Trend in the utilization of antenatal care during pregnancy among the adolescents in Bangladesh: Evidence from national survey data 2012/2013 and 2019

Md. Sabbir Ahmed

Abstract

Introduction: Pregnancy during adolescence is a global health problem and the leading cause of maternal mortality. This study was aimed to explore the trends of the utilization of prenatal care or antenatal care (ANC) services during 2012/2013 and 2019, and to identify the factors associated with the use of ANC among adolescents in Bangladesh.

Methods: This study was based on the secondary data set of two consecutive surveys of Bangladesh Multiple Indicator Cluster Survey (MICS) 2012/2013 and 2019.

Results: The prevalence of utilizing ANC among Bangladeshi adolescents is in increasing trend; however, as per WHO recommendation, the prevalence of utilizing 4+ ANC visits was very low in 2019 (34.1%), which was 26.2% in 2012/2013. Educational status of the adolescents, area of residence, household wealth status, administrative division, and status of watching television were independent predictors of receiving 4+ ANC visits among the pregnant adolescent girls in Bangladesh.

Conclusions: The status of ANC among Bangladeshi adolescents is still very low. Awareness building programs among adolescents and their family members through health education interventions should be taken.

Keywords
adolescent, antenatal care, Bangladesh, pregnancy

1 | INTRODUCTION

Adolescents are vulnerable to pregnancy and childbirth due to several adverse health and socioeconomic consequences both for mother and child. Adolescent mothers had the risk of prolonged labor pain, preterm birth, and malnourished babies. Pregnancy during adolescence is considered a sexual and reproductive health problem and a leading cause of maternal death especially for low- and middle-income countries (LMICs). According to the World Health Organization (WHO), every year about 12 million girls aged 15–19 years give birth in the developing world of which at least 10 million were unintended. Due to a higher rate of early marriage, adolescent pregnancies are highly persistent in Bangladesh. According to recent statistics, the adolescent birth rate is 74/1000 for girls aged 15–19 years in Bangladesh. As adolescents are biologically immature for pregnancy, timely exposure to adequate (quantity and quality) prenatal...
or antenatal care (ANC) provides a scope to prevent or treat or manage the complications related to delivery.1,5,7

ANC is a broad aspect including medical procedures and care provided to the mothers during pregnancy and crucial to maintain a healthy pregnancy state and ensure safe childbirth.8 The components of ANC include "risk identification, prevention and management of pregnancy-related or concurrent diseases, and health education and health promotion."9 Previous studies reported most of the obstetric and gynecological problems related to pregnancy and childbirth can be prevented through ANC.10 Utilization of ANC services also influence skilled birth attendants.11 Evidence shows that adolescent pregnant girls are less likely to utilize ANC and demographic and socioeconomic factors such as education, employment, place of residence, geographical variations, birth order, and parity were associated with the use of ANC.12 WHO recommended that every pregnant woman should have at least four ANC visits during pregnancy.9 According to the Bangladesh Demography and Health Survey report 2014, about 19.2%, 50.3%, and 30.5% of Bangladeshi adolescent pregnant girls received no care, one to three times, and 4+ times ANC service, respectively, during pregnancy.12

As adolescent pregnancies are highly prevalent in Bangladesh, data on the utilization of ANC among this group are very limited. Thus, it is important to understand the current trends, where progression has been done, where to invest additional resources, and who to specifically target to scale up the overall situation. Considering the vulnerability of adolescent girls due to early pregnancy, significance of ANC in protecting maternal and child health, and to fill the research gap this study was aimed; to explore the trends of utilization of ANC services during 2012/2013 and 2019, and to identify the factors associated with the use of ANC among the adolescents in Bangladesh.

