Inequalities in Access to Essential Maternal Health Services in Bangladesh: A National and Sub-national Level Assessment

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ABSTRACT

In the context of high maternal mortality rate, access to perinatal health care is a priority issue for women's health and development in Bangladesh. This paper tried to quantify skilled birth attendance (SBA), post-natal care for mothers (PMC) and new-born (PNC) based on socio-economic determinants. We used Bangladesh Demographic and Health Survey, 2014 data. Subjects of this study are ever married women, aged 15-49 years, who had at least one birth in last three years preceding the survey date, and were considered. Final analytical sample size was 7886. We performed multilevel analysis with regression-based inequality models including slope index (SII), relative index (RII) and concentration index (CI). National coverage of ANC, SBA, PMC, and PNC were 25% (95% CI=23.9 to 26.4, p<0.05), 42% (95% CI=40.4 to 43.3, p<0.05), 35% (95% CI=34 to 36.7, p<0.05), and 34% (95% CI=32.8 to 35.5, p<0.05) respectively. SII values showed the wealthiest mothers received all the four services, 51.5 (95% CI=46 to 57.2, p<0.05) to 61.4 (95% CI=56.3 to 66.4, p<0.05) percentage point more than their poorest counterpart and higher educated mothers received four basic MHSs, 46.4 (95% CI=39.3 to 53.5, p<0.05) to 58.5 (95% CI=53.2 to 63.7, p<0.05) percentage points higher than mothers with no education. Programs, targeting socially marginalized women, can drastically enhance the utilization of essential MHSs.

Keywords: Antenatal care; Birth-attendance; Post-natal care; Newborn health maternal health

INTRODUCTION

Improved maternal health is one of the most important global development goals. Despite constant efforts by the international community, there persists a huge lack of maternal health service (MHSs) usage in poor countries, and consequently maternal and neonatal mortality remain serious issues. Globally, 800 mothers die every day from childbirth related complications of which 99% occur in the low and middle-income countries [1]. Several studies reported that poor utilization of MHSs is the main indirect underlying cause of high maternal and neonatal deaths [2]. This study will correlate the determinants and their adjusted effects on low MHSs utilization in the context of Bangladesh, a developing country.

Previous study suggests that 74% of maternal deaths are pre-ventable by adopting the necessary precautions through MHS [3]. The basic components of MHSs are antenatal care (ANC), skilled birth attendance (SBA), post-delivery checkup for mothers (PMC) and newborns (PNC). In developed countries, 98% of women receive ANC and 94% of women deliver under the supervision of skilled health professionals [4]. In developing countries, on the other hand, about 50% of women never receive any ANC in their pregnancy [5]. And more than half of all births take place under unhygienic and unsafe conditions [6].

Bangladesh has made notable progress in maternal mortality rate (MMR) reduction in the last few decades [1]. However, MMR in Bangladesh is still high at 176 per 100,000 live births [1]. All the previous studies in Bangladesh were limited to small sample size, specific region (rural/slum areas) and targeted

only vulnerable groups of women such as adolescent mothers to assess the utilization of basic MHSs. This is the first study in Bangladesh that assesses inequalities in the use of basic MHSs on diversified groups of women, includes a wide range of co-variates, and covers all the most essential perinatal health services.

SUBJECTS AND METHODS

Study Design

This is an observational cross-sectional study. Data for this study were taken from Bangladesh Demographic and Health Survey (BDHS) that has been conducted in 2014.

Population and Sample

BDHS covered all 7 administrative divisions in Bangladesh. The survey is based on a two-stage stratified sample of households. In the first stage, 600 primary sampling units (PSU) were selected. In the second stage, following a systematic sampling procedure, 30 households on average were selected per PSU. Each of the seven divisions was also separated into urban and rural regions. With this design, the survey selected 18,000 residential households, which were expected to result in a completed interview with about 18,000 ever-married women. Out of those, data for 7886 women aged 15-49 years who had at least one birth in last three years preceding the survey date were considered.

