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Health behaviors among the adolescents in Bangladesh: Evidence from a nationwide survey

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ABSTRACT

Objectives: *The aim of this study is to investigate the multiple reproductive health care-seeking behaviors among those of adolescents compared to young adult and adult women in Bangladesh.*

Methods: *The present study was based on the data from the Bangladesh Demographic Health Survey-2011. A country representative sample of 8,753 married women who had given at least one birth been were extracted from married adolescents (10-19 years), young adult (20-34 years) and adult (35-49 years) were analyzed. Any contraceptive method, modern contraceptive method, at least one antenatal care visit by skilled health professionals (SHP), at least four or more antenatal care visit by SHP, institutional delivery, delivery by SHP, and mothers' postnatal checkup by SHP were used as a proxy indicator of reproductive health care-seeking behavior. Multilevel Poisson regression analysis was used to examine the association between outcomes and exposure variables for three intergenerational age group of women.*

Results: *This study found that the young adult women (66.6%) had higher practice of using any type of contraceptive methods in compare to adolescents (28.0%). The utilization of modern contraceptive methods for adolescent people is 28.9% whereas for young adults is 66.7% which is comparatively more than double of the adolescents. The rate of at least one time antenatal care visit for adolescent provided by SHP is much lower (26.8%) than young adults (68.8%). However, the rate of at least four or more antenatal care visit for adolescent provided by SHP is much lower (26.6%) than young adults (69.6%). The two outcome variables (place of delivery and delivery by skilled health professionals) have more or less equal level of association with maternal age at birth. Mothers' postnatal checkup by SHP for adolescent is also much lower (26.0%) than young adults (69.3%) and much higher than adults (4.7%). The results of the multilevel analysis indicate that the adolescents have higher propensity to use any contraceptive methods as well as modern contraceptive methods in compare to their young counterparts. The adolescents are least interested of visiting for at least one/four or more ANC supported by skilled health professionals in compare to the reference category, young adults. The likelihood of using institutional delivery care are much lower for adolescents which is statistically significant (ARR = 0.77, CI = 0.69-0.85). The results explain that adolescents are less likely to use institutional delivery and safe delivery care but adults are more likely to use those services in compare to young adults. There is also a reduced likelihood of mothers' postnatal checkup by SHP for adolescent mothers with a statistically significant association (ARR = 0.75, CI = 0.67-0.85) than young adult mothers.*

Conclusions: *Based on the fact that adolescence is a crucial development stage which reflects both childhood health care status and sets the foundation for adult health care status, it is particularly important to protect adolescent women against many reproductive health care-seeking issues that emerged from early marriage and pregnancy. We recommend future longitudinal research to provide clarity regarding these concerns.*

Keywords: *Maternal age at birth, care-seeking behavior, antenatal care, delivery care, skilled health professionals, relative risk, Bangladesh.*

INTRODUCTION

Although a large number of adolescents suffer from reproductive health problems, a vast majority of them do not seek healthcare for these conditions (Mattebo et al., 2019; Kulkarni and Durge 2011). One on three girls in the developing countries (excluding China) continues to marry as a child that is before age 18 (Santhaya, 2011). Recent studies (Irani and Latifnejad, 2019; Groot et al., 2018) reiterate the adverse health consequences of early marriage among young women and their children even after a host of confounding factors are controlled. The current evidence is conclusive with regard to many indicators: unintended pregnancy, pregnancy-related complications, preterm delivery, delivery of low birth weight babies, fetal mortality and violence within marriage (Irani and Latifnejad, 2019; Yaya et al., 2019; Groot et al., 2018; Khan et al., 2018; Santhya 2011).

Teenage pregnancy is often referred to as 'at-risk pregnancy' and is of great concern. Teenage women face a greater risk of obstetric complications than women in their twenties (Banerjee et al., 2009). The risks are greatest for the very poor who have worse diets and the least opportunity for prenatal care. Social problems like illiteracy, poverty, and low socio-economic conditions aggravate the situation (Banerjee et al., 2009). Bangladesh has one of the highest population densities in the world, with a population of more than 150 million and a land size of 144,000 km^2 (BBS, 2015). Recent economic growth of the country has been robust, averaging 7% annually between 2001 and 2015 despite periods of political turmoil and frequent natural disasters; income per head reached US$1,314 per year in 2014 (Programme 2015). There were significant improvements in women's dietary diversity score (increase of 0.2%) and participation in healthcare decision-making (proportion increase 14.0%. There were also increases in knowledge about: contraception (4.2%), ways to treat (55.4%), prevention of (71.0%) sexually transmitted infections, nutrition (46.6%) and prevention of anemia (62.8%) (Harris-Fry et al. 2016).