2 | METHOD

This study was based on the secondary data set of two consecutive surveys of Bangladesh Multiple Indicator Cluster Survey (MICS) 2012/2013 and 2019,13,14 which were national representative surveys, conducted by the Bangladesh Bureau of Statistics (BBS) and supported by UNICEF. MICS aimed to capture various health indicators and household characteristics. MICS usually follow a two-stage stratified sampling procedure to collect data at the household level. In the first stage, sampling census enumeration areas are selected using the probability proportional to size sampling technique using the statistics provided by the respective national statistical office as a sampling frame. In the second stage, households are selected through systematic random sampling from the complete listing of households within a selected enumeration area. Details of the sampling process, data collection procedure, and questionnaire are available in each final survey report.13,14 Adolescent girls (15–19 years) who had a live birth in the last 2 years of the survey were included in this analysis. Data of 1246 pregnant adolescent girls were included in this study for statistical analysis. Details of the data extraction process are presented in Figure 1.

FIGURE 1 Participants recruitment procedure for this study from Bangladesh’s multiple indicator cluster survey 2019 dataset

2.1 | Antenatal care

Participants were asked, “Did you see anyone for antenatal care during your pregnancy (yes/no)?” If “yes,” “How many times did you receive antenatal care during pregnancy?” From the above responses, a new variable was generated “Utilization of antenatal care” and the responses were categorized as “No visit,” “1 visit,” “2–3 visits,” and “4+ visits.” Data were collected retrospectively from the participants based on recall of events from their last pregnancy.

2.2 | Study variables

The demographic and socioeconomic status of the participants were considered as the independent variables of this study. The study variables include (i) age (categorized as 15, 16, 17, 18, and 19 years), (ii) educational status (categorized as preprimary or none, primary, secondary, and higher secondary+), (iii) areas (urban/rural), (iv) wealth index (categorized as poorest, poorer, middle, richer, and richest), (v) division (categorized as Barishal, Chattogram, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet), and (vi) watch television (yes/no).

2.3 | Statistical analysis

Data set were cleaned before formal data analysis. Both descriptive and inferential statistics were run to calculate the number and frequencies. To calculate the current prevalence of utilization of ANC according to the demographic and socioeconomic status of the participants Pearson's chi-square test used the most recent data set (i.e. MICS–2019). A binary outcome variable was generated for the utilization of 4+ ANC visits. To identify the factors associated with 4+ ANC visits, univariate
and multivariate binary logistic regression models were used, and the Hosmer–Lemeshow goodness of fit test indicated a good model fit. Data were analyzed using SPSS for Windows Version 23 (IBM, Armonk, NY, USA) using sampling weight to ensure the results at the National level. The tests for the main effects were considered significant at p < 0.05 level. Microsoft PowerPoint 2013 (windows version) was used for the graphical presentation of results.

3 | RESULTS

Trends in the utilization of ANC among adolescent girls during 2012/2013 and 2019 are presented in Figure 2. The prevalence of not receiving any ANC during 2019 was found 12.1%, which decreased by 15% from 2012/2013 to 2019. Prevalence of using 2–3 and 4+ times of ANC also increased by 8.8% and 7.9%, respectively, during this period. However, prevalence decreased by 1.8% for those who received one ANC.

From the chi-square test statistics, educational status of the adolescents, area of residence, household wealth status, administrative division, and status of watching television were positively associated (p < 0.001) with the utilization of ANC among the pregnant adolescent girls in Bangladesh (Table 1).

Logistic regression analysis between study variables and utilization of 4+ ANC visits are presented in Table 2. Those who completed higher secondary and above education grades had 3.8 times possibility for receiving 4+ ANC compared with those who had preprimary or no formal educational attainment (AOR = 3.89, 95% CI: 1.38–10.96). Adolescents who resided in a rural area had 41% less likely to receive 4+ ANC visits (AOR = 0.59, 95% CI: 0.42–0.83). Respondents from rich and the richest households had 2.3 and 4.4 times possibility to receive 4+ ANC visits compared with those from the poorest households. Those who watched television were 24% more likely to receive 4+ ANC visits (AOR = 1.24, 95% CI: 0.92–1.67).

