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Permanent, long-acting and short-acting reversible contraceptive methods use among women in Bangladesh: an analysis of Bangladesh Demographic and Health Survey 2017–2018 data

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ABSTRACT

Objectives This study aims to explore the factors associated with the permanent and long-acting reversible contraceptive (LARC) method use compared with short-acting reversible contraceptive (SARC) methods among Bangladeshi ever-married women aged 15–49 years.

Design Cross-sectional study.

Setting We used data from Bangladesh Demographic Health Survey (BDHS) 2017–2018.

Participants A total of 9669 Bangladeshi reproductive-aged women who gave information on contraception use were the study participants. A multilevel multinomial logistic regression model was employed where the SARC method was considered as the base category and the cluster was considered as level-2 factor.

Results Among the contraceptive users in Bangladeshi women, about 83.48% used the SARC method, while 11.34%, and 5.18% used permanent and LARC methods, respectively. Compared with SARC, women with no formal education and only primary education who were non-Muslims, and had parity of ≥3 had a higher likelihood of using both permanent and LARC methods. Women from the age group of 25–34 years (adjusted relative risk ratio (aRRR): 7.03, 95% CI: 4.17 to 11.85) and 35–49 years (aRRR: 12.53, 95% CI: 7.27 to 21.58) who were employed (aRRR: 1.19, 95% CI: 1.00 to 1.40), had media access (aRRR: 1.24, 95% CI: 1.03 to 1.49), gave birth in last 5 years (aRRR: 1.40, 95% CI: 1.11 to 1.76), whose contraception decision solely made by their husband (aRRR: 7.03, 95% CI: 5.15 to 9.60) and having high decision-making power (aRRR: 2.12, 95% CI: 1.62 to 2.77) were more likely to use permanent contraceptive methods. We observed that women from households with richer (aRRR: 0.65, 95% CI: 0.45 to 0.93) and richest (aRRR: 0.38, 95% CI: 0.23 to 0.63) wealth quintiles were less likely to use LARC methods.

Conclusions This study identified that women with no/less education, non-Muslims, and having parity of ≥3 were more likely to use both permanent and LARC methods than SARC methods. Targeted interventions could be developed and implemented to promote personalised contraceptive use.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study used the most recent nationally representative data set; therefore, the study results could be generalisable across the country and other similar settings.

⇒ The cluster effect on the factors associated with the contraception method usage in Bangladesh was accounted for using a multilevel modelling approach, which is the proper analytical strategy for this type of hierarchical data.

⇒ We identified the factors associated with different types of modern contraceptive methods among Bangladeshi women.

⇒ Cross-sectional study design was one of the limitations which prevented us from drawing a causal association between the outcome and explanatory variables.

⇒ Another limitation was that a few important factors related to the respondents' health were not included in this study due to unavailability and incomplete information of those variables in the data set.

INTRODUCTION

Unintended pregnancy is a major cause of increasing population burden[1] and other maternal and neonatal difficulties in many developing countries like Bangladesh[2] and sub-Saharan Africa (SSA).[3] Significant efforts have been made to lower fertility rates and unplanned pregnancies.[4] Family planning (FP) is one of the most effective methods for preventing unintended pregnancies and reducing maternal and newborn mortality rates.[5] One of the primary predictors of fertility transition and FP in emerging nations, contraceptive use is one of the proximal determinants of fertility.[6] Despite the high efficiency of long-acting reversible contraceptives (LARCs), the rise in the use of contraceptives for FP has been largely driven by

short-acting reversible contraceptive (SARC) techniques.[7] Compared with SARC methods, (LARCs) offer uninterrupted protection for 3–12 years against undesired and unexpected pregnancy.[8] LARCs (including intrauterine devices (IUD) and hormonal implants) are more cost-efficient, oestrogen-free, extremely safe and highly effective regardless of user compliance after insertion than SARCs.[9–11] Reports from Sweden[12] and the USA[13] have shown that LARCs provide significant economic advantages over short-term solutions.

Globally, there were an estimated 358 000 maternal deaths in 2008, and developing nations continued to account for 99% (355 000) of these deaths; on the other hand, 87% (313 000) of all maternal deaths worldwide occurred in SSA and South Asia.[14] To reduce the maternal mortality ratio and support families and nations in achieving their health-related goals, it is critical to provide affordable, acceptable and accessible contraceptive options.[15] According to several indicators, the maternal mortality ratio may have decreased by more than 25% because of effective FP efforts.[5] Bangladesh's contraceptive prevalence rate (CPR), which increased from 8% in 1975 to 62% in 2014, impressively increased sevenfold in less than 40 years.[16]

The CPR is crucial in determining how FP policies affect demographics.[17] Therefore, it is essential to understand that fertility depends not only on the prevalence of contraceptive usage but also on the efficacy of that use and adherence of the users.[17] Most maternal and newborn deaths can be avoided with established strategies to ensure that every pregnancy is desired with contemporary contraception and every delivery is safe.[18] Compared with SARCs, LARCs provide better contraceptive effectiveness, lowering the need for abortion treatment.[19] However, everyone may not prefer LARC, and factors other than effectiveness in preventing pregnancy are also important in making contraceptive decisions. While expanding access to LARC for those who choose to use such methods is important, FP providers should disclose women's true contraceptive preferences. In addition, educational materials should include information on all contraceptive method options, and they should be effectively used.

