**Introduction**

Maternal mortality rate (MMR) is always been a global concern and many conferences and forums have been held to discuss the need for the reduction of MMR worldwide, however, the declaration of Millennium Development Goals (MDGs 5) gave it an extra push which brought a noticeable change in this global crisis. The goal of the MDG 5 is to reduce the MMR to 75% between 1990 and 2015.[1] While the Middle East and the CIS countries did not show significant contributions, Asia contributed 19%, which is the second-highest amount to the reduction in the under-five mortality rate as a result of the MDG campaign [2]. Among the nations of Asia Bangladesh achieved a noteworthy improvement in its maternal mortality ratio (MMR) from 574 per 100,000 live births in 1990 to 176 by 2015. Although the three-quarter reduction goal was not entirely met, the progress was still commendable. [3] [4] [5] After the completion of the MDGs 5, the United Nations introduced the Sustainable Development Goals (SDGs) in 2015, intending to achieve them by 2030.[7]

To accomplish this, MMR should be decreased through improved antenatal care (ANC), skilled medical delivery, and, change in the mode of delivery when required. In recent years women’s interest in obtaining maternal healthcare services seemed to be increasing in Bangladesh. The percentage of women receiving high-quality ANC increased from 18% to 21% between 2017 and 2022.10] [8] In 2022, 70% of births were attended by medically qualified professionals, up from 33% in 2011. This led to a sharp increase in facility-based deliveries, growing from 31% to 65%. From 2017 to 2022, deliveries at public institutions decreased by 3%, while deliveries at private facilities increased by 13%. NGO facilities had a meager 4% of the market in 2017–18; by 2022, this had dropped to 2%. [10] Based on these data, it can be concluded that maternal healthcare services in Bangladesh are improving. However, a significant concern is the rising costs associated with these services, leading to increased out-of-pocket (OOP) spending. Lower-income families are disproportionately affected by this, which causes unequal access to maternity care. This growing financial burden from OOP expenses hinders Bangladesh's progress toward achieving the Sustainable Development Goal (SDG) 3 target of ensuring healthy lives and well-being for all.

Both direct and indirect costs present significant barriers to women's use of facility-based maternity care. While direct expenses are more visible, indirect costs like lost wages can also be substantial and are harder to measure due to variations in income, employment, and seasonality. Some studies suggest that these indirect costs may even surpass direct OOP expenses.[9] Place of birth is also an important determinant in terms of OOP expenditure. Delivery costs are highest in private institutions, averaging around Taka 6,800, while public facilities and non-profit organizations have lower average costs, at approximately Taka 3,000 and Taka 2,600, respectively. At private facilities, the median cost of a C-section was approximately Taka 20,000. In contrast, the government facilities had the lowest median cost—roughly Taka 12,000—for C-section deliveries.[11] The Cesarean Section (CS) is another factor contributing to the skyrocketing OOP costs. Among all the delivery modes, the CS is gaining popularity globally. High rates of cesarean delivery are linked to high rates of catastrophic health spending (CHS) and OOP expenditure.[14] In 2018, families in Bangladesh paid $483 million for a medically unnecessary C-section. [12]

In 2012, Bangladesh's total health expenditure (THE) was BDT 325,094 million. According to the World Bank's CPI, this figure was projected to rise to BDT 374,012 million by 2014. Deliveries accounted for 10.3% of THE in 2014, amounting to BDT 38,533 million. CS procedures made up 66.5% of the total delivery costs, representing 6.9% of THE. Unnecessary CS not only poses risks to women's health but also imposes a significant financial burden on them.13]

Building on the understanding of rising health expenditures in Bangladesh, it becomes clear that the healthcare system, while well-organized and supported by both private and nongovernmental organizations (NGOs), faces significant challenges.[6] Despite collaborative efforts between the government, development partners, donors, and specialists, out-of-pocket (OOP) expenses related to childbirth continue to increase, exacerbating the financial strain on families.[8] In Bangladesh, 'free' maternity care comes with significant hidden expenses, which could be a big reason why fewer people use maternity services overall, especially those from lower-income backgrounds. [16] Numerous studies have shown that the significant out-of-pocket (OOP) expenses associated with childbirth in Bangladesh are primarily financed through family savings, gifts from relatives, and often bank loans.[11] [16] This growing financial burden calls for a thorough investigation into the trend of OOP expenses related to childbirth in the country. Hence, in our study, we aimed to analyze the pattern of OOP costs in Bangladesh from 2014 to 2022, with the goal of understanding and addressing the severe financial strain it imposes on families.

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**Methodology**

**Research Setting**

Bangladesh is a rapidly growing populous country in the world where approximately 10 thousand children born in each day (UNICEF). It came to light that the incidence of cesarean sections in Bangladesh was extremely high (Ahmed et al., 2023). Data from the National Institute of Population Research and Training showed that of the 3.6 million babies born in Bangladesh in 2022, over 1.6 million, or about 45 percent, were delivered via C-section. Furthermore, in 2018, parents paid over Tk 4,071,031,200 in out-of-pocket costs for medically unnecessary C-sections, with an average of Tk 51,905 per case (Save the Children International, 2019). In 2016-2018, the c-section rate increases from 31% to 51% (4) .

