Contraception and Reproductive Medicine

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Association between women's empowerment and use of modern contraception methods in Bangladesh: evidence from Bangladesh demographic and health survey 2022

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Abstract

Background While women's empowerment is widely recognized as a significant factor influencing the use of modern contraception, most studies focus primarily on women's decision-making autonomy as a measure of empowerment, often overlooking other dimensions such as social independence. This study aims to explore the association between multiple dimensions of women's empowerment and the use of modern contraceptives among reproductive-aged women in Bangladesh.

Methods Data of 17,848 currently married reproductive-aged women were analyzed from the 2022 Bangladesh Demographic and Health Survey. The outcome variable considered was the use of modern contraceptive methods (yes, no). The survey-based women's emPowERment index (SWPER) was considered as main explanatory variable. The index encompasses three domains: (i) attitude to violence, (ii) social independence, and (ii) decision-making. These domains were classified as low, medium, and high empowerment. Multilevel mixed-effect logistic regression model was used to assess the association between SWPER index and use of modern contraception methods adjusted for confounding factors.

Results The prevalence of modern contraceptive method use was 58.3% (95% CI: 57.3–59.4). Women with higher empowerment in the attitude toward violence and decision-making domains had slightly higher prevalence rates of 58.5% (95% CI: 57.4–59.6) and 58.9% (95% CI: 57.7–60.2), respectively. Conversely, among women with high empowerment in the social independence domain, the prevalence of modern contraceptive use was lower at 52.5% (95% CI: 50.3–54.6). While no significant associations were observed in the attitude toward violence and decision-making domains, women with high empowerment in these areas had 1.14 times (95% CI: 0.97–1.34) and 1.05 times (95% CI: 0.95–1.15) higher odds of using modern contraception, respectively, compared to those with low empowerment. In contrast, women with high empowerment in the social independence domain had 14% lower odds of using modern contraception (aOR: 0.86; 95% CI: 0.79–0.95) compared to their counterparts.

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Conclusion These findings suggest that different dimensions of women's empowerment may have varying influences on contraceptive use, highlighting the need for targeted interventions to improve reproductive health outcomes.

Keywords Women's empowerment, Contraception use, Bangladesh demographic and health survey, Bangladesh

Background

The current public health interventions in low- and middle-income countries (LMICs) primarily aim to address the prevailing higher rates of unintended pregnancies, short interval births, and a significant proportion of unsafe abortions [1, 2]. Together these contribute to the higher occurrence of maternal and child morbidity and mortality in LMICs [2–4]. Access to modern and effective contraceptive methods can alleviate these persistent public health concerns by improving women's reproductive practices [5–7]. This ensures proper spacing between childbirths and aligns with their intentions for additional pregnancies, thereby reducing the incidence of short-term pregnancies and positively impacting maternal and child health outcomes [8, 9]. However, despite the critical importance of ensuring access to modern contraception, its utilization remains notably low in LMICs, with a concerning trend observed in Bangladesh [10–14], where the modern contraception use has stagnated since 2000's decades [15, 16]. This highlights a persistent challenge in addressing the reproductive health needs of the population, posing a risk to achieving universal access to modern contraception as outlined in Sustainable Development Goal (SDG) 3, target 3.7. Additionally, it underscores the barriers to achieving SDG 5, which aims to promote gender equality and empower women and girls [17, 18].

Empowerment is a broad and multidimensional concept and is measured using several indices, including economic, social independence and socio-cultural, interpersonal or familial––such as domestic supports towards exercising of their rights, power over sexual relationships, women's controls over finances or resources for the family [19, 20]. It emphasizes the underscore of achievements which allows women to express their rights and raise voice in their lives [21]. Furthermore, women's empowerment is also defined as the measures of their decision-making role in the household, reflecting freedom of choice and opinion, and also freedom of movement to make them capable in taking necessity decisions in the household [20, 21]. It also plays a significant role in sustaining maternal and child health outcomes in LMICs, particularly in Bangladesh [22–27]. A previous study indicated that women with higher empowerment were most likely to utilize antenatal care, delivery healthcare services supports from skilled birth attendants and postnatal healthcare services in Bangladesh [22]. Moreover, a systematic review conducted covering literature from LMICs showed the positive associations of higher women empowerment with improving maternal and child health outcomes, including use of antenatal healthcare, delivery healthcare, postnatal healthcare, and full vaccination [23]. There is also evidence that women's empowerment is significantly increase modern contraception usage [21, 28, 29], by increasing their ability to discuss contraception with their husbands and jointly make informed decisions [30, 31]. This, in turn, contributes to a smaller family size, reduced occurrence of short interval births, and reduced occurrence of pregnancy terminations [32, 33]. However, the extent of this association remains largely unexplored in Bangladesh, with existing literature reporting conflicting findings—ranging from significant to insignificant associations, as well as varying strengths of these relationships [21–23, 28, 29]. Moreover, a systematic review of studies conducted in Bangladesh provides evidence that, although research has explored women's empowerment and contraception use, it has largely overlooked the use of comprehensive measures such as the SWPER index [23]. To address these gaps, we conducted this study to explore the association between modern contraception use and women's empowerment, measured using the comprehensive SWPER index.

