

Literature Survey on Factors Influencing the Cesarean Section (CS) Delivery in Bangladesh: Evidence from Global

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Literature Survey on Factors Influencing the Cesarean Section (CS) Delivery in Bangladesh: Evidence from Global

A thesis submitted in partial fulfillment of the requirement for the degree for the

Master of Science in Public Health

by

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List of Abbreviations

ANC	Antenatal Care
AOR	Adjusted Odd Ratio
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
CDMR	Cesarean Delivery on Maternal Request
CF	Conceptual Framework
CI	Confidence Interval
CS	Cesarean Sections
DGFP	Directorates General of Family Planning
DGHS	Directorate General of Health Services
EmOC	Emergency Obstetric Care
GDP	Gross Domestic Product
GOB	Government of Bangladesh
HDI	Human Development Index
HIES	Household Income and Expenditure Survey
HRH	Human Resources for Health
LGRD	Local Government, Rural Development, and Cooperatives
LMICs	Low- and Middle-Income Countries
MICS	Multiple Indicator Cluster Survey
MOHFW	Ministry of Health and Family Welfare
NGOs	Non-Governmental Organizations
OOP	Out-of-Pocket
OR	Odds Ratio
P value	Probability Value
PNC	Post Natal Care
SES	Socio-Economic Status
VD	Vaginal Delivery
WB	The World Bank
WHO	World Health Organization

Glossary of Terms

Caesarean Section: “A cesarean section is a surgical procedure performed for childbirth, in which an incision is made through the woman's abdomen and a corresponding incision in the uterus.” (1)

Elective Caesarean Section: “It is a caesarean procedure that is performed in the absence of an immediate medical indication, and the decision to have this procedure is made before to the commencement of labor.” (2)

Cesarean delivery on maternal request (CDMR): “CDMR is defined as an elective cesarean section delivery that is conducted on women’s request without any medical indications or obstetric risk associated with normal vaginal delivery.” (3)

Emergency cesareans: “It is a caesarean procedure that are performed in response to acute maternal or fetal complications, to avoid the risk of mortality for both the mother and the newborn.” (2)

“Too Little, Too Late” and “Too Much, Too Soon”: “Maternal health care faces two extreme situations: Too Little, Too Late and Too Much, Too Soon. Too Little, Too Late refers to inadequate resources, below evidence-based standards, or withheld care until too late, leading to high maternal mortality and morbidity. Too Much, Too Soon involves routine over-medicalization of normal pregnancy and birth, including unnecessary non-evidence-based interventions and life-saving interventions that can be harmful when used improperly.” (4)

Abstract

Background: Currently, 45% of all deliveries in Bangladesh underwent through Caesarean section (CS). This rate exceeds the WHO-recommended rate of 10-15%. Thus, understanding the factors and process for taking the decision of CS remains an important issue to break down the high CS rates.

Objective: To study the determinants of CS delivery and evidenced-based interventions globally, and in Bangladesh.

Methodology: This study surveyed CS-related literature from 2013-2023 using Google Scholar, PubMed, and VU library search engines. Cross-referencing, snowballing, and specific search terms were used to include peer-reviewed articles, reports, and websites of organizations like the World Health Organization (WHO). Inclusion and exclusion criteria were established to ensure relevant information.

Findings: The demand-side factors like maternal levels of education, family wealth status, and mass media access were likely to result in CS deliveries, whereas the supply-side factors, like private hospitals, were found to be a dominant factor. Multi-country studies revealed that the CS rates were higher among wealthier mothers (18.4%) compared to poorest quintile (3.7%). Women who received ANC (4+) showed 2.5 times more chances of undergoing CS. Many studies revealed that most of the time decisions for CS deliveries take place without confirmed medical symptoms or indications.

Conclusions: Factors driven by both the supply and demand side need consideration for further study. Evidence-based interventions like nurse-led programs and routine clinical audits may contribute to reducing the burden of CS deliveries in countries like Bangladesh.

Keywords: Caesarean section, supply-side factors, demand-side factors, women's preference, Bangladesh.

Word Count: 12,066

Chapter 1: Background Information of Bangladesh

1.1 Geographical, Demographic, and Political Context

Bangladesh is one of South Asia's most densely populated nations (5). Bangladesh is primarily bordered by India, with the exception of a small portion of its southeast bordering Myanmar (6). The climate of Bangladesh is characterized by moderate temperatures, high humidity, and a strong influence of monsoon patterns. This geographical location also makes the country susceptible to tropical cyclones and many natural calamities, including floods and droughts (7). At present, the administrative framework of Bangladesh consists of eight divisions [Figure 2]. The divisions are further fragmented into 64 districts. These districts are subsequently subdivided into around 500 sub-districts (8). The country continues to have a stable political environment (9), as seen by the most recent political stability index result from 2021, which is -0.97 points (-2.5 weak; 2.5 strong) (10). Yet, the nation is confronted with several significant challenges, including corruption, high population growth, and vulnerability to the adverse effects of climate change (11).

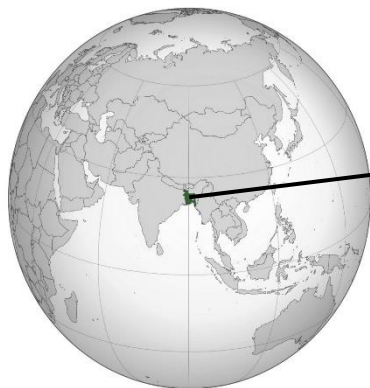


Figure 1 Map of earth. Source: Mapland.com



Figure 2 Map of Bangladesh with divisions. Source: Wikipedia

1.2 Population

The World Bank (WB) reported that Bangladesh's population is approximately 169 million, growing at an average rate of 1.1% annually (12). The nation is diverse, composed of Muslims (90%), Hindus (9%), and other groups (1%) (13). The 2023 population density is 1,168.79 people per square kilometer, a 1.03% rise from 2022 (14). Ranking 8th globally, Bangladesh contributes 2.16% to the world's population (15). Females constitute 50.4%, males around 50%, (12) with a sex ratio of 100.8 males per 100 females (16). As of 2020, life expectancy is 72 years (12).

1.3 Socio-Economic Status (SES)

Based on the Household Income and Expenditure Survey (HIES) 2022, improvements in gross domestic product (GDP) and human development index (HDI) in Bangladesh are reflected in significant increases in both household and per capita income. According to the HIES 2022 findings, the average monthly household income at the national level in 2022 is Tk. 32,422, which represents a nearly twofold increase from 2016 [Figure 3]. The survey also revealed that households living in urban areas have a higher income (Tk. 45,757) than those living in rural areas (Tk. 26,163) [Figure 4] (16). HIES 2022 reported a monthly income per capita of Tk. 7,614, Tk. 10,951 in urban areas and Tk. 6,091 in rural areas [Figure 3]. Similar to the income per household, the income per person was more in urban regions than in rural regions (16)

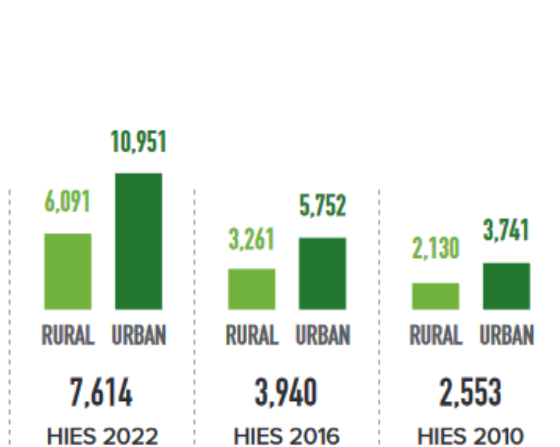


Figure 3 Average income per household. Source: HIES 2022

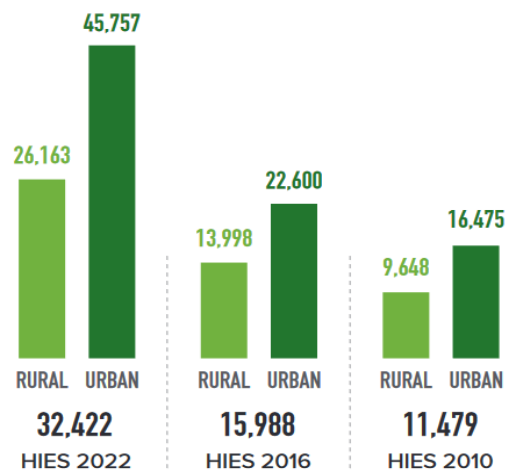


Figure 4 Average income per person. Source: HIES 2022.

1.4 Education

According to Rahman et al. (2018), education is regarded as a significant social factor in health, with female education in Bangladesh increasing significantly over time (17). This statement was evident from the HIES 2022 study (16). According to HIES 2022 report literacy rate (ability to read and write) in Bangladesh, was found 74% for individuals (aged 7 years and above) for both genders (male and female) (16). In addition, according to HIES 2022, male education rate was found 75.8% and female education rate was 72.3% (16). The literacy rate in urban areas (82.0%) was found to be substantially higher than in rural areas (70.3%). However, there was a disparity between the literacy rates of urban and rural women. Urban women had an 80.7% literacy rate, while rural women had a 68.5% literacy rate (16). This indicates that urban women are more educated than rural women. [Figure 5].

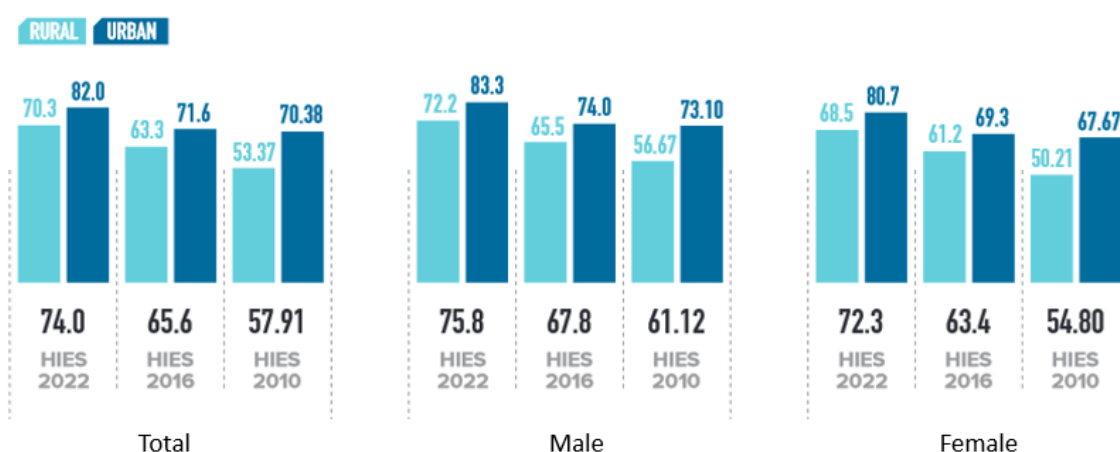


Figure 5 Bangladesh's literacy rate in percentage (by place of residence and gender). Source: HIES 2022

1.5 Social Media Exposure

According to the 2019 Bangladesh Multiple Indicator Cluster Survey (MICS) report, more women watched television (64.2%) than listened to the radio (1.5%) or read the newspaper (4%) (18). Urban women (83.8%) were more likely to watch television than rural women (59.2%) (18). Further analysis revealed that women from the richest quintile watched television more frequently (89.8%) (18). [Figure 6].

Percentage of women age 15-49 years who are exposed to specific mass media on a weekly basis, Bangladesh, 2019				
	Percentage of women who:			Number of women
	Read a newspaper at least once a week	Listen to the radio at least once a week	Watch television at least once a week	
Area				
Total	4.7	1.5	64.2	64,378
Urban	11.9	3.0	83.0	15,094
Rural	2.5	1.0	58.5	49,284
Wealth Index quintile				
Poorest	0.5	0.7	23.0	11,267
Middle	1.8	0.9	67.6	12,988
Richest	14.9	3.2	89.8	14,170

Figure 6 Percentage of women in Bangladesh exposed to mass media. Source: MICS 2019, Bangladesh

According to MICS 2019, only 4.6% of women utilized computers, with urban women (11.3%) using them more than rural women (2.5%) (18). Richest (14.5%) and higher educated (20.7%) women used computers more than their respective counterparts (18). 71.4% of women owned a mobile phone, including 80.4% of urban women and 68.6% of rural women (18). Richest (89%) and higher educated (87.4%) women possessed more mobile phones than their counterparts (18) [Figure 7]. Internet use was higher among urban women (25.1%) than rural women (10.9%). Richest (33.7%) and higher educated (39.4%) women had better internet access (18) [Figure 7].