4 | DISCUSSION

This study reported the trend of utilization of ANC among the Bangladeshi adolescent girls during 2012/2013 and 2019 and the factors associated with receiving 4+ ANC visits. The overall prevalence of utilizing ANC among Bangladeshi adolescents is in increasing trend. Educational status of the adolescents, area of residence, household wealth status, administrative division, and status of watching television were independent predictors of utilizing 4+ ANC visits in Bangladesh.

As per WHO’s recommendation,9 prevalence of receiving 4+ ANC visits among adolescents was found very low (3.41%) during 2019, however, it was higher than earlier study.12 A study conducted in India reported that 55.4% of pregnant adolescents received counseling from frontline health workers.7 Another study conducted in Indonesia reported that 70% of pregnant adolescents received 4+ ANC visits.15 Ensuring 4+ ANC visits during pregnancy is essential to protect maternal and child health from complications and to ensure safe delivery. As a large number of adolescent mothers are not receiving 4+ ANC visits in Bangladesh, it signifies that they are at risk of the complications and consequences of lower utilization of ANC.5,16 As Bangladesh is working towards achieving the SDG target in reducing maternal mortality rate, ensuring quality ANC could be an effective intervention to protect maternal and child health.10,17

Educational status and household wealth status had the highest influence on the utilization of ANC among Bangladeshi adolescent pregnant mothers. These findings are consistent with the study conducted in Indonesia15 and India.7 Education is a proven factor of utilizing ANC during pregnancy. Higher educated girls may have adequate knowledge on the benefits of care during pregnancy and have more decision-making power, which influences them to receive more ANC during their pregnancy.7 From a practical view point, it may not be possible to increase formal education at a later stage in females; however, reproductive health education can certainly be improved,10 which may influence the mothers to take more ANC in their later pregnancy period. The utilization of ANC positively increases with the household wealth status. The economic barrier may restrict teen mothers to receive quality health care during the pregnancy period.19 Women with lower educational attainment and who belong to poor households should be the primary target group to provide immediate interventions to scale up the utilization of 4+ ANC visits during pregnancy. A significant urban–rural disparity was also observed. A previous study also reported urban–rural disparity in the utilization of ANC among Bangladeshi mothers.20 A recent study reported gaps in adequate coverage and content in ANC in rural Bangladesh.21 Adolescent mothers residing in urban areas may have adequate availability and accessibility to health care services compared to their counterparts. Regional variation was also observed in utilizing ANC similar to a previous study.12 These regional variations indicated a gap in the existing reproductive health care services across the country. For instance, the Mymensingh division had the highest prevalence of no visit (31.8%), and the lowest coverage of 4+ ANC visits (12.5%) in Bangladesh. This would mean that immediate public health actions and additional resources are needed.
TABLE 1 Background characteristics of the study participants and the prevalence of utilization of antenatal care services (multiple indicator cluster survey 2019)