Using contraceptive methods has increased globally. About 49% of reproductive aged women (15–49 years) were using any type of contraception, an increase from 42% in 1990.[20] Bangladesh's current contraceptive usage prevalence (62%)[21] is higher than the global prevalence, and than that of other South Asian nations like India (58%),[22] Nepal (50%),[23] Pakistan (35%)[24] and Afghanistan (23%).[25] When looking at the LARCs, not more than 15% of women use LARCs globally.[26] The prevalence of LARC usage varies widely throughout Europe, for instance; although it is 2.9% in Poland, it is 16% in France, which is greater than the global percentage of women who use LARCs.[27] The USA has historically lagged well behind Europe,[28] while Asia and Latin America showed a high prevalence of using LARC procedures.[29]

Higher education of both parents, having more than three children, women having used LARC in the past and women's strong knowledge and favourable attitudes towards LARC were revealed to be major drivers of usage in a study in Nigeria.[30] According to a previous study, women who select permanent contraception may differ considerably from those who choose SARC based on age or socioeconomic status. Superior socioeconomic position may be linked to more frequent use of permanent contraception and LARC.[7] Women's autonomy is crucial to improve health-related outcomes like lower total fertility,[31] and studies conducted in SSA have shown that women's autonomy impacts modern contraception use.[32]

Bangladesh is now the fifth most populated nation in Asia and the eighth most populous country overall, with an estimated 165.16 million people.[33] The government of Bangladesh has decentralised healthcare facilities to ensure better access to maternity and FP services among the rural community and to promote LARC and permanent contraceptive methods more strongly towards the population in addition to all modern contraceptive methods, in an effort to lessen the burden of the country's population.[34] Given the significance of permanent methods to lower fertility rates and LARCs to ensure high efficacy rates, it is essential to comprehend the factors that influence their use among sexually active women to improve reproductive health outcomes and increase the uptake of permanent and LARC methods.[4 35] Although there is a need for a better understanding of the factors associated with using permanent and LARC methods, it has not been given much attention in the Bangladeshi context. Therefore, we aimed to identify the factors associated with permanent and LARC methods used among women in Bangladesh using the most recent Bangladesh Demographic Health Survey (BDHS) 2017–2018 data. By expanding access to, and distribution of permanent and LARC methods especially among those who prefer those methods, we anticipate that the results of this study might help Bangladesh to considerably reduce unwanted pregnancies, maternal mortality and morbidity.

METHODS
Data source and study design
The current study used nationally representative cross-sectional data from the BDHS 2017–2018. The survey included urban and rural households from all administrative divisions of Bangladesh. A two-stage cluster sampling was used to select samples. At the first stage, enumeration areas (EAs) were selected with probability proportional to sizes (675 in 2017–2018 BDHS). In the second stage, on average, 30 households were selected from each EA (cluster) using systematic sample selection. Information on the survey methodology, sampling design and sampling technique is detailed in the BDHS 2017–2018 survey report.[21] According to the birth record (IR) file, 20 127 women aged between 15 and 49 were interviewed to gather information on
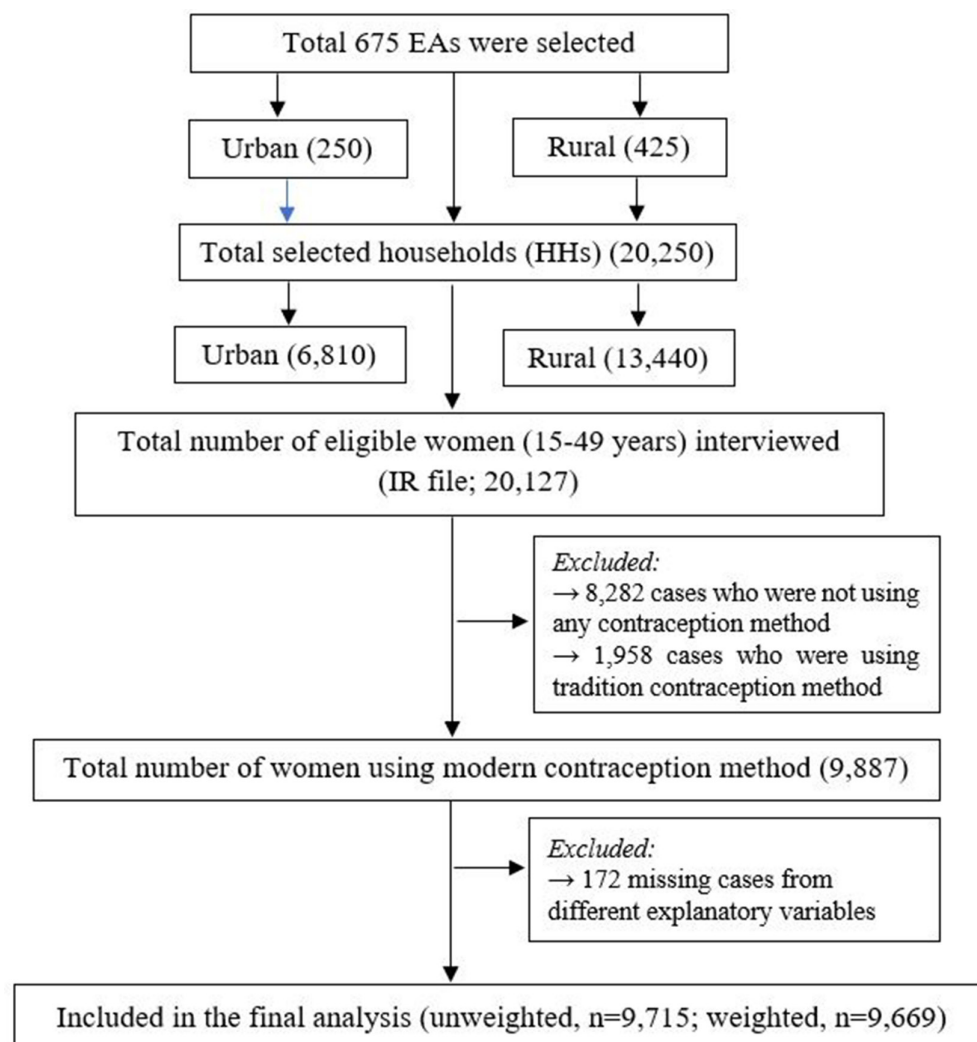
Figure 1 Flow chart of the participants selection from Bangladesh Demographic and Health Survey 2017–2018 data (IR file). EAs, enumeration areas; HHs, households; IR, individual record.

