal will affect the decrease in members departure, potential members, and enrolment.
13. Loop B5 presents the impact of service availability on policy cost sufficiency. An increase in service availability will increase the policy cost and will decrease the policy cost sufficiency. A decrease in the policy cost sufficiency will decrease service availability.
14. Loop B6 shows that an increase in insured members will affect an increase in premium collection, total revenue, and allocation to fundamental cost. An increase in allocation to fundamental cost will affect the decrease in allocation to policy cost, policy cost sufficiency, non-health benefit implementation, members renewal, members expired, members departure, potential members, and enrolment.
15. In loop B7, the increase in insured members will affect an increase in premium collection, total revenue, and allocation to fundamental cost. An increase in allocation to fundamental cost will affect the decrease in allocation to policy cost, policy cost sufficiency, service availability, service quality, members renewal, members expired, members departure, potential members, and enrolment.
16. Loop B8 illustrates that an increase in insured members will affect an increase in premium collection, total revenue, allocation to policy cost, policy cost sufficiency, service availability, service quality, members renewal. An increase in members renewal will decrease members departure, potential members, and enrolment.

7.3.3.1. External support for policy implementation

Figure 7.6 (a1, a2, and a3) shows enhanced outcomes for enrolment, renewal, and population coverage when external support is exclusively allocated for policy implementation (see scenario 1 and 2 in table 7.1). With the application of the same baseline policies coupled with a non-health benefit policy, scenario 1 achieved a population coverage of 6.9% (see figure 7.6-a3). Furthermore, under scenario 2, if extended policies are implemented, a substantial population coverage of 38.8% will be attained (see figure 7.6-a3). However, the premium-to-total cost ratios will be remained inadequate at 48% for scenario 1 and 51% for scenario 2 (see figure 7.6-a4).

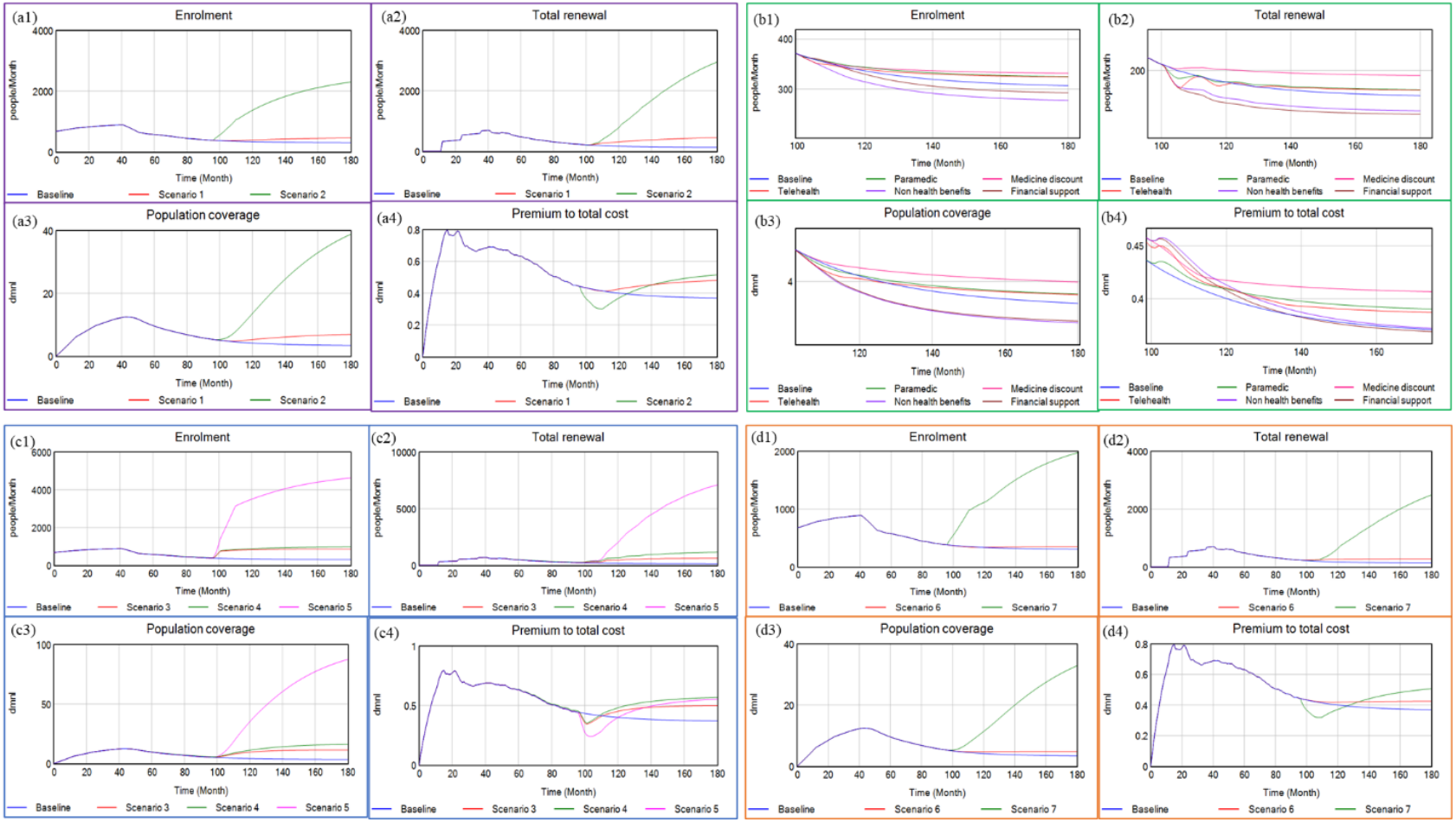

Figure 7.6. (a1, a2, a3, a4) scenarios under the external support for policy implementation strategy; (b1, b2, b3, b4) scenarios to explore effectiveness of individual policies; (c1, c2, c3, c4) scenarios under the continued external support for fundamental activities and policy implementation strategy; and (d1, d2, d3, d4) scenarios under the reallocation strategy.

Furthermore, we explored the efficacy of individual policies, excluding door-to-door visits which fall under advertising and marketing activities (see figure 7.6- b1, b2, b3, and b4). Through this assessment of individual policy effectiveness under the financing strategy, we determined that the implementation of a single policy have little impact in terms of enrolment, renewal, and population coverage compared to implementation of all policies at baseline (see figure 7.6-b1, b2, and b3). Among the individual policies, it was observed that policies such as additional paramedic staff, medicine discount, and telehealth would be more effective to increase enrolment, renewal, and population coverage. Respectively, we observed that medicine discount, telehealth, and extra paramedic increased population coverage by 2.9% to 4% compared to the baseline simulation.

Surprisingly, extending financial support to low-income households and introducing non-health benefit policies led to a reduction in enrolment and renewal rates, and population coverage compared to the baseline (see figure 7.6-b1, b2 and b3). This can be explained through the SFD illustrated in figure 7.2 as financial support and non-health benefit will affect the enrolment, insured members, and consequences in premium collection. But with the absence of medicine discount, telehealth service, and additional paramedic, there will be a reduction in impact on service quality that will affect both renewal and WOM marketing (see loops R3 and R4 in figure 7.2). Since in the baseline simulation, the combined effect of all policies is integral to the functioning of the scheme, omitting certain policies to see individual effects will diminish this impact, caused when only single policy implemented the impact of other policy absence is considered. Based on the result in figure 7.6-b3, the rank of impactful policies from best to worst to implement are as follows: medicine discount, telehealth services, and additional paramedic staff. Implementation of non-health benefits, and government support should be taken carefully since they have less impact on increasing the performance of the scheme—compared to baseline—as the absences of the other policies.

7.3.3.2. Continued external support for fundamental activities and policy implementation

As previously stated, this strategy involves a gradual increase of external support from 0% to 100% of the funding gap between total cost and premium collection, encompassing both fundamental activities and policy implementation, over the timeframe extending from the 96th to the 100th month. Three scenarios (described in table 7.1) have been tested in the simulation (scenario 3, 4, and 5).

The outcomes reveal an increase in enrolment and renewal, with an overall increase in population coverage as compared to the baseline model, as illustrated in figure 7.6-c1, c2, and c3. In scenario 3, where only policies with baseline levels were implemented, population coverage reaches a maximum of 11.4% (see figure 7.6-c3). In scenario 4, the inclusion of a non-health benefit policy (i.e., offering discounted groceries from local shops) alongside the baseline policies leads to a higher coverage at 16.2%. Scenario 5, which involves the implementation of policies with higher levels, reaches the highest population coverage of 87.6%. However, despite the expanded population coverage, the revenue generated from premium collection does not fully recover total costs. Following the resurgence of external support in the 96th month, the premium-to-cost ratio initially declines, and subsequently shows improvement. The peak ratios were 50%, 57%, and 55% for the three respective scenarios (see figure 7.6-c4).

7.3.3.3. Reallocation strategy

In the re-allocation strategy of revenue generated from premium collection, various allocation options between fundamental activities and policy implementation were implemented and the most effective strategy was found to be a split of 80% to fundamental activities and 20% to policies. This analysis was conducted under the premise that external support would stop after the historical period. Consequently, we solely presented scenarios based on this optimal allocation strategy. Scenario 6, which continues the baseline policies while introducing an additional non-health benefit policy, demonstrates a minor enhancement in member enrolment, renewal, and population coverage (4.8% compared to 3.4%) when 80% of the premium revenue is directed to fundamental activities and 20% towards policies, as portrayed in figure 7.6- d1, d2, and d3. Notably, population coverage of 33% was achieved in scenario 7 by implementing increased policy levels under the same allocation strategy (see figure 7.6-d3). Despite resulting in an improved total cost recovery towards the end of the simulation in scenario 6 (42%) and scenario 7 (50%), the recovery rates remained relatively modest compared to the baseline (37%) (see figure 7.6-d4).

7.4. Discussion

The purpose of this study is to investigate effective policies for improving the performance of voluntary CBHI in Bangladesh. This study examines the sustainability of CBHI, analysing whether it can become financially self-sufficient once it covers a substantial portion of the population and how long it might require external financial assistance before becoming self-

sustaining. In addition, this study explores different policies to address issues such as low enrolment, renewal, and limited population coverage. Due to the objective of this study, we first attempted to identify effective policies for the voluntary CBHI schemes that would increase enrolment and renewal rates in order to increase population coverage. Then, we examine the issues of sustainability, i.e., how to make a CBHI self-sufficient, if the scheme cannot accomplish self-sufficiency with a higher population coverage. Results obtained from baseline simulations indicate that, even after implementing the majority of identified policies, the population coverage of the CBHI was projected to only reach 3.4% after 15 years due to low enrolment, renewals, and high departure rates. During this period, the revenue generated from premiums would only cover 41% of the fundamental cost. The lack of financial resources is a major contributor to this situation, especially since external support was not available beyond the first 40 to 50 months. Therefore, the study explores various scenarios within three financing strategies: external support for policy implementation, continued external support for fundamental activities and policy implementation, and reallocation of resources after the historical period. However, the best performing scenarios under these strategies cover 38.8%, 87.6%, and 33% of the population, respectively, and only recover 51%, 55%, and 50% of the total costs for fundamental services and policy implementation. It was also noted that implementing all policies simultaneously is more effective than adopting them individually. Among the policies studied, the most impactful were the medicine discount policy, followed by telehealth services and additional paramedic services.

Achieving sustainability for the voluntary CBHI remains challenging. Sustainability of a scheme may be defined as a scheme's capacity to fund all of its cost through premium revenue. Therefore, CBHI will be self-sufficient once premium revenue will be at least equal to the total cost required for fundamental services and policy implementation. From the scenario analysis, we observed that, under the current context, CBHI will not be financially sustainable since premium revenue may only recover half of the total cost even with a larger population coverage. This may be because larger population coverage is a driver for both premium revenue and operational and medical costs. To address the situation, the scheme needs to focus on cost reduction and revenue generation. However, it would not be feasible to charge additional premium to members therefore, the only option for improvement is cost management.