Study Variables

In this study dependent variables include ANC, SBA, PMC and PNC and independent variables include socio-economic status, level of education, age, children ever born, place of residence, occupation of respondent's partner, region.

Operational Definition of Variables

As per the recommendation of World Health Organization (WHO 2016), ANC was defined as having at least four visits to a qualified healthcare provider during pregnancy. SBA was determined by the usage of medically trained birth attendant during labor and delivery. For PMC and PNC, the study considered a health check-up for both the mother and the newborn by a medical expert within 48 hours after delivery. ANC, SBA, PMC and PNC are all binary variables. The participants, who received the service as per the definition above, were coded with one and zero otherwise. Socio-economic status is one of the most potential contributors to inequalities in usage of perinatal health care services. But direct data on income and expenditure of household were not available in DHS data. So, a wealth index was used instead. The wealth index is a composite measure of a household's cumulative living standard. Information on the wealth index was based on the data collected in the household questionnaire. This questionnaire included questions concerning the household's ownership of some specific consumer items such as television and car; dwelling characteristics such as flooring material; type of drinking water source; toilet facilities; and other characteristics that are related to wealth status. Each household asset for which information collected was assigned a weight or factor score generated through principal components analysis. The resulting asset scores were

standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one. These standardized scores were then used to create the break points that define wealth quintiles as: lowest (poorest), second (poorer), middle, fourth (richer), and highest (richest). Another important covariate was region that contained all seven divisions of Bangladesh-Dhaka, Khulna, Sylhet, Chittagong, Rajshahi, Barisal, and Comilla.

Study Instrument

Three disparity measures were used to assess the extent of inequalities in access to MHSs-slope index of inequality (SII), relative index of inequality (RII), and concentration Index (CI).

SII and RII were calculated through regression analysis on an indicator of the cumulative relative position of each group with respect to a socioeconomic variable account for both the socioeconomic status (SES) of the groups and the size of the population.

The concentration index is defined as twice the area between the concentration curve and the line of equality (the 45-degree line). The convention is that the index takes a positive value when it lies below the line of equality suggesting that perinatal care services were more concentrated among high SES groups and takes a negative value when it lies above the line of equality suggesting that perinatal care services were more concentrated among low SES groups. CI can range from -1 to $+1$. The larger the absolute value of CI, the greater the disparity. CI equals zero when the concentration curve coincides with the diagonal line, indicating no socioeconomic inequality in access to perinatal care exists. CI provides a clear visual depiction of socio-economic inequality in access to ANC, SBA, PMC and PNC.

Data Analysis

Descriptive analysis was performed to estimate frequency and proportion. Multilevel logistic regression model was used to assess the adjusted effect of wealth quintiles, education, and other demographic characteristics on the likelihood of using ANC, SBA and PNC for mothers and children. Results were computed with adjusted odds ratio (AOR) and 95% confidence interval (CI). In order to ensure the actual representativeness of survey results at the national level, sampling weights were used during the analysis. All analysis was performed using Stata version 12/SE.

RESEARCH ETHICS

As we used publicly available secondary data we did not need to take any ethical approval.

Characteristics of Subjects

Table 1 showed the results of the descriptive analysis (frequencies and percentages) on the socio-demographic characteristics of the sample population. There were a total of 7886 women aged 15 to 49 years who had at least one birth in the last three years preceding the survey. Of them, around 62% of women lie in the safe pregnancy age range, which is 20 to 29, and 24% was at late pregnancy, aged 30 years or more. Regarding education, almost 56% of the respondents had at least secondary lev-

el although 16% had no education. Whereas for respondent`s husband, around 44% had at least secondary level of education and 26% lies in no education group. Distribution of respondent`s husband`s occupation shows that agriculture and manual workers consist of 70%, and only 7% were engaged in professionals works. Almost one third of the subjects had only one birth. Half of the population (50%) had between two to three births. Only 17% had more than three births. According to the place of residence, three fourth of total participants,74%, lived in rural area and only 25% lived in urban area.