contraception use. Among them, 8282 participants who did not use contraception were excluded. In addition, 1958 cases who were using contraceptives other than modern methods were also excluded. After deleting 172 missing cases, the final analyses included a total of 9715 (unweighted) cases (weighted, N=9669) (figure 1).

Outcome measure

Types of contraceptive methods used by the reproductive-aged women in Bangladesh were the primary outcome variable of interest. Only the women using modern contraceptive methods were included in this study. We categorised the modern contraceptive methods into three categories: permanent contraceptive method (male and female sterilisation), LARC method (IUD and implants/norplants) and SARC method (condoms, injections, pills and emergency contraception).[6] The outcome variable was coded as '1', '2' and '3' for the use of permanent, LARC and SARC methods, respectively.

Explanatory variables

According to the guidance of reviewed literature[4 36–43] and the availability of the variables in BDHS 2017–2018, several explanatory variables were included in this current analysis. They are the age of women, education of women, employment status of women, husband/partner's education, religion, body mass index (BMI), media exposure, current breastfeeding status, parity, birth history in last 5 years, history of a terminated pregnancy, hearing information about FP from media, the decision for using contraception, knowledge of ovulatory cycle, women decision-making power, household wealth status, place of residence and administrative division. The mothers' BMI was divided into four categories based on the WHO guidelines: underweight ($<18.5\,\text{kg/m}^2$), normal (18.5–$24.9\,\text{kg/m}^2$), overweight (25.0–$24.9\,\text{kg/m}^2$) and obese ($\geq 30.0\,\text{kg/m}^2$).[44] Mothers were asked how frequently they watch television, listen to the radio and read the newspaper to estimate their media exposure. Media exposure was reclassified as 'less than once a week'

Sl. no.	Variables	Categories
1	Age of women (years)	15–24, 25–34, 35–49
2	Education of women	No education, primary, secondary, higher
3	Women employment status	Working, not working
4	Husband's education	No education, primary, secondary, higher
5	Religion	Muslim, non-Muslim
6	Body mass index	Underweight, normal, overweight, obese
7	Media exposure	Never/less than a week, at least once a week
8	Currently breast feeding	Yes, no
9	Parity	None, 1–2, 3 or more
10	Birth in the last 5 years	No birth, gave birth
11	Ever had a terminated pregnancy	Yes, no
12	Heard about family planning from media	Yes, no
13	Decision for using contraception	Mainly respondents, mainly husband/partner, joint decision
14	Knowledge of ovulatory cycle	Yes, no
15	Women decision-making power	High, moderate, low
16	Household wealth status	Poorest, poorer, middle, richer, richest
17	Place of residence	Rural, urban
18	Administrative division	Barisal, Chittagong, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, Sylhet

Table 1 Explanatory variables along with their categories

or 'at least once a week'. Knowledge of the ovulatory cycle was assessed by asking whether women properly knew about the fertile period during their ovulatory cycle.[21] The household wealth status was calculated based on the ownership of different household assets using principal component analysis (PCA).[45] Women's involvement in decisions about their healthcare, large household purchases and visits to family/relatives were used to estimate their decision-making power. These components were further condensed using PCA into a more generalised set of weights that rate 'decision-making power' on a scale of 0–100. Individual scores were then allocated to low, medium and high categories based on the standardised z-scores.[38] The explanatory variables and their categories have been listed in table 1.