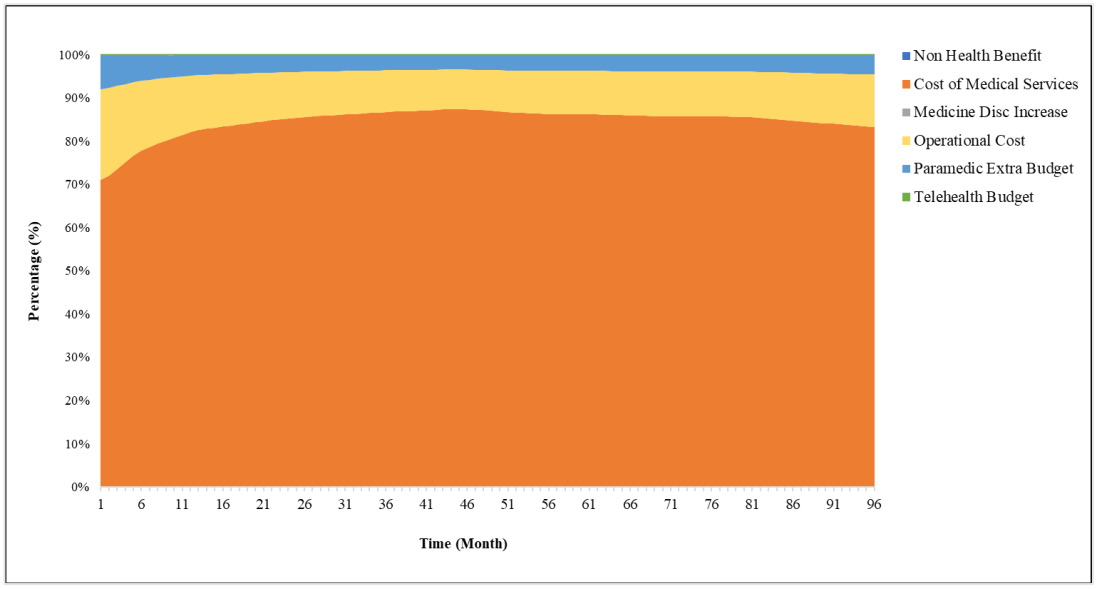

Figure 7.7. Percentages of different cost components.

The total costs of the system comprise costs associated with medical services and operational expenses for fundamental services, along with the implementation of policies. Analysis conducted during the historical period reveals that medical services costs hold the predominant share of the cost structure, accounting for approximately 70% to 80% of scheme expenditures, as depicted in figure 7.7. Operational costs constitute around 10% to 15%, while the remainder encompasses paramedic and telehealth costs. The cost of medical services also incorporates a policy component in the form of a 20% discount on medicines. The cost of medical services itself can be further broken down into three components: fixed costs for medical treatment, costs related to hospitalization, and costs associated with outpatient medical services. Both hospitalization and outpatient medical services costs are influenced by the unit cost (average expense for claim settlement in hospitalization and medical treatment variable costs (discounted medicine price)), and the factors driving these costs include members utilizing hospitalization services and the total number of members utilizing benefits. There are two potential avenues for achieving cost reduction. The first involves reducing the unit cost for average claim settlement in hospitalization and the medical treatment variable cost through policy revisions. However, this approach could render the market less appealing if there is a reduction in medical coverage. Alternatively, cost reduction can be achieved by attracting a less risky population to the scheme or implementing strategies to enhance the health conditions of insured members within their environment.

Based on the historical healthcare utilization data, it was observed that approximately 80% of the insured members use healthcare services, defined as their first visit within the couple of months of joining the scheme. An additional 6% of members used healthcare benefits within the remaining duration of their coverage. Additionally, 4.5% of members received healthcare on multiple occasions. This suggests the possibility that during the historical period, a larger proportion of high-risk individuals might have enrolled in the insurance scheme, or perhaps individuals are less motivated to maintain healthy behaviours due to their existing coverage.

Our simulation findings reveal a significant rise in population coverage, increasing from the baseline of 12% to a range of 33% to 88%. Thus, it becomes plausible to anticipate risk-sharing between the low-risk and high-risk populations in these scenarios. After consulting with the scheme operator, two additional scenarios (8 and 9) were simulated. In these scenarios, it was assumed that 20% to 30% of insured members would utilize healthcare benefits within the first couple of months of enrolment, 2% would do so throughout the remainder of their coverage periods, and 2.25% would utilize healthcare benefits multiple times. We derived our assumption from the analysis of Bangladesh Household Income Expenditure Survey data in 2016-17, which revealed that 21% of rural individuals reported experiencing illness or symptoms within the preceding 30 days [121]. About 88% of these individuals sought medical treatment. Given that our study focuses on insured individuals, who have a higher likelihood to seek healthcare, we anticipate that between 20% and 30% of insured individuals may become sick and all of them will seek treatment. Both scenarios were simulated with the same financing assumption as the baseline, where external support would be available until the 50th month. In scenario 8, the same baseline policies were retained with the inclusion of a non-health benefit policy covering 100% of insured members from the 100th month onwards. In scenario 9, increased levels for the baseline policies were incorporated during simulation with the same external support assumptions.

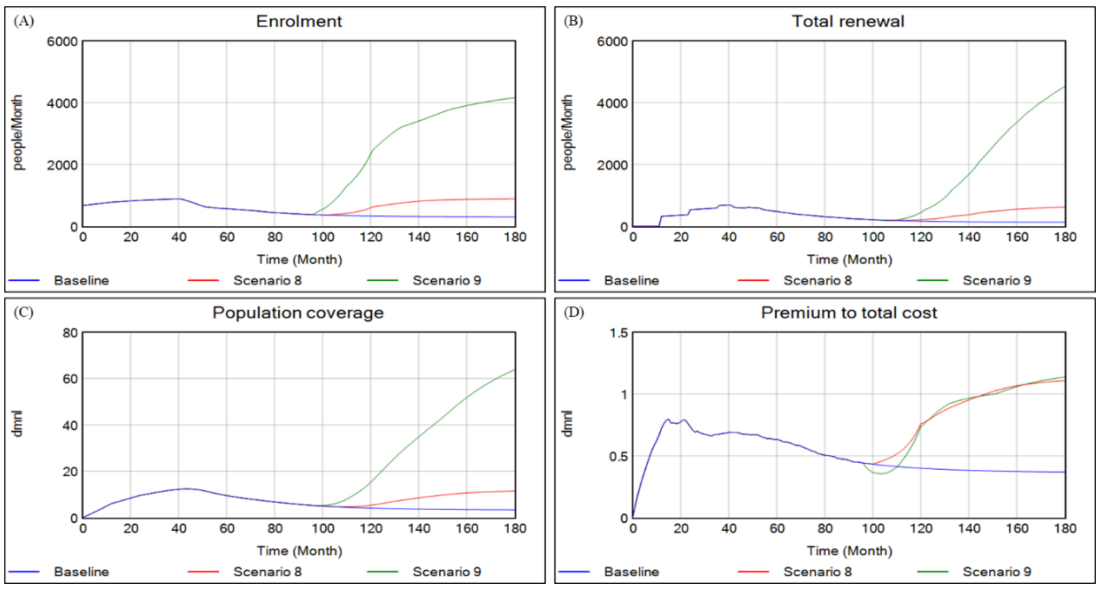

Figure 7.8. Findings from scenarios analysis considering risk sharing between low-risk and high-risk individuals.

Population coverage reached 11.5% and 63.4% for scenario 8 and scenario 9, respectively (see figure 7.8C). Although these coverage figures were lower than the best performing previous scenarios (88% for scenario 5), they demonstrated better progress in terms of the ratio of revenue to total cost required for self-sufficiency. After the 100th month, the premium to total cost ratio began an upward trend, ultimately reaching a value of 1 after the 145th month (i.e., 4 years after the historical period) (see figure 7.8D). This signifies that the premium revenue becomes sufficient to cover total cost. Starting from the 145th month, both the costs of fundamental services and policy implementation can be funded through the premium revenue, moreover, presenting an opportunity to introduce additional policies. However, it is unlikely to achieve risk-sharing between high-risk and low-risk individuals when population coverage is 11.5%, as found in scenario 8. Consequently, we expect that 63% of the population coverage would achieve a mix of high-risk and low-risk insured members, and the prospect of self-sufficiency. Based on this analysis, there exists a prospect to enhance self-sustainability by ensuring risk-sharing between low-risk and high-risk members within the insured population and by promoting healthier practices among the target population to reinforce overall healthiness.

7.5. Conclusion

In this research, we have utilized an SD modelling approach to model the CBHI system, aiming to determine policies which will support a sustainable CBHI by effectively tackling the challenges associated with the CBHI scheme. By leveraging SD models, we were able to capture the structure and dynamics behaviours of the CBHI scheme. We applied several policies, including door-to-door visits, providing healthcare services by paramedics, providing discounts on medicine, and telehealth services, providing financial support to low-income households, and incorporating non-health benefits into the benefit packages, to seek to achieve a high population coverage to test the hypothesis that voluntary CBHI may attain self-sufficiency after achieving a substantial population coverage. However, our research indicates that voluntary CBHI will not be financially sustainable, i.e., it will not attain self-sufficiency, even if more than 80% of the population is covered. The chance of attaining self-sufficiency can be increased by ensuring risk-sharing among insured members, i.e., by ensuring that both high-risk and low-risk individuals join the scheme. For this reason, our research suggests incorporating health promotion and awareness activities at community level into the scheme to encourage healthier behaviour among the community. Such activities will allow for the spread of information about the scheme and will help to enrol more participants and enhance the health of the population. However, voluntary CBHI will require financial assistance prior to attaining financial sufficiency. Our research revealed that CBHI will require external support for a reasonable length of time, at least four years in our model, prior to achieving self-sufficiency. In addition, the policies analysed in our study will be effective in increasing population coverage, but policy levels should be revised. The findings of our research underscore the imperative of government engagement in the context of CBHI. The viability of achieving self-sufficiency within small-scale, voluntary CBHI schemes is revealed to be notably challenging in the absence of government interventions. These governmental interventions may include, but are not limited to, the provision of financial assistance by the government, integration with the broader health system to increase population coverage and ensuring a more comprehensive healthcare delivery system, as well as enact legislations to foster a more balanced and equitable risk pool for the CBHI scheme. In conclusion, it can be asserted that CBHI schemes have the potential to effectively engage with the informal sector in Bangladesh, helping to integrate them into the planned social health protection scheme, provided they receive adequate financial and technical support from the government.

7.6. Limitations and future research

The application of an SD modelling approach has employed simulation techniques based on feedback loops to investigate and observe the potential outcomes of various policy scenarios aimed at resolving the issues within the voluntary CBHI system in Bangladesh. However, our study does possess certain limitations, which in turn point toward avenues for future research. Firstly, the scope of the models is confined to our assumptions and simplifications. Therefore, our research may overlook the presence and influence of other healthcare providers in the target areas including local private practitioner, drug vendors, and others. In addition, our study was limited to a provider based CBHI scheme. Consequently, there remains scope to model other types of schemes, namely microfinance-based and non-microfinance-based CBHI schemes, in future research [37]. Despite these limitations, the findings of this study provide insights into policy implications for the implementation of healthcare financing strategies in Bangladesh. Moreover, the context of CBHI in Bangladesh may also be relevant to provider based CBHI schemes in other similar settings.

Chapter 8

8. Conclusion

The aim of this thesis was to examine the needs, challenges, and future prospects of an alternative method of healthcare financing to contribute to the development of a national-level social health protection scheme aimed at achieving UHC, particularly for the low-income informal sector in Bangladesh. The thesis has examined the need for a prepaid health insurance scheme (i.e., CBHI) for the informal sector and the poor to provide them financial protection against healthcare expenditure. The thesis has also examined the challenges associated with the implementation of voluntary CBHI schemes and the strategies suggested by national-level stakeholders to overcome these obstacles. In addition, the thesis identifies effective policies that address obstacles associated with CBHI implementation and evaluates the policies' effectiveness through mathematical modelling. Five sub-studies were conducted under the three objectives and presented in chapters 3 to 7. This concluding chapter synthesises the key findings from these sub-studies, aligns them with the research objectives and research questions, provides a concise summary of methodological limitations and strengths, discusses the overall contributions, policy implications, and outlines potential avenues for future research endeavours.

8.1. Summary of major findings

8.1.1. Need for a prepaid health insurance scheme for the informal sector and the poor (objective 1)

Two sub-studies (sub-study 1 and sub-study 2) have been conducted to assess the need for a prepaid health insurance scheme for the informal sector and the poor, and the results were presented in chapters 3 and 4, respectively. In sub-study 1, the utilisation pattern of maternal and child healthcare benefits from public healthcare facilities was examined to determine whether socioeconomically disadvantaged individuals can access benefits from public healthcare facilities. The results demonstrate that lower-income households are more likely to not utilize maternal and child healthcare than those with higher incomes. They are also less likely to use healthcare services provided by private sector providers. This disparity may be attributable to low-income households' inability to afford these services. In spite of the fact that the poor have less access to private healthcare and a higher rate of non-utilization due to the high cost of healthcare, the rich have utilised public healthcare benefits more than

the poor. Within the public facilities, healthcare utilisation from the secondary level healthcare facilities were more concentrated among the rich and healthcare utilisation from the primary level facilities were more concentrated among the poor. In addition, the findings indicate that the 20% poorest households cannot receive 20% of the public benefits for maternal and child healthcare services if their needs are overlooked. This study also demonstrates the inequity in the utilisation of maternal and child healthcare from public healthcare facilities, where the poor, who work predominantly in the informal sector, have less access to healthcare.