**Study Design and Sampling**

We collected data from a secondary source from the years 2014, 2017-18 and 2022 of Bangladesh Demographic and Health Survey (BDHS). These are the BDHS's Seventh, Eighth and Ninth national survey respectively and women who had ever been married was the target group for this survey age ranging from 15-49. A two-stage stratified sample of households serves as the basis for the survey and 675 EAs (237 in urban and 438 in rural areas) were chosen in the first stage using a probability proportionate to the size of the EA. In addition to that, for obtaining statistically significant estimates of important demographic and health variables for both urban and rural areas individually as well as for each of Bangladesh's eight divisions, a systematic sample consisting of an average of 45 families per EA was chosen for the second round of sampling. Moreover, the purpose of this survey was to report on the demographic and health status of Bangladeshi women and their families and performed by the private research firm Mitra and Associates. However, the sample strategy, survey design and tools, measurement system, and quality control etc. have been described in somewhere else (NIPORT, 2014: BBS, 2010). The survey was carried out under the direction of the Medical Education and Family Welfare Division, Ministry of Health and Family Welfare, and the National Institute of Population Research and Training (NIPORT).

**Outcomes and Covariates**

**Dependent Variable**

The dependent variable is out of pocket expenditure (OOP) and the factors of OOP associated with institutional normal delivery, C‐section delivery, home delivery, and the total cost of child delivery services are also considered in this study. Out-of-pocket healthcare expenditures of households comprise a major share of the total health expenditure in Bangladesh.

**Possible Covariates**

The covariates were socioeconomic strata, age, educational and occupational status of spouse household size, education and working status of mothers, exposure of mass media, residence, antenatal care (ANC) visits, the administrative region as well as birth order. In order to conduct analysis, the covariates were selected from the BDHS datasets.

**Statistical analysis**

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**Discussion**

The aim of this study is to explore delivery costs and the determinants associated with them. Our study observed that the proportion of live births delivered in a health facility has increased tremendously over the last three decades (from 3% to 65%), and the proportion of home deliveries decreased (from 97% to 35%). We also observed that institutional and C-section delivery have increased over time. We found several indicators of institutional and C-section delivery, such as mother’s education, birth order, ANC visit, wealth quintile, region, etc. This is supported by earlier studies. ​(Dixit & Dwivedi, 2016; Setu et al., 2022)​

Our study revealed that the tendency toward institutional delivery is higher among educated women and lower among women who have no education. ​(Dixit & Dwivedi, 2016; Setu et al., 2022) Women in the lowest wealth quintile had the lowest tendency of deliveries in a health facility, whereas women in the highest wealth quintile had the highest tendency. Older mothers had a higher demand for institutional delivery than younger mothers. According to our study, the demand for institutional delivery was higher among employed women than unemployed women. ​(Sarker et al., 2018; Setu et al., 2022)​ we also found that there was a lower chance for institutional and C-section delivery in rural areas than urban areas. ​(Mehari Kifle et al., n.d.; Rifat HaiderID et al., 2018; Setu et al., 2022)​ This might be the result of reduced access to institutional delivery in rural areas and a poor communication system, higher transportation costs, and other related expenses. According to a study of Eritrea, due to their limited ability to make decisions, women who lived in rural areas had little control over their reproductive health. ​(Mehari Kifle et al., n.d.)​ We observed that the delivery rate in health facilities was highest in Khulna and lowest in Barisal. Maybe socioeconomic environment resulted in this condition.

Cost of delivery was typically higher in private facilities than those in public facilities. And C-section delivery in private facilities was more than twice according to earlier studies. ​(Borghi et al., 2006; Rifat HaiderID et al., 2018)​ Our study revealed that the primary coping strategies during delivery were family funds, loans, and outside support, which is supported by another study. ​(Sarker et al., 2018)​ Earlier study found that generally, richer households preferred to use their current income and savings to pay for their medical expenses, indicating that borrowing money or depleting assets were undesirable options. ​(Hoque et al., 2015)​ According to our study, although the majority of the costs associated with the delivery were paid for by family funds, the amount of delivery cost payments through loans had increased by almost 50% in the last five years, sold assets and mortgages increased by almost 70%, and gifts from relatives and friends also increased. This indicates the burden of delivery costs is alarming for the households.

We analyzed years of data and compared one year's data with another year's data. This is the strength of our study.

We have several limitations in our study. We used the Bangladesh Demographic and Health Survey's secondary data. Since the survey was based on self-reported data from respondents, recall bias may be associated with some factors. The survey was cross-sectional in nature. That's why we were unable to provide any evidence of a causal relationship. Many poor households may have been unable to afford institutional deliveries, but we could not identify those households.

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