

Assessing the pattern of key factors on women's empowerment in Bangladesh: evidence from Bangladesh Demographic and Health Survey, 2007 to 2017-18

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Abstract:	<p>This study aimed to explore the significant factors of women's empowerment and at the same time, assessed the pattern of potential factors affecting women's empowerment in Bangladesh using four cross-sectional waves of Bangladesh Demographic and Health Surveys (2007, 2011, 2014, and 2017-18) data. We put forth two domains—household decision-making and attitudes toward domestic violence—to assess women's empowerment. Principal component analysis (PCA) was employed to create women's empowerment index. In order to examine the progress of women's empowerment over the years, we utilized the frequency percentages of variables related to decision-making and attitudes toward violence. We employed the Chi-square test to assess the unadjusted association between the selected covariates and women's empowerment. To determine the adjusted association of the selected covariates with women's empowerment, we utilized the proportional odds model (POM). Findings showed that marriage at 18 or later age, education, employment, higher wealth index, media exposed, NGO membership, urban residency, etc. significantly increased the likelihood of experiencing empowerment. And most importantly, our study affirmed that, over time, women were more likely to protest against physical violence and to participate in various decision-making regarding their personal and social life. Policy making interventions are needed to raise awareness among uneducated, unemployed and economically poor, physically oppressed women through imposing strict laws and providing more facilities that can accelerate women's empowerment rapidly and in a better way.</p>
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The data underlying the results presented in the study are available from BDHS 2007, 2011, 2014, and 2017-18.

- 1.National Institute of Population Research and Training - NIPORT/Bangladesh, Mitra and Associates/Bangladesh, and Macro International. 2009. Bangladesh Demographic and Health Survey 2007. Dhaka, Bangladesh: NIPORT, Mitra and Associates, and Macro International. Available at <http://dhsprogram.com/pubs/pdf/FR207/FR207.pdf>.
- 2.National Institute of Population Research and Training - NIPORT/Bangladesh, Mitra and Associates/Bangladesh, and ICF International. 2013. Bangladesh Demographic and Health Survey 2011. Dhaka, Bangladesh: NIPORT, Mitra and Associates, and ICF International. Available at <http://dhsprogram.com/pubs/pdf/FR265/FR265.pdf>.
- 3.National Institute of Population Research and Training - NIPORT/Bangladesh, Mitra and Associates, and ICF International. 2016. Bangladesh Demographic and Health Survey 2014. Dhaka, Bangladesh: NIPORT, Mitra and Associates, and ICF International. Available at <http://dhsprogram.com/pubs/pdf/FR311/FR311.pdf>.
- 4.National Institute of Population Research and Training - NIPORT, Ministry of Health and Family Welfare, and ICF. 2020. Bangladesh Demographic and Health Survey 2017-18. Dhaka, Bangladesh: NIPORT/ICF. Available at <https://www.dhsprogram.com/pubs/pdf/FR344/FR344.pdf>.

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June 05, 2023

The Editor

PLOS ONE

Dear Editor,

I am pleased to submit an original research article for publication in *PLOS ONE*, entitled “Assessing the pattern of key factors on women’s empowerment in Bangladesh: evidence from Bangladesh Demographic and Health Survey, 2007 to 2017-18.” The paper was coauthored by Md. Solayman Hossain, Md. Shehab Khan and Bikash Pal.

We suggested utilizing two key dimensions: household decision-making and attitudes regarding wife-beating to measure women's empowerment. Principal component analysis was used to quantify women's empowerment. The probable contributing variables to women's empowerment in Bangladesh as well as the evolution of women’s empowerment over time were our key research interests. The study results revealed several efficient factors of women's empowerment such as division, place of residence, age at first marriage, NGO membership, media exposure, education gap, etc. We believe that our study makes a significant contribution to the literature since it is essential to evaluate the state of women's empowerment because they are an integral part of a nation's growth, just like men are.