Table 1: Background information of population, Bangladesh, 2014 CI, Confidence interval

Characteristics	Frequency	Percent (95% CI)
Women age, years		
15-19	1146	14.7 (13.9-15.4)
20-24	2714	34.0 (32.9-35.0)
25-29	2164	27.7 (26.8-28.7)
30-34	1223	16.0 (15.2-16.8)
≥ 35	639	7.7 (7.2-8.3)
Respondent education		
No education	1233	16.4 (15.6-17.2)
Primary	2206	28.0 (27.0-29.0)
Secondary	3621	46.3 (45.2-47.4)
Higher	826	9.3 (8.7-10.0)
Number of birth		
1	2575	32.2 (31.2-33.2)
2-3	3953	50.7 (49.6-51.8)
≥ 3	1358	17.1 (16.3-18.0)
Husband education, %		
No education	2008	26.0 (25.1-27.0)
Primary	2377	30.2 (29.2-31.2)
Secondary	2360	30.3 (29.3-31.3)
Higher	1139	13.5 (12.8-14.3)
Husband's occupation		
Agriculture	1748	23.4 (22.5-24.3)
Manual worker	3643	46.4 (45.3-47.5)
Professional	508	5.7 (5.2-6.3)
Business	1763	22.0 (21.1-22.9)
Others	197	2.5 (2.2-2.9)
Socio-economic status		
Poorest	1737	22.7 (21.8-23.6)
Poorer	1503	19.2 (18.3-20.0)
Middle	1516	19.4 (18.5-20.2)
Richer	1602	19.8 (189.0-20.7)
Richest	1528	19.0 (18.1-19.9)
Region of residence		
Barisal	906	5.7 (5.2-6.2)
Chittagong	1517	21.6 (20.7-22.5)
Dhaka	1378	35.0 (34.0-36.0)
Khulna	862	7.6 (7.0-8.2)
Rajshahi	959	10.3 (9.6-10.9)
Rangpur	958	9.8 (9.2-19.5)
Sylhet	1306	10.1 (9.5-10.8)
Place of residence		
Urban	2488	25.4 (24.5-26.4)
Rural	5398	74.6 (73.6-75.5)

Inequalities in Access to Health Services

Table 2 presented the slope index and ratio index of inequality in access to essential perinatal healthcare services due to unequal socio-economic status. SII values revealed the usage of all the four selected components of MHS were 51.5 (95% CI=45.9 to 57.2) to 61.4 (95% CI=56.3 to 66.4) points higher in wealthy mothers than in the poorest mothers. National coverage for professional antenatal care, at least 4 visits during pregnancy per WHO recommendation, was 25.1% (95% CI=23.9 to 26.4, $p<0.05$), SBA was 41.8% (95% CI=40.4 to 43.3, $p<0.05$), postnatal care of mothers within 2 days of delivery was 35.4% (95% CI=34.0 to 36.7, $p<0.05$), and postnatal care of children within 2 days of birth was 34.1% (95% CI=32.8 to 35.5, $p<0.05$). These figures of maternal healthcare service usage varied widely under different socio-demographic conditions.

Table 2: Inequality in access to perinatal healthcare services by socio-economic status, Bangladesh, 2014

Services indicators	National coverage (95% CI)	Coverage by SES (95% CI)		Inequality indices (95% CI)	
		Poorest	Richest	SII	RII
ANC4+	25.1 (23.9-26.4)	6.3 (4.8-7.8)	50.0 (46.8-53.2)	51.5 (45.9-57.2)	11.2 (7.5-14.9)
SBA	41.8 (40.4-43.3)	17.7 (15.4-20.1)	73.3 (70.4-76.1)	61.4 (56.3-66.4)	5.3 (4.3-6.4)
PMC	35.4 (34.0-36.7)	14.7 (12.5-16.8)	66.8 (63.8-69.8)	57.9 (52.5-63.3)	6.5 (5.1-8.0)
PNC	34.1 (32.8-35.5)	16.1 (13.9-18.4)	64.7 (61.6-67.7)	55.5 (49.5-61.6)	6.3 (4.7-7.8)

ANC4+, at least four antenatal care visit; SBA, Skill birth attendants; PMC, Post-natal care of mother; PNC, post-natal care of children; SII, slope index of inequalities, RII, relative index of inequalities; CI, confidence interval.