Methods

Study design and sampling strategy

Data for this study were extracted from the 2022 Bangladesh Demographic and Health Survey (BDHS), a nationally representative cross-sectional survey. It is important to note that we initially developed this manuscript using data from the 2017/18 BDHS. However, following reviewer comments on the first draft, we updated it with data from the 2022 BDHS. Both surveys followed a similar sampling strategy and were conducted by the National Institute of Population Research and Training (NIPORT), an independent research organization under the Ministry of Health and Family Welfare in Bangladesh. Financial support was provided jointly by the Government of Bangladesh (GoB) and the United States Agency for International Development (USAID) and technical assistance was provided by ICF to conduct this survey. The survey selected the nationally representative households through two-stage stratified sampling methods. In the first stage of sampling, the survey selected 675 clusters (237 in urban areas and 438 in rural areas) from the list of 296,718 clusters that was created by the Bangladesh Bureau of Statistics as part of the 2011 National

Population Census [34]. Of the selected clusters, data were successfully collected from 674 clusters with the one remaining rural cluster located in Cox's Bazar was excluded due to security concerns. In the second stage of sampling, 45 households were systematically selected from each cluster, resulting a list of 30,330 households. Of these, data were collected from 30,018 households with a response rate of 99.6%. Among the interviewed households, there were 30,358 eligible women, of which 20,217 women were eligible for the full questionnaire and 10,141 for the short questionnaire. Of the eligible women, 30,078, 19,987, and 10,091 women were successfully interviewed for overall, full and short questionnaire, respectively, and included in the survey. Detailed information on the sampling procedure of the BDHS has been published in the respective survey report [35].

Study sample

Data of 17,848 women from the original sample included in the BDHS 2022 analyzed in this study (Fig. 1). This selection was based on the following inclusion criteria: (i) reproductive-aged (15–49) married women with ability to conceive, (ii) sexually active (at least one episode of sexual intercourse was reported within one month of the survey day), (iii) not currently pregnant and not in the post-partum amenorrhea period, and (iv) reported information related to the women's empowerment domains questions.