The incidence of maternal mortality in Bangladesh is recently decreasing; however though, it is still beyond the expectation as compared to that of the developed countries (Mahmudur, 2018). Majority of married women in Bangladesh are poorly educated and lacking from their childbearing and its related knowledge significantly (Islam et al., 2017;Hasan 2005). Adolescents appear to be poorly informed with regard to their own sexuality, physical well-being, health, and bodies(Crocker et al., 2019). Whatever knowledge they have, moreover, is incomplete and

confused. Low rates of educational attainment, limited sex education activities, and inhibited attitudes toward sex contribute to this ignorance (Denno et al., 2015).

In Bangladesh, most intercourse between teenagers occurs without the use of condoms or inconsistent condom use (Rukhsana et al., 2009). Few teenage pregnancies are planned. Adolescents are particularly prone to peers influences to take risks and often have false beliefs about what peers are doing. Thus, adolescence is a vulnerable period when young adults are exposed to new experiences relating to sexuality and reproduction (Nahar and Min 2008). It is a complicated point in time for both the female adolescents and young adults here in Bangladesh as they are to deal with a number of decisions concerning education, work, marriage, fertility, and establishment and overall many roles they are to play in family and society as well. Though Bangladesh population program has made substantial progress over the last thirty-eight years but still 5.2 % infants die before reaching their first birthday while 6.8% are of child mortality (ESCAP 2008). The abortion scenario varies considerably within South Asia.

In Bangladesh, abortion has been available since 1999 for up to 12 weeks of gestational age in the form of "menstrual regulation", and large proportions of women use these services. Akhter et al. (2012) reported that while adolescents constituted 9% of women who received services from "menstrual regulation" clinics, they constituted 15% of those rejected by the clinics, presumably because their pregnancies were too far along. As a result, many adolescent girls were hospitalized for complications of induced abortion after undergoing an abortion by traditional birth attendants or after attempting to self-induce. About half of these girls resorted to unsafe methods such as inserting a solid stick or rubber catheter, or ingesting medicines (Akhter et al. 2012). Currently married women of reproductive age group constitute 51.7% of total female population (BBS, 2004). More than 500,000 women die in pregnancy or childbirth every year in the developing world due to lack of proper care (Katrina and Manson 2009).

Early marriage is customary for females in Bangladesh. Like early marriage, early pregnancy is common among females in Bangladesh (Islam et al., 2017). Utilization of reproductive healthcare services such as antenatal care (ANC), delivery place facilities and delivery attendant facility are essential and a basic need for mothers around the globe. In our country, antenatal care coverage (at least one visit) is 48.7% (PRB 2002) and most of the deliveries (about 87.7%) take place at home, only 11.2% deliveries occur in hospitals or clinics (Rahman et al., 2011). The number of births attended by skilled health personnel is 13% (Children 2008). In Bangladesh inequalities in

many forms affect the health care utilization of married women. These inequalities include socio-economic status, age, education, family size, and existence of living children, occupation and household location (Rani and Lule et al., 2004; Zaman 2013).

According to the current reproductive health status of Bangladesh TFR (total fertility rate) is 2.7 children per woman, contraceptive use among married woman aged 15-49 is 48% (modern method), percentage of females aged 15 to 19 who are ever been married 48%, percentage of females who have given birth by age 18 is 46%, literacy rate among women aged 15-24 is 41% (PRB 2006). Pregnant mothers receiving antenatal care is 31%, home deliveries are 92%, percentage of birth attended by skilled health personnel are 20% (Children 2008).

Adolescents represent a large and rising proportion of the population of Bangladesh. While youth are generally among the healthiest of any age group, they have special biological needs and other vulnerabilities to reproductive health problems. These issues are a widely discussed phenomenon in the world but the socio-demographic wellbeing of married female adolescents' reproductive problems in Bangladesh are largely remained to be studied.

Although several studies have been conducted in Bangladesh on the use of reproductive health services by adolescent women, none of these thoroughly explore aspects of their healthcare-seeking behavior as compared with young or adult women. Hence, this study aimed to fill the gap, to help policymakers, program planners and researchers improve the reproductive health of adolescent women in Bangladesh. Accordingly, the aim of this study is to investigate the multiple reproductive health care-seeking behaviors among those of adolescents compared to young adult and adult women in Bangladesh

METHODS

Data sources and sample

This study used data from the 2011 Bangladesh Demographic Health Survey (BDHS). The 2011 BDHS is a countrywide representative household-based survey. The survey is allotted on a two-stage stratified sample. In the 1st stage, 600 primary sampling units (PSU) were created (urban areas: 207; rural areas: 393). The PSU was adopted from the 2001 Bangladeshi census frame. In the second stage, a systematic sample of 30 households on average was chosen per PSU. Five questionnaires were used in this survey: (i) household; (ii) women; (iii) men; (iv) community; and (v) a facilities questionnaire. The questionnaires were drawn up in English and then translated into the national and official language of Bangladesh, Bangla.