Statistical analysis

Both unweighted and weighted frequencies and percentages were calculated to show the background characteristics of the study participants. Considering the complex survey of BDHS, we used the 'svy' command in Stata V.16.0 (StataCorp, College Station, Texas, USA) for assigning the sample weight to adjust for clustering effect and sample stratification. Since the BDHS 2017–2018 used a two-stage stratified cluster sampling involving a hierarchical composition, a multilevel regression model would be an appropriate technique to consider that accounts for complex survey design-related variation.[46] Thus, we used the multilevel multinomial regression model to identify the factors associated with the contraception method, where all the explanatory variables were included in one model to adjust for the confounding effects and clusters (EAs) were considered as level-2 factor. Generalised structural equation modelling (GSEM) using the 'gsem' command in Stata was used to execute the analysis. The fixed effects of various explanatory variables and random effects at the cluster level were estimated. Multicollinearity among explanatory variables was checked using the variance inflation factor. The adjusted relative risk ratio (aRRR) and 95% CI were interpreted, and statistical significance was considered when a p value was less than 0.05.

Patient and public involvement
No patient involved.

RESULTS
Background characteristics of study participants
A total of 9669 (weighted) married women were included in our study. Among the contraceptive users in Bangladeshi women, about 83% (95% CI: 82.7% to 84.2%) of participants used the SARC method, while 11.3% (95% CI: 10.72% to 11.99%) and 5.2% (95% CI: 4.75% to 5.64%) of women used permanent and LARC methods, respectively. In this study, 40.9% of the women belong to the 25–34 age group and 32.5% of the women from 35 to 49 age group while only 26.61% were from the 15–24 age group. Of 9669 women, 14.66% had no formal education, and only 11.93% had higher education. About more than half (52%) of women were unemployed, and the majority of the participants were Muslim (89.2%). Majority 58% of women and 38% had one to two and three or more living children, respectively, and 47% gave birth in the last 5 years of the survey, where 4.2% have no children. Among the sample, 19.4% of women had a history of terminated pregnancy. About 83.5% of the study participants did not hear about FP from any media, and 66% of women were unaware of the ovulatory cycle. In decision-making for contraception use, 77.6% was taken jointly, while 6.5% was taken solely by the partner. About 31% of the participants had low women decision-making power, while only 8% of women had high power regarding decision-making. A large number of participants (70.4%) were from rural areas, while the highest number of

participants were from the Dhaka division (25.6%), and the lowest number was from the Sylhet division (5%). All the explanatory variables were significantly associated with the contraceptive method usage in the bivariate χ^2 analysis (all p<0.001) (table 2).

Factors associated with contraceptive method use

Compared with women who had higher education, those having no education (aRRR: 2.93, 95% CI: 1.88 to 4.58) or only primary education (aRRR: 2.19, 95% CI: 1.44 to 3.33) were more likely to use permanent contraceptive methods compared with SARC method. Similarly, the use of the LARC method was also higher than the SARC method among women with no education (aRRR: 2.35, 95% CI: 1.32 to 4.18) or only primary education (aRRR: 1.77, 95% CI: 1.04 to 2.99). Compared with women aged 15–24 years, the older women aged 25–34 years (aRRR: 7.03, 95% CI: 4.17 to 11.85) and 35–49 years (aRRR: 12.53, 95% CI: 7.27 to 21.58) were more willing to use permanent method compared with SARC method. Unemployed women (aRRR: 1.19, 95% CI: 1.00 to 1.40) had a 19% more likelihood of using the permanent method than the SARC method. Compared with the Muslim women, non-Muslims were more likely to use both permanent (aRRR: 1.35, 95% CI: 1.04 to 1.76) and LARC (aRRR: 1.73, 95% CI: 1.27 to 2.35) methods than the SARC methods. Women having no/less exposure to media compared with those who were exposed at least once a week (aRRR: 1.24, 95% CI: 1.03 to 1.49) were 24% more willing to use the permanent method than the SARC methods (table 3).

When looking at the parity of the women, those having three or more children had a higher likelihood of using both permanent (aRRR: 3.10, 95% CI: 1.30 to 7.41) and LARC methods (aRRR: 3.65, 95% CI: 1.87 to 7.92) compared with SARC methods in comparison with those having no children. Women who gave no birth in the last 5 years were 40% (aRRR: 1.40, 95% CI: 1.11 to 1.76) more likely to use the permanent contraceptive methods than the SARC methods. When looking at the decision-making for contraceptive use, we found when the decision was only by husband/partner (aRRR: 7.03, 95% CI: 5.15 to 9.60) and joint decision (aRRR: 1.84, 95% CI: 1.47 to 2.30), the likelihood of using the permanent methods was 7.03 times and 1.84 times higher, respectively, compared with the decision taken by the women own. Women with high decision-making power were 2.12 times (aRRR: 2.12, 95% CI: 1.62 to 2.77) more likely to use permanent methods compared with those with low decision-making power. For women from richest households, the likelihood of using LARC methods was 62% lower (aRRR: 0.38, 95% CI: 0.23 to 0.63) than those from the poorest households (table 3).