In stub-study 2, we estimated disease-specific distress healthcare financing and catastrophic OOP expenditure for hospitalisation in Bangladesh in order to measure the extent of financial hardship among socioeconomically disadvantaged groups and to identify specific health conditions (diseases) that should be included in the planned social health protection scheme. In Bangladesh, 26% of households experienced CHE, and 58% of households reported financial distress as a result of hospitalisation. The severity of financial hardship (CHE and distress financing) was greater among households admitted to private healthcare facilities and for NCDs. In general, the rich households made more use of inpatient (hospitalisation) healthcare; however, the findings indicate that poor households experienced greater financial hardship than rich households. In addition, the study found that NCDs accounted for a greater proportion of financial hardship, particularly cancer, liver diseases, paralysis, and kidney diseases.

Both sub-study 1 and sub-study 2 found that poor households (who mostly work in the informal sector) have less access to available healthcare services and experience a greater burden as a result of their reliance on OOPE. Therefore, a prepaid health insurance like CBHI is necessary to protect this vulnerable group from the financial burden of OOPE and provide them access to affordable healthcare.

8.1.2. Barriers associated with voluntary CBHI implementation and the strategies to overcome these barriers (objective 2)

We conducted a qualitative study (sub-study 3, presented in chapter 5) to identify the obstacles associated with voluntary CBHI in Bangladesh as well as potential remedies to these obstacles. The results of this research suggest that the existing CBHI scheme faces difficulties with low-enrolment and low renewal rate because of its voluntary enrolment strategy. High benefit utilisation rates in existing schemes due to adverse selection and moral hazard is

also an important concern for their long-term viability. The implementation of the CBHI schemes is also hindered by the community's lack of knowledge regarding health insurance principles, the absence of external assistance, and a shortage of medical supplies. The study found several strategies to resolve these challenges from the views of national stakeholders including door-to-door visits by community-health workers, regular promotional and educational campaigns to educate and encourage people to enrol in the schemes. In addition, they emphasised the significance of external funding and government involvement for the successful implementation of the existing voluntary CBHI scheme in Bangladesh.

The thesis also included a PEA (sub-study 4, presented in chapter 6) of HFR in Bangladesh to explore the political economy challenges to the implementation of healthcare financing strategy, given the level of government involvement in the existing voluntary CBHI scheme. Multiple groups of stakeholders, including the MOHFW, MOF, various government agencies, health professionals' associations, local and national-level political leaders, research and academic institutions, donor agencies, and representatives of the civil society, were involved in the major HFRs in Bangladesh. The study reveals that the medical association and health professionals in Bangladesh resisted the health financing reform because they perceived it as an additional burden for them. Due to the limited fiscal capacity to support reform activities, the MOF was essentially neutral. Additionally, the reform encountered ownership conflicts between the DGHS and the HEU, as well as leadership conflicts between donor agencies and development partners. It was determined that the strategy of transparency and inclusiveness to involve stakeholders from various sectors, and to distribute ownership among them, was effective in addressing the challenges raised by external and bureaucratic actors. The findings of the study also indicate that strong leadership is one of the most effective enabling factors for obtaining the support of political leaders and making reform a political agenda rather than a health sector agenda. Therefore, the implementation of HFR will necessitate leadership skills, political commitment, and determination.

8.1.3. Policies to overcome the challenges associated with CBHI and assess their effectiveness through mathematical modelling (objective 3)

The objective of sub-study 5 was to identify policies that will effectively address the insufficient population coverage for the voluntary CBHI scheme and to evaluate their efficacy using the system dynamic modelling approach. Three findings of this study were notably discussed in chapter 7 following the three research questions. Using a SD model, we tested

several policies in this study, namely, door-to-door visits, the provision of healthcare services by paramedics, offering medication discounts, and introducing telehealth services. Additionally, the study explored the concept of extending financial support to low-income households and incorporating non-health benefits into the CBHI benefit packages. These policies were applied to test the hypothesis whether a voluntary CBHI may achieve self-sufficiency after achieving substantial population coverage.

The findings indicate that these policies will improve population coverage for the voluntary CBHI scheme only if sufficient funding is allocated for their implementation and if policy targets are adjusted (for example, increasing the budget for door-to-door visits and the number of paramedics). However, the study found that among these policies, the policy of providing discounted medicines is the most effective at increasing population coverage, followed by the implementation of telehealth services and the provision of additional paramedic services. The findings also reveal that the voluntary CBHI scheme could achieve 33% to 88% population coverage along with 50% to 55% of total cost recovery through premium collection if the scheme can get sufficient funding to implement fundamental and policy activities (including increased level of policies). The scheme has a lower total cost recovery through premium collection primarily due to the high utilisation of healthcare services. Thus, additional analysis suggests that the voluntary CBHI scheme can also achieve self-sufficiency, i.e., recover total cost by premium revenue, if they can assure that both low-risk and high-risk individuals are enrolled to the scheme, manage external funding to run the scheme (at least four years in our model after the baseline periods), and implement policies described above with higher targets (i.e., increasing budget for door-to-door visits, involving four paramedics instead of baseline two paramedics, etc.).

8.2. Summary of methodological limitations and strengths

This thesis utilises quantitative, qualitative, and system dynamics research methods. This section discusses the methodological shortcomings and strengths of the thesis.

In sub-study 1, a BIA was performed to evaluate whether socioeconomically disadvantaged populations get access to public healthcare services. However, it is important to acknowledge that this analysis had certain limitations. Notably, the study was restricted to examining only maternal and child healthcare services and specific categories of primary and secondary healthcare facilities. Owing to data constraints, other healthcare services, including those at the tertiary level, were not integrated into the analysis. Furthermore, the assessment was

confined exclusively to public healthcare facilities, despite the significant role played by private and NGO-operated healthcare facilities in service delivery throughout Bangladesh. BIA itself has inherent limitations as well. One critical assumption of BIA is that individuals fully benefit from public services. In reality, various factors such as administrative obstacles and social stigma can prevent some individuals from fully accessing these benefits. Consequently, there is a potential for overestimating the benefits received by certain income groups. Additionally, BIA predominantly focuses on the distribution of monetary benefits and does not capture non-monetary benefits, such as improved health outcomes, increased access to education, or enhanced overall well-being, all of which can have substantial and wide-reaching impacts on individuals' lives.

The main limitation of sub-study 2 lies in its narrow scope, as it exclusively focuses on inpatient healthcare services, does not account for outpatient services. This limitation could potentially lead to an underestimation of the overall burden of OOPE, CHE, and distress financing. In this analysis, the study uses THCE and NFE as a proxy indicator for household's ability to pay, instead of considering income directly. However, this approach may inadvertently overstate the CHE for households whose income significantly surpasses their THCE. Furthermore, there exists a methodological limitation when estimating CHE, as it necessitates the establishment of a threshold beyond which healthcare spending is considered catastrophic. The selection of this threshold can often be arbitrary and varies across studies, posing challenges for cross-study comparisons. A similar limitation pertains to estimating distress financing, as the absence of a standardized definition makes it difficult to conduct meaningful cross-study assessments in this regard.

Both of the quantitative sub-studies rely on secondary cross-sectional data to calculate point estimates. It is worth noting that the findings may be representative for specific points in time when these surveys were conducted, as we did not assess changes in benefit utilization and the financial hardship burden over time. Nevertheless, despite these limitations, BIA is a convincing tool for evaluating how government healthcare expenditures are distributed. It provides policymakers with valuable insights into whether healthcare benefits are effectively reaching their intended recipients and whether the system is promoting fairness and equity. Similarly, while the analysis of CHE and distress financing has its methodological constraints, these methods remain valuable for appraising the financial burden of healthcare expenses

on individuals and households. These tools help to identify vulnerable populations and inform policy strategies aimed at enhancing financial protection in healthcare.

The thesis investigates qualitatively the implementation barriers of the CBHI scheme and strategies for overcoming these barriers (sub-study 3) as well as the political economy factors of HFRs in Bangladesh (sub-study 4). Both sub-studies employ KIIs, and data analysis follows the framework analysis technique. However, it is important to acknowledge some general limitations associated with qualitative research. These include potential participant selection bias, as those who agreed to participate may not represent the full spectrum of perspectives, given that qualitative studies rely entirely on the subjective viewpoints of interviewees. In the sub-study 3, participants were drawn from schemes with documented information available in the literature, which could introduce bias, as successful schemes are more likely to be well-documented. Sub-study 4 may face the limitation of recall bias, as participants were asked to provide information on past major health financing reforms. Nevertheless, despite these limitations, qualitative studies based on KIIs enable us to gain thoughtful and nuanced insights into the challenges encountered during CBHI implementation and the complex political economy context of HFRs in Bangladesh.

Lastly, the thesis employs a SD approach to identify the effective policies for overcoming the obstacles associated with the implementation of CBHI and evaluate their efficacy in addressing these obstacles. The main limitation of our SD study design is its focus on a single type of CBHI scheme. Consequently, the study's findings may possess limited applicability, primarily pertaining to this specific type of CBHI scheme (provider-based scheme), thereby restricting the generalizability of the results. Another constraint is that the model could potentially overlook unintended consequences due to its reliance on assumptions and simplifications. Nevertheless, despite these limitations, the main methodological strength of this thesis resides in the application of the SD modelling approach, to quantitatively model the complex systems of CBHI in Bangladesh.

8.3. Summary of contribution to the literature

The thesis provides significant contributions to the field of health economics and financing, particularly concerning the attainment of UHC for the informal sector and the poor. These contributions, detailed in chapters 3 to 7, are summarized below-

The key findings of the benefit incidence analysis are that poor households utilise fewer maternal and child healthcare services from public healthcare facilities, have limited access

to secondary level healthcare facilities, and cannot meet their demand for healthcare from public services. This specific facility and service level evidence, which has been lacking in the existing literature, can provide valuable guidance to policymakers in determining where to allocate resources to enhance healthcare equity among the population groups. The findings from sub-study 2 offer disease-specific calculations of CHE and distress health financing, utilizing data from a nationally representative survey. This disease-specific evidence of financial hardships, which has not been previously available in the literature, represents a novel contribution. This new knowledge will contribute to the literature and aid policymakers in determining which diseases should be integrated into the national social protection scheme for Bangladesh. To date, research in the Bangladeshi context has examined factors influencing CBHI enrolment, renewal rates, willingness to pay, and the impact of CBHI on OOPE and healthcare utilization. However, there has been limited exploration of the challenges related to CBHI implementation in Bangladesh from the perspective of scheme providers. The literature on the political economy aspects of HFR is notably limited. Examining the political economy factors influencing HFRs in Bangladesh will contribute new evidence to the literature, offering valuable guidance not only for policymakers in Bangladesh but also for policymakers in other developing countries. Furthermore, employing the SD modelling approach to model the complex CBHI system to address its associated challenges will introduce a new dimension to the existing CBHI literature. The findings of the modelling study to overcome the barriers of limited population coverage and to develop a road map for a sustainable CBHI will contribute to international debates on the role of CBHI in health financing systems.

8.4. Policy implications of study findings

The policy recommendations arising from the thesis findings can be broadly discussed from two perspectives. First, there is a need for a prepaid healthcare scheme for the informal sector and the poor, considering the accessibility barriers and the significant burden of OOPE on health. The prepaid scheme should aim to provide them affordable healthcare services and financial protections against healthcare expenditures. Second, it is crucial to address the challenges and explore the potential of the CBHI scheme in achieving universal coverage for the informal sector and the poor.