Reliability of the questionnaire was conveyed using a pilot study. The goal of the household questionnaire is to determine women and men eligible for individual interviews and gather data on sociodemographic and household characteristics. To assemble information from ever-married men aged 15–54 years, the men's questionnaire was used. Community and facilities questionnaire was used to capture information about the existence of development organizations and the availability and accessibility of health services and other facilities in the community. The survey had a 98% response rate for face-to-face interviews of the total of 17,964 selected households. Of the 18,222 ever-married women aged 12–49 years deemed eligible to complete the women's questionnaire on maternal and child health behaviors and outcomes, 17,842 did so (response rate 98%). In our study, we enrolled 8,753 women of 15–49 years having a child younger than 5 years (Fig. 1).

Figure1: **Study design and sampling procedure**

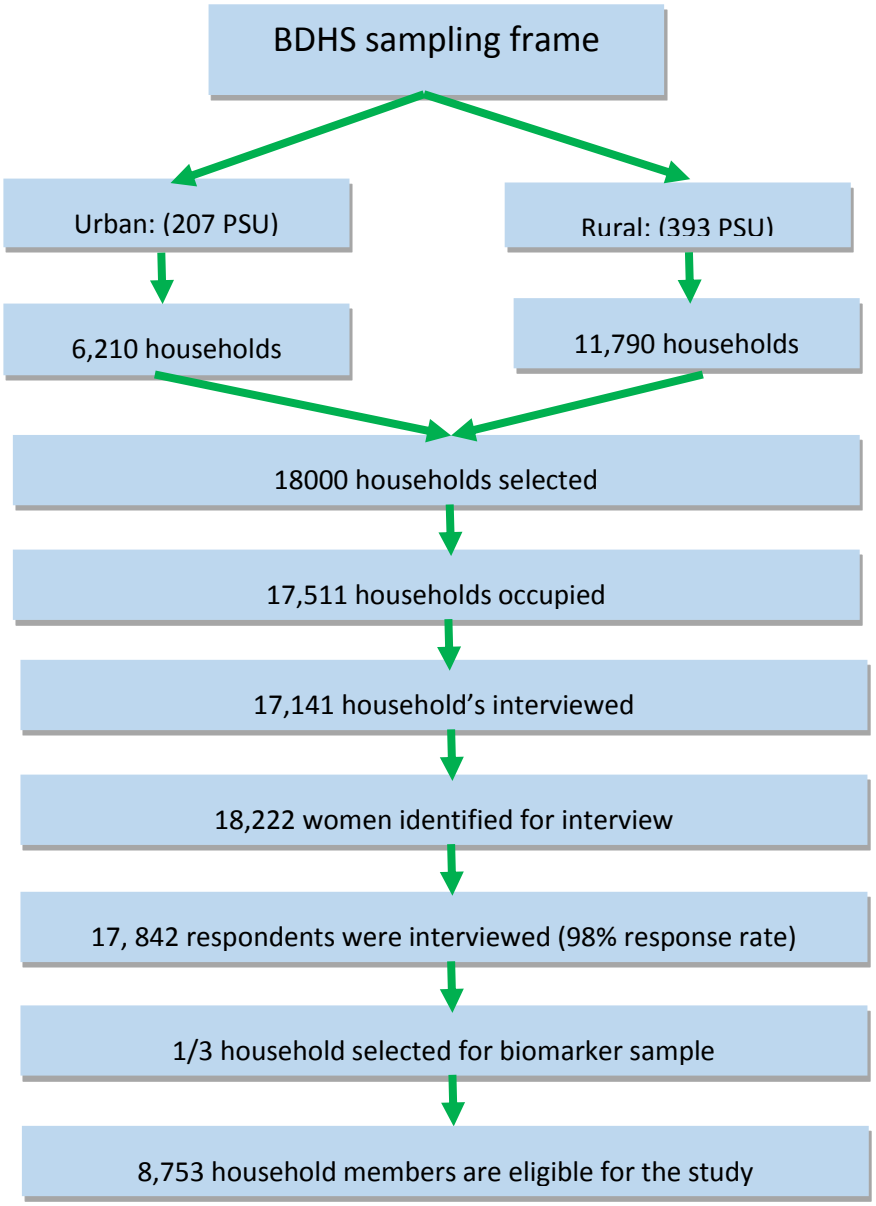

Figure1: Selection of the sample

Measures

Outcomes

We used seven outcomes as proxy indicators of reproductive health care-seeking behavior: 1) Any contraceptive method; 2) modern contraceptive method; 3) at least one antenatal care visit by skilled health professionals(SHP); 4) at least four or more antenatal care visit by SHP; 5) institutional delivery; 6) delivery by SHP; and7) mothers' postnatal checkup by SHP. To measure any contraceptive method, in the BDHS 2011, women were asked whether they used Pill, IUD, injections, condom, female sterilization, male sterilization, periodic abstinence, withdrawal, other, implants/norplant. A binary variable was created to define whether a woman any contraceptive method or not. Modern contraceptive method using were measured by asking whether they were used Pill, IUD, male condom, female sterilization, male sterilization, injectable, implants. At least one antenatal care visit by skilled health professionals(SHP) were measured by asking they were visited by at least one time by skilled health professionals(SHP). On the other hand, at least four or more antenatal care visit by SHP was measured by asking whether the respondents were visited by SHP of at least four or more times before giving birth. Institutional delivery was measured by asking whether or not the eligible respondents of the study received delivery care from govt. hospital, private hospital, private clinic, upazilla health complex, etc. Delivery by SHP was measured by asking if they were delivered by skilled health professionals. Mothers' postnatal checkup was measured by interviewing the respondents of asking if SHP provided care to women within 42 days after delivery.

Explanatory variable

Women's current age was the explanatory variable of interest. We defined women's age into three specified groups: 1) adolescence; 2) young adult; and 3) adult. We defined adolescent, young adult, and adult as any person between ages 10 -19, 20-34, and 35 years and over. We followed these definitions according to the review of the literature and the definition provided by the World Health Organization (WHO) (Akhter et al., 2012; WHO 2013).

Covariates

We included several individuals, households, and community-level variables theoretically and empirically linked to reproductive health-seeking behavior among adolescents (Akhter et al., 2012;