| Variables                      | N (%) | No visit | 1 Visit | 2-3 Visits | 4+ Visits | \(\chi^2\) | p-Value |
|--------------------------------|-------|----------|---------|------------|-----------|------------|---------|
| **Age (years)**                |       |          |         |            |           |            |         |
| 15                             | 18 (1.4) | 22.2 | 11.1   | 44.4       | 22.2      | 13.37      | 0.343   |
| 16                             | 61 (4.9) | 9.7   | 17.7   | 38.7       | 33.9      |            |         |
| 17                             | 110 (8.8) | 15.3 | 9.0    | 43.2       | 32.4      |            |         |
| 18                             | 474 (38.1) | 11.8 | 14.7   | 42.7       | 30.7      |            |         |
| 19                             | 583 (46.8) | 11.9 | 14.4   | 36.3       | 37.5      |            |         |
| **Educational status**         |       |          |         |            |           |            |         |
| Preprimary or none             | 37 (3.0) | 39.5 | 18.4   | 28.9       | 13.2      | 89.87      | <0.001  |
| Primary                        | 254 (20.4) | 20.4 | 16.9   | 42.4       | 20.4      |            |         |
| Secondary                      | 807 (64.8) | 10.1 | 13.6   | 40.0       | 36.3      |            |         |
| Higher secondary+              | 148 (11.8) | 2.0  | 11.6   | 35.4       | 51.0      |            |         |
| **Area**                       |       |          |         |            |           |            |         |
| Urban                          | 258 (20.7) | 6.2  | 8.9    | 32.6       | 52.3      | 51.18      | <0.001  |
| Rural                          | 988 (79.3) | 13.7 | 15.6   | 41.4       | 29.4      |            |         |
| **Wealth status**              |       |          |         |            |           |            |         |
| Poorest                        | 256 (20.5) | 25.8 | 19.9   | 36.7       | 17.6      | 178.56     | <0.001  |
| Poor                           | 253 (20.3) | 14.6 | 18.9   | 42.9       | 23.6      |            |         |
| Middle                         | 260 (20.8) | 11.2 | 13.8   | 44.6       | 30.4      |            |         |
| Rich                           | 275 (22.1) | 4.7  | 11.6   | 41.5       | 42.2      |            |         |
| Richest                        | 202 (16.2) | 3.5  | 4.5    | 30.2       | 61.9      |            |         |
| **Division**                   |       |          |         |            |           |            |         |
| Barishal                       | 75 (6.0) | 10.7 | 22.7   | 37.3       | 29.3      | 110.95     | <0.001  |
| Chattogram                     | 264 (21.1) | 12.9 | 17.1   | 38.8       | 31.2      |            |         |
| Dhaka                          | 280 (22.4) | 5.7  | 12.5   | 37.3       | 44.4      |            |         |
| Khulna                         | 137 (11.0) | 4.4  | 13.1   | 34.4       | 48.2      |            |         |
| Mymensingh                     | 88 (7.1) | 31.8 | 13.6   | 42.0       | 12.5      |            |         |
| Rajshahi                       | 180 (14.4) | 14.9 | 15.5   | 39.8       | 29.9      |            |         |
| Rangpur                        | 135 (10.9) | 8.8  | 6.6    | 46.3       | 38.2      |            |         |
| Sylhet                         | 87 (7.0) | 23.3 | 15.1   | 45.3       | 16.3      |            |         |
| **Watch television**           |       |          |         |            |           |            |         |
| No                             | 482 (38.7) | 18.7 | 18.0   | 39.0       | 24.3      | 58.39      | <0.001  |
| Yes                            | 764 (61.3) | 8.0  | 11.8   | 39.9       | 40.3      |            |         |

The government of Bangladesh took several initiatives including setting up more than 13,000 community clinics across the country to provide basic health care including reproductive health services to the community level. However, these urban-rural and regional disparities indicate loopholes in the existing health service system in the community. A comprehensive governmental and nongovernmental approach is required to ensure the maximum coverage of ANC for pregnant mothers. Among the participants, those who watched television had a higher tendency to receive health care during pregnancy. They might be influenced by the health promotion messages broadcasted through television. Public health activist or family planning workers should especially focus on the adolescent girls those who have no access to television to scale up the situation.

This study is not out of its limitations. The major limitation of this study is the cross-sectional nature of the data. Further, recall bias may influence the study findings. Despite limitations, as this study is based on nationwide data, the study findings can be generalized at the national level.

**CONFLICT OF INTEREST**

The authors declare to have no conflict of interest.
### Table 2: Factors associated with the utilization of antenatal care during pregnancy among the adolescent mothers