Percentage of women age 15-49 years who have ever used a computer, the internet and who own a mobile phone, percentage who have used during the last 3 months and percentage who have used at least once weekly during the last three months, Bangladesh, 2019										
	Percentage of women who:									Number of women
	Used a computer			Used a mobile phone			Used internet			
	Ever	During last 3 months	At least once a week during the last 3 months	Own a mobile phone	During last 3 months	At least once a week during the last 3 months	Ever	During last 3 months	At least once a week during the last 3 months	
Area										
Total	4.6	1.9	1.3	71.4	97.8	91.4	14.2	12.9	11.5	64,378
Urban	11.3	5.3	4.0	80.4	98.4	94.9	25.1	23.1	21.0	15,094
Rural	2.5	0.8	0.5	68.6	97.6	90.3	10.9	9.8	8.6	49,284
Wealth Index quintile										
Poorest	0.6	0.1	0.1	53.8	94.6	81.2	1.9	1.4	1.0	11,267
Middle	2.0	0.4	0.2	69.9	98.4	92.7	9.7	8.6	7.3	12,988
Richest	14.5	6.8	5.1	89.0	99.2	97.7	36.0	33.7	30.8	14,170
Education										
Pre-primay /No education	0.1	0.0	0.0	59.2	95.6	84.7	2.4	2.0	1.8	10,187
Primary	0.3	0.0	0.0	68.3	97.8	90.6	5.1	4.5	3.9	14,615
Secondary	2.2	0.7	0.5	71.2	97.9	92.0	13.4	12.1	10.7	28,497
Higher	20.7	9.0	6.5	87.4	99.3	97.3	39.4	35.9	32.4	11,079

Figure 7 Percentage of Bangladeshi women who have access to a computer, the internet, and a mobile phone. Source: MICS 2019, Bangladesh.

1.6 Health System Organizational Structure

Bangladesh's diverse health system comprises public, private, non-governmental organization (NGOs), and donor agencies (11). Bangladeshi government sets policies, and regulations, and provides health services, including financing and human resources (11). The Ministry of Health and Family Welfare (MOHFW) manages these responsibilities. The Directorate General of Health Services (DGHS) and Directorates General of Family Planning (DGFP) manage family planning services in the country. The Ministry of Local Government, Rural Development, and Cooperatives (LGRD) manages urban primary care services, but the quality is subpar due to insufficient resources, absenteeism, and healthcare provider negligence (11). The MOHFW service delivery structure is summarized in the chart below [Figure 8]. The country has formal and informal private sectors. Professionals from different medical fields work in the formal private sector to deliver modern and traditional healthcare (11). The private sector is mostly concentrated in large cities and urban areas (19). The private sector employs more healthcare employees, including public sector health workers, resulting in geographical health service disparities (11). Privatization has overtaken public sector growth, and private services are poorly supervised (11). NGOs address low-quality public healthcare services and population inaccessibility through effective outreach. NGOs provide mostly not-for-profit preventive and basic care services to the underserved population (11).

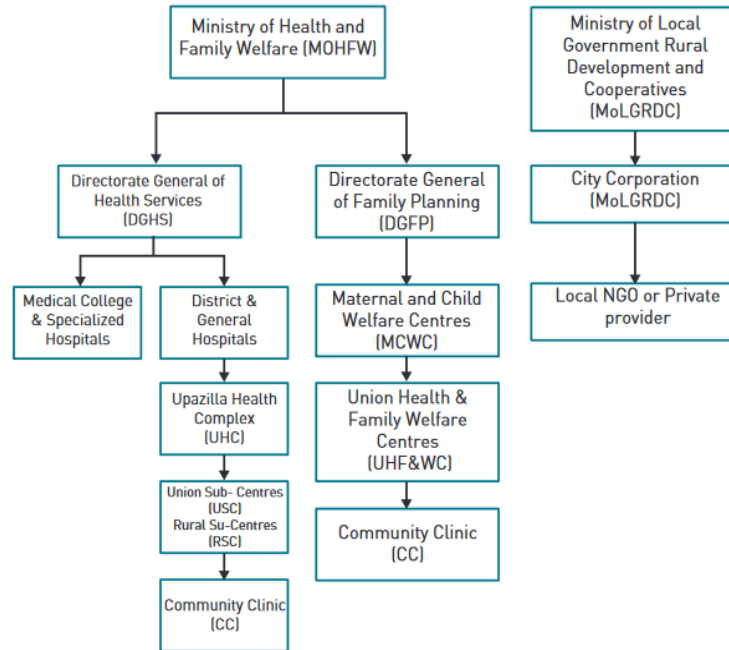


Figure 8 Health service delivery organizational structure in Bangladesh. Source: WHO (2015)

1.7 Human Resources for Health (HRH)

In Bangladesh, professional health workforce size is growing, however, still inadequate (19). Despite employing 151,532 healthcare professionals in 2019, which increased the density to 9.9 doctors, nurses, and midwives per 10,000 inhabitants, this figure remains significantly lower than the globally recommended median of 48.6 per 10,000 population (19). Moreover, healthcare workers are more concentrated in urban areas (75.3% of doctors and 75% of nurses) (19). In addition, a significant proportion of vacant public sector positions remain unfilled (19) [Figure 9]. This indicates that the country is facing unmet demand for qualified health workers in the public sector, specifically in rural regions (19). [Figure 9]

Health worker category	Sanctioned posts	Filled posts	% Vacant posts
Doctors	40 162	26 619	33.7
Dentists	1361	829	39.1
Nurses	40 015	35 828	10.5
Sub-Assistant Community Medical Officers (SACMOs)	5397	3,661	32.5
Midwives	2996	1145	61.7
Medical Technologists (total eight sub-categories)	6406	3892	39.2
Domiciliary staff	75 009	59 183	21.1
Alternative medicine	1906	1053	44.7
Pharmacists (Category B)	2982	1744	41.5
Total	176 234	133 210	24.0

Figure 9 MOHFW health worker distribution by occupation. Source: Nuruzzaman et al. (2022)

1.8 Health Situation: Maternal Health Context

According to World Health Organization (WHO), maternal mortality has been continually decreasing over the years in Bangladesh (20,21). In 2020, there were 123 maternal deaths per 100,000 in Bangladesh, compared to 223 globally (21). The infant mortality rate was 23 per 1000 live births in 2020 (22).

1.8.1 Antenatal Care (ANC)

According to Bangladesh Demographic and Health Survey (BDHS) 2022 report, 92% of urban women and 86% of rural women utilized ANC services (23). However, the quality of ANC was reported to be subpar (21%) (23). Urban women (33%) received better-quality ANC services compared to rural women (17%) (23). Additionally, 39% of rich women received quality ANC services, in contrast to only 8% of poor women (23). 57% of urban women participated in 4 or more ANC visits, compared to 35% of rural women (23). However, the percentage of rural women who attended fewer than 4 ANC visits was substantially higher than that of urban women [Figure 10]. In 2022, 41% of women received 4 or more ANC visits, which declined from 46% in 2017-18 (23). The report also revealed that educated women (97.5%) used ANC more than women without education (75.7%) (23).

Number of antenatal care visits

Percent distribution of women who had a live birth in the 2 years preceding the survey by number of antenatal care (ANC) visits for the most recent birth, according to residence, Bangladesh DHS 2022

Number of ANC visits	Residence		Total
	Urban	Rural	
None	4.6	8.5	7.4
1	8.2	16.9	14.6
2	13.1	21.5	19.3
3	17.1	18.6	18.2
4 or more	56.9	34.5	40.5
Median	4.5	3.4	3.7
Total	100.0	100.0	100.0
Number of women	970	2,640	3,610

Figure 10 Number of antenatal care (ANC) visits in Bangladesh. Source: BDHS 2022.

1.8.2 Delivery Preference

According to the BDHS 2022, 45% of women gave birth in private health facilities and 18% in public facilities [Figure 11] (23). The percentage of births in private facilities increased from 32% in 2017-18 to 45% in 2022(23). Among women in the highest wealth quintile, institutional deliveries increased from 61% in 2011 to 87% in 2022 (23).

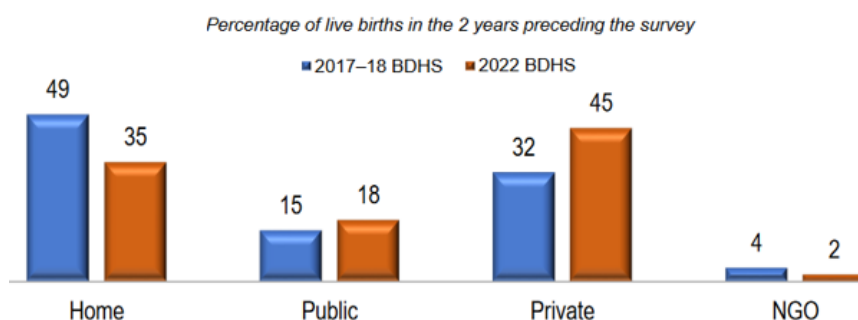


Figure 11 Trends in place of delivery among women in Bangladesh. Source: BDHS 2022

1.8.3 Cesarean Section (CS) Delivery

According to the BDHS 2022 report, almost 45% of deliveries were conducted via CS in Bangladesh, an increase from 34% in 2017-18 (23) [Figure 12]. With a span of 10 years, the CS rate increased from 18% in 2011 to 45% in 2022 (23) and was higher in urban mothers than rural (24) [Figure 12]. It was also observed from the BDHS 2022 report that the percentage of CS was higher among women who had completed secondary or higher education (58.5%) and belonged to the wealthy quintile (67.3%) (23) [Figure 13]. According to the MICS 2019 data, 20.7% of CS were performed before labor pain (18).

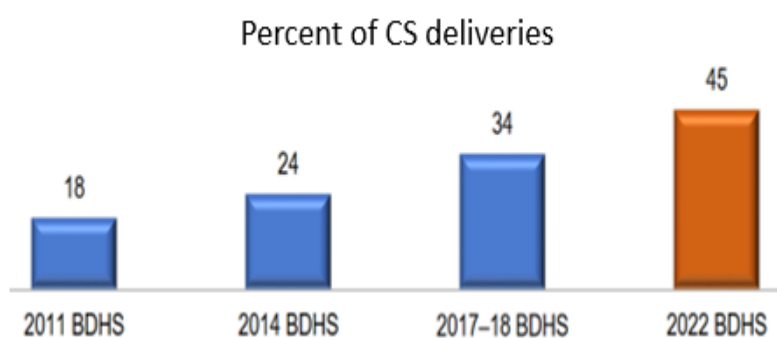


Figure 12 Cesarean section (CS) deliveries in Bangladesh (2011 -2022). Source: BDHS 2022

Percent distribution of live births in the 2 years preceding the survey by place of delivery, according to background characteristics, Bangladesh DHS 2022