Nahar & Min 2008; Rahman 2008; Rahman et al., 2011). The women's educational level was defined in terms of the formal education system of Bangladesh: no education (0 years), primary (1–5 years) or secondary or higher (6 years or more).Place of residence was categorized as rural versus urban. Religion was categorized as Muslim or non-Muslim and age at first cohabitation as ≤ 15 years or >15 years. Tertiles were used in classifying the total number of children ever born (1, 2, 3or more). Contraceptive use was categorized as yes versus no. Since access to media seems an important component to raise awareness toward reproductive health health-seeking behaviors, a variable was created whether the respondents had access to mass media (if they listened to the radio, watched television, or read newspapers or magazines at least once a week) versus no. A variable was created to define the household food insecurity. In the BDHS 2011, Household Food Insecurity Access Scale (HFIAS) was developed by USAID (Coates et al., 2007).Five items were used for measuring food insecurity indicators, and it was classified in three broad categories: never, sometimes, or few often.

The BDHS wealth index was constructed from data on household assets, including ownership of durable goods (such as televisions and bicycles) and dwelling characteristics (such as source of drinking water, sanitation facilities, and construction materials). Each asset was assigned a weight (factor score) generated through principal components analysis, and the resulting asset scores were standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one(Coates et al., 2007). Each household was then assigned a score for each asset, and the scores were summed by household. The sample was then divided into population quintiles; each quintile has designated a rank, from one (poorest) to five (wealthiest), and individuals were ranked according to the total score of the household in which they lived.

Statistical analysis

Descriptive statistics were presented first to show different individual, households, and community-level characteristics according to three age groups of women (adolescents, young adults, and adults). We used contingency analysis to show the differences between those variables among the three groups of ever-married women. We also calculated the prevalence of reproductive health care-seeking behaviors according to three intergenerational age groups of women. Because of multiple hierarchies in 2011 BDHS survey, we fitted multilevel Poisson regression models to observe the association between any contraceptive method, modern contraceptive method, at least one antenatal care visit by skilled health professionals (SHP), at least four or more antenatal care

visit by SHP, institutional delivery, delivery by SHP, and mothers' postnatal checkup by SHPin relation with three age groups of women. We estimated three-level Poissonregression models for individual *i* living in household *j* in cluster *k* for our seven outcome variables. Analyses were performed using stata version 14.0 (Stata Corp., College Station, TX, USA) to allow for adjustments for the cluster sampling design, sampling weights, and the calculation of standard errors.