DISCUSSION

This study found that the factors associated with permanent method use versus SARC include the age of women,

education of women, women's employment status, religion, BMI, media exposure, parity, birth in the last 5 years, the decision to use contraception and women's decision-making power while factors associated with the use of LARC versus SARC methods were the education of women, religion, parity, the decision to use contraception and household wealth status.

Among the contraceptive users, 83.48% of the participants used the SARC method and 11.34% and 5.18% used the permanent and LARC methods, respectively. SARC methods were among the most popular in Bangladesh, except for older women, among the modern methods.[21] The key rationales for SARC use on a large scale were strategic behaviour change communication programmes involving the integration of three major communication channels—mass media, interpersonal and community channels—as well as the introduction of new brands of contraceptives, an effective commodity supply chain and continuing and strengthening domiciliary services.[47] Another study also identified that women who chose to use SARC over LARC significantly believed that LARC is not effective in preventing pregnancy.[48] Not everyone prefers LARC, and factors other than effectiveness in preventing pregnancy are also important in making contraceptive decisions. While expanding access to LARC for those who choose to use such methods is important, FP providers should disclose women's true contraceptive preferences. In addition, educational materials should include information on all contraceptive method options.

In line with other studies in North West Ethiopia[49] and Central Ethiopia,[50] the study indicated a significant relationship between age and the usage of permanent contraceptive methods among the increasingly aged women compared with the younger ones. The older women could have more children and were more motivated to restrict their pregnancies, which might be the most probable reason for this finding.[49] Also, the fact that couples generally do not begin using permanent FP strategies until they have the desired number of children, which generally coincides with older ages and larger female parities.[51]

Women with no formal education or less education were more likely to use both permanent and LARC methods than those with higher education, consistent with findings from Kenya,[52] and Ethiopia.[53] Previous studies reported that the highest fertility rates are found in women with less education, and also they begin having children sooner. Therefore, they are more willing to attain their desired children earlier than the higher educated women.[54 55] Hence, as they age, they may be more likely to use the permanent and LARC methods to prevent pregnancies, which might explain this finding. Besides, educated women might have better knowledge of the menstrual cycle and management of SARC methods, and hence they are more willing to use SARC methods than the permanent and LARC methods.

Our study showed a significant association between women's employment status and their use of the permanent contraceptive method. Unemployed women were

Table 2 Distribution of using contraception methods among women in Bangladesh by explanatory variables (N=9669)

Variables	Weighted n (%)	Contraceptive method (weighted n (%), row)		
		Permanent method	**LARC method**	**SARC method**
Overall % (95% CI)	9669	11.34(10.72 to 11.99)	5.18(4.75 to 5.64)	83.48(82.73 to 84.21)
Age of women				
15–24 years	2573 (26.61)	19 (0.74)	121 (4.69)	2433 (94.57)
25–34 years	3953 (40.88)	351 (8.89)	216 (5.47)	3386 (85.64)
35–49 years	3143 (32.51)	726 (23.09)	164 (5.22)	2254 (71.70)
Education of women				
No education	1417 (14.66)	353 (24.87)	100 (7.05)	965 (68.08)
Primary	3133 (32.41)	446 (14.23)	187 (5.96)	2500 (79.81)
Secondary	3965 (41.00)	243 (6.12)	190 (4.79)	3532 (89.09)
Higher	1153 (11.93)	55 (4.79)	24 (2.11)	1074 (93.10)
Women employment status				
Working	5014 (48.15)	629 (12.55)	295 (5.88)	4090 (81.57)
Not working	4656 (51.85)	467 (10.03)	206 (4.42)	3982 (85.54)
Husbands' education				
No education	2190 (22.65)	421 (19.24)	158 (7.20)	1611 (73.56)
Primary	3258 (33.70)	362 (11.11)	198 (6.07)	2698 (82.82)
Secondary	2727 (28.21)	220 (8.07)	107 (3.92)	2400 (88.00)
Higher	1493 (15.45)	93 (6.21)	38 (2.57)	1362 (91.22)
Religion				
Muslim	8629 (89.24)	953 (11.04)	423 (4.91)	7253 (84.05)
Non-Muslim	1040 (10.76)	144 (13.81)	77 (7.44)	819 (78.75)
Body mass index				
Underweight	1048 (10.84)	123 (11.70)	64 (6.06)	862 (82.25)
Normal	5592 (57.84)	586 (10.47)	304 (5.43)	4703 (84.10)
Overweight	2437 (25.21)	292 (12.00)	107 (4.39)	2038 (83.61)
Obese	591 (6.11)	96 (16.17)	27 (4.51)	469 (79.32)
Media exposure				
Never/less than a week	4178 (43.21)	492 (11.77)	273 (6.54)	3413 (81.69)
At least once a week	5491 (56.79)	605 (11.01)	227 (4.14)	4659 (84.85)
Currently breast feeding				
Yes	2494 (25.80)	108 (4.32)	150 (6.00)	2237 (89.68)
No	7175 (74.20)	988 (13.78)	351 (4.89)	5835 (81.33)
Parity				
None	405 (4.19)	7 (1.73)	8 (1.98)	390 (96.29)
1–2	5585 (57.76)	291 (5.20)	283 (5.06)	5011 (89.73)
3 or more	3679 (38.05)	799 (21.71)	218 (5.92)	2663 (72.37)
Birth in the last 5 years				
No birth	5104 (52.79)	852 (16.69)	243 (4.75)	4009 (78.56)
Gave birth	4565 (47.21)	244 (5.35)	258 (5.66)	4063 (88.99)
Ever had a terminated pregnancy				
Yes	1872 (19.36)	262 (13.97)	99 (5.27)	1512 (80.76)
No	7797 (80.64)	835 (10.71)	402 (5.16)	6560 (84.14)