Background characteristic	Place of delivery					Total	Percent-age delivered in health facility	Percent-age delivered via C-section	Number of births
	Public	Private	NGO	Home	Other/missing				
Mother's age at birth									
<20	19.4	44.0	1.7	34.5	0.4	100.0	65.0	44.3	890
20–34	17.6	46.0	1.8	34.2	0.4	100.0	65.4	45.2	2,608
35–49	15.8	37.4	1.0	45.3	0.5	100.0	54.2	35.4	194
Birth order									
1	20.0	51.0	1.7	27.0	0.3	100.0	72.8	51.0	1,471
2–3	17.2	44.3	1.6	36.6	0.3	100.0	63.1	43.6	1,892
4–5	13.3	23.6	2.7	58.8	1.5	100.0	39.7	20.8	304
6+	(9.3)	(16.4)	(0.0)	(74.3)	(0.0)	100.0	(25.7)	(12.6)	25
Number of ANC visits¹									
None	11.8	10.1	0.4	76.3	1.4	100.0	22.3	10.3	268
1	15.7	26.5	0.7	57.1	0.0	100.0	42.9	23.7	526
2	18.5	38.8	0.9	41.2	0.5	100.0	58.3	39.0	695
3	17.6	52.3	1.8	28.3	0.0	100.0	71.7	51.4	658
4 or more	19.5	58.0	2.8	19.2	0.5	100.0	80.3	57.9	1,462
Don't know/missing	22.8	43.0	0.0	34.2	0.0	100.0	65.8	39.5	82
Residence									
Urban	19.4	54.1	2.9	23.4	0.3	100.0	76.3	56.0	997
Rural	17.4	41.7	1.3	39.1	0.4	100.0	60.5	40.2	2,695
Division									
Barishal	13.2	36.8	1.1	48.9	0.0	100.0	51.1	35.0	219
Chattogram	21.3	36.7	2.9	38.9	0.2	100.0	60.9	31.0	793
Dhaka	17.5	50.6	2.3	29.2	0.4	100.0	70.4	53.1	926
Khulna	18.2	63.2	0.8	17.5	0.3	100.0	82.2	66.0	380
Mymensingh	18.5	35.2	0.7	45.4	0.3	100.0	54.3	38.9	333
Rajshahi	13.3	55.7	1.2	29.2	0.7	100.0	70.1	53.5	382
Rangpur	17.1	44.3	0.4	37.4	0.8	100.0	61.8	43.1	419
Sylhet	21.0	28.3	2.3	48.4	0.0	100.0	51.6	25.7	240
Education									
No education	19.8	22.6	2.3	55.3	0.0	100.0	44.7	23.9	185
Primary incomplete	15.2	24.2	2.0	58.4	0.3	100.0	41.3	21.4	374
Primary complete ²	13.7	35.6	1.2	48.7	0.8	100.0	50.5	35.2	469
Secondary incomplete	18.9	44.7	1.6	34.5	0.3	100.0	65.2	44.8	1,503
Secondary complete or higher ³	19.0	59.7	2.0	19.0	0.4	100.0	80.6	58.5	1,161
Wealth quintile									
Lowest	17.2	24.6	0.6	57.3	0.3	100.0	42.4	22.7	745
Second	18.8	34.4	1.0	45.4	0.3	100.0	54.3	35.0	781
Middle	18.9	46.2	2.6	31.6	0.6	100.0	67.8	45.9	787
Fourth	16.9	56.3	2.0	24.6	0.2	100.0	75.2	54.6	718
Highest	17.7	67.2	2.4	12.1	0.6	100.0	87.4	67.3	661
Total	17.9	45.1	1.7	34.9	0.4	100.0	64.8	44.5	3,692

Note: BRAC maternity/delivery centers (also known as birthing huts) are included in the category "other." Deliveries in these centers are not considered facility births in this report. Figures in parentheses are based on 25–49 unweighted cases.

¹ Includes only the most recent birth in the 3 years preceding the survey

² Primary complete is defined as completing grade 5.

³ Secondary complete is defined as completing grade 10.

Figure 13 Trends in place of delivery among women in Bangladesh with CS delivery. Source: BDHS 2022

Chapter 2. Problem Statement, Justification, and Objectives

2.1 Problem Statement, and Justification

Cesarean sections (CS) are a vital surgical intervention to reduce maternal and fetal mortality during childbirth (25). WHO has recommended about 10%-15% CS rate in a population (26,27). However, the CS rate below 10% indicates that a large percentage of women lacked access to CS delivery, while the percentage over 15% indicates over utilization of CS delivery in a population. Evidence suggests that in many countries the CS rate exceed the rate 15% and also some countries the CS rates are found 30% (28). Over the years the CS rates are found at increasing trends in some countries e.g., in Latin America, Asia (29–31). The highest prevalence of CS was revealed in Latin America (32%), followed by Asia (23.1%), while the lowest prevalence was found in Africa (7%) (29–31). WHO reported that one in five deliveries (21%) now involves CS (32). In addition, globally approximately 42% of CS performed lacked the necessary medical justification (28). Literature suggest that the deliveries through CS without medical need are not beneficial to maternal and infant health (28).

CS was adopted in Bangladesh in the late 1990s to reduce the risks associated with complicated pregnancies and improve outcomes for mothers and infants (24,33). However, studies revealed the CS rate in Bangladesh is about 45%, which exceed the WHO-recommended 10-15% range (23,24,33–35). This rate is considerably higher than the CS rates in Pakistan (14%), India (14%), and Nepal (4%) (33,36–38). Studies found that private hospitals in Bangladesh performed 84.7% of CS procedures which is significantly higher compared to public hospitals (11.9%) (25,34). Repeat CS, fetal distress, protracted labor, oligohydramnios, and post-maturity emerged as the primary indications for CS in Bangladesh (25). Muhammad et al. (2022) found more than 18% of Bangladeshi mothers had non-medical CS, compared to 14.1% with medical justification (34). Several studies found that non-medical factors significantly impact the global rate of CS, including in Bangladesh. These factors include demand-side factors like socio-demographic characteristics, cultural beliefs, and women's preferences, and supply-side factors like health professionals, healthcare institutions, private facilities, and antenatal care (ANC) services (31,39–43).

The CS rate in Bangladesh was observed as a rising trend. This is thus important to focus on the risk factors of CS. Besides the lifesaving benefits (both mother and fetus) of CS, it has severe negative consequences as well. CS is a major surgical procedure that carries risks for both mother and infant (27). Mothers are at risk of hemorrhage, transfusions, infections, and blood clots, while newborns are at risk of infection and respiratory problems (25,44,45). Furthermore, repeat CS greatly increases chances of experiencing serious complications such as hysterectomy and uterine rupture (44). Literature suggests that excess CS rate was not beneficial for mother and child health outcomes (28). Furthermore, CS is a costly procedure, with the total out-of-pocket (OOP) cost for CS birth in 2018 in Bangladesh reaching USD 626.89 million (33). The cost per CS delivery is about USD 612 in Bangladesh (33). This amount of USD 612 spent for one CS delivery is six to eight times higher than the monthly income of poorest segment population (10%) in Bangladesh (28). Additionally, most CS are performed in for-profit private institutions, straining individuals and families financially (46).

Justification

In Bangladesh, it was found that many women undergo CS delivery. This high rate of CS deliveries in Bangladesh poses risks to women's health, endangers both mothers and neonates, and burdens the health care system (46). In order to safeguard the health of mothers and their infants, it is important to reduce the number of CS in Bangladesh (46). However, there is a lack of comprehensive understanding regarding the factors influencing the rate of CS deliveries in Bangladesh. To address the rising trend of CS in Bangladesh, it is necessary to acquire a thorough understanding of the factors that influence the decision to undergo CS in Bangladesh. Therefore, the objective of this study is to identify the various factors, such as demand-side and supply-side factors, and how they influence the CS rate in Bangladesh.

Research Question:

"What are the various factors influencing CS deliveries in Bangladesh?"

2.2 Objectives

2.2.1 Overall Objective

To identify, investigate, and analyze the various factors influencing the CS rate in Bangladesh to address the increasing trend and to recommend evidenced-based interventions to the MOHFW and policymakers to prevent the increasing trend of CS in Bangladesh.

2.2.2 Specific Objectives

- To Identify and analyze factors from the demand-side influencing the CS rate in Bangladesh.
- To identify and analyze factors from the supply-side influencing the CS rate in Bangladesh.
- To investigate evidence-based interventions from around the world aimed at reducing the CS rate.
- To provide MOHFW and policymakers with recommendations to prevent the rising CS rate.

2.3 Methodology

2.3.1 Materials and Method

This study utilized a literature review approach, to gather reliable data from peer-reviewed and published sources. Utilizing Google search engines, this study accessed reliable websites, including WHO, MOHFW, World Bank, and Save the Children. These sources provided recent data and information from surveys, policy briefs, reports, books, and guidelines. The study also incorporated data from Household Income and Expenditure Survey Hies (HIES), Bangladesh Demographic and Health Survey (BDHS), and Multiple Indicator Cluster Surveys (MICS) reports. Google Scholar, PubMed, and VU library were used to find English and high-quality grey literature and peer-reviewed journal articles. The search process included cross-referencing, snowballing methods, and specific search terms related to CS and associated factors. This study thoroughly assessed articles for relevance to the research topic and objectives, using exclusion and inclusion criteria. The study examined literature from 2013 through 2023, incorporating updated information.

In this study, careful consideration was given to the inclusion and exclusion criteria to select relevant articles. The inclusion criteria were the following:

- a) Original studies about CS and/or factors influencing CS.
- b) Original studies on factors that explain CS rate such as Pregnancy care indicators such as ANC services, number of ANC visits, type of healthcare institution.

The exclusion criteria were the following:

- a) Publications focusing on birth preparedness, gender-based violence, domestic violence, post-natal care (PNC), post-operative care.
- b) Studies not identifying CS-related factors.
- c) Opinion write-ups, non-English, and non-peer-reviewed papers

Following the problem statement and objectives of this study, the search words were used, for example, "*CS Rate in Bangladesh*," "*CS and health facilities in Bangladesh*," "*Health Resource and CS in Bangladesh*." etc. The study further expanded the scope to include global and neighboring countries for the comparisons in CS in Bangladesh. To determine the demand side factors that are associated with CS, search terms were used: "*Determinants of CS in Bangladesh*," "*Socio-economic Factors and CS in Bangladesh*," "*Culture and Belief and CS*," and "*Women's Preference of CS*" etc. For the supply side factors, this study focused on "Private and Public healthcare institution " "*Health professional role*," "*ANC and CS*," "*Economic Incentives*," "*Recommendation and CS*," etc. were used as keywords. For the clinical side objective search terms were used are, "*Previous CS*," "*Lack of Medical Indication*," "*Non-medically Indicated CS*" etc. The full search terms are attached in the study's appendix.

2.3.2 Conceptual Framework (CF)

For this study, multiple conceptual frameworks (CF) were explored to understand the factors influencing CS. For the global, the CF that included are Robson Classification System and Leone's framework, following Ghosh's framework in India and Nazir's framework in Pakistan. Nazir's framework is a modified version of Ghosh's framework. The Robson Classification System is a global standard for assessing CS rates (47,48), however, it was not adopted for this because many factors like cultural factors, women's preferences for CS, and social network factors were not incorporated in Robson CF. However, these factors are important to understand the decision-making process of CS in the low- and middle-income countries (LMICs) like Bangladesh. On the other hand, Leone's CF (17,49), encompassed social network factors like media exposure and institutional factors such as the type of delivery facility (public vs. private), number of ANC at health institution, and private ANC care (17,49). Studies found a significant correlation between health professionals' roles influencing CS rates, and doctors' tendency to recommend CS without medical necessity (50). Despite the insights offered by Leone's framework, it was not adopted in this study due to its limitations of demand-side factors, including socio-demographic elements like culture, women's preference for opting CS.

However, in 2010, Ghosh introduced a framework aiming to explore the rise of CS deliveries in India, focusing on demand by women, medicalization, and clinical reasons (51) [Figure 16]. Each category included socio-economic position, gender dimensions, cultural influences, institutional factors like economic motivations and risk-minimizing behavior, and risk factors like mother's age, child size, parity, previous CS, and other clinical considerations (51). Later, Nazir (42) adopted Ghosh's framework for a study on CS determinants in Pakistan. Nazir's modifications involved categorizing factors demand side (socio-economic aspects), medicalization factors (institutional influences), and clinical reasons [Figure 15] (42). However, both Ghosh and Nazir's frameworks overlooked influential factors, such as demand-side factors like social media exposure and women's preferences, as well as

supply-side factors like ANC, the role of healthcare professionals, and private healthcare facilities, which were found related to the increasing rate of CS (52).

Considering the strengths and limitations of the explored frameworks, I chose to use the modified Ghosh’s framework by Nazir (henceforth referred to as Nazir’s (2015) framework) (42). To improve the conceptual framework on factors associated with CS and the conceptual framework was modified to incorporate new variables in supply- and demand-side. The study categorized the framework into three main categories [Figure 14]: supply-side factors, demand-side factors, and clinical reasons. Both supply- and demand-side factors were considered non-medical. The factors are briefly described below:

- Demand-side factors included socio-demographics, culture and beliefs, women’s preference, and social network factors.
- Supply-side factors encompass institutional factors such as economic incentives, time management, surgical practices, health professional’s role, ANC received from private hospitals, and public vs. private facility.
- Clinical side factors incorporate medical/risk factors, including the age of mother and previous CS (25). For the purpose of this study, factors that are absolute indications for CS like maternal causes (general diseases, clinical complications, parities, post-dated pregnancy, psychological disorders etc.) and fetal causes (child size at birth, fetal distress etc.) were not researched (25). This is in alignment with the objective to explore reasons behind the recent increasing CS rates.