Table 3 showed the rate differences and relative differences in receiving all four services due to difference in educational status. Apparently, mothers with higher education were much more advanced in comparison with the mothers who have no education. The slope inequality index values for ANC4+, SBA, PMC and PNC were greater by 46.4 (95% CI=39.3 to 53.5, p<0.05) to 58.5 (95% CI=53.2 to 63.7, p<0.05) points for high-

er educated mothers. The highest level of disproportion was found in SBA service. As the concentration curve here lied below the line of equality, the concentration index took a positive value showing that the poor were more deprived in receiving all four basic MHS services with the highest level of disparity in ANC4+ (Figure 1).

Table 3: Inequality in access to perinatal healthcare services by respondent's educational qualification, Bangladesh, 2014

Services indicators	Coverage by respondent educational status (95% CI)		Inequality indices (95% CI)	
	No education	Higher education	SII	RII
ANC4+	8.4 (6.3-10.5)	54.4 (49.9-58.8)	46.4 (39.3-53.5)	8.1 (5.3-10.8)
SBA	16.9 (14.0-19.7)	78.6 (74.9-82.2)	58.5 (53.2-63.7)	4.8 (3.8-5.8)
PMC	15.5 (12.8-18.3)	69.5 (65.3-73.6)	51.9 (46.4-57.3)	5.0 (3.9-6.2)
PNC	14.5 (11.8-17.1)	63.2 (58.9-67.5)	47.3 (41.5-53.0)	4.5 (3.4-5.5)

ANC4+, at least four antenatal care visit; SBA, Skill birth attendants; PMC, Post-natal care of mother; PNC, post-natal care of children; SII, slope index of inequalities, RII, relative index of inequalities; CI, confidence interval
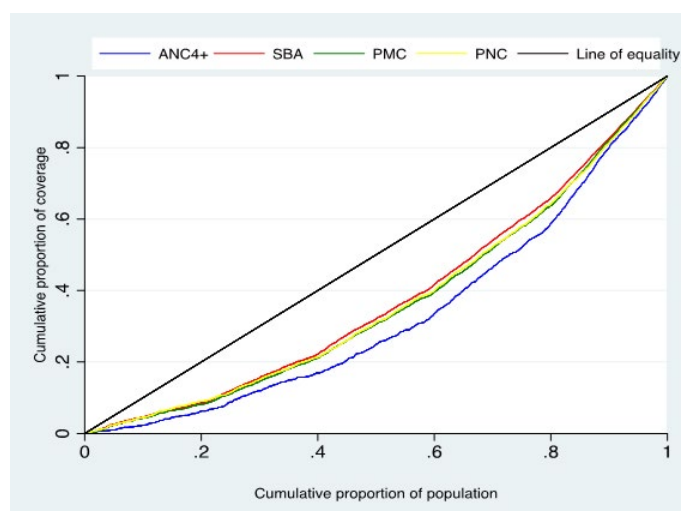

Figure 1: Concentration curve for pregnancy care related indicators, Bangladesh 2014. Note: ANC: Antenatal care, SBA: Skilled birth attendance, PMC: Post-natal care for mothers, PMC: Post-natal care for children.

Factors Associated with Perianal Healthcare Utilization

Table 4 showed the ORs with 95% CIs obtained from the multilevel logistic regression models for status of perinatal health care services usage. Multilevel logistic regression was performed to ascertain the effects of household wealth index, educational qualification, place of residence (urban versus rural), region of residence, maternal age, birth order, education and occupational status of respondent`s spouse on the likelihood of usage of antenatal care, skill birth attendants, postnatal care of mother and postnatal care of children. When moving household socio-economic status from poorest to richest in the wealth index the likelihood of having all the four selected ser-