Table 2 Continued

Variables	Weighted n (%)	Contraceptive method (weighted n (%), row)		
		Permanent method	LARC method	SARC method
Heard about family planning from media				
Yes	1594 (16.48)	139 (8.72)	73 (4.61)	1381 (86.67)
No	8076 (83.52)	957 (11.85)	427 (5.29)	6691 (82.85)
Decision for using contraception				
Mainly respondents	1539 (15.92)	132 (8.58)	91 (5.93)	1316 (85.50)
Mainly husband/partner	631 (6.52)	163 (25.81)	9 (1.46)	459 (72.72)
Joint decision	7499 (77.55)	801 (10.69)	400 (5.34)	6297 (83.97)
Knowledge of ovulatory cycle				
Yes	3290 (34.03)	334 (10.16)	165 (5.02)	2791 (84.83)
No	6378 (65.97)	762 (11.95)	336 (5.26)	5280 (82.79)
Women decision-making power				
High	784 (8.11)	152 (19.39)	41 (5.26)	591 (75.35)
Moderate	5893 (60.94)	677 (11.49)	310 (5.26)	4906 (83.25)
Low	2992 (30.95)	267 (8.93)	150 (5.00)	2575 (86.06)
Household wealth status				
Poorest	1966 (20.33)	253 (12.85)	157 (7.98)	1557 (79.17)
Poorer	1939 (20.06)	239 (12.33)	120 (6.20)	1581 (81.47)
Middle	1915 (19.81)	223 (11.65)	110 (5.72)	1583 (82.63)
Richer	2011 (20.80)	212 (10.55)	75 (3.71)	1725 (85.74)
Richest	1836 (18.99)	169 (9.21)	39 (2.15)	1627 (88.64)
Place of residence				
Rural	6811 (70.44)	817 (11.99)	387 (5.68)	5608 (82.33)
Urban	2858 (29.56)	280 (9.79)	114 (3.98)	2464 (86.23)
Administrative division				
Barisal	531 (5.49)	30 (5.73)	28 (5.31)	472 (88.96)
Chittagong	1493 (15.45)	143 (9.60)	63 (4.25)	1287 (86.15)
Dhaka	2473 (25.58)	283 (11.46)	115 (4.63)	2075 (83.91)
Khulna	1136 (11.75)	132 (11.62)	59 (5.16)	945 (83.22)
Mymensingh	803 (8.30)	69 (8.62)	39 (4.89)	694 (86.49)
Rajshahi	1439 (14.88)	184 (12.78)	83 (5.77)	1172 (81.45)
Rangpur	1314 (13.59)	191 (14.53)	95 (7.20)	1028 (78.27)
Sylhet	480 (4.97)	63 (13.14)	19 (3.97)	398 (82.88)

LARC, long-acting reversible contraceptive ; SARC, short-acting reversible contraceptive .

more likely to use the permanent method, aligned to a study from Northern Ethiopia.[56] The plausible explanation might be that unemployed women in Bangladesh might experience financial hardship and lack the resources to maintain additional children. In addition, permanent contraceptive techniques provide a long-term solution to preventing future pregnancies, which might be a more cost-effective strategy. We found that, non-Muslim (Hindus, Christians, Buddhists and others) women were more likely to use both permanent and LARC methods compared with Muslim women. This conclusion was in

alignment with studies in North East Ethiopia,[57] Nepal[58] and Malawi.[59] Possible explanations for our findings could be the apparent disagreement between religious teachings and the avoidance of contraception.[59] Besides, a further qualitative investigation is warranted to know the in-depth scenario of why Muslim women are less likely to use permanent and LARC methods in Bangladesh.