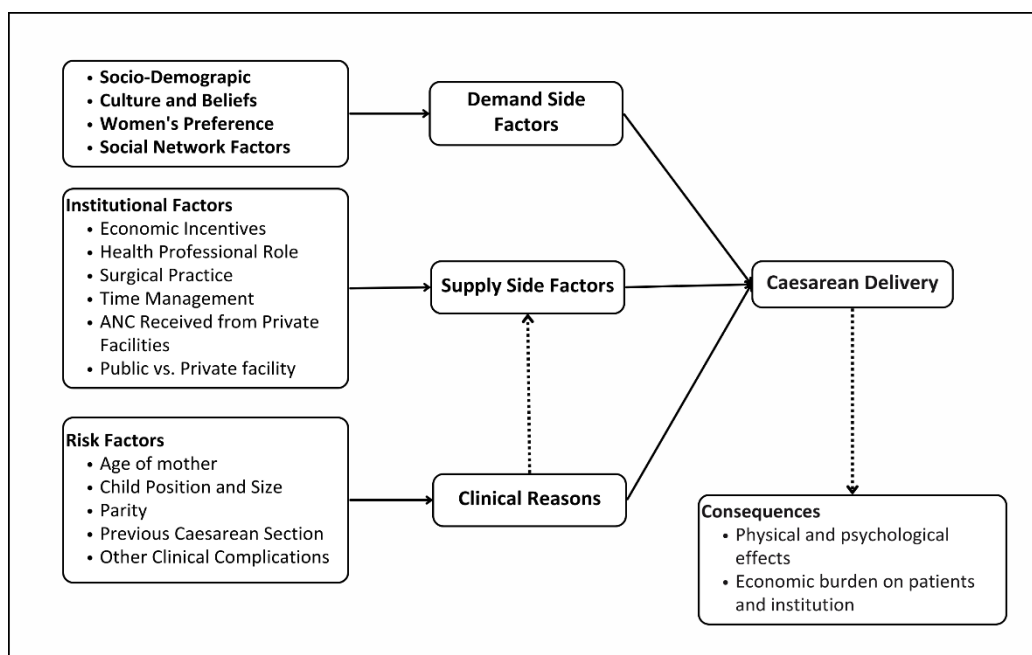


Figure 14 Conceptual framework for analyzing the factors associated with the rate of CS in Bangladesh. (Adopted from Nazir (2015), Original framework: Ghosh (2010))

The Conceptual framework of Nazir's (2015)(42). [Figure 15]

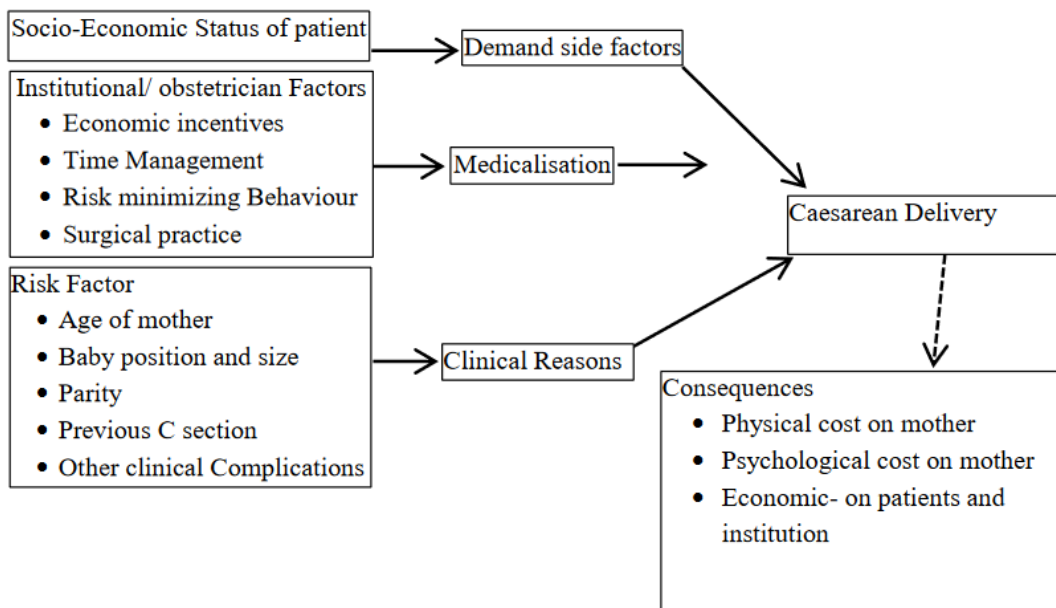


Figure 15 Conceptual framework of Nazir (2015). Source: Nazir (2015)

The Conceptual framework of Ghosh's (2010) (51). [Figure 16]

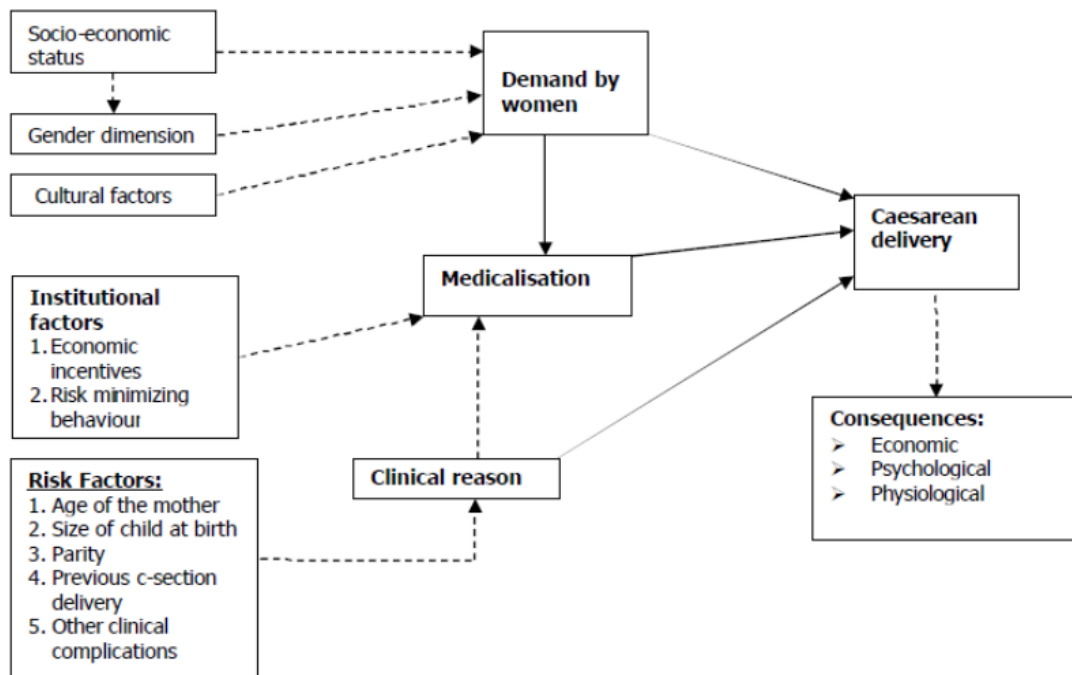


Figure 16 Conceptual framework of Ghosh (2010). Source: Ghosh (2010)

Chapter 3: Findings

This chapter explores three primary sections: demand-side factors, supply-side factors, and clinical factors influencing the rate of CS delivery. The study compares findings to highlight the importance of the Bangladeshi context, providing evidence about both global trends and the situation in Bangladesh. Using various evidence sources, the objective is to explain how and why these factors influence CS deliveries and delivery choices in Bangladesh.

3.1 Demand-side Factors

The global incidence of CS has increased over time (39–42,53–56). This increasing trend is significantly associated with demand-side factors, including socio-demographics, culture, and beliefs (31,39–41). In addition, women's preference for CS has been related to this increased trend (43). Social media networks also influence this trend (17,49).

3.1.1 Socio-Demographic Factors

Socio-demographic indicators, such as the place of residence, socioeconomic status (SES), and level of education, were found to be substantially linked to the rising CS trend in Bangladesh (34,39,52,57,58).

3.1.1.1 Place of residence

Multiple international studies found significantly high CS rates in urban areas, especially in Asia, Africa, and Latin America (39–42,53–56). This trend is also observed in neighboring countries like India and Pakistan, where CS rates are significantly higher in urban areas (39,42,56,59,60). In Southeast Asian countries like Vietnam, urban CS rates are nearly twice that of rural areas, with 42.4% compared to 22.9% (54). Likewise in Bangladesh, it was observed in multiple studies that urban areas have a higher rate of CS deliveries compared to rural areas (17,24,34,61). Urban CS rates increased significantly from 0% to 43% from 1996 to 2018, while rural CS rates increased slowly from 0% in 1996 to 28% in 2018 [Figure 17] (39). This high urban CS rates were observed among mothers in all eight divisions of Bangladesh [Figure 18] (39). In their study, Hasan et al. (2019) discovered that the high rate of CS delivery among urban mothers could be related to several other factors (62).

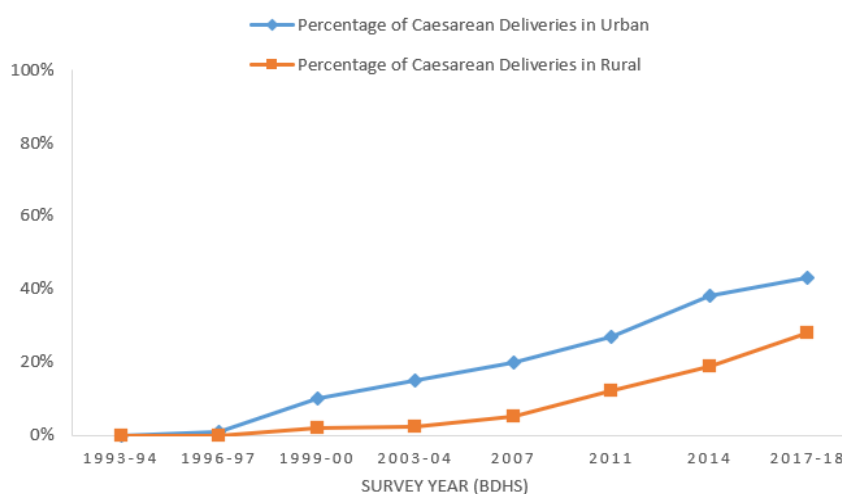


Figure 17 Trends in CS delivery by residence type. Source: Abdulla et al. (2023)

According to studies, urban women have greater access to education and typically have a higher socioeconomic status, which could have empowered them with confidence and health-related decisions (39,52,62,63). Moreover, healthcare institutions were found to be more available in urban areas, allowing urban women convenient access to healthcare facilities (39), and influencing the uptake of institutional deliveries like CS (25,39).

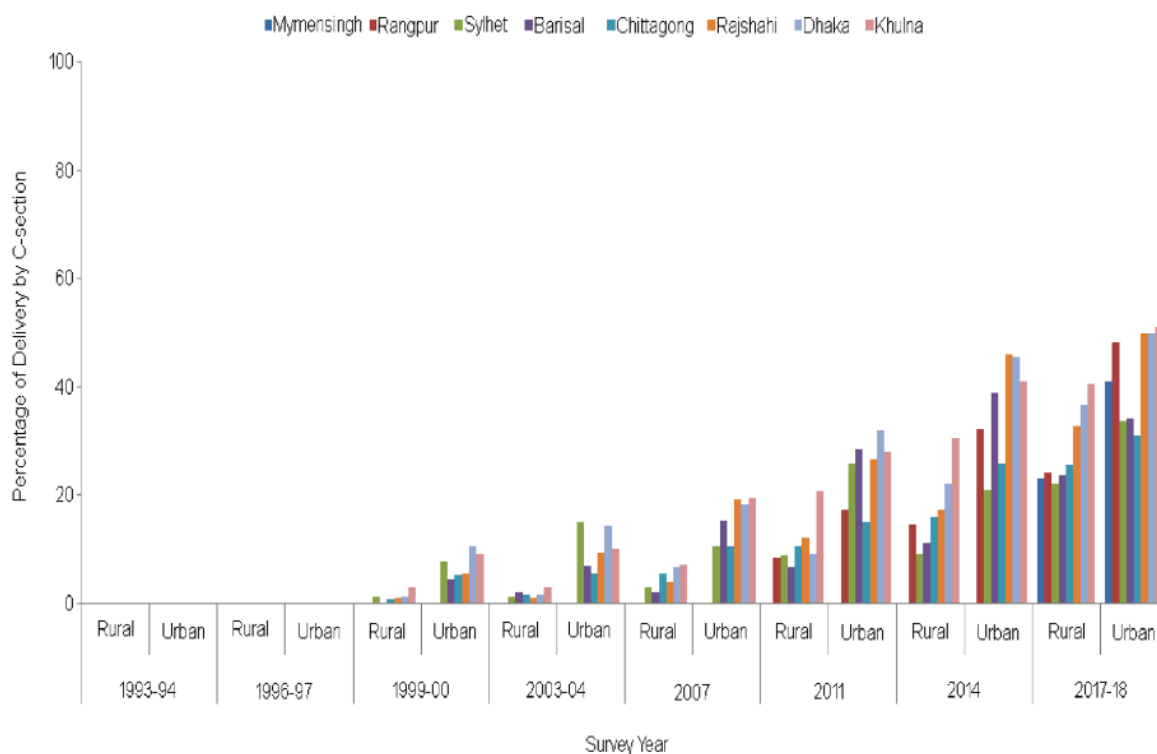


Figure 18 Trends in CS delivery by division and residence. Source: Abdulla et al. (2023)

3.1.1.2 Economic Status

According to multiple global studies, it was observed that CS rate was high among women from wealthy families compared to women from poor families (31,37,38,60,64,65). The findings reflect socio-economic inequalities in CS delivery. Furthermore, this information is linked to underestimation or overestimation of the CS rate over sub-groups, e.g., wealthy-poor, urban-rural etc. An observational study in 72 low- and middle-income countries (LMICs) found that the wealthiest quintile had 18.4% of CS rate, while the poorest had 3.7% (41). Similar findings were found in Mexico, Iran, Southern Asia, and Africa where wealthy urban mothers showed a higher tendency for CS deliveries compared to their counterparts (39,66,67). In neighboring countries like India, women from wealthy families were found opting for CS delivery more (37,60,64,65).