vices increased significantly. Richest mothers were more likely to receive at least four ANC (AOR=11.86; 95% CI=5.11 to 27.53; p<0.05), SBA (AOR=9.93; 95% CI=5.15 to 19.15; p<0.05), PMC (AOR=7.29; 95% CI=4.13 to 12.88; p<0.05) and PNC (AOR=8.9; 95% CI=3.98 to 19.91; p<0.05) than the poorest mothers. Furthermore, education level for respondent and respondent`s partner left a positive association to the probability of having all the four services. Higher educated mothers were more likely to receive at least four ANC (AOR=8.05; 95% CI=3.68 to 17.61; p<0.05) SBA (AOR=6.58; 95% CI=3.28 to 13.19; p<0.05), PMC (AOR=3.22; 95% CI=1.89 to 5.47; p<0.05) and PNC (AOR=4.32; 95% CI=2.07 to 9.03; p<0.05) compared to mothers with no education. Similarly, when respondent's partner had higher education, the likelihood was at least 2.26 (AOR=2.26 (95% CI=1.3 to 3.95; p<0.05)) times more for all the four services, particularly SBA was 4.28 (AOR=4.28 (95% CI=2.37 to 7.75; p<0.05)) times more likely to be received. However, number of births indicated a negative association to the access rate of all four services. For second and third births, the likelihood of receiving all the four perinatal care services decreased and for further births the odds ratios decreased further. In addition, when place of residence was rural, respondents were around 50% less likely to get all four selected services compared to their urban counter part. As for region of residence, southern and northern parts were advanced in receiving all four services whereas Sylhet lagged significantly in accessing SBA, PMC and PNC compared to the reference region Barisal. The capital Dhaka and the second largest city Chittagong trailed behind for PMC and PNC. According to the respondents' age distribution data, it was evident that respondents of safe pregnancy and late pregnancy age range that was 20-29 and 30 and above years of age were considerably more likely to receive all four services than the respondents of early pregnancy age range.

Table 4: Risk factors for access to perinatal healthcare services: Multilevel analysis