Human participation protection

Data collection procedures for the BDHS were approved by the ORC Macro institutional review board. The protocol of the survey was reviewed and approved by the National Ethics Review Committee of the Bangladesh Ministry of Health and Family Welfare. Before participating, all participants were asked to provide verbal informed consent after being read a document emphasizing the voluntary nature of this project, outlining potential risks, and explaining that the information gathered would be used to assess health needs and to plan health services.

RESULTS

Table 1 shows the background characteristics of the study participants' according to three intergenerational age group of women (adolescents [10-19 years age group], young adults [20-34 years age group], and adults [35 years and above age group]). A total of 8,753 ever-married women aged 10-49 years were included in this study. Among the study participants the proportion of adolescents, young adults, and adults are 27.5% (n=2,409), 67.2% (n=5,885), and 5.2% (n=459) respectively,

The participants who had practice of using contraceptive methods, the young adults (66.6%) had higher practice of any type of contraceptive methods in compare to adolescents (28.0%). On the other hand, the adults had lower practice (5.5%) of using any method. The utilization of modern contraceptive methods for adolescent people is 28.9% whereas for young adults is 66.7% which is comparatively more than double of the adolescents. The utilization of modern methods for adult is as lower (4.4%) as any contraceptive methods. The rate of at least one antenatal care visit for adolescent provided by SHP is much lower (26.8%) than young adults (68.8%) but higher than adults (4.4%). On the other hand, the rate of at least four or more antenatal care visit for adolescent provided by SHP is much lower (26.6%) than young adults (69.6%) but higher than adults (3.8%).

Table 1 Differentials in the utilization of maternal healthcare services

Variables	Participants' age (years old), n (%), N=8,753		
	≤19	20-34	≥35
Study participants	2409 (27.5)	5885 (67.2)	459 (5.2)
Any contraceptive			
No	862 (2.91)	2079 (66.7)	135 (4.2)
Yes	1513 (28.0)	3643 (66.6)	309 (5.5)
Modern contraceptive			
No	74 (18.1)	301 (65.3)	76 (16.6)
Yes	1439 (28.9)	3342 (66.7)	233 (4.4)
ANC ≥1 visit by SHP			
No	831 (24.8)	2279 (68.1)	255 (7.1)
Yes	1029 (26.8)	2758 (68.8)	173 (4.4)
ANC ≥4 visit by SHP			
No	886 (27.7)	2211 (67.7)	155 (4.6)
Yes	414 (26.6)	1,157 (69.6)	57 (3.8)
Place of delivery			
Home	1785 (2.2)	4230 (66.4)	356 (5.4)
Institution	624 (27.8)	1655 (68.1)	103 (4.1)
Delivery by SHP			
No	1696 (28.1)	4033 (66.4)	349 (5.5)
Yes	713 (28.2)	1852 (67.9)	110 (3.9)
Mothers' postnatal checkup by SHP			
No	1383 (25.8)	3638 (68.2)	333 (6.0)
Yes	477 (26.0)	1399 (69.3)	95 (4.7)

N; Total sample and n; number of event
Number is shown in outside the parenthesis and percent are shown in to the parenthesis
ANC; Antenatal care
SHP; Skilled health professionals include doctors, nurses and trained mid-wives
Any contraceptive method; Pill, IUD, injections, condom, female sterilization, male sterilization, periodic abstinence, withdrawal, other, implants/norplant
Modern contraceptive method; Pill, IUD, male condom, female sterilization, male sterilization, injectables, implants
Institutional delivery; Delivery care received from govt. hospital, private hospital, private clinic, upazilla health complex, etc.
Mothers' postnatal checkup; SHP provided care to women within 42 days after delivery

The health care-seeking behavior related to any contraceptive/modern contraceptive method; and at least one/four or more ANC by SHP is more or less equal pairwise. The utilization of the institutional delivery for adolescents is around twenty-eight (27.8%), around sixty eight (68.1%) percent for young adults and around four (4.1%) percent for adults. Similarly, the delivery for adolescents provided by the SHP is around twenty eight percent (28.2%), around sixty eight percent (67.9%) for young adults and around four (3.9%) percent for adults. So, the above two

outcome variables have more or less equal level of association with maternal age at birth. Mothers' postnatal checkup by SHP is an important outcome variable for finding the health care-seeking behavior of the study participants. Table 4.2 exhibits that mothers' postnatal checkup by SHP for adolescent is also much lower (26.0%) than young adults (69.3%) and much higher than adults (4.7%). The overall bi-variate results for prospective health outcomes related to care-seeking behavior in relation with maternal age at birth for adolescents, young adults and adults have same pattern of utilization respectively in its own category.