8.4.1. Need for a prepaid health insurance scheme for the informal sector and the poor

The thesis findings underscore several critical points. Firstly, it is evident that the poor use fewer public healthcare benefits, particularly from secondary-level healthcare facilities, while having relatively higher access to primary-level healthcare services. Moreover, 20% of the poorest households cannot access a 20% share of the public benefits. Conversely, while the poor utilize healthcare services to a lesser extent compared to wealthier individuals, they endure a more substantial burden of OOPE. The findings underscore the pressing need for a prepaid health insurance scheme tailored to this vulnerable population segment, so that they can access healthcare services with an affordable premium paid prior to becoming ill, based on their capacity to pay. However, it is not possible to cover the informal sector with a formal health insurance mechanism, whereas CBHI schemes offer the potential to reach them and provide health insurance coverage. Consequently, the government should investigate the applicability of CBHI schemes in Bangladesh in order to incorporate the informal sector in the planned social health protection scheme, drawing from international experiences to inform the implementation process.

8.4.2. Challenges and prospects of CBHI scheme

Although CBHI schemes primarily targeting a relatively small population with limited revenue collection and healthcare service purchasing capabilities, the thesis identifies several crucial challenges related to CBHI implementation and suggests strategies to overcome these challenges, potentially making CBHI schemes viable in the context of Bangladesh.

One of the most prevalent challenges for voluntary CBHI schemes is inadequate population coverage. Both theoretical underpinnings and empirical evidence regarding CBHI emphasize its reliance on voluntary enrolment, which often leads to insufficient population coverage due to low rates of enrolment and renewal. For instance, as discussed in chapter 7, after three years of implementation, the case CBHI scheme had captured only 20% of the population, and only 38% of the insured members had renewed their membership at the end of their coverage periods. Since premium collection is the only source of revenue generation for the CBHI scheme, the revenue collection is insufficient to ensure the scheme's financial viability due to the limited population coverage. Moreover, the voluntary nature of enrolment and the limited participation of the population increase the likelihood of experiencing adverse selection within the scheme. Adverse selection poses a threat to the financial viability of

schemes, particularly since these schemes collect a flat-rate premium without considering the varying risk levels among individuals or households. Consequently, adverse selection could drive up the costs of medical treatment, given that insured members are more likely to seek healthcare services more frequently. The findings of sub-study 5 emphasize that voluntary CBHI schemes could achieve financial sustainability if they effectively address the issue of adverse selection. This can be achieved by enrolling both high-risk and low-risk individuals into the scheme, although financial support is also necessary before achieving self-sufficiency.

8.4.2.1. Integrate CBHI with the broader health system

Integration between CBHI schemes and the larger health system is considered essential for the successful implementation and expansion of CBHI schemes [32]. CBHI is already an integral component of the healthcare financing strategy in Bangladesh. Integrating CBHI schemes into the broader healthcare system in Bangladesh is a vital strategy for assuring the sustainability of these schemes. This integration will facilitate the efficient pooling of resources, sharing of risks, and enhancement of healthcare services. Through the efficient integration of small sub-pools from existing CBHI schemes, local resources can be mobilized, addressing the government's limited capacity to fund the health sector effectively. This integration has the potential to improve the referral system for the CBHI scheme and can also reduce fragmentation and administrative costs, ultimately bolstering the financial viability of CBHI in the long run. Furthermore, integration will ensure that CBHI schemes are in alignment with the government's overarching healthcare goals and policies, promoting consistency and effectiveness. Consequently, such integrated schemes are more likely to gain the trust of the communities they serve, encouraging people to participate in these schemes. Additionally, the integration of CBHI schemes will open up opportunities for public-private partnerships among NGOs, the private sector, and the government in Bangladesh, building upon the success of previous public-private initiatives like mass immunization.

Nonetheless, it is apparent that the successful implementation of CBHI schemes relies on receiving technical and financial support from the government. Rwanda, Ghana, Nepal, and India represent some of the countries where CBHI schemes have been integrated successfully within the larger health system [33]. Bangladesh can draw valuable lessons from these countries on how they integrate existing CBHI schemes into their healthcare systems. This integration has the potential to enable Bangladesh to achieve coverage for the informal

sector and impoverished populations, aligning with its healthcare financing strategy and the development of a national social health protection scheme. By integrating CBHI schemes into the broader healthcare system, the government can also gain insights into the effective management of health insurance for the informal sector. It can also aid in identifying which diseases should be included in the planned social health insurance scheme, determining appropriate premium rates, devising strategies to prevent adverse selection, and creating a scheme that is both affordable and acceptable to the informal sector and the poor [21]. To ensure the long-term viability of this integrated approach, it is essential to address issues like governance, regulatory frameworks, and equity in order to establish a balance between the autonomy of CBHI schemes and the broader public health objectives. By doing so, Bangladesh has the opportunity to construct a more resilient and sustainable healthcare financing system that ultimately benefits its citizens, particularly those in the informal sector and those living in poverty.

8.4.2.2. Provide subsidies for households using general tax revenues

International experience suggests that attaining a high population coverage through a voluntary CBHI scheme is challenging, as low-risk individuals are unlikely to be motivated to enrol, and if they do enrol, they are more likely to leave the scheme after their initial coverage period [243]. One effective solution to improve population coverage is to make participation in the scheme mandatory. However, implementing mandatory enrolment in existing voluntary CBHI schemes operated by NGOs is not feasible without proper legislation and government enforcement. Some mandatory schemes have been successfully managed by microfinance institutions because they can compel their borrowers to enrol and remain in the scheme. Another recommendation found in the literature is to provide subsidies to vulnerable segments of the population using tax revenue [243]. This approach encourages them to join the scheme, ensuring their access to essential healthcare services without encountering financial hardship. Subsidies can also help to achieve higher population coverage in existing CBHI schemes, allowing them to overcome the issues of inadequate population coverage, adverse selection, and insufficient risk-pooling. The financial viability of CBHI schemes may also significantly improve with government subsidies. Sub-study 5's findings also indicate that CBHI schemes require financial support from the government or external sources before becoming self-sufficient. Therefore, a substantial amount of tax funding will be needed to make voluntary CBHI schemes financially viable. For instance, China's Rural Cooperative Medical System provided subsidies to the informal sector to

encourage their participation and access to healthcare coverage [24]. Similarly, premiums for the informal sector in Mexico's Seguro Popular scheme also determined based on their ability to pay, making it affordable for them [28]. Additionally, health insurance schemes for the informal sector have been subsidized in countries like Rwanda, Ghana, Thailand, and Nepal [23,30,34,36]. In addition, the government of Bangladesh needs to consider increasing its allocation to the health sector, especially when compared to other South-East Asian countries, government expenditure on health in Bangladesh is relatively low.

8.4.2.3. Political leadership and commitment

Although CBHI is indeed included in Bangladesh's healthcare financing strategy, the successful implementation of this strategy, especially when aiming to provide UHC to the informal sector and the poor, hinges on political leadership and commitment. The international experiences outlined in chapters 2 and 6 make it abundantly evident that political commitment and perseverance are prerequisites for achieving the goals of UHC. Universal coverage often necessitates reforms in the healthcare financing system. In the context of Bangladesh, HFR is a matter of both political decision-making and a technical endeavour. The insights from the political economy study (sub-study 4, discussed in chapter 6) also underscore that the success of previous HFRs in Bangladesh largely relies on political leadership and a willingness to embrace and support reform initiatives. Political leaders must exhibit a commitment to allocate adequate resources, enact relevant legislation, and mobilize stakeholders to achieve the healthcare financing strategy's goals, particularly with regard to CBHI schemes' role in providing health coverage to the informal sector and their families. To establish CBHI schemes as a viable component of the country's healthcare financing for the informal sector, the government must play a significant role in both financial and technical aspects. Additionally, the creation of separate legislation and authorities, as seen in the experiences of Thailand, Nepal, Vietnam, Rwanda, and Ghana, is essential for implementing the healthcare financing strategy effectively. In light of international experiences of healthcare financing systems incorporating CBHI, it is clear that effective leadership, political commitment, and determination are required to achieve this goal.

8.5. Future research

This thesis has made a valuable contribution by generating evidence related to health financing in Bangladesh and other low- and middle-income countries. The thesis consists of five sub-studies designed to address three objectives. As stated in the limitations section,

both quantitative sub-studies (sub-study 1 and sub-study 2) are based on cross-sectional data; thus, additional research could be conducted to generate over-time estimates of public healthcare benefits utilisation, the burden of OOP expenditures, and the financial hardship indicators. The thesis primarily focuses on the supply-side barriers associated with CBHI schemes. Therefore, there is room for further research to explore demand-side barriers. For example, investigations into the satisfaction levels regarding the quality of services offered by CBHI schemes, community perceptions and knowledge on the CBHI schemes, and the willingness of individuals/households to accept and pay for CBHI schemes could be conducted using a discrete choice experiment design. The system dynamics model developed in the thesis is based on a provider-based model of CBHI schemes. Consequently, additional modelling initiatives could be pursued to develop models for other types of CBHI schemes, such as microfinance-based CBHI schemes. Findings of this thesis underscore the significance of collaboration between the public and private sectors, involving microfinance institutions, NGOs, cooperative societies, and the government. Future research could explore the feasibility and practicality of such collaborations from the perspectives of various stakeholders.

8.6. Concluding remarks

In conclusion, it is evident that socio-economically disadvantaged individuals engaged in informal sectors face significant obstacles in accessing healthcare through government healthcare facilities. Even after receiving care, they face severe financial hardship due to the heavy reliance on OOPE. To address the healthcare needs of this vulnerable population, the implementation of the targeted social health protection scheme is imperative for Bangladesh to realize its goal of achieving universal coverage. Due to the nature of the employment, covering the informal sector, which employs the majority of the population, is the most difficult aspect for Bangladesh. CBHI could therefore serve as a foundation for the envisioned national social health protection scheme in the path to universal coverage. To achieve this, it is crucial to systematically address the challenges associated with CBHI implementation, and policymakers should provide both technical and financial support to CBHI schemes, drawing from international experiences.

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10. Appendix

A5.1. Interview topic guides

Name of department: Department of Management Science, School of Business.

Title of the study: Challenges and prospects of Community-Based Health Insurance Schemes in Bangladesh.

Please tick the box if you agree with the statement.

- I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
- I confirm that I have read and understood the Privacy Notice for Participants in Research Projects and understand how my personal information will be used and what will happen to it (i.e., how it will be stored and for how long).
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
- I understand that I can request the withdrawal from the study of some personal information and that whenever possible researchers will comply with my request. This includes the following personal data:
    - audio recordings of interviews that identify me.
    - my personal information from transcripts.
- I understand that anonymized data (i.e., data that do not identify me personally) cannot be withdrawn once they have been included in the study.
- I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
- I consent to being a participant in the project.
- I consent to being audio recorded as part of the project.

(PRINT NAME)	Hereby agree to take part in the above project
Signature of Participant:	Date:

1. Does the health insurance scheme (schemes) face any operational challenges? If yes, what are those challenges?

   Probes:

   Are there any administrative challenges faced by this your scheme?

   Does the enrolment and renewal rate sufficient to sustain?

   Do you face any demand side barriers such as lack of awareness, knowledge, and trust on health insurance? Is there any distance related issue raised by the consumers?

   Do you have enough human resources and infrastructure?

   Does this scheme have any referral system or network with other hospitals?
2. How can those challenges be overcome?
3. Do you think this scheme (schemes) is (are) financially feasible and possible to scale up?

   Probes:

   If not, how to make it (those) financially feasible?

   Is there any need for internal support (either financial or technical) to make it viable?
4. Can you describe ongoing and planned government health care financing reform activities?
5. How the CBHI to be integrated with those ongoing or planned healthcare financing reform activities?
6. Please explain what could be the key obstacles to implementing CBHI in large scale in Bangladesh?
7. Can you explain from your experience how can those obstacles be overcome?

A6.1. Topics guideline

Title of the study: Political economy analysis of health financing reform in Bangladesh

Question 1. Can you tell me about the major health financing reforms undertaken by the Government of Bangladesh (GOB) for health financing towards the universal health coverage?

Probe question: *Can you tell me more about the health care financing strategy 2012-2032? Can you tell me about the SSK piloting?*

Question 2. Can you tell me about the stakeholders who were prominently involved during the development of national health care financing strategy 2012-2032?

Probe questions:

Can you tell me more about the presence of different interest groups? Can you tell me more about the presence of local and central political leaders? Can you tell me more about the presence of different government agencies? Can you tell me more about the presence of finance ministry? Can you tell me more about the presence of donor agencies? Can you tell me more about the presence of beneficiaries?

Question 3. Can you tell me about the main challenges you found during the implementation of national health care financing strategy 2012-2032 particularly during SSK piloting?