Characteristics	Odds ratio (95% Confidence interval)			
	ANC4+	SBA	PMC	PNC
Women age, years				
15-19	1	1	1	1
20-24	1.38(0.97-1.98)	0.9(0.64-1.26)	1.01(0.77-1.33)	0.81(0.56-1.16)
25-29	1.52(0.97-2.38)	1.42(0.92-2.2)	1.53(1.06-2.21)	1.22(0.78-1.92)
30-34	1.46(0.84-2.53)	1.35(0.8-2.28)	1.65(1.08-2.52)	1.18(0.69-2.03)
>=35	2.61(1.26-5.44)	2.51(1.26-4.99)	2.25(1.31-3.87)	1.71(0.85-3.44)
Women education				
No education	1	1	1	1
Primary	2.01(1.17-3.47)	1.96(1.3-2.95)	1.43(1.01-2.04)	1.54(0.96-2.47)
Secondary	3.6(1.98-6.55)	2.86(1.8-4.54)	1.94(1.33-2.84)	2.29(1.4-3.75)
Higher	8.05(3.68-17.61)	6.58(3.28-13.19)	3.22(1.89-5.47)	4.32(2.07-9.03)
Number of birth				
1	1	1	1	1
2-3	0.7(0.5-0.98)	0.51(0.36-0.73)	0.52(0.39-0.7)	0.54(0.37-0.79)
>=3	0.39(0.2-0.74)	0.24(0.13-0.43)	0.33(0.21-0.54)	0.35(0.19-0.65)
Husband's education				
No education	1	1	1	1
Primary	1.28(0.85-1.92)	1.27(0.91-1.77)	1.13(0.85-1.51)	1.14(0.8-1.64)
Secondary	1.95(1.25-3.03)	1.93(1.28-2.9)	1.39(1.01-1.91)	1.87(1.22-2.85)
Higher	2.26(1.3-3.95)	4.28(2.37-7.75)	2.92(1.85-4.61)	2.68(1.5-4.78)
Husband's occupation				
Agriculture	1	1	1	1
Manual worker	1.39(0.95-2.03)	1.13(0.82-1.56)	1.02(0.78-1.33)	1.3(0.92-1.83)
Professional	2.16(1.14-4.09)	1.49(0.79-2.78)	0.88(0.56-1.41)	1.28(0.69-2.39)
Business	1.19(0.79-1.8)	1.88(1.29-2.73)	1.41(1.05-1.9)	1.67(1.12-2.5)
Others	1.1(0.44-2.74)	1.78(0.9-3.52)	1.1(0.62-1.97)	1.47(0.71-3.03)
Socio-economic status				
Poorest	1	1	1	1
Poorer	2.16(1.29-3.63)	1.93(1.29-2.9)	1.77(1.24-2.53)	1.56(0.99-2.45)
Middle	2.79(1.62-4.83)	2.6(1.68-4.01)	2.25(1.54-3.28)	2.24(1.39-3.62)
Richer	5.53(2.85-10.72)	4(2.4-6.66)	3.25(2.1-5.04)	3.44(1.94-6.1)
Richest	11.86(5.11-27.53)	9.93(5.15-19.15)	7.29(4.13-12.88)	8.9(3.98-19.91)
Region of residence				
Barisal	1	1	1	1
Chittagong	1.13(0.66-1.93)	1.17(0.67-2.03)	0.8(0.5-1.28)	0.64(0.32-1.28)
Dhaka	1.38(0.85-2.24)	1.25(0.72-2.17)	0.88(0.56-1.41)	0.66(0.33-1.33)
Khulna	2.43(1.38-4.27)	4.07(2.13-7.79)	2.28(1.37-3.81)	1.26(0.59-2.69)
Rajshahi	1.45(0.82-2.54)	1.96(1.11-3.47)	1.5(0.92-2.47)	1.2(0.58-2.49)
Rangpur	4.02(2.08-7.75)	1.44(0.82-2.53)	1.23(0.76-2)	0.9(0.44-1.86)
Sylhet	1.09(0.64-1.86)	0.83(0.47-1.47)	0.67(0.42-1.06)	0.66(0.34-1.29)
Place of residence				
Urban	1	1	1	1
Rural	0.47(0.32-0.7)	0.49(0.35-0.69)	0.55(0.41-0.73)	0.44(0.28-0.7)
Variance (cov.)				
Level 2	3.66 (1.70)	3.96 (1.32)	1.59 (.82)	4.03 (1.93)
Level 3	1.04 (.34)	1.11 (.27)	.82 (.21)	2.5 (.76)

ANC4+, at least four antenatal care visit; SBA, Skill birth attendants; PMC, Post-natal care of mother; PNC, post-natal care of children.

DISCUSSION

This study attempts to demonstrate the determinants of inequality in maternal and perinatal health care services in Bangladesh using nationally representative survey data. In this study, we sought to investigate how household wealth inequality, place of residence, region, maternal age, and number of births affect the utilization of essential perinatal health services among Bangladeshi women. The study findings indicated that the national coverage of professional four ANC, SBA during de-

livery, PMC and PNC were quite low, and found wide wealth and education-based inequalities to access those services. One in four Bangladeshi women received at least four ANC, and around one in three women and child received postnatal health care services.

Our finding showed that compared with poor mothers, the risk of receiving at least four ANC visits, skilled birth attendance and accessing PNC and PMC were significantly higher among wealthy mothers. Our findings are consistent with previous studies conducted in developing regions of Africa and Asia [7,8]. A study in India showed that the use of skilled assistance at delivery and antenatal care is 80% or higher for wealthy mothers [9].

This finding indicates that wealth inequality was a limiting factor for MHS usage in Bangladesh. One previous study also showed that any amount of spending for health care can be competed against household food availability and education of children in poor households [10]. Moreover, in Bangladesh, healthcare financing has serious resource constraints (only 3.5% of its GDP) and 63% of total health care expenditure is out of pocket payments (OOP) [11,12]. Considering the scenario, since 2007 Bangladesh Ministry of Health and Family Welfare, with support from WHO, has launched a demand side financing (DSF) program, in some areas, that covers direct OOP expenses, transportation, food, and medicine cost for poor pregnant women (Bangladesh Ministry of Health and Family Welfare, 2004) [13]. To ensure universal reproductive health care service, this program needs to be expanded throughout the country.