After carefully considering the options for publication, I have selected *PLOS ONE* as the ideal outlet for this manuscript since *PLOS ONE* is an open access journal with a rigorous peer-review process and broad readership, providing access to high-quality research without a subscription fee.

This manuscript has not been published elsewhere in part or in entirety and is not under consideration by another journal. We have read and understood your journal’s policies and we believe that neither the manuscript nor the study violates any of these and we are confident that our research meets the high standards of *PLOS ONE* and will contribute to the scientific community. We would be honored to have it considered for publication in your esteemed journal. There are no conflicts of interest to declare.

Thank you for your consideration. I look forward to hearing from you.

Sincerely,

Sahera Akter

University of Dhaka

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**Assessing the pattern of key factors on women's
empowerment in Bangladesh: evidence from Bangladesh
Demographic and Health Survey, 2007 to 2017-18**

An assessment of women's empowerment in Bangladesh

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Abstract

This study aimed to explore the significant factors of women's empowerment and at the same time, assessed the pattern of potential factors affecting women's empowerment in Bangladesh using four cross-sectional waves of Bangladesh Demographic and Health Surveys (2007, 2011, 2014, and 2017-18) data. We put forth two domains—household decision-making and attitudes toward domestic violence—to assess women's empowerment. Principal component analysis (PCA) was employed to create women's empowerment index. In order to examine the progress of women's empowerment over the years, we utilized the frequency percentages of variables related to decision-making and attitudes toward violence. We employed the Chi-square test to assess the unadjusted association between the selected covariates and women's empowerment. To determine the adjusted association of the selected covariates with women's empowerment, we utilized the proportional odds model (POM). Findings showed that marriage at 18 or later age, education, employment, higher wealth index, media exposed, NGO membership, urban residentship, etc. significantly increased the likelihood of experiencing empowerment. And most importantly, our study affirmed that, over time, women were more likely to protest against physical violence and to participate in various decision-making regarding their personal and social life. Policy making interventions are needed to raise awareness among uneducated, unemployed and economically poor, physically oppressed women through imposing strict laws and providing more facilities that can accelerate women's empowerment rapidly and in a better way.

Introduction

Women's empowerment is regarded as a significant subject of interest over the world. It has risen in importance in today's global development strategy and is closely related to many

progressions. It is widely acknowledged that women's empowerment is essential for developing countries to achieve sustainable economic growth and poverty reduction [1]. Empowerment is defined as an interactive technique that allows people to experience personal and communal change while taking action to impact the institutions and organizations that affect their lives and communities [2]. And the empowerment of women refers to a circumstance where women are permitted to fully participate in everyday life's economic, political, and social aspects [2, 3]. Without the participation of women in every aspect of life, comprehensive sustainable social and economic development could not be achieved. In developing countries, gender inequality is highly prevalent compared to developed countries [4]. Human rights are violated by gender inequality, which hampers women's empowerment and the development of a country. The Global Gender Gap Index, which measures gender disparity, is formed using four major factors (educational attainment, health and survival, political empowerment, and economic participation). Bangladesh is one of the South Asian nations with a medium human development index (HDI), ranking 129th among 191 countries in accordance with the recently published Human Development Report 2022 [5]. The Global Gender Gap Report 2021 clearly states that Bangladesh has become 65th position among 156 countries on the index of the gender gap with a score of 0.719 (0.00=imparity, 1.00=parity), showing that gender inequality still exists [6]. However, depending to this report, Bangladesh is the 7th best country out of 156 countries, in terms of women's political empowerment indicator [7]. Bangladeshi women are most well-represented in national legislatures. Currently, there are 20.86% of national legislators who are female, and 25.21% of cabins in regional governments [8, 9]. Nowadays, the Prime Minister, Opposition Leader, Deputy House Leader, and Speaker of the National Legislature all are women in Bangladesh. The Bangladeshi government approved the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) in 1984, supported the Beijing Platform for Action (BPFA) in 1995, and pledged to the

Millennium Development Goals (MDGs) in 2000 and the Sustainable Development Goals (SDGs) in 2015 in order to abolish all types of gender-based discriminatory practices and violence against female and girls and to increase women's participation in every aspect of life [10-12].