Likewise, in Bangladesh, women with the most wealth had a 41% CS rate, whereas those in the middle wealth group had a rate of 19.90%, and the lowest wealth group had a rate of 8.70% (17,25,61). Studies found that wealthier women are 1.64 times more likely to choose CS delivery than poorer women (adjusted odd ratio [AOR]: 1.64; 95% confidence interval [CI]: 1.04 to 2.6) (30,34). It was also found in studies that wealthy mothers in urban areas have 4.84 times higher odds of CS delivery compared to 3.67 times in rural areas (30,39). This indicates that socioeconomic status influences women's access to health facilities and institutional deliveries, such as CS, with wealthy women having greater affordability and access, while rural women face limited access to private and government facilities (28,39,62).

3.1.1.3 Level of Education

Multiple international studies have associated women's education to high CS delivery rates (28,28,31,36,39,42,54,68–70). In Africa, higher education is significantly associated with increased CS rate (29,69–72). In Nigeria, women with higher education were found 2.47 times more likely to undergo CS than those without formal education (95% CI: 1.49 to 4.08) (69,70). In Brazil, women with a higher level of education were found to be more inclined to opt for CS delivery (73). Neighboring countries like India and Pakistan, a positive association was found between women with high school education and opting for CS delivery (38,43,64).

Similarly, in Bangladesh, women with secondary education or higher are two times more likely to give birth via CS than those without education (odd ratio [OR]: 2.06, 95% CI: 1.24 to 3.25) (25). Around 57% of women with secondary or higher education undergo CS delivery, while only 12% of low-educated women opt for CS (28). Abdulla et al. (2023) found that as a mother's education level increased, her likelihood of undergoing a CS also increased (39). In contrast, Lower education levels are significantly related to increased vaginal delivery (VD) (24). In addition to women's education, partners' education level was found to be associated with a higher likelihood of CS use (28). Educated women and their partners lead to better career and financial security, encouraging women to deliver through CS (30,74). It was also observed that educated pregnant women in Bangladesh want to avoid VD due to labor pain and other consequences, contributing to the increased rate of CS delivery (62).

3.1.2 Social and Cultural Factors

Non-clinical factors such as families and socio-culture were linked to high CS rates worldwide (75). Women in LMICs often lack control over their health decisions, with societal expectations, family pressures, and community attitudes influencing their preference for delivery method (76). In Brazil, women face social pressure to undergo CS to avoid labor (57), while in Africa, women often lack decision-making authority and involve their partners or families (68). In Africa, a common perception of VD leading to permanent damage to the external genitalia influences women to opt for CS (68). In places like Ghana and Iran, relatives, socio-cultural, and religion play significant roles in influencing women's decisions to opt for CS delivery (76,77).

Similarly in Bangladesh, cultural influences, such as religious beliefs and social attitudes, significantly influence the decisions around CS deliveries (34,39,62). However, these factors influence the rate of CS delivery differently in urban and rural areas (39,62). In rural areas, religion acts as a protective factor for CS, with Muslim women being 20% less likely to choose CS delivery compared to non-Muslim women (probability value [p-value] = 0.051) (39,52,62), due to religious views and privacy concerns, especially when consulting with male doctors (39,62). This finding reflected in the higher VD rate in rural areas (54.40%), where people are more religious (24). However, religion may have less influence on the high CS rate in Bangladesh due to her Islamic majority (62). Close friends and relatives also significantly influence women's choice of delivery method, alongside their religious beliefs (24). Family (40.60%), doctors (34.4%), and friends (13.3%) are statistically significant factors influencing women's decisions regarding CS delivery (24). Even educated women tend to base their delivery preferences on family elders, as found in a qualitative study in Bangladesh (61,78). Although cultural and religious variables significantly influence CS delivery preference, they cannot fully explain Bangladesh's high CS rate.

3.1.3 Women's Preference for CS

According to international studies, there is a significant correlation between women's preference for delivery method and the high rates of CS delivery (24,34,62,68,77). Notably, a large proportion of mothers opted for CS delivery on maternal request (CDMR) without medical necessity, contributing to the increasing CS rate in developed countries, ranging from 4% to 18% (77). Reasons for women's preference for CS delivery include fear, anxiety, convenience, past birthing experiences, and inadequate healthcare (30,34,39,52,62,63,68,77,78). In Iran, women's preference for CS is influenced by past traumatic birthing experiences, fear, and pain associated with VD (77). In Africa, women perceive CS as a painless and safer procedure (68). Lack of knowledge about alternative birth methods and limited awareness of CS benefits are additional factors influencing women's preference for CS (68,71). Health service-related reasons, such as inadequate labor pain care, dismissive behavior from healthcare professionals, and insufficient pain management during VD, also significantly influence women's preference for CS (68).

Multiple studies in Bangladesh found that women's preferences for delivery methods and the increasing incidence of CDMR are influenced by factors such as fear of childbirth pain, anxiety, and perceived low quality of care (24,34,62). Rahman et al. (2022) found that two-thirds of women choose CS for medical reasons, while the remaining third opts for convenience and avoidance of labor pain (79). Additionally, Akhtarul et al. (2022) found CS is preferred among Bangladeshi women, who perceive it as a safer, less painful, and easier alternative to VD (30). This trend is consistent with other studies (30,34,39,52,62,78,80), indicating a rising trend of non-medically indicated CS due to fear of labor pain. Qualitative studies also revealed that women consider CS to be a risk-free medical intervention for birthing (80,81), however this preference stems from a lack of awareness about the risks associated with CS (34). Moreover, the dissemination of inaccurate messages and misinformation promoting CS as a safe, painless procedure with fewer complications compared to VD, influencing the preference for CS among women (17,30,62,78). Health service-related factors significantly influence women's preference for CS delivery (78,80,81). A qualitative study found that unsupportive behavior from healthcare providers during labor and lack of respectful treatment led mothers to request CS for subsequent deliveries (78). Women, initially preferring VD, accepted the recommendation to opt for CS, relying heavily on their healthcare providers' advice (78,82). However, performing CS upon a woman's request (CDMR) for low-risk pregnancies remains a debated topic (82) and the notion of requesting CS as a woman's right is yet to be established in Bangladesh. To address the rise in non-medically indicated CS, it is essential to ensure CS is performed based on evidence-based protocols and appropriate medical indications, rather than solely on CDMR (82,83).

3.1.4 Social Network Factors

Multiple global research studies have discovered a significant correlation between media exposure and high rates of CS (17,34,52,84,85). This indicates that social network components like television, internet, mobile phone and media exposure influence choice of delivery methods. Luce et al. (2016) found that women relied on the media for childbirth information (52,84) with 99% of US women using electronic devices for pregnancy and childbirth information (52). Pregnancy related apps also found to influence 56% of first-time mothers to prefer CS as birthing mode (52). It was also found in a study that positive media depictions of CS as a safe procedure have influenced women's preference for CS over VD (52), while negative media portrayals of VD as painful and uncomfortable have instilled anxiety and unease among women (52,84–86).

Several studies in Bangladesh found that social network factors significantly influence the choice of delivery methods and are associated with high CS rates (17,30,34,52,63). Women with media access have a 43% higher likelihood of opting for CS delivery compared to those without media access (AOR: 1.43, CI: 1.19 to 1.71) (30). Muhammad et al. (2022) found that media exposure increased the likelihood of choosing CS by 32% (AOR: 1.32; CI: 1.02 to 1.72) (34). Afiaz et al (2021) found in her study that having a mobile phone increased the likelihood of CS among women (AOR: 1.25, p-value 0.020) (52), indicating that women's consistent access to information greatly influenced their preference. Similarly, television viewership also found to be associated with higher rate of CS delivery (17). This information from social networks helps women make informed choices about their health and well-being, while influencing their choice of delivery method. These results highlight how social media, especially exposure to media, can influence delivery choices.

3.2 Supply-side Factors

Global studies have identified supply-side factors as significant contributors to the rising rates of CS (25,42,87,88). Healthcare institutions and professionals are the primary drivers of supply-side factors (42,58). To explore further, this study included ANC received from private facilities and compared public versus private facilities (17,49).

3.2.1 Economic Incentives

Global studies show that private healthcare facilities are profit-oriented, leading to a rise in CS deliveries due to their incentive-driven approach (39,58,68,89). This trend is evident in Africa as well where private healthcare doctors conduct CS procedures for financial gain (29,68,90). Similarly, in Brazil has a high CS delivery rate, especially in the private sector, surpassing public services (91). In South Asian countries, the increase in national CS rates is largely due to private health facilities' profit maximization tendency (39). This discrepancy highlights the financial incentives provided to physicians and private institutions for performing more CS procedures, leading to higher rates in private hospitals compared to public ones (89).

Several studies found that in Bangladesh, private healthcare providers' profit-driven approach has led to a significant increase in non-medically indicated CS deliveries (52,57,58,80) contributing to the rising proportion of CS deliveries. According to the study, this was found primarily due to the profit-seeking mentality of healthcare providers (80). Healthcare practitioners are motivated by financial incentives (34,39), and are found to recommend more CS deliveries, resulting in a higher CS delivery rate in Bangladesh compared to other Asian countries (34). In addition, some healthcare providers exploit maternal fear of pain to promote CS for financial gain (88). The net income from performing CS is higher than conducting vaginal deliveries (VD), driving practitioners to opt for more CS (57). In addition, private hospitals' financial and organizational structures significantly influence physicians' treatment decisions and approaches (39). Khan et al.(2017) discovered that inappropriate pressure from private healthcare employers contributes to this practice of performing more CS (88). Moreover, administrators set financial targets and pressurize obstetricians to perform more CS deliveries (92). A qualitative study revealed that obstetricians felt compelled to conduct more CS in private institutions to meet financial targets (78). Private providers maximize profits by influencing affluent women to opt for CS, contributing to higher CS delivery rates in private facilities (58).

3.2.2 Health Professional Role

Several global research indicated that non-medical factors like health professionals significantly influenced women's delivery preference (28,57,68,79). In Africa, a study found that the preferred method of childbirth for African women was significantly associated with the counseling doctor's preferences and credentials ($P < 0.001$) (68). The role of health professionals in contributing to the rising trend of CS differs between public and private healthcare institutions (78). In private institutions, healthcare providers recommend more CS deliveries due to financial incentives, leading to higher CS rates (34,39,78). In public hospitals, physicians tend to follow standard medical practices, showing less inclination to recommend CS (78), due to lack of financial incentives and reimbursement. Another study found that public hospital physicians were reluctant to recommend CS due to a lack of supervision, carers, and clinical standards (68).