Results of this study also revealed that educational attainments of both women and their husbands are positively associated with receiving essential MHSs. The effect of maternal education level was stronger than husband's education. This outcome is consistent with one previous study, conducted in Bangladesh in 2009, that reported increased rate of female literacy was strongly associated with sharp decline in maternal mortality in the region [14]. This association between education and health indicators is intuitively reasonable, as educated individuals tend to be more cautious of personal health issues, more knowledgeable on the importance of maternal and perinatal care and exhibit better adherence to healthy behavior [15]. Currently in Bangladesh, literacy rate for women aged 15 years or more is 58.5% and men 64.6% as per 2015 estimates [16]. There is a lot to do to increase the uptake of maternal and child-care services through educational advancement in the mass population.

In this study, urban women were significantly more associated with the utilization of all four selected MHSs compared to their rural counterpart. This result is consistent with many other studies conducted in low-income countries [17]. The difference may be due to increased availability and accessibility of infrastructure in urban areas than in rural areas. For example, in rural parts of Bangladesh, the concentration of reproductive care facilities and healthcare professionals are far lower compared to those in urban areas [18]. Although 75% of total population lives in rural areas.

This study reveals that number of birth influence health service utilization considerably. Women who had only one birth

were more likely to use all four selected services. This may be since women with higher parity may have developed self-confidence. A study in Bangladesh has shown a similar result, which found that a woman is more likely to seek maternal health care services for first order than higher-order births because of perceived risk associated with first pregnancy [19]. Having more children may also cause resource constraints, which have a negative effect on health care utilization [19]. Many studies have shown consistent findings on the low likelihood of having a health facility delivery as the number of children ever born increases [20].

Finally, our study showed that uptake of MHSs utilization varied widely among the regions. Sylhet is the most behind region whereas Khulna is the most advanced region regarding MHSs utilization. Possible reasons are differences in norms, cultural values and demographic patterns. One study showed that national disparities in fertility rate are very wide in Bangladesh. Fertility was the lowest in Khulna (1.9 births per woman) and highest in Sylhet (3.1 births per woman) [21]. Our study shows that when birth number increases, uptake of all four selected services decreases considerably. Again, previous studies in Bangladesh have reported that the reduction in fertility alone has averted one third of all maternal deaths between 1983 and 2001 [22]. Furthermore, this study reveals that two megacities of Bangladesh, Dhaka, and Chittagong, are lagging in post maternal and neonatal health care services. At the same time these two cities are accommodating millions of slum dwellers. Studies show that among slum people, uptake of MHSs are lower and maternal and neonatal death rates are higher compared to other urban residents [23]. So, in this point it can be suggested that scaling up family planning services for mass community and focus on slum population may hold great promise to increase the utilization of MHSs.

As this study was based on the 2014 DHS dataset, the study sample size was moderately high. Data was analyzed at the subnational level. So, the findings were expected to be very much close to the real scenario. This study included a wide range of confounding variables. Furthermore, for disparity measurements, both absolute and relative methods were used along with graphical representation of disparity concentration giving a better understanding. Limitations of this study include the secondary nature of data that predates this analysis by several years, selection bias, no special focus on any vulnerable group of population. Due to the cross-sectional nature of data no cause effect relationship can be established. In conclusion, utilization of all four MHSs was very low in Bangladesh. One in four women accessed professional four ANC visits whereas SBA during delivery, PMC and PNC were attained by one in three women. This study concludes that emphasis on female education, poverty reduction, special reproductive healthcare service projects targeting the most disadvantaged class of people could substantially improve the uptake of basic MHSs.

AUTHOR CONTRIBUTION

Sabera Sultan and Md. Mizanur Rahman contributed to research design and implementation, and results analysis. Sabera Sultana did script writing. Md. Mahfuzur Rahma and Shamima Akter did critical review and added intellectual contents.

CONFLICT OF INTEREST

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