Table 2 shows the intergenerational differential of reproductive healthcare status. Table 2 demonstrates that adolescents have no significant association (CI = 0.96-1.04) with using any contraceptive methods while taking URR calculation in compare to the reference category, young adults but adults were 1.09 times more likely to use any contraceptive methods which is statistically significant (CI = 1.02-1.17). After confounding adjustment, adolescents were 1.04 times (considering ARR) more likely to use any contraceptive methods in compare to young adults which is statistically insignificant (CI = 0.99-1.09). On the other hand, adults were 0.96 times less likely to use any contraceptive methods in compare to the reference category (RC) and this association is also statistically insignificant (CI = 0.88-1.06).

Multilevel Poisson regression model for modern contraceptive method in relation to maternal age at birth exhibits that adolescents were 1.04 times (URR) more likely to use modern contraceptive methods compared to young adults and the association is statistically significant (CI = 1.02-1.05). The adults were 0.82 times (URR) least interested of using modern contraceptive methods compared to young adults and the association is statistically significant (CI = 0.77-0.88). However, ARR related to modern contraceptive methods is 1.01 times for adolescents, which is higher than the RC and 0.89 times for adults, which is lower than the RC. The association between modern contraceptive method and maternal age at birth for adolescents and adults are statistically insignificant and significant respectively. Therefore, the results indicate that the adolescents had higher propensity to use any contraceptive methods as well as modern contraceptive methods in compare to their young counterparts.

Table 2 Relative risk (RR) of health care-seeking behavior

Variables	Participants' age (years old), N=8,753		
	≤19	**20-34**	**≥35**
Study participants	2409 (27.5)	5885 (67.2)	459 (5.2)
Relative risk (RR) and 95% confidence interval			
Any contraceptive			
Unadjusted RR	1.00 (0.96-1.04)	1.00	1.09 (1.02-1.17)
Adjusted RR	1.04 (0.99-1.09)	1.00	0.96 (0.88-1.06)
Modern contraceptive			
Unadjusted RR	1.04 (1.02-1.05)	1.00	0.82 (0.77-0.88)
Adjusted RR	1.01 (0.99-1.03)	1.00	0.89 (0.82-0.97)
ANC ≥1 visit by SHP			
Unadjusted RR	1.02 (0.97-1.07)	1.00	0.76 (0.68-0.86)
Adjusted RR	0.87 (0.82-0.93)	1.00	1.07 (0.93-1.23)
ANC ≥4 visit by SHP			
Unadjusted RR	0.96 (0.88-1.05)	1.00	0.80 (0.64-1.00)
Adjusted RR	0.91 (0.80-1.03)	1.00	1.00 (0.79-1.26)
Institutional delivery			
Unadjusted RR	0.96 (0.88-1.04)	1.00	0.88 (0.73-1.05)
Adjusted RR	0.77 (0.69-0.85)	1.00	1.24 (0.99-1.55)
Delivery by SHP			
Unadjusted RR	0.98 (0.91-1.06)	1.00	0.82 (0.69-0.98)
Adjusted RR	0.80 (0.73-0.89)	1.00	1.04 (0.85-1.28)
Mothers' postnatal checkup by SHP			
Unadjusted RR	0.95 (0.87-1.04)	1.00	0.87 (0.73-1.04)
Adjusted RR	0.75 (0.67-0.85)	1.00	1.36 (1.07-1.73)

N; Total sample and n; number of event
Relative risks (RR) are shown in outside the parenthesis and confidence intervals (CI) are shown in to the parenthesis
The proportion (percent) and the result of multilevel Poisson regression analysis (relative risk (95% confidence interval)), are tabulated for each variable according to maternal age at birth.
All multilevel Poisson regression analysis includes current age, age at first marriage, religion, children ever born, exposure to mass media, respondents' education, wealth index, region, place of residence and food insecurity as confounding factors.

Multivariate results for at least one antenatal care visit provided by the skilled health professionals (SHP) in relation with maternal age at birth are shown in Table 4.3. The utilization of at least one time ANC visit supported by SHP for adolescent mothers aged 19 or younger were insignificantly more likely (URR = 1.02, CI = 0.97-1.07) than women aged 20-34 years and highly significantly less likely (URR = 0.76, CI = 0.68-0.86) for adults than the reference category. After the adjustment of confounding factors, the finding also shows that the utilization of at least one time ANC visit provided by SHP for adolescent was less likely than young adults and it is statistically

significantly associated (ARR = 0.87, CI = 0.82-0.93). But the adults were more likely to use at least one-time ANC visit provided by SHP than RC and it shows an insignificant association (ARR = 1.07, CI = 0.93-1.23).