Probe questions: *Can you discuss more about interest groups opinions regarding SSK piloting? Can you tell me about the political leaders' viewpoint? Can you tell me more about the standpoints of different government agencies? According to you what was finance ministry's view on SSK piloting? I'd like to hear more about the national and international donor agencies perspectives. Can you discuss about any challenges you can remember raised from the beneficiary's perspectives i.e., about their acceptance?*

Question 4. Can you discuss more about roles of different group of stakeholders were played during the implementation of national health care financing strategy 2012-2032 particularly during SSK piloting?

Probe questions:

-Can you talk about the goals you think interest groups wanted to achieve? I'd like to hear more about actions they played during implementation. Can you talk more about how government manage this group of stakeholders?

-Can you talk about the goals you think political leaders wanted to achieve? I'd like to hear more about actions they played during implementation. Can you talk more about how government manage political leaders to achieve strategic objectives?

-Can you talk about the goals you think different government agencies wanted to achieve? I'd like to hear more about actions they played during implementation. Can you talk more about how government coordinated among different government agencies?

-Can you talk about the goals you think finance ministry wanted to achieve? I'd like to hear more about actions they played during implementation. Can you talk more about how government utilized finance ministry?

-Can you talk about the goals you think donor agencies wanted to achieve? I'd like to hear more about actions they played during implementation. Can you talk more about how government coordinated among different national and international donor agencies?

-Can you talk about the goals you think beneficiaries wanted to achieve? I'd like to hear more about actions they played during implementation. Can you talk more about how government encouraged beneficiaries to involve with this process?

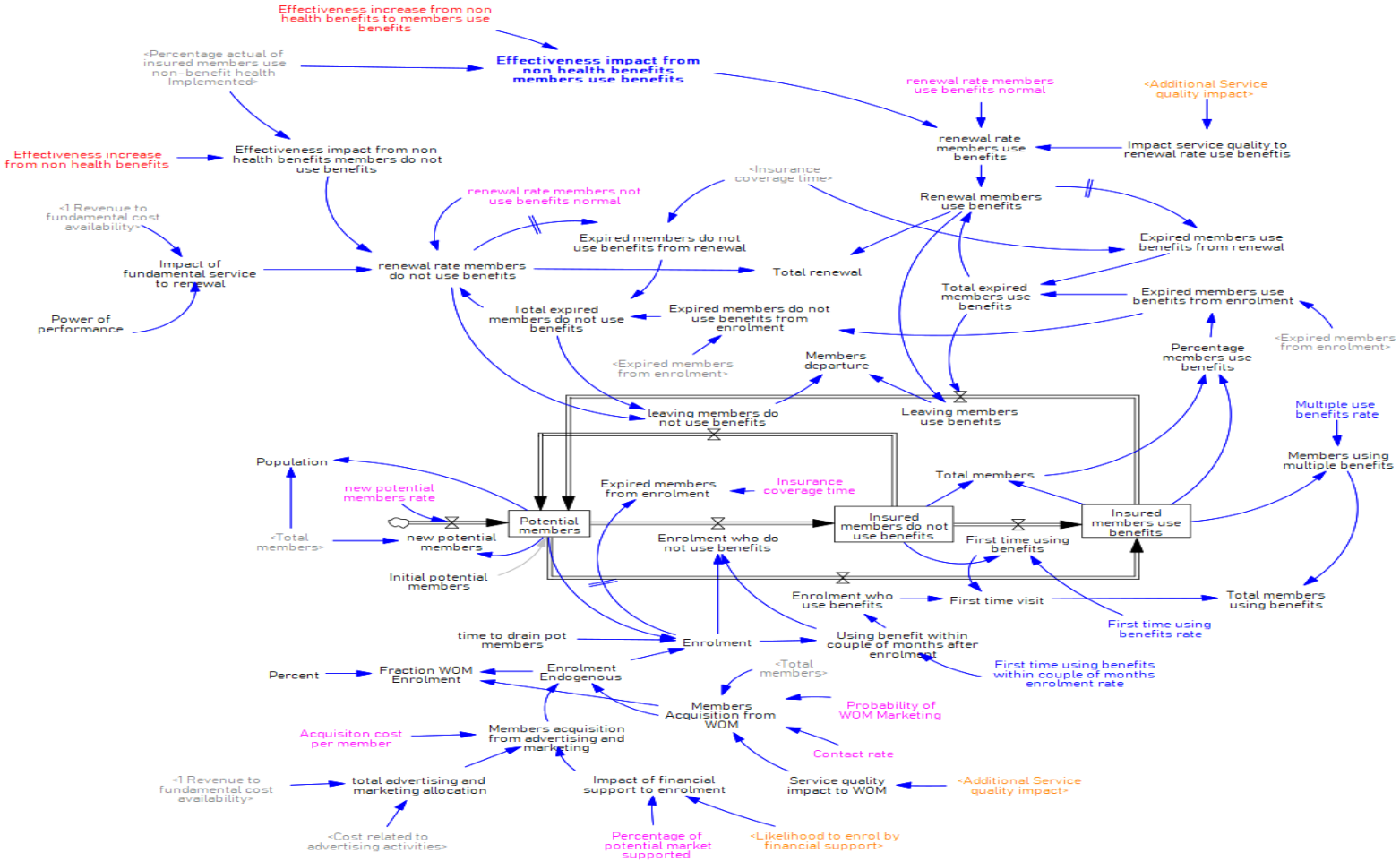
According to you can you tell me which groups of stakeholders were played primary roles during the implementation of this strategy (based on rank)? Which groups of stakeholders were played secondary roles during the implementation of this strategy? Which groups of stakeholders were opposed during the implementation of national health care financing strategy 2012-2032*?*

Question 5. Can you discuss more about the overall government stakeholder management strategies that helped to gain from the SSK pilot scheme?

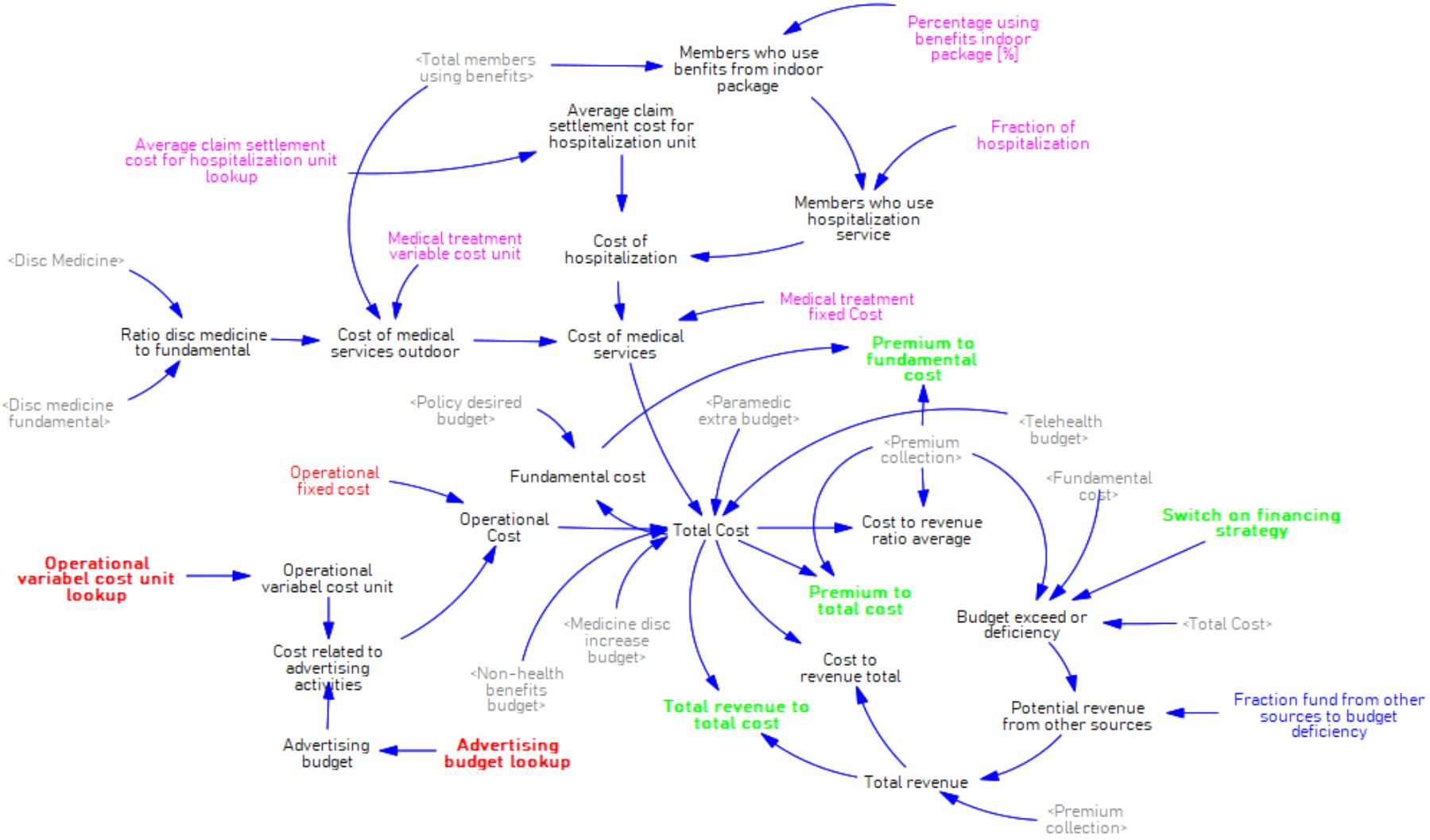
Question 6. Can you discuss about the most important factors you think need to address for future health financing reform and implementation in Bangladesh?