| Variables       | Crude model | Adjusted model |
|-----------------|-------------|----------------|
|                 | OR | 95% CI | p-Value | OR | 95% CI | p-Value |
| **Educational status** |    |         |         |    |         |         |
| Preprimary or none | Ref. |         |         | Ref. |         |         |
| Primary          | 1.52 | 0.58–3.99 | 0.386 | 1.43 | 0.53–4.10 | 0.448 |
| Secondary        | 3.37 | 1.34–8.49 | 0.010 | 2.49 | 0.93–6.68 | 0.068 |
| Higher secondary | 6.21 | 2.36–16.35 | <0.001 | 3.89 | 1.38–10.96 | 0.010 |
| **Area**         |    |         |         |    |         |         |
| Urban            | Ref. |         |         | Ref. |         |         |
| Rural            | 0.38 | 0.28–0.50 | <0.001 | 0.59 | 0.42–0.83 | 0.003 |
| **Wealth status** |    |         |         |    |         |         |
| Poorest          | Ref. |         |         | Ref. |         |         |
| Poor             | 1.44 | 0.93–2.22 | 0.097 | 1.11 | 0.70–1.77 | 0.633 |
| Middle           | 2.05 | 1.35–3.11 | 0.001 | 1.50 | 0.95–2.36 | 0.081 |
| Rich             | 3.41 | 2.28–5.10 | <0.001 | 2.33 | 1.48–3.66 | <0.001 |
| Richest          | 7.69 | 5.00–11.82 | <0.001 | 4.49 | 2.63–7.67 | <0.001 |
| **Division**     |    |         |         |    |         |         |
| Barishal         | Ref. |         |         | Ref. |         |         |
| Chattogram       | 1.07 | 0.61–1.88 | 0.797 | 0.68 | 0.36–1.26 | 0.222 |
| Dhaka            | 1.90 | 1.10–3.29 | 0.021 | 0.90 | 0.49–1.66 | 0.748 |
| Khulna           | 2.25 | 1.22–4.04 | 0.009 | 1.79 | 0.94–3.41 | 0.073 |
| Mymensingh       | 0.34 | 0.15–0.76 | 0.009 | 0.36 | 0.15–0.84 | 0.018 |
| Rajshahi         | 1.00 | 0.55–1.81 | 0.983 | 0.84 | 0.45–1.59 | 0.612 |
| Rangpur          | 1.46 | 0.79–2.67 | 0.219 | 1.52 | 0.79–2.91 | 0.203 |
| Sylhet           | 0.45 | 0.21–0.97 | 0.042 | 0.52 | 0.23–1.19 | 0.124 |
| **Watch television** |    |         |         |    |         |         |
| No               | Ref. |         |         | Ref. |         |         |
| Yes              | 2.10 | 1.63–2.71 | <0.001 | 1.24 | 0.92–1.67 | 0.146 |

Abbreviations: OR, odds ratio; Ref., reference group.

*Significant p-value (< 0.05).

† Adjusted with all the variables in the table.

---

**ETHICS APPROVAL**

As this study was based on a secondary data set, ethical approval was not required. However, the survey protocol of MICS was approved by the technical committee of the Government of Bangladesh lead by the Bangladesh Bureau of Statistics (BBS), and we received authorization from the MICS team to use the data set for analysis.

**ACKNOWLEDGMENT**

The authors wish to acknowledge UNICEF and MICS for providing access to the data sets.

**DATA AVAILABILITY STATEMENT**

Data are freely available on request at the MICS website: https://mics.unicef.org/surveys.

**ORCID**

Md. Sabbir Ahmed https://orcid.org/0000-0002-7663-2181

**REFERENCES**

1. Hackett K, Lenties L, Summers A, et al. How can engagement of adolescents in antenatal care be enhanced? Learning from the perspectives of young mothers in Ghana and Tanzania. BMC Pregnancy Childbirth. 2019;19(1):184.

2. Islam MM, Islam MK, Hasan MS, Hossain MB. Adolescent motherhood in Bangladesh: trends and determinants. PLoS One. 2017;12(11):e0188294.

3. Gurung R, Målqvist M, Hong Z, et al. The burden of adolescent motherhood and health consequences in Nepal. BMC Pregnancy Childbirth. 2020;20(1):318.

4. Morris JL, Rushwan H. Adolescent sexual and reproductive health: the global challenges. Int J Gynecol Obstet. 2015;131:540-542.
5. World Health Organization. Adolescent pregnancy. 2020. https://www.who.int/en/news-room/fact-sheets/detail/adolescent-pregnancy Accessed January 31, 2020.