The rates of the utilization of at least four or more times ANC visit provided by SHP for adolescents are as less likely to visit as adults in compare to young adults but have statistically insignificant (URR = 0.96, CI = 0.88-1.05) relation while the youngest is considered and have marginally significant (URR = 0.80, CI = 0.64-1.00) relation while the later one is considered. After the inclusion of the confounding factors, at least four or more times ANC visit provided by SHP for adolescents once again of less likely (ARR = 0.91) but the adults show no significant variation (ARR = 1.00) compared to young adults. The both cases have statistically insignificant association (CI = 0.80-1.03 for adolescents and CI = 0.79-1.26 for adults) respectively with at least four or more times ANC visit provided by SHP. As a result, the above two results highlight that the adolescents were least interested of visiting for at least one/four or more ANC supported by skilled health professionals in compare to the reference category, young adults.

Institutional delivery is firmly related with maternal age at birth. Table 4.3 also shows that adolescents were less likely (URR = 0.96, CI = 0.88-1.04) to go for institutional delivery care and the same scenario found among the adults (URR = 0.88, CI = 0.73-1.05). The likelihood of using institutional delivery care are much lower for adolescents which is statistically significant (ARR = 0.77, CI = 0.69-0.85) and much higher for adults which is statistically insignificant (ARR = 1.24, CI = 0.99-1.55) in compare to women of aged 20-34 years.

Adolescent women who had received delivery care from the SHP shows less likely of such practicing with statistically insignificant association (URR = 0.98, CI = 0.91-1.06) in compare to young adult women. The adults were also least interested of such practicing but it shows a statistically significant association (URR = 0.82, CI = 0.69-0.98). On the other hand, after adjusting the confounding factors the relative risks for both cases have a different set-up. The probability of delivery care by SHP are less likely among adolescents and it shows a statistically significant connection compared to young adults (ARR = 0.80, CI = 0.73-0.89). However, Adults were more likely to use safe delivery care provided by the SHP and this association is insignificant (ARR = 1.04, CI = 0.85-1.28). In connection with the above mentioned two outcome variables, the results explain that adolescents were less likely to use institutional delivery and safe delivery care but adults were more likely to use those services in compare to young adults.

Table 2 demonstrates the results of multilevel analysis on the use of postnatal checkup by SHP in relation with maternal age at birth. Comparatively adolescent women (URR = 0.95, CI = 0.87-1.04) and adult women (URR = 0.87, CI = 0.73-1.04) were less likely to go for postnatal checkup than young adult women with statistically insignificant connection respectively. There is also a reduced likelihood of mothers' postnatal checkup by SHP for adolescent mothers with a statistically significant association (ARR = 0.75, CI = 0.67-0.85) than young adult mothers. But adult mothers are more interested for going to postnatal checkup provided by the SHP (ARR = 1.36, CI = 1.07-1.730) compared to young adult mothers.

DISCUSSION

This is the first attempt by considering a nationally representative cross-sectional study in Bangladesh that has demonstrated reproductive health care-seeking behavior in connection to maternal age at birth. Findings suggest that, adolescents had higher propensity to use modern contraceptives compared to the older women. This findings is consistent with a previous study conducted in Oman, which showed that, women who belonged to (15-24 years) were 2.948 times more likely to use modern contraceptive methods compared to women who belonged to (45-49 years) in multilevel model, while women who belonged to (15-24 years) were 2.609 times more likely to use modern contraceptive methods compared to women of 45-49 years in a single level model. Another study showed that, behavioral patterns of contraceptive acceptance and use rate differ significantly between adolescents in both developed and developing countries (female approximately 10-19 years of age) and adults (women 20-49 years) (Blanc et al., 2009). This finding is very important, because, contraceptive use is of critical importance in reaching a balanced judgment about fertility trends. Unless there is evidence of appreciable use of contraception, it is unlikely that fertility has declined. In Bangladesh, the comparison of past and present fertility indicators showed that, because of increases in contraceptive use rate, a decline of almost two children per woman was possible from 3.9 to 2.3 children (BDHS, 2014).

Findings also elucidate that, receiving at least one-time ANC visit by SHP was significantly lower among the adolescents. There are notable variations were also observed by previous several other studies in the exploitation of ANC services by younger (adolescents) and older (adult) women. Older women are more likely to utilize ANC as compared to adolescent women, and a number of socioeconomic and demographic factors like education, employment, income, place of residence,

geographical variations, birth order, and parity explain the differences in utilization of ANC services among adolescent and adult pregnant women (Ali et al., 2018; Boamah et al., 2016; Kisuule et al., 2013).