Likewise in Bangladesh, women trust doctors to make decisions about CS, as they believe they have all the necessary information and authority whether or not to perform CS (81). Physicians in Bangladesh were identified as final decision-makers for CS delivery in a qualitative study (81). Health professionals' recommendations (34.4%) significantly influence a mother's delivery method choice in Bangladesh (24,79). A study by Rahman et al. (2022) found that health service providers primarily advocate for CS (73%), followed by family members (21%) and others (6%) (79). Mothers (58%) often changed their decision from VD to CS after repeated counseling from physicians (24). Although few women initially opted for CS, a significant number ended up opting for CS based on their physicians' recommendations (79,80). Private physicians in Bangladesh are reported to recommend CS without considering the mother's physical condition (80), leading to a rise in clinically non-indicated CS deliveries in private hospitals. In some cases, women were compelled to consent to CS due to unsupportive behavior from health professionals during labor (93). Studies found that this influential role of healthcare professionals is most prominent during ANC visits, where they offer counseling on childbirth options (78–80). However, women are not adequately informed about the risks of CS during these visits and sometimes receive incorrect information about the procedure (28,79).

3.2.3 Time Management

Physicians prefer CS delivery for reasons other than economic considerations, such as time management. Studies indicated that doctors choose CS for time management without medical justification (39,57,79). Physicians often opt for CS delivery due to their preference for shorter, more convenient delivery times compared to the longer process of normal childbirth (57,93). In Bangladesh, Rahman et al. (2022) found that that doctors were unwilling to work beyond their designated shifts in both public and private hospitals (79), indicating that doctors' preferences for working hours could influence a tendency to recommend CS. Another study reported that to avoid patient's call at odd hours, doctors were found performing CS delivery before labor induction (94). Moreover, women's constant attention during labor makes managing pain during VD more challenging and time-consuming (79). Consequently, physicians often recommend CS to address these challenges of providing care, and time constraints (17,79) contributing to the high CS delivery rate in the country. In contrast to VD, CS requires less time from physicians and can be scheduled in advance, reducing ambiguity about delivery times (57). Therefore, physicians often resort to performing more CS as a solution to the inconvenience of managing prolonged labor. Two studies from 2018 and 2021 consistently show that approximately 40% of CS deliveries are decided two or more days prior to the scheduled delivery date (17,61), indicating that physicians have a significant influence in encouraging mothers to opt for CS due to reduced ambiguity in delivery timing. This interaction of physician time management, challenges in VD

management, and the convenience of CS scheduling contributes to the high CS delivery rate in Bangladesh.

3.2.4 Surgical Practice

CS is a life-saving surgical intervention that should be performed when medically indicated (39), however several studies have observed a significant trend among physicians opting for CS over VD without medical justification (17,77,93). Professional medical practice, particularly surgical practices like CS for profit, contributes to the high rate of CS in LMICs (74,94). Multiple studies have reported that physicians are more inclined to perform CS as part of their surgical practice due to their risk aversion mechanism and concerns over legal liability (17,77,93,94). Studies have found a correlation between doctors' predilection for CS and their irrational fear of childbirth (77), as well as the fear of potential abuse and harassment from patients' relatives and the public (93,94). To avoid potential harm to their professional image doctors' often decided to opt for CS delivery (93,94). Additionally, physicians opted for CS as part of risk minimization of VD (42), believing it was a safe way to alleviate labor pain for both mothers and their newborns (28).

Similar findings have been observed in Bangladesh. An obstetrician in a Bangladeshi private clinic said in a qualitative research that “physicians are reluctant to take risks during VD, even in private clinics, as the loss of even one fetus could end a doctor's entire career” (78). In addition, lack of cutting-edge VD equipment and skilled healthcare workers for pain-free VD raises the likelihood of undergoing CS (24). Fear of legal liability and self-protection influences physicians' decision-making processes,, leading to a preference for CS as a risk aversion mechanism (93). Afiaz et al. (2021) found that a higher number of CS were performed for the purpose of training intern doctors (52). Moreover, Post-graduation trainees, particularly in medical colleges, were performing more CS to enhance their surgical skills (95). Conducting CS as surgical training is unacceptable, however there are no measures in Bangladesh to monitor and address such practices, exacerbating the situation.

3.2.5 Antenatal Care (ANC) Received from Private Facilities

ANC is an essential component of pregnancy care (96–98), preventing pregnancy-related threats and improving outcome (99). WHO recommends at least eight ANC visits during pregnancy (25,100). However, several global studies have shown a significant association between ANC visits and increased CS rate (17,30,39,52,57,61,68,78,79,81), raising concerns about ANC's effectiveness in reducing CS rates. Studies also found that 4 or more ANC visits increased the likelihood of CS delivery (30,34,39,52,79,81). In Africa, women with at least 4 ANC sessions had higher CS prevalence (68). Despite ANC's purpose to ensure safe pregnancies and deliveries, frequent visits was found to lead to a higher likelihood of opting for CS, possibly due to medicalization preference (57).

Studies in Bangladesh have found a significant association between the number of ANC visits and the high rate of CS (17,25,34,39,52,57,61,79,81). Although ANC accessibility has improved in Bangladesh, the quality of care and counseling remains inadequate (17,79,101). In Bangladesh, 92% of urban and 86% of rural women visited ANC sessions at least once, with 57% of urban women having 4 or more ANC visits (23). Studies have shown that women receiving 4 or more ANC visits have 2.47 times higher odds of CS delivery (AOR: 2.47; 95% CI 1.15 to 5.28) (34), and over 4 ANC visits are more than 4 times more likely to opt for CS (AOR 4.12 with p-value < 0.001) (52). Similar results were observed in other studies (17,25,30,39,52,57,78,79,81). Significant differences in CS rates were observed between healthcare types where ANC care is provided, with private hospitals having higher CS rates than public hospitals (17,30,34,57,61,79). The high prevalence of medically non-indicated CS in private hospitals indicates a profit-driven motive or personal economic gain for care providers (30). In Bangladesh,

women were advised to undergo CS during ANC visits (81). Women getting ANC in public hospitals are less likely to choose CS (OR: 10.35, 95% CI: 8.55 to 12.54) (58). Pervin et al. (2021) discovered a shift in ANC utilization from public to private facilities after the first ANC visit, attributed to the lack of services and quality care in public hospitals (99). Additionally, physicians advocated for CS without providing comprehensive information about indication, procedure, risks, and benefits during ANC sessions (78,81), raising concerns over the counseling and quality of ANC services in hospitals. A study found that poor ANC quality is primarily caused by inadequate infrastructure, long waiting times, unsupportive service providers in public hospitals, and evidence-based practices in private hospitals (25).

3.2.6 Public vs. Private Facility

Studies worldwide show a higher CS rate in private healthcare facilities compared to public facilities (17,17,25,34,39,52,58,68,78–80,94). In Africa, CS was 4.19 times higher in the private sector compared to 2.67 times in the public sector (68). In Brazil, the private sector had 72% of CS and the public sector 31%(78). In Mexico, 85.07% of women from medium to high social classes attended private hospitals and underwent CS delivery (66). However, public care facilities in LMICs like Pakistan and Ethiopia also reported increased CS rates (28,43,72,102). The CS rate increased in both private and public healthcare facilities, with a higher increase in the private sector. High CS rates are primarily due to private hospitals' profit motive for performing CS without medical indications (17).

In Bangladesh, private healthcare facilities had an alarming growth in CS, from 50% in 2004 to 84.7% in 2017/18 (28) [Figure 19]. Private facilities had high CS rates in urban (39%) than rural (28%) settings (79). The growth in CS use in private hospitals is attributed to individuals and health facilities, as well as inadequate government regulation (28). Mohammed et al. (2022) explored the rationale for choosing private facilities, and found that women believed private facilities offer superior care and easier access to specialists (34), which influenced their choice to opt for CS at such establishments. Similarly, several studies have found that factors such as the perception of enhanced quality care, qualified doctors, and diagnostic facilities influenced the high CS rate at private facilities (52,58,61,79,80,94). Moreover, private institutions often perform CS on request without medical

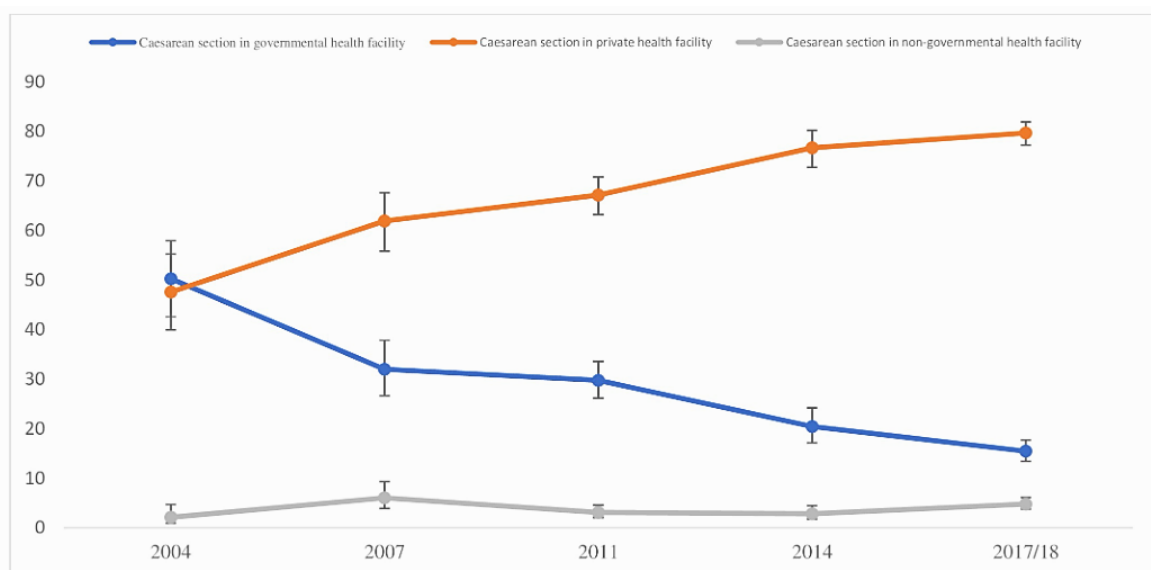


Figure 19 Caesarean section (CS) utilization by health facility type, Bangladesh (2004-2017/18). Source: Khan et al. (2022)

indication (28,94). This overuse of CS in private healthcare facilities (28) leading to inequalities in care, as women from poor and rural populations are deprived of necessary CS when medically warranted.

On the other hand, From 2004, 48% of CS performed in government health facilities decreased to 15% in 2017/18 (28,80). Studies show that women who initially sought care at government health centers later shifted to for-profit private hospitals for CS (28,91,94). The reasons for this shift include a shortage of healthcare providers, subpar services, long waiting times for consultations, and unsympathetic nurses in public hospitals (28,63,94). Lower trust in public hospitals, a shortage of specialist doctors and nurses, and insufficient health services also influenced women to avoid public hospitals during delivery (17,61,80). Additionally, the absence of 24/7 obstetric services in public health institutions compelled more women to seek care in the private sector (78). Public healthcare institutions were unable to provide these services outside of working hours due to a lack of medical personnel and on-call physicians and nurses lacking the knowledge and skills to manage normal vaginal deliveries (78). These findings highlight the challenges faced by the public healthcare system, contributing to the shift towards private sector care for CS.

3.3 Clinical Reason

3.3.1 Age of mothers

Multiple worldwide studies have shown that mother's age is a clinical factor associated with a high CS delivery rate (17,24,28,33,63,68,94,103–106). According to studies, the likelihood of CS delivery increases with increasing maternal age (73,94). In Africa, women aged 30 or older are twice as likely to have CS as those younger than 20 years (68). In India, women aged 30 or older were 2.44 times (95% CI, 2.07 to 2.88) more likely to have CS than younger women (60,64,65). Similar findings were observed in several countries, including Brazil, Pakistan, Spain, China, and Mexico, where maternal age was positively associated with a higher CS rate (38,43,66,73,89,91).

Similarly, in Bangladesh, a significant correlation was found between the mother's age and the increasing trend of CS (17,28,39,58,104). Mothers aged 30 or older are more likely to have a CS than those under 30 years (17,33). According to MICS 2019 data, women aged 30-34 years had a 36% greater likelihood of undergoing CS than those aged 15-19 (18,58). Additionally, studies found a significant association between advanced maternal age and increased CS (104,106). This trend was prevalent in both urban and rural areas (39). Individual choices play a significant role in this trend, with middle to high-income women in Bangladesh choosing to delay childbirth until they are 30 years old due to higher education and better job, resulting in opt for CS as a delivery method (104,105). In recent years, late-reproductive-age women opted CS to avoid labor pain and pregnancy difficulties (17,104,107). Maternal age is perhaps a significant contributor to the increasing CS trend in Bangladesh as maternal age is increasing over the years. Also, maternal age is relevant from both a clinical and individual perspective.