6. United Nations Population Fund. Adolescent birth: rate per 1,000 women aged 15–19. 2020. https://www.unfpa.org/adolescent-pregnancy Accessed August 19, 2020.

7. Fulpagare PH, Saraswat A, Dinachandra K, et al. Antenatal care service utilization among adolescent pregnant women—evidence from Swabhimaan Programme in India. Front Public Heal. 2019;7:369.

8. Ekabua J, Ekabua K, Njoku C. Proposed framework for making focused antenatal care services accessible: A review of the Nigerian setting. ISRN Obstet Gynecol. 2011;2011:253964.

9. World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. 2016.

10. Bwalya BC, Sitali D, Baboo KS, Zulu JM. Experiences of antenatal care among pregnant adolescents at Kanyama and Matero clinics in Lusaka district, Zambia. Reprod Health. 2018;15(1):124.

11. Ryan BL, Krishnan RJ, Terry A, Thind A. Do four or more antenatal care visits increase skilled birth attendant use and institutional delivery in Bangladesh? A propensity-score matched analysis. BMC Public Health. 2019;19(1):583.

12. Ali N, Sultana M, Sheikh N, et al. Predictors of optimal antenatal care service utilization among adolescents and adult women in Bangladesh. Heal Serv Res Manag Epidemiol. 2018;5:1-8.

13. Bangladesh Bureau of Statistics (BBS) and UNICEF Bangladesh. Progotir Pathey Bangladesh, Multiple indicator cluster survey 2012–2013: key findings. 2014. https://mics.unicef.org/files?job=W1siZiIsIiwvMTUvMDcvMDcvMTcvMjAvMDkvNzk2L0JhbmdsYWdlc2hhMjAxM18xM19NSUNTX0ZbmFsX1JlcG9ydC5wZGYYiXVO&sha=f6f33951c5125263

14. Bangladesh Bureau of Statistics (BBS) and UNICEF Bangladesh. Progotir Pathey Bangladesh, Multiple indicator cluster survey 2019: survey findings report. 2019. https://www.unicef.org/bangladesh/media/3281/file/Bangladesh%202019%20MICS%20Report_English.pdf

15. Efendi F, Chen C-M, Kurniati A, Berliana SM. Determinants of utilization of antenatal care services among adolescent girls and young women in Indonesia. Women Health. 2017;57(5):614-629.

16. Konje JT, Magoma MTN, Hatfield J, Kuhn S, Sauve RS, Dewey DM. Missed opportunities in antenatal care for improving the health of pregnant women and newborns in Geita district, Northwest Tanzania. BMC Pregnancy Childbirth. 2018;18(1):394.

17. Phommachanh S, Essink DR, Jansen M, Broerse JW, Wright P, Mayxay M. Improvement of quality of antenatal care (ANC) service provision at the public health facilities in Lao PDR: perspective and experiences of supply and demand sides. BMC Pregnancy Childbirth. 2019;19(1):255.

18. Ahmed MS, Yunus FM. Factors associated with knowledge and use of the emergency contraceptive pill among ever-married women of reproductive age in Bangladesh: findings from a nationwide cross-sectional survey. Eur J Contracept Reprod Heal Care. 2020:1-13.

19. Nabugoomu J, Seruwagi G, Corbett K, Kanyesigye E, Horton S, Hanning R. Needs and barriers of teen mothers in rural eastern Uganda: stakeholders’ perceptions regarding maternal/child nutrition and health. Int J Environ Res Public Health. 2018;15(12):2776.

20. Rahman M, Islam R, Islam AZ. Rural-urban differentials of utilization of antenatal health-care services in Bangladesh. Heal Policy Dev. 2008;6(3):117-125.

21. Siddique AB, Perkins J, Mazumder T, et al. Antenatal care in rural Bangladesh: gaps in adequate coverage and content. PLoS One. 2018;13(11):e0205149.