Findings also demonstrated that, adolescents were significantly less likely to have institutional delivery and assisted delivery by skilled health care professional. Previous several studies also reported that, the two outcome variables place of delivery and delivery by skilled health professionals have more or less equal level of association with maternal age at birth, where adolescents were less likely to have institutional delivery and less likely to assist delivery by skilled birth attendants (Anwar, 2015; Zere et at., 2013; Singh et al., 2012).

Our study shows that mothers' postnatal checkup by SHP for adolescent is also much lower (26.0%) than young adults (69.3%) and much higher than adults (4.7%). The multivariate analyses showed a reduced likelihood of mothers' postnatal checkup by SHP for adolescent mothers with a statistically significant association (ARR = 0.75, CI = 0.67-0.85) than young adult mothers. This finding is consistent with previous other studies conducted in several developing countries (Tarekegn et al., 2014; Rahman et al., 2011). Our study exhibits that there is also a reduced likelihood of mothers' postnatal checkup by SHP for adolescent mothers with a statistically significant association (ARR = 0.75, CI = 0.67-0.85) than young adult mothers.

The study should be considered in light of some limitations. First, the study was based on self-reported outcomes and might have caused a response bias. However, BDHS 2011 stated that respondents were informed about the importance of their giving accurate responses and also assured the confidentiality of their responses. Moreover, according to the BDHS, interviewers were provided training for implementing the survey based on a training manual especially developed to enable the field staff to collect data in a friendly, secure, and ethical manner. Moreover, to increase response rates, interviewers were trained to maintain motivation with longer questionnaires, probe for responses, clarify ambiguous questions, use memory jogging techniques for aiding recall of events and behavior, and control the order of the questions. Second; information about the reproductive health seeking behaviors were obtained from the respondents, and not from medical records; therefore, bias could have occurred that may have affected the reliability of the data. Third, this study involved reporting of past behaviors; therefore, recall bias is possible. However, we chose a five-year recall period to minimize this bias. Finally, our study was cross-sectional and, thus, does not allow for assessment of the chronology of the associated events or

inferences regarding causality. Longitudinal research is needed to provide clarity regarding these concerns. Despite the limitations, our results may also be relevant in other resource-limited settings where reproductive health service utilization among adolescents is lower.

Conclusions

Concerns about the adverse consequences of early childbearing, and the risks of contracting sexually transmitted diseases have led to renewed interest in the contraceptive and sexual behavior of adolescents. The fact that adolescents have an enormous impact on future population growth make an understanding of the extent to which young women are aware of and use contraceptives significant policy issue (Yidana et al. 2015). Our study showed that contraceptive use rate among the adolescents (38.0%) is much lower than that for the young adult age group (66.6%). Possible explanations for such lower rate of contraceptive use among the adolescents as compared to young adults are: inadequate knowledge of the role of condoms and hormonal contraceptives on the prevention of both sexually transmitted diseases and lack of education.

Around the world, it is recognized that postnatal care is crucial in maintaining and promoting the health of the woman and the newborn baby, while providing an opportunity for health professionals to identify, monitor and manage health conditions that may develop in the mother and newborn during the postnatal period (Matthews et al. 2010). In addition, postnatal care provides health professionals with the opportunity to promote exclusive breastfeeding, personal hygiene, appropriate feeding practices, and family planning counseling and services. Moreover, postnatal care allows for the provision of postnatal vitamin A and iron supplementation to the mother and immunization of newborns to provide them with optimal start to life. The study highlighted the poor utilization of PNC care among the adolescent mothers, only a little more than one fourth of whom received postpartum care as compared to 69.3% young adult women. Multivariate analysis also indicates that adolescents were less likely to receive postnatal care as compared to young adult women. This finding is similar to the findings from studies conducted in Bangladesh and India (Rahman et al. 2011, Singh et al. 2012).

This study also found that adolescents were less likely to have institutional delivery and less likely to assist delivery by skilled health professional. These findings are also consistent with several of the previous findings from studies conducted in developing countries (Rahman 2008, Singh et al. 2012). There may be several factors which are responsible for non-institutional delivery and assisted birth by non-skilled health professional among the adolescents: includes lack of

knowledge, literacy problems, cost, transport, previous negative experiences with service providers, and a lack of social and family support. However, bivariate analysis shows that adolescent's women were less likely to receive ANC care compared to the young adult women.

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Competing interests The authors declare that they have no competing interests.

Data availability The study is based on publicly available secondary data. The data are available on the website:https://dhsprogram.com/data/available-datasets.cfm

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