A7.1. Elaborated SFD and policy structure

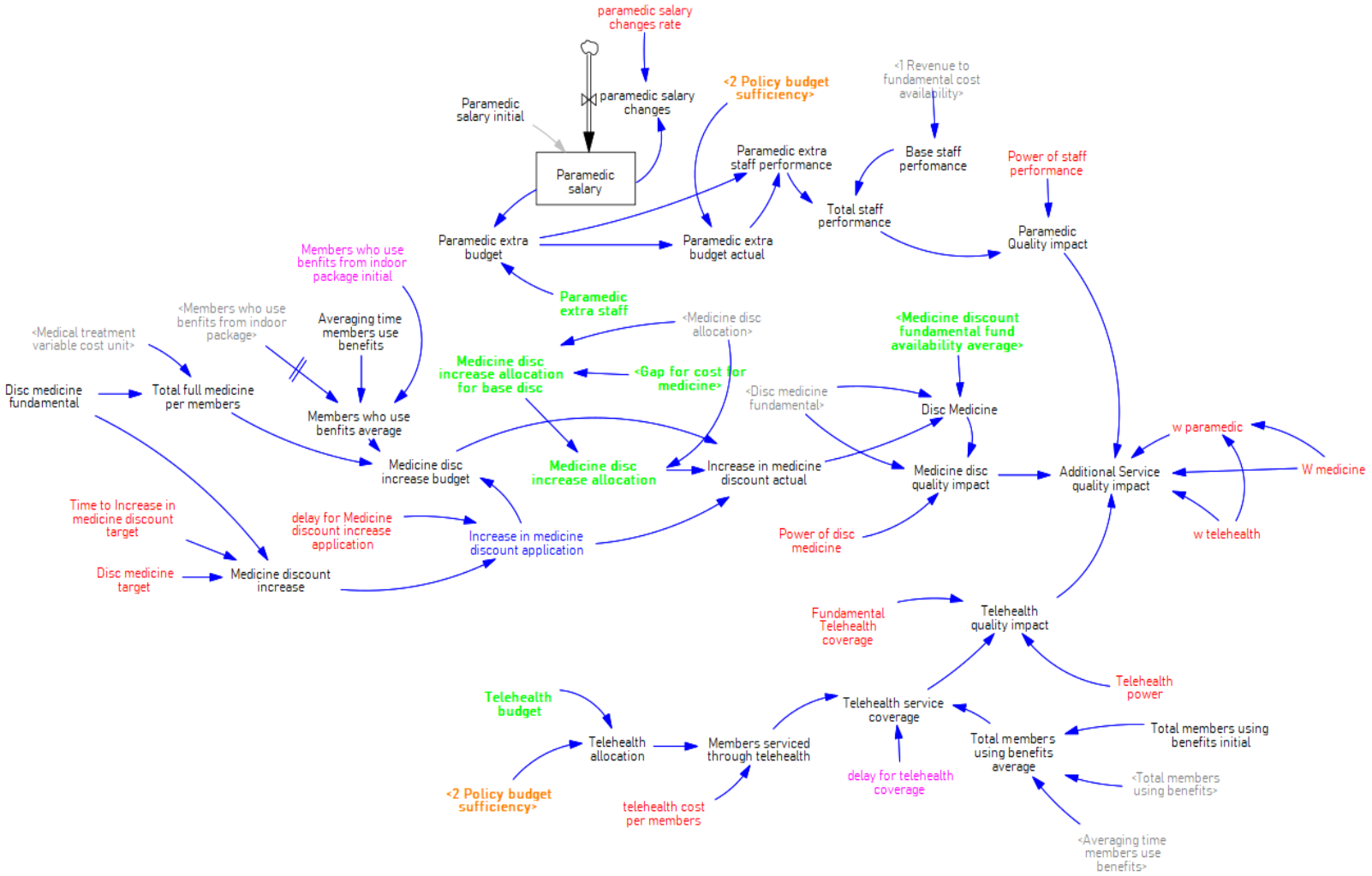
A7.1.1. Main structure of the model



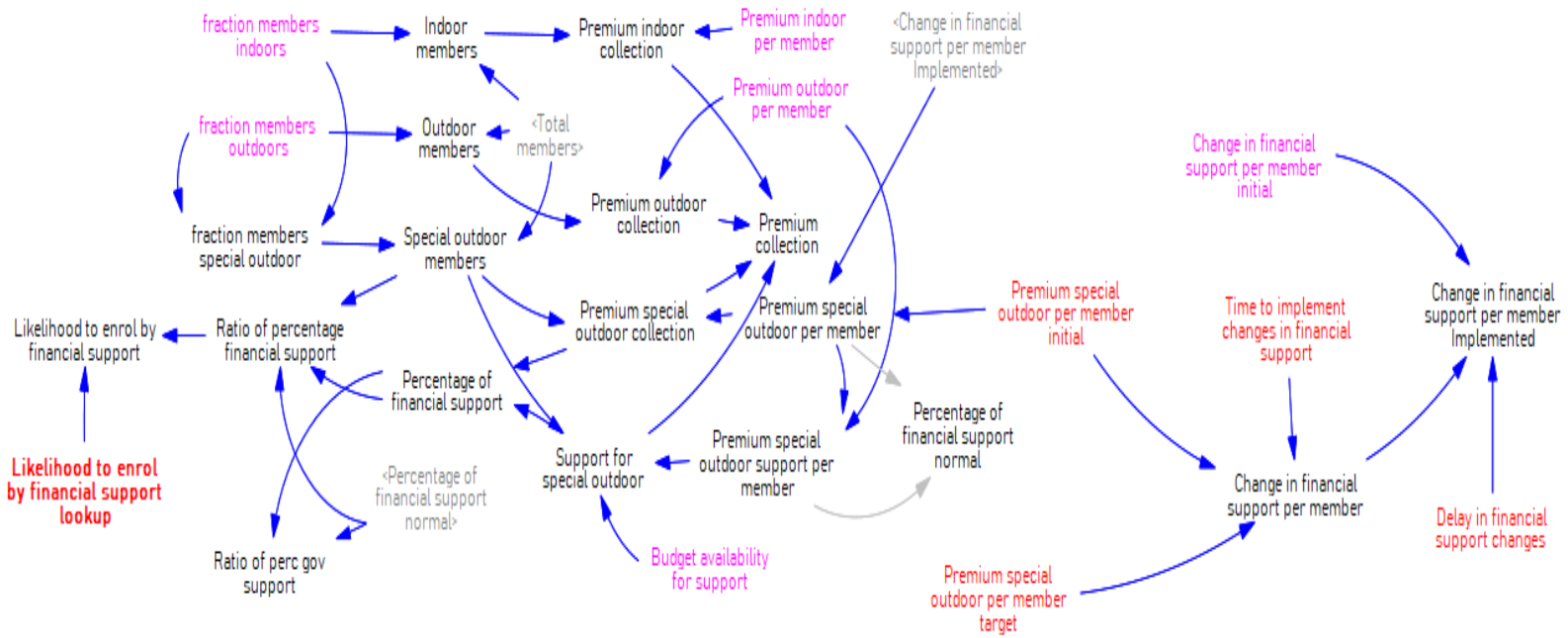
A7.1.2. Financial structure of the model



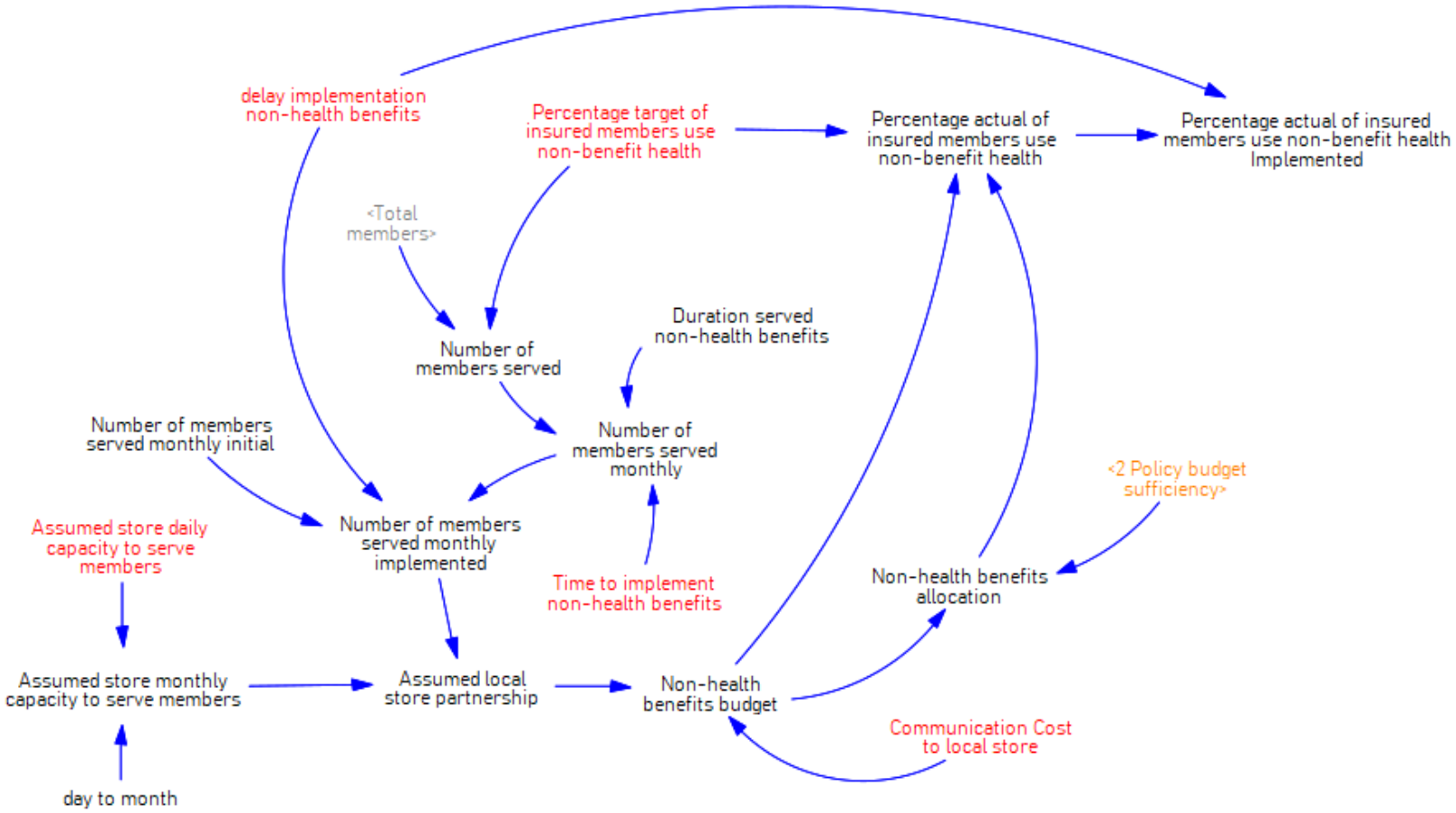
A7.1.3. Policy structure to increase service availability



A7.1.4. Policy structure for financial support policy



A7.1.5. Policy structure for non-health benefit (discount on grocery products) policy



A7.2: Sources and values of the key variables

SN	Variables	Value				Units	Sources	Comments
		Indoor	Outdoor	Special outdoor (Poor)	Overall			
Main model structure								
1	Potential/target members	117113	117113	25760	142873	Individual	Mahmood et al. (2018) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6179054/ Chakaria Health and Demographic Surveillance System report – 2017	According to the 2017 surveillance report, 18.03 population were belonged to the lowest quintile are eligible for the special outdoor package
		20,913	20,913	4600	25,513	Household		
2	Average household size	5.6				Number	Mahmood et al. (2018) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6179054/	
3	Population growth rate	0.6 (2017)				Percentage	Chakaria Health and Demographic Surveillance System report – 2017	
4	New potential member rate	0.0005				Members per month	Chakaria Health and Demographic Surveillance System report – 2017	

5	New potential members	Time series data				Persons/month	Chakaria Health and Demographic Surveillance System report – 2017	
6	Member acquisition cost (per individual)	16				BDT	Amader Shathya, icddr'b	Authors estimation*
7	Member acquisition from advertising	95-85				Percentage	Amader Shathya, icddr'b	Experts' opinion
8	Member acquisition from WOM marketing	5-15				Percentage	Amader Shathya, icddr'b	Experts' opinion
9	Contact rate	10-15				Persons/month		Data calibration
10	Probability of WOM marketing	0.001				Numeric		Data calibration
11	Insured members	Historical time series data				Persons/month	Amader Shathya, icddr'b	
12	Enrolment	Historical time series data				Persons/month	Amader Shathya, icddr'b	
13	Percentage of members that use benefits	97	81	42	90	Percentage	Amader Shathya, icddr'b	Authors estimation*
14	Enrolment who uses benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
15	Enrolment who does not use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
16	Insured members use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
17	Insured members do not use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
18	Insurance coverage time	12				Months	Mahmood et al. (2018) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6179054/	
19	Renewal rate who do not use benefits normal	20	26	66	42	Percentage	Amader Shathya, icddr'b	Authors estimation*

20	Renewed members who do not use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
21	Expired members from do not use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
22	Probability to use benefits after renewal	8-10				Percentage	Amader Shathya, icddr'b	Experts' opinion
23	Renewal rate	40	40	66	47	Percentage	Amader Shathya, icddr'b	Authors estimation*
24	Expired members from use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
25	Renewal rate who use benefits normal	44	48	66	50	Percentage	Amader Shathya, icddr'b	
26	Renewed members who use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
27	Leaving members who do not use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
28	Leaving members who use benefits	Historical time series data				Persons/month	Amader Shathya, icddr'b	
29	Members leave	Historical time series data				Persons/month	Amader Shathya, icddr'b	
30	Population cover by insurance	Historical time series data				Percentage	Amader Shathya, icddr'b	
Financial Dynamics								
31	Operational cost per members (individual)	Fixed cost 230,528 a month and variable cost 1.79 per person				BDT/month and BDT/person	Amader Shathya, icddr'b	Authors estimation*

32	Medical cost per members (individual)	Fixed medical cost 205,000 a month and medical cost (variable costs) 41 a person and 4697 for indoor service a person				BDT/month, BDT/person, and BDT/person	Amader Shathya, icddr'b	Authors estimation*
33	Advertising budget	5000				BDT/month	Amader Shathya, icddr'b	
34	Premium for packages	1200	500	200	-	BDT/HH	Mahmood et al. (2018) https://www.ncbi.nlm.nih.gov /pmc/articles/PMC6179054/	
38	Ratio of medical cost covered	Time series data				Percentage	Amader Shathya, icddr'b	Authors estimation*
39	Ratio of total cost covered	Time series data				Percentage	Amader Shathya, icddr'b	Authors estimation*
Policy: Door to door visits								
40	Number of HH visited by a field staff	170-200				HH/month	Amader Shathya, icddr'b	Experts' opinion
41	Effectiveness of door-to-door policy (new members enrolment rate)	15-20				Percentage	Amader Shathya, icddr'b	Experts' opinion
42	Average cost to implement door to door policy	134,483				BDT/month	Amader Shathya, icddr'b	Authors estimation*
Policy: Non health benefits								
43	Bill per members for non-health benefits	0						
44	Budget allocation for non-health benefits	0						
45	Percentage of members that will use non-health benefits	60-70				Percentage	Amader Shathya, icddr'b	Experts' opinion