Furthermore, women were more likely to use the permanent and LARC methods if exposed to the media at least once a week. A significant association with media exposure indicates a positive influence of media on

Table 3 Multilevel multinomial regression showing the factors associated with contraceptive method use among Bangladeshi women

Variables	Permanent method versus SARC method		LARC method versus SARC method	
	aRRR	95% CI	aRRR	95% CI
Fixed-effect results				
Age of women				
15–24 years (RC)	1		1	
25–34 years	7.03***	4.17 to 11.85	0.97	0.73 to 1.28
35–49 years	12.53***	7.27 to 21.58	0.87	0.60 to 1.29
Education of women				
No education	2.93***	1.88 to 4.58	2.35**	1.32 to 4.18
Primary	2.19***	1.44 to 3.33	1.77*	1.04 to 2.99
Secondary	1.24	0.84 to 1.83	1.55	0.95 to 2.53
Higher (RC)	1		1	
Women employment status				
Working (RC)	1		1	
Not working	1.19*	1.00 to 1.40	1.05	0.85 to 1.30
Husbands' education				
No education	1.14	0.79 to 1.64	1.53	0.95 to 2.47
Primary	0.89	0.63 to 1.25	1.33	0.85 to 2.08
Secondary	0.88	0.63 to 1.22	1.10	0.71 to 1.69
Higher (RC)	1		1	
Religion				
Muslim (RC)	1		1	
Non-Muslim	1.35*	1.04 to 1.76	1.73***	1.27 to 2.35
Body mass index				
Underweight	1.56**	1.21 to 2.02	1.16	0.86 to 1.55
Normal (RC)	1		1	
Overweight	0.90	0.75 to 1.08	0.95	0.75 to 1.22
Obese	1.33*	1.00 to 1.76	1.19	0.76 to 1.85
Media exposure				
Never/less than a week (RC)	1		1	
At least once a week	1.24*	1.03 to 1.49	0.87	0.69 to 1.10
Currently breast feeding				
Yes	0.75	0.56 to 1.01	1.09	0.83 to 1.43
No (RC)	1		1	
Parity				
None (RC)	1		1	
1–2	1.05	0.45 to 2.48	1.07	0.49 to 2.57
3 or more	3.10*	1.30 to 7.41	3.65**	1.87 to 7.92
Birth in the last 5 years				
No birth	1.40**	1.11 to 1.76	0.89	0.68 to 1.17
Gave birth (RC)	1		1	
Ever had a terminated pregnancy				
Yes	1.08	0.91 to 1.28	0.94	0.73 to 1.20
No (RC)	1		1	
Heard about family planning from media				

Continued

Table 3 Continued

Variables	Permanent method versus SARC method		LARC method versus SARC method	
	aRRR	95% CI	aRRR	95% CI
Yes (RC)	1		1	
No	1.04	0.83 to 1.32	0.77	0.57 to 1.02
Decision for using contraception				
Mainly respondents (RC)	1		1	
Mainly husband/partner	7.03***	5.15 to 9.60	0.34**	0.16 to 0.68
Joint decision	1.84***	1.47 to 2.30	0.98	0.76 to 1.26
Knowledge of ovulatory cycle				
Yes (RC)	1		1	
No	1.02	0.87 to 1.20	0.97	0.79 to 1.19
Women decision-making power				
High	2.12***	1.62 to 2.77	1.20	0.82 to 1.74
Moderate	1.14	0.95 to 1.37	0.95	0.76 to 1.18
Low (RC)	1		1	
Household wealth status				
Poorest (RC)	1		1	
Poorer	0.88	0.69 to 1.12	0.88	0.66 to 1.16
Middle	0.82	0.63 to 1.07	0.81	0.59 to 1.12
Richer	0.81	0.61 to 1.09	0.65*	0.45 to 0.93
Richest	0.84	0.59 to 1.20	0.38***	0.23 to 0.63
Place of residence				
Rural	0.97	0.78 to 1.21	0.88	0.66 to 1.15
Urban (RC)	1		1	
Administrative division				
Barisal	0.48**	0.31 to 0.74	0.95	0.58 to 1.55
Chittagong	0.74	0.51 to 1.07	0.80	0.50 to 1.28
Dhaka (RC)	1		1	
Khulna	1.14	0.79 to 1.63	1.01	0.63 to 1.61
Mymensingh	0.62*	0.41 to 0.92	0.89	0.55 to 1.42
Rajshahi	1.21	0.84 to 1.72	1.16	0.74 to 1.82
Rangpur	1.11	0.77 to 1.61	1.08	0.68 to 1.72
Sylhet	1.04	0.71 to 1.52	0.64	0.38 to 1.07
Random-effect results				
Cluster random effects	0.577	0.420 to 0.792	0.670	0.456 to 0.985

*p<0.05, **p<0.01, ***p<0.001.
aRRR, adjusted relative risk ratio; LARC, long-acting reversible contraceptive ; RC, reference category; SARC, short-acting reversible contraceptive .