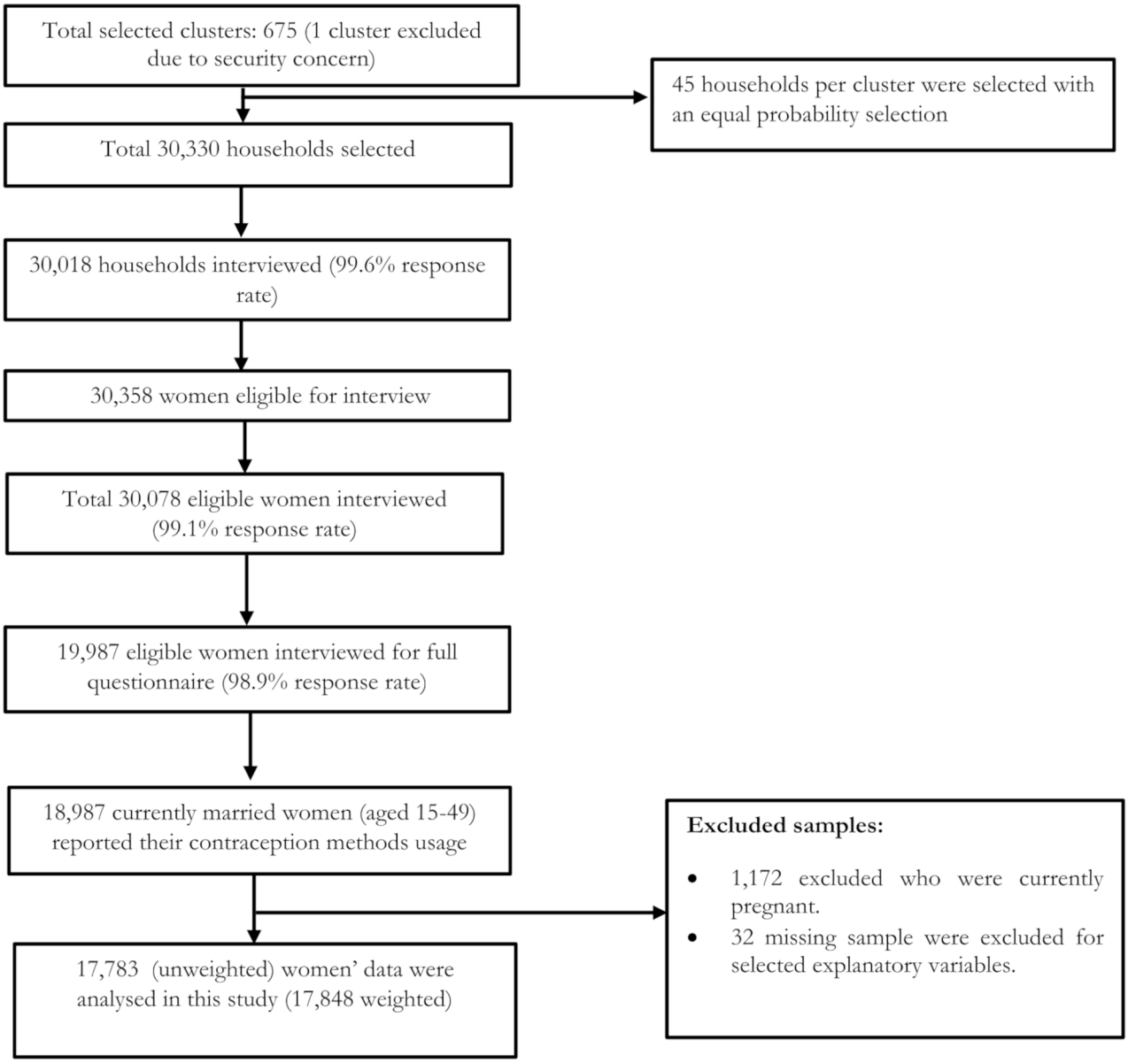

Fig. 1 Sampling strategy of the 2022 BDHS and sample selection procedure for this study

Outcome variable

Modern contraception method use (yes/no) was considered the outcome variable. This variable was generated based on women's responses regarding their use or non-use of contraception method, along with the reported type of contraceptive method. Eligible women were first asked, *"Are you or your husband currently doing something or using any method to delay or avoid getting pregnant?"* Responses were recorded dichotomously as *"yes"* or *"no."* Women who responded *"yes"* were then asked, *"Which method are you using?"* They were provided with a list of contraceptive methods to choose from, along with an open-ended option to report any methods not listed. If a woman reported using multiple forms of contraception, she was asked to specify her most recent method. Based on their responses, women were classified as modern contraceptive users if they reported using methods such as pills, condoms, or intrauterine devices (IUDs), following the classification provided by the World Health Organization (WHO) and adopted by the BDHS [36–38].

Explanatory variables

The primary explanatory variable in this study was women's empowerment, measured using the SWPER index across three domains: (i) attitude toward violence, (ii) social independence, and (iii) decision-making. The *attitude toward violence* domain includes five questions assessing women's perceptions of whether wife beating is justified in various situations, such as going out without informing the husband, arguing with him, refusing sex, neglecting the children, or burning food (Supplementary Table 1). The *social independence* domain includes factors such as the frequency of reading newspapers or magazines, years of completed education, age at first birth, age at first cohabitation, and age and education differences between the woman and her husband.

The *decision-making* domain is based on three questions related to personal healthcare, major household purchases, and arranging visits to family or relatives. A total of 14 components were used to construct the SWPER index, which was generated using principal component analysis (PCA) [39, 40]. This approach aligns with the development and standardization of the Global SWPER [39, 40]. Each SWPER domain was then classified into low, medium, and high categories using standard cut-off points [39, 40]. We have also reported the Cronbach's alpha coefficients for all items and each of the SWPER domains (Supplementary Table 1). The Cronbach's alpha coefficient for all items was 0.69. Considering the SWPER domains, the Cronbach's alpha coefficients for attitude to violence, social independence, and decision-making were 0.68, 0.71, and 0.78, respectively, indicating acceptable to good reliability.