Effectiveness of non-health benefit policy					
46a	Percentages of members will renew their memberships after utilizing non-health benefits (did not receive healthcare)	10-12% more renewal after utilizing non-health benefits	Percentage	Amader Shathya, icddr'b	Experts' opinion
46b	Percentages of members will renew their memberships after utilizing non-health benefits (receive healthcare)				
Policy: Service availability improvement policies					
47	Allocation fraction telehealth	0.01	Numeric	Amader Shathya, icddr'b	Experts' opinion
48	Allocation fraction medicine	0.31	Numeric	Amader Shathya, icddr'b	Experts' opinion
49	Allocation fraction paramedics	0.69	Numeric	Amader Shathya, icddr'b	Experts' opinion
50	Extra percentage of medical cost for increase in service availability	30-60	Percentage	Amader Shathya, icddr'b	Experts' opinion
51	Extra percentage of medical cost to telehealth	30-60*0.01	Percentage	Amader Shathya, icddr'b	Authors estimation*
52	Extra percentage of medical cost to medicine	30-60*0.31	Percentage	Amader Shathya, icddr'b	Authors estimation*
53	Extra percentage of medical cost to paramedics	30-60*0.69	Percentage	Amader Shathya, icddr'b	Authors estimation*

54	W telehealth (weight to impact to increase availability)	0.17	Numeric	Amader Shathya, icddr'b	Experts' opinion
55	W medicine (weight to impact to increase availability)	0.50	Numeric	Amader Shathya, icddr'b	Experts' opinion
56	W paramedics (weight to impact to increase availability)	0.33	Numeric	Amader Shathya, icddr'b	Experts' opinion
Effectiveness of service availability improvement policies					
57a	Increased renewal rate due to polices implementation	10-12	Percentage	Amader Shathya, icddr'b	Experts' opinion
57b	Increased enrolment through WOM marketing due to polices implementation	10	Percentage	Amader Shathya, icddr'b	Experts' opinion
Policy: Financial support					
58	Fraction support for premium	60	Percentage	Mahmood et al. (2018) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6179054/	
59	Likelihood to join without financial support	5-8	Percentage	Amader Shathya, icddr'b	Authors estimation*
60	Likelihood to join with financial support	18-25	Percentage	Amader Shathya, icddr'b	Authors estimation*

***Authors estimations are based on primary data collection from the scheme and data calibration.**

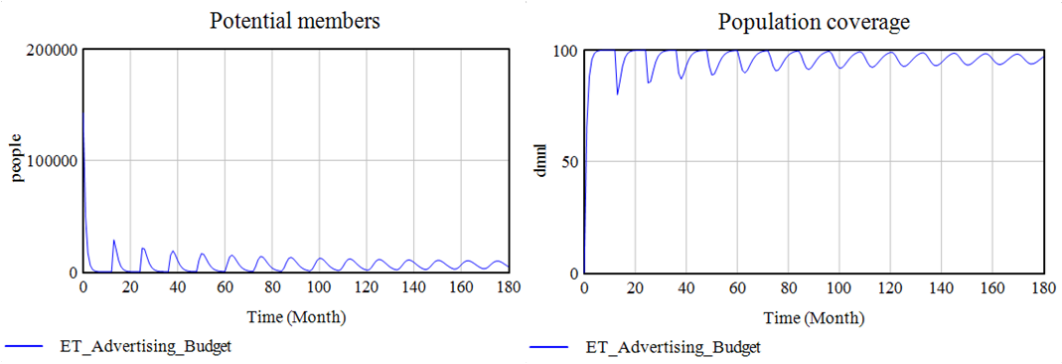
A7.3: Tests for confidence building on model:

A7.3.1. Extreme condition test:

Models should be robust in extreme conditions. Robustness under extreme conditions means the model should behave in a realistic fashion no matter how extreme the inputs or policies imposed on it may be. Inventories can never drop below zero no matter how large the demand may be. The demand for products must fall to zero when the price rises high enough. Production cannot occur without materials, labour, equipment, and other resources. Extreme condition tests ask whether models behave appropriately when the inputs take on extreme values such as zero or infinity (Sterman, 2000). Therefore, there are some extreme values inputs carried out to test the model behaviour

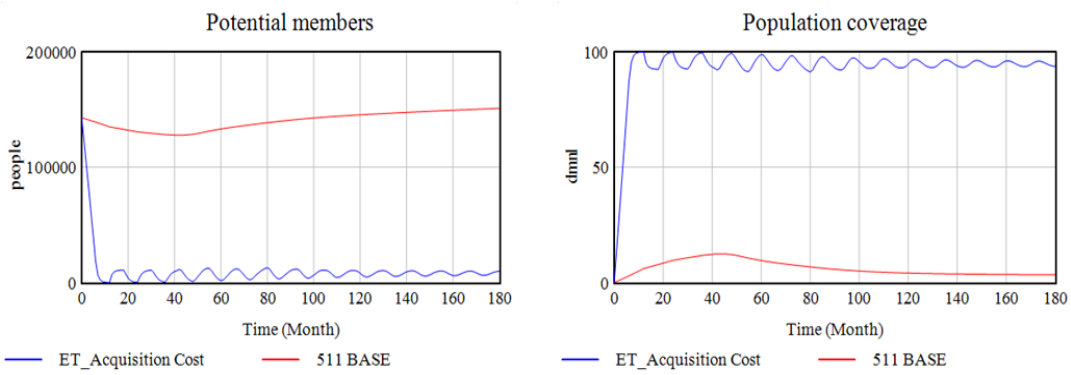
a) Large Advertising Budget

On the large advertising budget, extreme conditions involved advertising budget set to 1,000 times larger than baseline assumptions (from 5,000 BDT/month to 5,000,000 BDT/month since beginning of simulation time), and fund availability ensured 100% to finance this by assumed 'Fraction fund from other sources to budget deficiency' always maintain at 1 or 100% (while in baseline assumption reduce to 0% after month 40). The result is potential members is goes to zero, means that most of population joined the scheme. The oscillation pattern shows that removal is happens periodically (cause some number of expired members will leaving scheme) but on the next period they will join again as result of advertising performance. Consistently, the population coverage also maintains on 100%, the cycle is caused by dynamics of removal and enrolment over time. The behaviour appears to be sensible enough cause extreme condition (in terms of advertising budget) will lead to high enrolment and removal but will reach to 100% population coverage and no level variables goes below zero.



b) Low acquisition cost

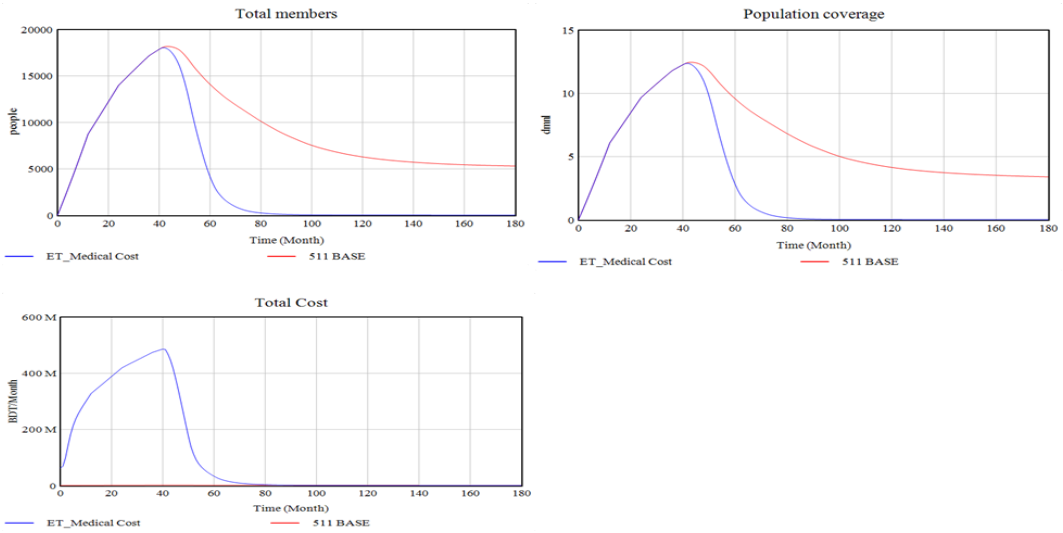
Another alternative to test model performance similar to put extreme values on advertising budget is reduce acquisition new member, by changing 'Acquisition cost per member' from around 30 BDT/people to only 1 BDT/people, means with same amount of baseline advertising and marketing cost, will gather more people to join the scheme. The result is quite similar with large advertising budget test prior.



Like the prior test, the potential members will be drained to zero as the acquisition cost is extremely low and also the population coverage will be maintained close to 100%. Therefore, the result of extreme test of acquisition cost appears to be fine.

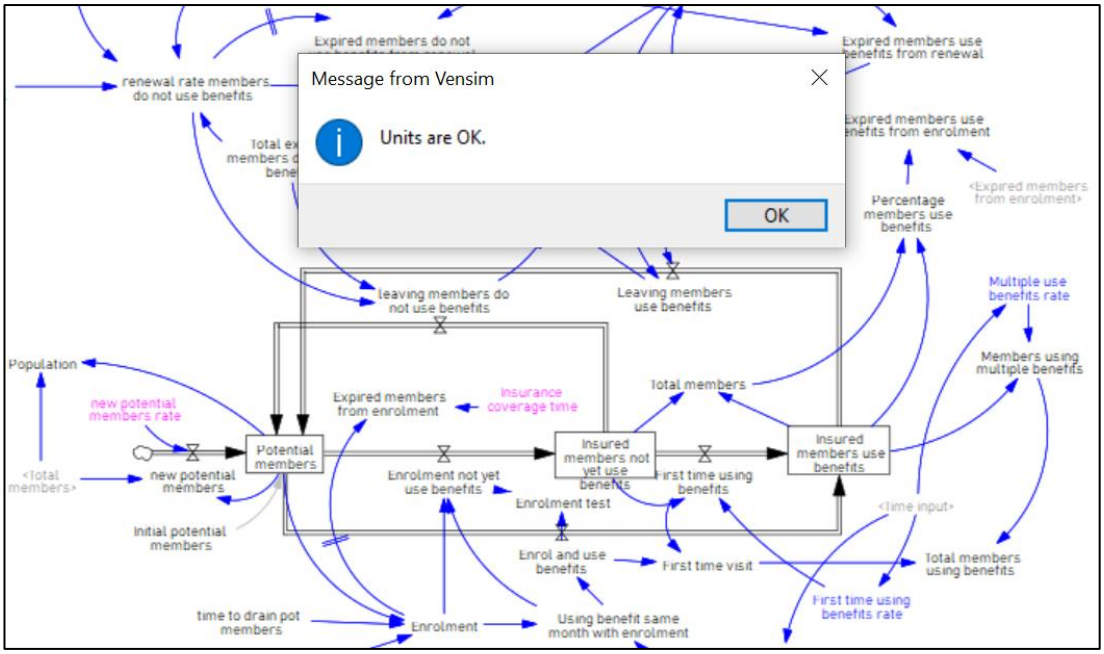
c) Extreme medical cost per members

For medical cost per members, variables changed on the model including (1) Medical treatment variable cost unit from 200 BDT/people to 200,000 BDT/people, and (2) 'Average claim settlement cost for hospitalization unit lookup' from around 4,700 – 8,500 BDT/month to 100x times bigger, 470,000 – 850,000 BDT/month. With extreme medical cost, it expected that the availability will reduce and close to zero, impacted availability for advertising and marketing and lead to reduction on enrolment; at the end, the enrolment, members, and population coverage will close to zero.