contraception choices. Our findings coincide with those from studies conducted in SSA,[60] and Western Ethiopia.[61] Women exposed to media at least once a week may obtain information regarding FP since the media can describe various methods, their advantages and where they are accessible to women, improving women's usage of contraceptive methods.[43]

Regarding parity, women with three or more children were more likely to use both permanent and LARC methods. According to previous studies,[4 62 63] using permanent and LARCs increases as children grow.[64] One explanation could be that multiparous women frequently get FP information and counselling on contraceptive usage throughout their pregnancy counselling or that women who have previously achieved their desired fertility may take permanent contraceptives or LARCs until menopause.[4 64] Also, there was a higher tendency for women who had not given birth in the previous 5 years to use

permanent contraceptive methods. The fact behind this finding could be that women who had not given birth in the last 5 years might have already adopted the permanent contraceptive methods.

In this study, we identified that when decision-making for contraception use was taken solely by the husband or jointly (both respondents and their husband), the use of the permanent contraception method was higher, that is, the husband's approval had a more significant influence. The earlier investigations found positive associations between contraceptive use and the husband's acceptance and shared decision.[61 65–68] The most likely explanation could be that Bangladesh has a traditional society where women are expected to follow their husbands' advice in many aspects of life[66] and frequently require their husbands' consent before using contraception.[36] On the other hand, a few husbands might be unaware of the advantages of LARCs, and some might even have misapprehended that they are incompatible with the use, which might be the possible reasons for the low use of LARCs when the decision was taken by the husbands only.[65]

Notably, the likelihood of using permanent contraception was higher among women with high decision-making power than those with low decision-making power. We observed a consistent result in our study that is in agreement with other studies from SSA[69 70] and the Democratic Republic of the Congo.[71] Though a previous study argued that women are more likely to prefer a readily accessible type of contraception regardless of their empowerment status,[70] an alternative statement might explain our finding that increasing women's autonomy gives them greater authority to choose whether or not to use contraception as well as which contraceptive method to use.[40]

Women from affluent households tended to adopt LARC methods less than those from households with lower wealth quintiles. This result is in line with the findings from previous studies conducted in Ethiopia,[8] France,[72] Bangladesh and India.[73] Bangladesh's government has prioritised contraceptive services, and the country has a substantial budget that includes money for client repayment and provider payments, which might explain this situation.[74] Additionally, wealthy families might believe that their children could help them maintain their wealth, and they might need more family members to inherit their assets when they pass away.[8] In contrast, poorer families might use a variety of contraceptive methods for an effective and long-lasting method of pregnancy prevention because childbirth and parenting are more expensive.[8]

Implications for public health research and policy

There are several benefits from this study regarding public health and policy. This study identified a positive association between household wealth status and LARC practices among women, where affluent women were less likely to use the LARC method than the poorest women. This association was significant and it indicates a disparity in accessing LARC and permanent methods in Bangladesh. Further, prospective studies and qualitative exploration could be adopted to investigate why women from wealthier households are less willing to use the LARC method in Bangladesh. Along with the government, this inequity could be addressed by other relevant stakeholders. We also identified that media exposure among women significantly influenced their choice of permanent method. Given that media is an inexpensive way to convey information and spread awareness among women, it might be used objectively to promote FP by sensitising and creating awareness regarding the availability and useability of the services. To increase the permanent and LARC methods uptake, who choose to use them, we also recommend that public health campaigns and policies focusing on young and employed women and those having lower decision-making power might be created and disseminated. Finally, the findings of this study will be helpful to our policymakers in reducing maternal mortality rates and controlling fertility rates in Bangladesh and other similar settings. Besides, further trend analysis using data from previous survey waves of BDHS is recommended to look at the demographic shifts over time in contraceptive use among Bangladeshi women.

Strengths and limitations

The major strength of this study is the use of the most recent nationally representative data set; therefore, the study results could be generalisable across the country and other similar settings. The cluster effect on the factors associated with the contraception method usage in Bangladesh was taken into account in this study using a multilevel model where clusters were considered as level-2 factor, which is the proper analytical strategy for this type of hierarchical data. This study identified the factors associated with both permanent and LARC methods among Bangladeshi women. However, this study has some limitations, and one of those is that the cross-sectional study design prevented us from concluding the causal association between outcome and explanatory variables. Furthermore, some important factors related to the respondent's health were not included in this study due to the unavailability and incomplete information of those variables in the data set.

CONCLUSION

Among modern contraceptive users, about 83.48% of participants used the SARC methods, while only 11.34%, and 5.18% of women used permanent and LARC methods, respectively. This study found that women with no/less education, non-Muslims and having parity of ≥3 were more likely to use both permanent and LARC methods compared with SARC methods. Besides, women from higher age groups, those with media exposure, and high decision-making power were more likely to use the permanent methods, while women within the richest wealth index were less likely to use the LARC methods compared with the SARC methods. Targeted

interventions could be developed and implemented to promote personalised contraceptive use.

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