Confounding factors

Multiple factors were considered as potential confounding variables to explore association between the exploratory and outcome variables. These factors were identified through an extensive literature search which was guided by relevant existing studies conducted in LMICs and Bangladesh [21, 28, 29, 41–43]. The factors included were women's employment status (no vs. yes), partner's occupation (agricultural worker, non- agricultural worker, services, business, and others), and household wealth status (poorest, poorer, middle, richer, and richest) place of residence (urban or rural) and administrative divisions (Barishal, Chattogram, Dhaka, Khulna, Rajshahi, Rangpur, and Sylhet).

Statistical analysis

We summarized the characteristics of the respondents using descriptive statistics. Pearson chi-squared test was used to assess the significant differences between the outcome and explanatory variables. Multi-level mixed-effect logistic regression model was employed to explore association between outcome and explanatory variables adjusted for confounding factors. The reason for using the multi-level regression was the nesting structure of the BDHS data, where individuals were nested within a household, and households were nested within a cluster. Previous study has recommended using multi-level logistic regression model in such hierarchical data [44]. Three different models were run, separately for each dimension of the SWPER index. Sampling weight and complex survey design were considered in all analyses by Stata's "svy" command. Multicollinearity was checked before running each model. All statistical tests were two-sided, and a p-value < 0.05 was considered statistically significant. Results were reported as adjusted odds ratio (aOR) with corresponding 95% confidence interval (95% CI). We also reported the cluster level variance and summary statistics for each model through Intra-Class Correlation Coefficient (ICC), Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC). Stata software version 17.0 was used for all statistical analyses.

Ethical approval and consent to participate

We analyzed secondary data extracted from the 2022 Bangladesh Demographic and Health Survey. The survey collected nationally representative data following ethical approval from the Bangladesh Medical Research Council (BMRC) and ICF. The data were provided in a de-identified format after submitting a research proposal specific to this study. Therefore, no additional ethical approval was required.

Table 1 Background characteristics of the study population, BDHS, 2022 (weighted *n* = 17,848)

Characteristics	Percentage (%)	95% CI
Women's formal employment status		
No	67.9	66.3–69.4
Yes	32.1	30.6–33.7
Partner's occupation		
Agricultural worker[a]	24.7	23.4–26.1
Non-agricultural laborer[b]	45.3	44.0-46.7
Services	6.5	5.9–7.2
Business	19.4	18.6–20.2
Others	4.1	3.8–4.5
Household wealth status		
Poorest	17.5	16.4–18.8
Poorer	20.3	19.3–21.3
Middle	20.6	19.6–21.6
Richer	21.0	19.9–22.1
Richest	20.6	19.1–22.3
Place of residence		
Urban	28.4	27.2–29.6
Rural	71.6	70.4–72.8
Administrative divisions		
Barishal	6.1	5.7–6.4
Chattogram	18.4	17.3–19.6
Dhaka	25.4	24.3–26.5
Khulna	12.0	11.4–12.6
Mymensingh	7.6	7.2–7.9
Rajshahi	13.4	12.6–14.2
Rangpur	11.6	11.2–12.0
Sylhet	5.5	5.3–5.8

Notes: [a]Land owner, farmer, agriculture worker, fisherman, poultry rising, cattle rising, and home-based manufacturer; [b]Rickshaw/bus/ taxi driver, brick field worker, domestic servant, non-agricultural worker, carpenter, and masson

Results

Background characteristics of the respondents

Table 1 presents the background characteristics of the respondents. Almost 32% of the total respondents had engaged with formal employment status. Nearly 25% of the women's partners worked as an agricultural worker and 45% worked as non-agricultural worker. Around 72% of the total respondents reported living in rural areas as their place of residence.

Patterns of modern contraception method usage and women's empowerment as per domains of SWPER

The pattern of modern contraceptive methods uses and women's empowerment are presented in Table 2. The reported prevalence of modern contraceptive method use was 58.3%. Of them, the highest usage method was pills (29.3%), followed by injectables (12.1%) and male condoms (8.6%). In SWPER index, around 85% and 60% of the total women reported they had high empowerment in attitude to violence and decision-making domains, respectively, while only 16% of the women reported they had high empowerment in social independence domain.