3.3.2 Previous Cesarean Section (CS) Delivery

Multiple research studies have identified previous CS as a key clinical indicator of CS worldwide (2,25,26,70,106,108–113). According to a study, 30% of the CS conducted in developed nations was an indication of previous CS (108). Previous CS significantly influences and contributes to the rising trend of CS (26,108), increasing the risk of repeated CS (2,26,34,42,106,108). International obstetrics guidelines advised against repeat CS in the absence of obstetric emergencies (25). In addition, VD was reported to be safe following previous CS (110). However, repeated CS rates continue to rise, with 87.44% of Brazilian women having a previous CS undergoing another in their subsequent birth (110).

Previous CS is also cited as a primary cause of the increasing CS rate in Somalia and Nigeria (70,108). A German study using the Robson classification found that repeated CS was an important contributor of the overall increased CS rates (111). Previous CS was also found to be a major clinical component in South Asia's increasing high CS rate in a systemic analysis study (112).

Similarly in Bangladesh, previous CS (24%) are a top five indication for CS along with fetal discomfort (21%) and prolonged labor (16%) (25). Another study in Bangladesh revealed, repeat CS constitutes 35% of CS cases in government hospitals (25,108,113), and women with previous CS delivery contribute significantly to the overall high CS delivery rate (34). In addition, according to a study, despite the fact that healthcare providers were aware that not all previous CS procedures necessitate a repeat CS, they still recommended CS (25,109,113). A mixed-method study indicated that healthcare providers stated "CS is frequently recommended for all women with a previous CS, becoming a prevailing practice across the country." (113). This situation is concerning because repeated CS carries significant risks. Studies have shown that complications increase with each repeat CS, resulting in potential maternal morbidity as fibrosis and adhesion formation increase (109).

3.4 Caesarean Section (CS) Related Policy in Bangladesh

Studies show that maternal healthcare in Bangladesh has improved greatly, however, government initiatives and policies have not been effective in reducing high rate of CS deliveries (17,28). Emergency obstetric care (EmOC) was first implemented by MOFHW at public hospitals across the country in 1994 (17,28,33). In 2003, MOFHW initiated a program to train home-based competent birth attendants (27). In 2007, MOFHW introduced a subsidy program as part of demand-side financing (DSF) to improve access to maternal health care for poor mothers (27). However, supply and demand side barriers slowed progress in these initiatives, causing delays in improving access to healthcare (27). Over time, these strategies improved maternal health by lowering maternal and infant mortality and morbidities (17). However, it was found that better access to EmOC unintentionally increased CS deliveries rapidly (17). In 2009, in response to the rising CS rate, the Supreme Court of Bangladesh mandated the formation of a group comprised of professionals and relevant authorities tasked with reducing the rate of high CS deliveries (28). The panel mandated healthcare providers to record their rationale for deciding on and performing CS (28). However, government initiatives to decrease rate of CS deliveries were unsuccessful, and the policies and programs were ineffective (28). Additionally, there were no regulations prohibiting private healthcare providers from offering CS delivery for non-medical indications (28). Due to the absence of a holistic quality control system, private hospitals in Bangladesh maximize profits on CS deliveries (39,63).

Chapter 4 Interventions from Worldwide

CS deliveries in Bangladesh are increasing due to complex factors, and evidence-based interventions are needed to reduce this trend. This chapter examines WHO-recommended and evidence-based interventions from various countries, focusing on demand-side and supply-side interventions. This study evaluates the effectiveness of these interventions using other studies.

4.1 Demand-side interventions

The World Health Organization (WHO) recommends several demand-side interventions to reduce the high rate of CS deliveries, including “childbirth training workshops”, “nurse-led applied relaxation training programs”, “psychosocial couple-based preventive programs”, and “psychoeducation” (114–116). Chen et al. (2018) evaluated interventions' effectiveness using evidence from different countries, classifying them as low-evidenced, moderately evidenced, or high-evidenced (115). Chen et al. (2018) found that, in Iran, childbirth training workshops reduced the CS rate by 50% (RR 0.55, 95% CI: 0.33 to 0.89) (115–117). The intervention reduced pregnancy-related fear and anxiety and increased preference for VD (RR 2.25, 95% CI: 1.50 to 4.35) (114–116). However, Chen's study rated the intervention as low-evidenced due to imprecise results and limited generalizability to a large population due to a small sample size of 60 participants (115). Research revealed that nurse-led relaxation training programs reduced CS significantly by 80% (RR 0.22, 95% CI: 0.11 to 0.43) (114–116). This program also reduced stress, fear, and anxiety commonly experienced during labor. However, the sample size was small (104 participants)(115). Similarly, the psychosocial couple-based prevention program significantly reduced CS rates (RR 0.53, 95% CI: 0.32 to 0.90) (115), as did the psychoeducation intervention (RR 0.70, 95% CI: 0.49 to 1.01) (115). The psychosocial couple-based program focused on emotional self-management and conflict management, while the psychoeducation intervention focused on pain, anxiety, childbirth, labor stages, and pain relief (115). However, both interventions had a small sample size of 147 and 371 participants, respectively indicating that the estimated reduction of the intervention might vary from other studies (115).

Chen et al. (2018) also found that Iran's antenatal education program significantly decreased women's dread of VD (RR = 1.03, 95% CI: 0.72 to 1.45) (115,116). Similarly, in Sweden, antenatal education on birthing preparation and breathing and relaxation training was effective, supporting normal VD and reducing the likelihood of CS (115,116). Both interventions were classified as moderate, indicating reliable research evidence and consistent outcomes (115). In England and Scotland, computer-based decision aids were found to be effective in promoting VD, encouraging women with previous CS to have VD (intervention group 37% vs non-intervention 30%, OR 1.42; 95% CI: 0.94-2.14) (115). Chen's (2018) study found that the decision-aid booklet intervention program in Australia reduced birthing decisional conflict and improved knowledge of delivery methods after previous CS (115). This moderate intervention was classified as moderate by Chen et al. (2018).

4.2 Supply-side Interventions

It was found that WHO has recommended interventions that focus on healthcare professional and health organizations, facilities, or systems as part of supply side interventions (114–116). Programs focusing healthcare professionals include the implementation of evidence-based clinical practice guidelines, alongside the incorporation of organized, obligatory second opinions and adoption of evidence-based guidelines, conducting audits of CS, and providing timely feedback (114). The collaborative midwife-obstetrician model and financial interventions for healthcare providers are interventions for healthcare organizations (114,115,118). Chen et al. (2018) provided a thorough

analysis of these interventions. Chen observed that evidence-based guidelines and obligatory second opinions for CS indications reduced CS rates (115). This intervention was considered high-certainty evidence, with low potential for significant variation in outcomes (115). However, this intervention requires adequate resources and experienced professionals to provide second opinions (114–116). Chen's study also found that clinical guidelines, audit, and feedback led to decrease in the overall CS rate (risk difference [RD] -1.7%, 95% CI: -3.8 to -0.2) and positive cultural change (25,114,115,119,120). This intervention, originally conducted by Chaillit et al. (2015) in Canada, was evaluated as evidenced with high certainty (115,119). Chen's study found that local opinion leaders' physician education significantly reduces CS rates (115). The intervention group received education from opinion leaders, resulting in a significantly lower CS rate (53.7% compared to 66.8%) (115). The evidence was assessed as high certainty (115). Rosenstein's (2015) study found that the collaborative “midwifery-labourist model of care” significantly decreased CS rates among women, from 31.7% to 25.0% (OR 0.56, 95% CI 0.39 to 0.81) (114–116,118). This intervention also increased the incidence of VD, rising from 13.3% before to 22.4% after (OR 2.03, 95% CI 1.08 to 3.80) (115,118). Chen's study found several additional interventions, including public health nurses' delivery training, surgeon audits, CS rate monitoring, national health campaigns, and neonatal outcomes assessments (115). However, these interventions were deemed low-evidenced, suggesting their impact on CS rates is not well-established due to limited evidence (115). There was minimal or no impact observed between the interventions and the control group (115).

Chapter 5 Discussion

Cesarean section (CS) is considered an essential intervention for mother and child survival (25). However, the rising global incidence of CS, notably in Bangladesh, has raised concerns. According to BDHS 2022 report, 45% of Bangladeshi childbirths were delivered through CS (23), a trend that is rising. This number in Bangladesh exceeds the WHO's 10-15% limit by nearly three times. Even though CS can improve pregnancy outcomes, it is important to address the rising number of CS in Bangladesh. Additionally, an increased CS rate does not necessarily correlate with improved outcomes in mother and child health. In LMICs like Bangladesh, increasing the rate of CS can strain individuals and the healthcare system. The findings of this study indicate that many factors related to demand, supply, and clinical factors have a significant influence on the increasing CS rates in Bangladesh. The chapter discusses supply-side factors, demand-side factors, and clinical reasons, focusing on effective evidence-based interventions to reduce Bangladesh's rising CS rate.

The findings of this study indicated that many demand-side factors, including socio-demographics, culture, beliefs, women's choice for CS, and social network elements, played a role in influencing the decision to undergo CS deliveries in Bangladesh. However, the interactions between factors of demand-side are complex. The demand-side factors such as, socio-demographic factors, such as place of residence, economic status, and level of education are reviewed critically following the objectives of this study. It was observed that CS deliveries were higher in urban areas (43%) than rural areas (28%) (39). However, to explain the higher CS rate in urban areas, it is perhaps due to access to more private clinics, and more educated and rich people living in urban areas. Also, this is possible that urban people are more interconnected with each other, reflecting the demand-side factor of social networks. Further, women who are residing in urban regions tend to have greater exposure to social media. It is evident that education, and social media network factors significantly influence women's preference for delivery methods. The lower proportion of CS deliveries in rural areas could be related to other factors, including lower level of education, limited media exposure, and reduced access to healthcare services.

Economic status is another important factor on the demand-side and was found to be significantly influencing the CS rate in the findings revealed in the existing literature. Similar as place of residence, economic status is also linked to other factors such as education, social media exposure, and women's preference. In Bangladesh, in the highest wealth quintile, the CS rate was found 41% compared to 8.7% in the lowest quintile (17,25,61). However, having better economic status probably does not reflect the likelihood of increasing trend of CS. Women from wealthy families have access to better education and better exposure to media. This enables women to get more healthcare information to seek quality healthcare and utilization of healthcare services more. Moreover, the ability to afford CS was observed higher in women from better economic status. These interconnected influences with economic status influence the CS rate in Bangladesh. It was evident that educated women opted for CS more than those without formal education. Education enhances women's decision-making and empowers them to understand health status. Educated urban resident women are found to seek quality health care and use healthcare services more which could be attributable to increasing the CS rate. However, since factors are observed to be interconnected it needs further empirical study, and new data collection following innovative study design with the intention for statistical analysis to oversee the factors in a structural way.

Culture and beliefs were also found to significantly influence the decision-making process of CS. In Bangladesh, religion and social attitudes were found to be influencing CS preferences (34). Religion played a role in influencing the choice of VD, resulting in a lower proportion of CS rates in rural areas. Moreover, due to Islamic beliefs women from religious families were found to opt for VD than CS. However, 90% of Bangladesh's population is Muslim, which raises concerns about the influence of religion on the country's high CS rates. This is important information and needs further attention to its association with CS in Bangladesh. Literatures suggested that women exposed to social network factors such as the internet, television, and media had a high prevalence of CS (17,34,52,84,85). Media exposure emerges as a potential influence on the choice of methods of childbirth delivery. It was found that negative portrayals of VD as a painful and uncomfortable procedure have negatively influenced women's opinions, instilling fear, and unease, while positive media portrayals of CS as a safe procedure potentially have increased women's inclination towards opting for CS over VD. However, social media factors may be influenced by other demand-side factors like economic status, place of residence, and education. As evidenced by the findings, urban women with higher education and socioeconomic status have better media access than poor rural women with lower education levels.

It was evident in the findings that increasing CS rate can be linked to women's preferences. Many women request CS due to maternal perceptions of risk, fear, anxiety, and pain avoidance during childbirth, as well as inadequate healthcare, despite the lack of clinical indications. However, the reason for women's preferences for CS could be a combination of other factors such as, social network factors, economic status, education, and place of residence. It was found that affluent educated women living in urban areas with better exposure to media were found to prefer for opting for CS more than their counterparts. Moreover, women's preference for delivery methods changed due to pursuit of higher education, leading them to delay their motherhood and thus opt for CS. However, the individual demand-side factors solely are not contributing to the increase rate use of CS in Bangladesh.