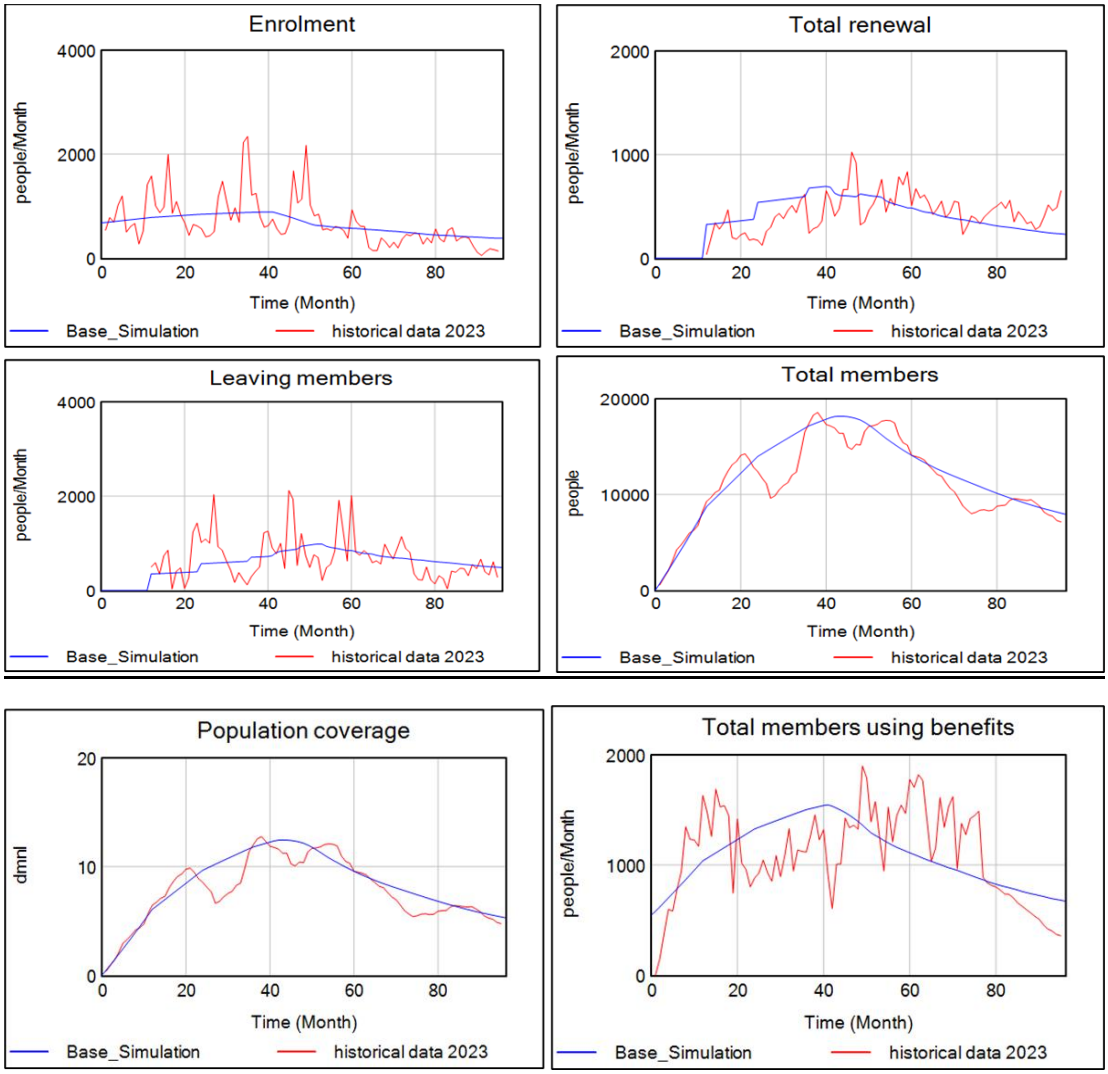


With extreme medical cost per members, lead to huge total cost, and with limitation on fund lead to reduction to availability and in turn reduce the enrolment, impacted total members and population coverage as expected—close to zero (0).

A7.3.2. Unit consistency check:



A7.3.3. Behaviour reproduction tests:



Results from t-tests and Theil's inequity statistic

Indicators	t-statistic (p-value)	Theil's inequity statistic
Enrolment	-0.2048 (0.838)	1
Renewal	-0.6751 (0.500)	1
Leaving/drop-out	0.2906 (0.772)	1
Insured members	-1.8289 (0.069)	1
Population coverage	-1.8065 (0.083)	1
Total benefits utilization	-1.7405 (0.073)	1

Comments: The t-test for mean differences were statistically insignificant and Theil's inequity statistic were 1, meaning that there were significant differences between simulated and historical data for the key indicators. This signify that our model significantly captured historical data over time.

A7.3.4. Interview questionnaire:

Interview Date: ____/____/_____

Section 1: Respondent information

1.1. Name of the respondent:

1.2. Designation of the respondent:

Section 2: Scheme information

2.1. Name of the insurance scheme:

2.2. Location:

2.3. Establishment year:

Section 3: Enrolment, renewal, premium collection, and healthcare utilization

3.1. What are the target population? _____(Household)

3.2. Could you please tell me the about the type of packages available in your scheme?

3.3. What are the benefits included under each package?

3.3. What percentages of insured households participated over the year do you believe as a result of-

a) Direct advertisement? _____ (%) in 2012, _____ (%) in 2013, _____ (%) in 2015, _____ (%) in 2018, and _____ (%) in 2020

b) Word of mouth marketing? _____ (%) in 2012, _____ (%) in 2013, _____ (%) in 2015, _____ (%) in 2018, and _____ (%) in 2020

Section 4: Cost-related information

4.1. Monthly/yearly operational costs (in BDT): (Could you please share your financial report if you have any?)

- Staff salary: _____ (monthly/annually) (excluding physicians/nurse/paramedics)
- Number of healthcare providers providing services?
    - ✓ Physician_____; Physicians' salary _____ (per month)
    - ✓ Nurse _____; Nurses' salary_____ (per month)
    - ✓ Paramedics _____; Paramedics' salary_____ (per month)
- Advertisement budget: _____ (monthly/annually)
- Claim processing cost _____(monthly/annually)
- Premium collection cost _____ (monthly/annually)
- Travel cost (for field staffs) _____ (monthly/annually)
- Office rent _____ (monthly/annually)
- Others (meeting, stationary, etc.,) _____ (monthly/annually)
- What do you think will be the average monthly operational cost (including staff salary, advertising cost, claim processing cost, premium collection cost, travel cost, office rent, etc., except medical treatment cost) per member/person? _____ (in BDT)
- What is the average member acquisition cost? _____ (in BDT)

4.2. What do you think will be the average medical consultation/checkup/treatment cost for per visit (among these who seek medical treatment)?

a) For outpatient healthcare service _____ (in BDT)

b) For inpatient healthcare service _____ (in BDT)

4.3. Other than premium collection, does your scheme have any other source of generating funds? If yes, how much annually? _____ (in BDT) and sources?

_____

4.4. From different published articles, we learn that voluntary community-based health insurance scheme in Bangladesh recover 30% to 65% of their total cost (operational and medical cost) from premium collection. That means, if annual total cost is 100 BDT, total annual premium collection was varies between 30 and 65 BDT. What were the percentages of total cost recovery for your scheme?

a) Overall cost recovery_____ (%) in 2012, _____ (%) in 2015, _____ (%) in 2018, and _____ (%) in 2020

b) Cost recovery_____ (%) in 2012, _____ (%) in 2015, _____ (%) in 2018, and _____ (%) in 2020 for outpatient package

c) Cost recovery_____ (%) in 2012, _____ (%) in 2015, _____ (%) in 2018, and _____ (%) in 2020 for special outpatient package

d) Cost recovery_____ (%) in 2012, _____ (%) in 2015, _____ (%) in 2018, and _____ (%) in 2020 for inpatient package

Section 5: Policy implication

In Bangladesh, we have conducted a qualitative study on implementation barriers and potential solutions to overcome them. Our interviewees proposed several strategies to enhance the voluntary community-based health insurance's low enrolment and renewal rates. These are- I) Door-to-door visits by field/community health workers, II) providing non-health benefits, III) increase service accessibility by providing telehealth services, and providing services by paramedics, and ensuring quality medicine availability to the enlisted drug shops, and IV) providing financial support for the poor. The below is the policy table with possible impact and consequences (each policy options will be described with impact and possible consequences)-

	Policy Implemented	Definition	Impact on membership	Cost-implication	Have you implemented this policy in your scheme? If yes, time?
1	Door to Door Policy	Increase awareness of potential population to be recruited as members through direct household visit by community health workers/field staffs (door to door activities).	• Increase awareness among the potential target population • Increase enrolment after door-to-door visit	Cost allocation for policy (either additional human resources or increase load of current human resources by providing financial incentives)	1. Yes 2. No Year_____ Month_____
2	Non-Health benefits	Providing daily groceries at a discounted rate to the insured household from the local groceries shops.	Increase the likelihood of membership renewal among the members who are not utilizing healthcare treatment because of getting non-health benefits.	Cost allocation for policy (increase additional budget to manage discounted groceries from local shops or need to contract with local shops so that they are willing to provide discount (in this case, cost to implement this policy will be minimal))	1. Yes 2. No Year_____ Month_____

	Policy Implemented	Definition	Impact on membership	Cost-implication	Have you implemented this policy in your scheme? If yes, time?
3	Increase service accessibility	Increase service availability through some means, • Use of paramedics will reduce physician's workload and will assist to improve service quality and availability • Ensure the availability of better quality of medicine at the contracted drug shops • Telemedicine and online consultation services will increase service availability.	• Increase renewal for expired members • Increase enrolment through word-of-mouth marketing	Budget required to implement policy activities (Salary allocation for paramedics and monitoring budget for affiliated drug shops, and budget for the staff and equipment required to implement telemedicine and online consultation services).	1. Yes 2. No Year_____ Month_____
4	Financial support for marginal and the poor	With financial support to poor (government subsidy, donor fund, or social funds), will increase enrolment because the poor will get the chance	Increase enrolment through the increased likelihood of potential members (poor groups) to join	Need to arrange (additional budget, donor/social funds) budget to provide discount to the poor to	1. Yes 2. No Year_____ Month_____

	Policy Implemented	Definition	Impact on membership	Cost-implication	Have you implemented this policy in your scheme? If yes, time?
		to pay lower premium.		increase their affordability to join.	
5	If any policy suggestions				

Now, I will ask you questions on these policies I described you with their impact and consequences.

5.1. Door to Door Policy Implication

A. How many staffs are implementing the door-to-door visit policy in your scheme area _____ (staff)
B. How many households visited by each person who are implementing door-to-door policy (on average) _____ (month)
C. If 100 households visited through door-to-door policy by field workers/community-health workers, how many likely to join as new member _____ (household)
D. How much is the average cost to implement door-to-door policy each month (stationary, conveyance, etc.) _____ (in BDT/month)

5.2. Providing Non-Health Benefits

A. What percentage of insured members do you believe will utilize non-health benefits (discounted grocery goods)? _____(%)
B. After receiving benefits from the non-health discounted grocery policy, what additional (increased renewal rate due to non-health policy) percentage of members do you believe would renew their membership?
   a) _____ (%) if they did not receive healthcare benefits within their coverage time.
   b) _____ (%) if they receive healthcare benefits within their coverage time.

C. How much additional funds will be needed to implement a non-health benefits policy, if 100 households utilized non-health benefits each month_____ (in BDT/month)

5.3. Increase Service Availability

Increase service availability policy implement through using telehealth facility for patients' consultation without coming to health facility, using/increase paramedics number, and increase medicine availability.

A. Do you think telehealth, paramedic, and medicine availability policies will increase service quality from the insured household perspectives? _____(Yes/No)
B. If yes, how do you rank them in descending (highest contributor first) order based on their contribution you assumed? -

a) Telehealth policy _____

b) Paramedics policy_____

c) Medicine availability policy_____

C. If you want to increase service availability through the telehealth, Paramedic, and medicine policies how do you allocate budget for each of the below?

a) Telehealth policy budget_____ (%)

b) Paramedics policy budget _____ (%)

c) Medicine availability policy budget_____ (%)

D. Before the service availability improvement policy was put into place, suppose it cost BDT 100 per person per month to provide medical treatment (among them who went to sought medical treatment). How much do you think medical costs will go up because of this policy?

a) Total _____ (%), increased amount to provide medical treatment

b) Telehealth policy _____ (%), among the total increased amount

c) Paramedics policy _____ (%), among the total increased amount

d) Medicine availability policy _____ (%), among the total increased amount

E. How much do you think the renewal rate will go up after three service improvement activities are put into place? If yes, _____ (%)

F. Do you think these service improvement activities will increase enrolment rate through WOM?

If yes, how much do you think enrolment will increase through word-of-mouth marketing after the three service improvement activities are put into place (clue: *If 20 household join each month before implementing service improvement activities through WOM, then how many households will join after the implementation*)?

_____(household/%)

5.3. Financial Support Policy

A. Do you believe providing financial support to the poor will increase their likelihood to join their membership to the scheme? _____Yes, _____No

B. How many households do you think will join each month with the normal premium charge? _____ (households/each month)

C. If financial support increases their likelihood to join/renew their membership, how many households do you think will join each month with a subsidized premium charge? _____ (households/each month)