Table 2 Patterns of modern contraceptive methods use and women's empowerment as per domains of SWPER

Outcome variable	Percentage (%)	95% CI
Overall modern contraception methods use	**58.3**	**57.3–59.4**
Pills	29.3	28.2–30.3
Intrauterine device (IUD)	0.5	0.4–0.6
Injectables	12.1	11.3–13.0
Male condoms	8.6	8.0-9.4
Female sterilization	4.8	4.4–5.2
Male sterilization	1.0	0.8–1.2
Implants, and other modern	2.0	1.7–2.3
Domains of SWPER		
Attitude to violence		
Low empowerment	3.8	3.4–4.3
Medum empowerment	10.8	10.2–11.5
High empowerment	85.3	84.4–86.2
Social independence		
Low empowerment	44.3	43.1–45.4
Medum empowerment	39.4	38.6–40.4
High empowerment	16.3	15.5–17.2
Decision-making		
Low empowerment	14.0	13.2–14.7
Medum empowerment	26.0	25.1–27.0
High empowerment	60.0	58.9–61.1

Note: All percentages are weighted. +Others modern = LAM, emergency, and others modern methods. SWPER = Survey-based Women's emPowERment index

Distribution of modern contraceptive methods use by respondents' characteristics

Table 3 presents the percentage distribution of modern contraception use across women's empowerment as per domains of SWPER and respondent's socio-demographic characteristics. We found higher prevalence of modern contraception use among women who had higher empowerment in attitude to violence and decision-making domains (58.5% and 58.9%), respectively. Conversely, the prevalence was lower among high empowered women in social independence domain (52.5%). The prevalence of modern contraceptive use was higher among women whose husbands were engaged in business occupations (63.6%). Additionally, women from the poorest households had a higher prevalence of modern contraceptive use (65.1%) compared to those from wealthier households. Geographically, women who lived in rural areas had lower prevalence of modern contraceptive methods use (59%). Modern contraceptive methods use was higher among women who resided in Rangpur and Rajshahi divisions.

Table 3 Prevalence of modern contraception use across women's empowerment as per domains of SWPER and respondent's individual, household, and community level characteristics, BDHS, 2022

Characteristics	Modern contraception methods use, %	95% CI	[a]*P*-value
SWPER: attitude to violence			0.208
Low empowerment	56.3	52.1–60.5	
Medum empowerment	57.8	55.3–60.4	
High empowerment	58.5	57.4–59.6	
SWPER: social independence			**< 0.001**
Low empowerment	59.5	58.1–60.8	
Medum empowerment	59.5	57.9–61.0	
High empowerment	52.5	50.3–54.6	
SWPER: decision-making			0.149
Low empowerment	56.8	54.5–59.1	
Medum empowerment	57.8	56.0-59.6	
High empowerment	58.9	57.7–60.2	
Women's formal employment status			**< 0.001**
No	55.9	54.7–57.2	
Yes	63.4	61.8–64.9	
Partner's occupation			**< 0.001**
Agricultural worker[b]	62.8	61.1–64.4	
Non-agricultural laborer[c]	55.4	53.9–56.9	
Services	55.3	51.7–58.9	
Business	63.6	61.7–65.5	
Others	44.2	40.1–48.4	
Household wealth status			**< 0.001**
Poorest	65.1	63.0-67.1	
Poorer	59.9	58.0-61.8	
Middle	59.1	57.2–60.9	
Richer	57.8	55.8–59.8	
Richest	50.8	48.8–52.9	
Place of residence			**< 0.001**
Urban	59.0	57.1–60.9	
Rural	58.1	56.8–59.3	
Administrative divisions			**< 0.001**
Barishal	57.5	54.3–60.6	
Chattogram	52.9	49.5–56.3	
Dhaka	56.5	54.2–58.8	
Khulna	60.0	57.5–62.5	
Mymensingh	62.9	60.1–65.7	
Rajshahi	63.8	61.3–66.3	
Rangpur	65.1	62.2–67.8	
Sylhet	48.3	45.4–51.2	

Notes: All percentages are weighted and presented as row percentages. [a]*P*-values are obtained from Pearson chi-square test. SWPER = Survey-based Women's emPowERment index. [b]Land owner, farmer, agriculture worker, fisherman, poultry rising, cattle rising, and home-based manufacturer; [c]Rickshaw/bus/ taxi driver, brick field worker, domestic servant, non-agricultural worker, carpenter, and masson

Association between women's empowerment as per domains of SWPER and modern contraception methods use

Table 4 presents the adjusted associations between modern contraception methods use and domain of women's empowerment as per SWPER index. We found no significant association of modern contraception use with the attitude to violence and decision-making domains of the SWPER index, although the odds ratio of modern contraception use was higher. However, we found that higher empowerment in the social independence domain was significantly associated with reduced odds (aOR: 0.86; 95% CI: 0.79–0.95) of using modern contraception.