Literatures suggested that private health sector significantly influence the CS rate in Bangladesh. Findings from different studies indicated that most of the CS were performed in private hospitals, driven by financial motives. Private hospitals saw an alarming rise in CS rate from 50% in 2004 to 84.7% in 2017/18 (28). The number is alarming, and it cannot be denied that private health facilities are contributing to this irrational use of CS. Inadequate regulation by the government in monitoring private hospitals is also contributing to this situation. Lack of accountability, lack of quality control, and

financial gain prompted private hospitals to perform more CS with proper medical indications. Demand-side factors like economic status and place of residence may also be interconnected with private healthcare, as urban wealthy women have better access to private care, utilize ANC services more and can afford CS. However, scarce health resources, limited private facilities in rural regions, and cultural factors resulted in underuse of CS among rural women in Bangladesh even though medically warranted.

The health professional role was found to be very influential during antenatal care (ANC) services, specifically in private hospitals. The quality of ANC, particularly in private facilities, has not always been comprehensive and unbiased, potentially leading to women making uninformed decisions about delivery methods. Additionally, public hospitals' ANC services are subpar, leading women to shift to private hospitals. Private healthcare doctors were found to use these ANC visits to advocate women for CS, and it was observed that higher ANC visits in private hospitals associated with a higher likelihood of undergoing CS. This raises the concern about the quality of ANC provided, specifically in private care in Bangladesh, and its efficacy in reducing the CS rate. Furthermore, other supply-side factors are interconnected with the health professional's role. The presence of incentive for performing CS motivated physicians to conduct more CS with proper medical indications. Doctors' preference for convenient working hours and avoiding time-consuming labor pain management also influence their recommendation of CS to women. Some physicians fear potential harm to their professional image and opt for surgical intervention, believing CS is a safe way to alleviate labor pain for both mothers and their newborns.

Studies have shown that age of mother and previous CS delivery significantly influences the CS rate globally and in Bangladesh. Maternal age is a prominent clinical factor associated with the likelihood of opting for CS as a delivery method. Advanced maternal age consistently correlates with higher rates of CS, reflecting individual choices driven by demand-side factors like education, socio-economic status, and personal preferences. Additionally, previous CS delivery has a significant influence on CS rates, with a significant proportion of CS deliveries attributed to women with a history of CS, even when obstetric emergencies are absent. This pattern of repeated CS births raises concerns about maternal well-being due to the increasing risks associated with each subsequent procedure. However, it is important to recognize that these factors do not influence individuals, as the complex interaction of demand-side factors (women's preference, cultural norms, socio-demographic factors, social media factors) and supply-side factors (healthcare professional role, ANC care) collectively influence clinical factors.

Bangladesh has improved significantly in maternal healthcare; however, government initiatives and policies have not been effective in reducing high rate of CS deliveries. This indicates the need for implementing evidence-based intervention in Bangladesh with an aim to reduce the high CS rates. It is evident from the findings that certain evidence-based interventions demonstrate efficacy in reducing CS rates, though the strength of evidence varies. Among demand-side interventions, “workshops on childbirth training”, “nurse-led programs focusing on applied relaxation training.”, “psychosocial preventative programs that focus on couples”, and “psychoeducation” have shown potential in influencing maternal decision-making, reducing childbirth fear and anxiety, and promoting vaginal delivery (VD). Supply-side interventions like evidence-based guidelines, mandatory second opinions, and clinical audits have shown promising results in reducing CS rates. The collaborative midwife-obstetrician model of care stands out as a particularly impactful intervention, leading to reduced CS rates and an increase in VD after previous CS. As different countries have experienced diverse success with these interventions, it becomes evident that a tailored combination of strategies, considering demand-side factors (e.g., cultural, social), and supply-side factors (healthcare system factors), is

essential for achieving meaningful reductions in CS rates. While some interventions exhibit more strong evidence about their effectiveness, the comprehensive findings emphasize the significance of implementing context-specific strategies and adopting an evidence-based multi-interventional approach to reduce the increasing high rate of CS in Bangladesh.

5.1 Limitations of the Study

The framework used in this study, which was adopted and modified from Nazir's (2015), was instrumental in achieving the purpose of this study. The modified framework accomplished the research objectives by systematically presenting the aspects of the study under investigation. In addition, the incorporation of factors into the framework has enhanced its adaptability, allowing for the investigation of new factors that have been shown to have an important influence on the CS rate in Bangladesh. This analysis attempts to provide a comprehensive comprehension of the factors influencing the CS rate in Bangladesh and worldwide. This study explored two clinical reasons, but it may be necessary to consider additional factors that were not investigated for a comprehensive understanding. It is recommended that more criteria be included under the clinical reasoning categories if the framework is to be used in future instances. In addition, due to word limitations, critical information may have been omitted, hindering a comprehensive comprehension of the findings. Furthermore, the author's knowledge may limit the scope of the interpretations and discussions of the findings. This study has limitations as the selection of literatures was restricted to English-language articles. This resulted in the prospect of missing relevant studies published in other languages. In addition, this study shares the same limitations as the reviewed literature. The majority of literature reviewed raised concerns about bias, lack of accessible information, and limitations of the available data used in the research. Despite these constraints, the study was able to highlight important factors that have a role influencing the CS rate in Bangladesh.

Chapter 6 Conclusion and Recommendations

6.1 Conclusion

Globally, the increasing rate of CS and the adverse effect of CS on mother and child health is very concerning. Over the decades, this high increasing rate of CS has been observed in Bangladesh. The findings revealed that demand-side factors and supply-side factors played a significant influence on this increasing rate of CS in Bangladesh. Urban women from wealthy backgrounds, with access to private facilities and media exposure, have a higher preference for CS. On the supply side, profit-driven private healthcare facilities and health professionals significantly influence the increasing CS rate in Bangladesh. Additionally, this profit-oriented tendency from private hospitals and physicians, coupled with demand from women living in urban areas and from wealthy backgrounds, has significantly contributed to the recent increasing trend of CS deliveries in Bangladesh. Furthermore, urban women from wealthy families were observed to utilize these private hospitals because of their affordability to afford these services. Healthcare professionals play a significant role in convincing women to opt for CS as mode of childbirth, more than women's individual choice or familial influence. Conversely, women from rural regions are devoid of this medical intervention due to scarce health resources and a lack of affordability. Thus, the demand-side factors and supply-side factors, along with clinical reasons, trigger CS when not medically indicated. This scenario can be considered as "Too Much Too Soon" for urban regions in Bangladesh as healthcare facilities are performing high rate of medically non-indicated CS, indicating overuse, whereas "Too Little Too Late" for rural regions as women from these regions do not have easier access even in medical emergency due to multiple constraints resulting in underuse of CS (4).

Though CS is a lifesaving intervention, undergoing CS without proper medical indications poses severe short and long-time health complications resulting in maternal morbidity and even mortality. Hence, it is an important issue to address to improve maternal and child health. Physicians should adhere to the clinical guidelines and opt for taking second opinion for senior experienced health professionals. Moreover, interventions such as the utilization of clinical guidelines among health professionals, along with the incorporation of audits and feedback for private healthcare facilities will be effective for Bangladesh to reduce the upward trend of CS. However, reducing the CS rate with interventions is not an easy process and will require efforts from MOHFW and other related stakeholders to formulate and implement these interventions. Increased CS rates in Bangladesh can be reduced by adopting evidence-based multi-interventional approach while increasing public awareness and monitoring private health facilities. However, to comprehend the role of private providers in ANC care and to examine the consequences of a rise in private sector CSs, additional evidence-based research is required. Bangladesh has experienced an overestimation of CS rates among women of privileged backgrounds and an underestimation among underprivileged women. It is essential to strategically address and reduce elevated CS rates. Therefore, evidence-based interventions are necessary to prevent healthcare providers from pressuring women to choose CS for financial reasons and to ensure that women are not denied CS when they are medically necessary.

6.2 Recommendations

In order to reduce the increasing CS rate in Bangladesh, it is imperative to implement evidence-based interventions. The following recommendations are made for Bangladesh based on the evidence found in reviewed literature:

Recommendations for the Ministry of Health and Family Welfare (MOHFW), Bangladesh, and policymakers

- The MOHFW should implement the highly evidenced intervention "utilization of clinical guidelines and incorporation of audit and feedback." Clinical guidelines on CS and routine clinical audits on all types of healthcare facilities are strongly recommended. Clinical audits can track CS rates, enhance clinical practice, and ensure high-quality care. By following clinical guidelines, institutional normal births can be increased, and needless CS procedures can be avoided.
- The MOHFW could consider implementing a "midwifery-labourist model of care" intervention, which involves healthcare providers providing uninterrupted labor and delivery services without conflicting clinical obligations. This intervention could improve public hospital obstetric care availability, allowing facilities to provide services at all hours throughout the week. This intervention could significantly enhance normal deliveries and reduce CS rates in Bangladesh.
- The MOHFW should consider implementing public outreach initiatives and media campaigns to raise awareness about the negative effects of CS delivery. It is strongly recommended that the MOHFW consider implementing a "Decision Aid Booklet" intervention that is effective in raising awareness about the mode of delivery and reducing the decisional conflict associated with childbirth.

Recommendations for Healthcare Facilities, Organizations, and Professionals

- Interventional programs could be launched by healthcare facilities. It is strongly recommended to implement "nurse-led programs focusing on applied relaxation training," which have been shown to reduce childbirth anxiety and fear while promoting vaginal delivery.
- Healthcare facilities should implement "evidence-based clinical practice guidelines" and "obligatory second opinions" as high-evidence interventions. It is recommended that the country's national obstetrics and gynecology societies advocate for the adoption of evidence-based protocols. Regular training, supervision, and the provision of second opinions by senior physicians have the potential to decrease the CS rate.
- It is imperative to ensure that health professionals effectively provide sufficient information to pregnant women and their families regarding labor and various delivery procedures. The implementation of an antenatal education program that effectively lowered women's fear of vaginal delivery is recommended.

Recommendation for Researchers

- The recommendation to researchers is to conduct a nationwide study to evaluate the influence of culture, religion, and beliefs on delivery method preferences and prevalent CS trends in Bangladesh.
- It is recommended that researchers investigate the role of private providers in ANC care and examine the consequences of rise in private sector CS.

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Annexes

i. Literature search strategy

1. Table with a summary of the search terms used in this study.

This study surveyed CS-related literature from 2013-2023 using Google Scholar, PubMed, and VU library search engines. Cross-referencing, snowballing, and specific search terms were used to include peer-reviewed articles, reports, and websites of organizations like the World Health Organization (WHO). Inclusion and exclusion criteria were established to ensure relevant information. In accordance with the inclusion and exclusion criteria of this study, the complete search terms are provided below.

1.1 List of search terms for background and problem statement

AND			
	Problem/issue terms	Determinants/factors term	Geographical term
OR	Country profile	Geographical	Global
	urban	Demographic	Bangladesh
	rural	Political Context	South Asia
		Population	Latin America
		Socio-Economic Status	Low-income country
		Education	Middle-income country
		Social Media Exposure	Europe
		Health System Organizational Structure	Africa
		Health System	Pakistan
		Human Resource for Health	India
		Maternal Health	Southeast Asia
		Antenatal Care	
		Delivery preference	
		Caesarean Section (CS)	
		Indication of CS	
		Consequences of CS	
		Burden of CS	

1.2 List of search terms for specific objectives

AND			
OR	Problem/issue terms	Determinants/factors term	Geographical term
	Caesarean Section (CS)	Demand-side factors	Global
	CS in Urban	Socio-demographic factors	Bangladesh
	CS in Rural	Place of residence	South Asia
		Socio-economic status	Latin America
		Social factors	Low-income country
		Cultural factors	Middle-income country
		Women preference	Europe
		Religion	Africa
		Social network factors	Pakistan
		Human Resource for Health	India
		Supply-side factors	Southeast Asia
		Economic incentive	
		Health professional role	
		Time management	
		Indication	
		Consequences	
		Burden	
		Surgical practice	
		Antenatal Care (ANC)	
		ANC care in private hospital	
		Quality of ANC	
		ANC in public hospital	
		Private healthcare facility	
		Public health care facility	
		Clinical reason	
		Maternal age	
		Previous CS	
	Policy		
	Guideline		
	Intervention		
	Demand-side intervention		