We found that women engaged in formal employment had higher odds of using modern contraception across all three domains of the SWPER index. Similarly, women whose partners worked in business were more likely to use modern contraception in all three domains. In contrast, women from wealthier households and rural areas had lower odds of using modern contraception. Regional differences were also observed. Women from most divisions, particularly Rajshahi and Rangpur, had higher odds of using modern contraception across all SWPER domains, while women from the Sylhet division had lower odds of modern contraception use.

Discussion

The aim of this study was to examine the association between women's empowerment, as measured by the SWPER index, and the use of modern contraceptive methods among reproductive-aged women in Bangladesh. Our findings indicate that 58.3% of women in Bangladesh use modern contraception methods. Modern contraceptive methods use was higher among women with high empowerment in the attitude to violence (58.5%) and decision-making (58.9%) domains. Conversely, women with high empowerment in the social independence domain had lower contraceptive use (52.5%). In the multilevel logistic regression model, no significant associations were found between modern contraceptive use and the attitude to violence and decision-making domains. However, a significant association emerged in the social independence domain, where women with higher empowerment had lower odds of using modern contraception. These findings highlight the complexity of these relationships and emphasize the need for targeted policies to address barriers and promote reproductive health across different empowerment domains.

The estimated prevalence of modern contraceptive use in this study is consistent with previous studies in Bangladesh [29, 45–48] but is higher than in other South Asian countries such as Nepal and Myanmar [13, 14]. Notably, the prevalence in Bangladesh is significantly higher

Table 4 Results from the adjusted multilevel mixed-effect logistic regression model in assessing the association of women's empowerment domain as per SWPER index with modern contraception Methos use in Bangladesh, 2022

Domains of SWPER	Modern contraception use					
	Attitude to violence		Social independence		Decision-making	
	aOR (95% CI)	*p*-value	aOR (95% CI)	*p*-value	aOR (95% CI)	*p*-value
Attitude to violence						
Low empowerment (ref)	1.00					
Medum empowerment	1.07 (0.89–1.29)	0.464				
High empowerment	1.14 (0.97–1.34)	0.110				
Social independence						
Low empowerment (ref)			1.00		1.00	
Medum empowerment			1.11 (1.04–1.19)	**< 0.001**		
High empowerment			0.86 (0.79–0.95)	**< 0.001**		
Decision-making						
Low empowerment (ref)					1.00	
Medum empowerment					1.02 (0.92–1.13)	0.685
High empowerment					1.05 (0.95–1.15)	0.350
Women's formal employment status						
No (ref)	1.00		1.00		1.00	
Yes	1.21 (1.13–1.29)	**< 0.001**	1.22 (1.13–1.31)	**< 0.001**	1.20 (1.12–1.29)	**< 0.001**
Partner's occupation						
Agricultural worker[a] (ref)	1.00		1.00		1.00	
Non-agricultural laborer[b]	0.84 (0.77–0.91)	**< 0.001**	0.84 (0.77–0.91)	**< 0.001**	0.84 (0.77–0.91)	**< 0.001**
Services	0.93 (0.81–1.08)	0.363	0.98 (0.85–1.14)	0.837	0.94 (0.81–1.08)	0.375
Business	1.23 (1.11–1.36)	**< 0.001**	1.24 (1.12–1.37)	**< 0.001**	1.23 (1.11–1.36)	**< 0.001**
Others	0.50 (0.44–0.56)	**< 0.001**	0.59 (0.50–0.70)	**< 0.001**	0.59 (0.50–0.69)	**< 0.001**
Household wealth status						
Poorest (ref)	1.00		1.00		1.00	
Poorer	0.79 (0.72–0.88)	**< 0.001**	0.80 (0.72–0.89)	**< 0.001**	0.80 (0.72–0.88)	**< 0.001**
Middle	0.75 (0.67–0.83)	**< 0.001**	0.75 (0.67–0.84)	**< 0.001**	0.75 (0.67–0.83)	**< 0.001**
Richer	0.68 (0.61–0.76)	**< 0.001**	0.68 (0.61–0.76)	**< 0.001**	0.68 (0.61–0.76)	**< 0.001**
Richest	0.49 (0.44–0.56)	**< 0.001**	0.51 (0.45–0.57)	**< 0.001**	0.50 (0.44–0.56)	**< 0.001**
Place of residence						
Urban (ref)	1.00		1.00		1.00	
Rural	0.76 (0.69–0.84)	**< 0.001**	0.75 (0.68–0.83)	**< 0.001**	0.76 (0.69–0.83)	**< 0.001**
Administrative divisions						
Barishal (ref)	1.00		1.00		1.00	
Chattogram	0.91 (0.76–1.08)	0.284	0.90 (0.75–1.08)	0.251	0.90 (0.75–1.08)	0.255
Dhaka	1.05 (0.88–1.25)	0.608	1.04 (0.87–1.24)	0.645	1.04 (0.87–1.24)	0.671
Khulna	1.18 (0.98–1.49)	0.083	1.18 (0.97–1.42)	0.090	1.18 (0.97–1.42)	0.094
Mymensingh	1.22 (1.00-1.49)	0.053	1.22 (1.00-1.49)	0.052	1.22 (0.99–1.49)	0.058
Rajshahi	1.33 (1.10–1.60)	**< 0.001**	1.32 (1.10–1.60)	**< 0.001**	1.32 (1.09–1.59)	**< 0.001**
Rangpur	1.30 (1.08–1.57)	**< 0.001**	1.31 (1.08–1.58)	**< 0.001**	1.30 (1.07–1.57)	**< 0.001**
Sylhet	0.75 (0.61–0.93)	**0.010**	0.76 (0.61–0.94)	**0.012**	0.76 (0.61–0.93)	**0.010**
Model summary						
Cluster-level variance (SE)	0.11 (0.01)		0.11 (0.02)		0.11 (0.01)	
ICC	3.21%		3.26%		3.19%	
AIC	23635.27		23608.60		23637.99	
BIC	23798.77		23772.11		23801.50	

Notes: aOR: Adjusted Odds Ratio. Ref: References. CI: Confidence Intervals. ICC: Intraclass Correlation Coefficient. AIC: Akaike's Information Criterion. BIC: Bayesian Information Criterion. SE: Standard Error. [a]Land owner, farmer, agriculture worker, fisherman, poultry rising, cattle rising, and home-based manufacturer; [b]Rickshaw/ bus/ taxi driver, brick field worker, domestic servant, non-agricultural worker, carpenter, and masson

than in India (48.6%) [11] and Pakistan (27.7%) [12]. This relatively high contraceptive use can be attributed to Bangladesh's strong government-led family planning initiatives, which have successfully expanded access to contraception through community-based interventions, door-to-door family planning services, and robust public health campaigns. The government's proactive approach, including the integration of family planning services within primary healthcare systems and the deployment of field-level health workers, has played a crucial role in improving contraceptive use across the country.

Modern contraceptive use was higher among women with greater empowerment in the decision-making domain, consistent with previous studies conducted in Bangladesh and other LMICs [21, 49–52]. Women who reported independent or joint decision-making with their husbands regarding personal healthcare, major household purchases, and visits to family were more likely to use modern contraceptive methods. This suggests that fostering women's decision-making power within households can lead to increased contraceptive use. Policies aimed at strengthening women's role in household decision-making could contribute to greater reproductive autonomy and improved family planning outcomes. Additionally, encouraging collaborative decision-making between spouses may create an environment where reproductive health choices, including contraception use, are more actively considered [21].

We found lower modern contraceptive use among women with higher empowerment in the social independence domain, a finding that aligns with previous research conducted in Bangladesh [21]. This counterintuitive result may be influenced by several factors, including a lack of communication about reproductive health, personal preferences for natural family planning methods, or evolving social norms that shape reproductive choices. Additionally, as women's empowerment continues to improve in Bangladesh, some women may prioritize career and educational aspirations over immediate family planning decisions [35]. Women with higher empowerment, characterized by higher education and formal employment, usually prefer not to access contraception from government healthcare facilities, despite these being the primary providers of contraception and family planning services [53, 54]. Their preference is driven by longer waiting times, lack of privacy, and a mismatch between their availability and the schedules of government healthcare providers [53, 54]. This underscores the need for tailored interventions that address the unique contraceptive needs of socially independent women.

Regional and urban-rural disparities in modern contraceptive use were significant in this study. Women residing in rural areas had lower odds of using modern contraception compared to those in urban areas, consistent with previous research in Bangladesh [10, 29, 48, 55, 56]. Despite the country's well-established family planning programs, the quality of contraceptive services in rural areas often remains poor, with limited availability of modern methods and inadequate counseling [57]. Moreover, poor infrastructure, including transportation and healthcare facility accessibility, further restricts rural women's ability to obtain contraceptive services [35, 55]. Regional differences were also notable, with women in Sylhet exhibiting lower contraceptive use compared to those in other divisions, possibly due to sociocultural norms and limited healthcare access.

Interestingly, women from wealthier households were less likely to use modern contraception compared to those from lower wealth quintiles. This finding aligns with previous studies in Bangladesh [10, 35, 55, 56, 58] but contradicts research from other countries, where higher socioeconomic status typically correlates with greater contraceptive use [59–61]. A possible explanation is that free contraceptive distribution programs in Bangladesh, supported by both government and international organizations, primarily target lower-income populations, thereby increasing access to modern contraception among economically disadvantaged women [35, 62]. Given the high prevalence of unintended pregnancies among lower-income groups in Bangladesh [54], this trend suggests that women from lower-income backgrounds may have a greater motivation to prevent unplanned pregnancies. These findings highlight the importance of ensuring that family planning services are equitably accessible to all socioeconomic groups.

Strengths and limitations

This study has several notable strengths that enhance the robustness of our findings. The use of nationally representative data with a large and diverse sample improves external validity and generalizability, allowing for meaningful insights into broader populations within the studied context. Additionally, employing a multilevel logistic regression model accounts for clustering effects, providing a more precise assessment of the association between women's empowerment and modern contraceptive use. This analytical approach strengthens the reliability and depth of our findings.

Despite these strengths, certain limitations must be acknowledged. Recall bias is a potential concern, as data on women's empowerment and contraceptive use were collected concurrently in a cross-sectional survey. This limitation restricts our ability to establish temporal relationships between variables, potentially introducing recall errors and affecting data accuracy. Furthermore, the cross-sectional nature of BDHS data limits causal inferences, making the observed associations susceptible to reverse causation or confounding factors.

While we adjusted for several relevant variables in our analysis, unmeasured factors—particularly at the healthcare facility level—may still influence the relationship between women's empowerment and contraceptive use. The absence of certain key variables in the survey constrained our ability to fully account for these potential influences. Recognizing these limitations is essential for a comprehensive interpretation of our findings. To address these gaps, future research should incorporate qualitative studies to provide a deeper understanding of the relationship between women's empowerment and modern contraceptive use in Bangladesh.

Conclusion

Our study establishes an association between women's empowerment and the use of modern contraceptive methods, focusing on the standardized Global SWPER index across three dimensions of empowerment. Our findings highlight the significant role of empowerment in attitudes toward violence and decision-making in positively influencing contraceptive use. Notably, the link between higher empowerment in decision-making and increased contraceptive use underscores the importance of shared decision-making in critical life matters. These results reinforce the essential connection between women's empowerment and reproductive health outcomes, emphasizing practical implications for interventions. Policymakers and healthcare providers should recognize and promote women's empowerment within households as a key factor in enhancing the use of modern contraceptive methods. By fostering greater empowerment, interventions can effectively address the complex dynamics of empowerment dimensions, contributing to more effective strategies for improving reproductive health outcomes.

Abbreviations

BDHS	Bangladesh Demographic and Health Survey
aOR	Adjusted Odds Ratio
LMICs	Low- and middle-income courtiers
SDGs	Sustainable Development Goals
FP	Family Planning
SSA	Sub-Saharan Africa
SWPER	Survey-based Women's emPowERment

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40834-025-00383-2.

Supplementary Material 1

Acknowledgements

The data analyzed in this study were derived from the Bangladesh Demographic and Health Survey Archive, and we extend our gratitude to MEASURE DHS for granting us permission to access the invaluable dataset. We also acknowledge the support of Jatiya Kabi Kazi Nazrul Islam University, Bangladesh, for their assistance in conducting this study.

Author contributions

MNK and MBA designed the study concept. MBA conducted the formal analysis with the help of MNK. MBA, SJK and MAK drafted the first manuscript. MNK and TAH reviewed the first manuscript. MNK supervised all works. All authors critically reviewed and approved the final version of this manuscript.

Funding

This research did not receive any specific funding.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Competing interests

The authors declare that they have no known competing financial interests or personal relationships.

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Received: 28 December 2023 / Accepted: 14 July 2025
Published online: 18 July 2025

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