To ensure more sustainable and equitable development all over the world, the fifth Sustainable Development Goal focuses on the responsibilities of putting an end to gender imbalance and violence against females, ensuring female's equal human rights, and ensuring the involvement of women at every level of decision-making by the year 2030 [13]. The third Millennium Development Goal is making progress toward closing the gender gap and giving women more political and economic power [11]. However, the prevalence of gender bias and violence against women remains higher in less-developed countries than in more-developed countries. Due to the poor presence of women empowerment in Bangladesh, women face violence in the household. The majority of the women were discriminated against by their parents and then by their husbands in the family. The Gender Statistics of Bangladesh 2018 report shows that about 54.2% of married women experience partner sexual or physical violence during their lifetime [14]. In Bangladesh, women constitute approximately 50.46% of the total population, according to the primary data of the Population and Housing Census 2022 [15]. The nation will progress significantly if this enormous number of women can be given more influence at whatever cost. Therefore, it is crucial to empower women in Bangladesh as this can result in more gender equality, increased access to education, promoted women's political engagement, enhanced economic and social results, and enhanced quality of life for women, their families, and communities. This enormous significance motivates us to concentrate on identifying possible contributors to women's empowerment.

However, the conceptualization of women's empowerment varies considerably. A number of studies have been conducted on women's empowerment which explored the potential variables

that influence women's empowerment in Bangladesh and worldwide [16-19]. Some studies proposed women's empowerment through two indicators: women's participation in household decision-making and opinions concerning wife abuse, using data from DHS 2010 and BDHS 2014, respectively [16, 17], showed that age at first marriage, education level, education gap, working status, number of living children, place of residence, media exposure, wealth index, etc. had a significant effect on women's empowerment. According to a study, the primary components of the empowerment of women include women's employment position, self-worth, self-confidence, ability to make decisions, and awareness [18]. An evidence-based analysis suggested an idea about women's empowerment based on four indicators: personal freedom, household decision, domestic financial decisions, and political independence, which explored how access to social media, education, community cultural values, women's job, and household participation rate significantly affect women's empowerment [19]. Another study in Bangladesh on women's empowerment through access to health information found that urban-dwelling, educated, working, middle-aged women had better decision-making abilities [20]. In this study, an attempt has been made to explore the significant factors of women's empowerment in Bangladesh. At the same time, an evaluation of women's empowerment in Bangladesh over the past 10 years, from 2007 to 2017-18 has also been observed here. The framework we have used in our study consisted of two key dimensions: household decision-making and attitudes toward wife beating. In the context of Bangladesh, to the researchers' knowledge, no study has yet been carried out in Bangladesh where changes in covariates' impact with respect to time were observed, so far. Hence, the uniqueness of this study lies in using the four waves of BDHS data (2007, 2011, 2014, and 2017-18) for assessing the pattern of potential factors affecting women's empowerment in Bangladesh.

Data and Methodology

Data

Data from the nationally representative Bangladesh Demographic and Health Survey (BDHS) have been extracted for conducting analysis on women's empowerment. To explore the changes in women's empowerment for one decade, we have used data from four waves of BDHS, collected in 2007, 2011, 2014, and 2017-18. These were nationally representative cross-sectional surveys based on a two-stage stratified sample of households. The details of the survey design are described in detail elsewhere [21-25].

In general, in the first stage, a certain number of enumeration areas, EAs (EAs varied for different BDHS) were selected with probability proportional to EA size and with independent selection in each sampling stratum (Table 1). In the second stage of selection, a fixed number—

Table 1. Sample design of BDHS from 2007 to 2017-18

Dataset	Selected enumeration areas (EAs) in first stage	Number of selected households per EAs in second stage	Number of completed interviews	Total number of women aged 15-49 after removing missing observations
BDHS 2007	361	30	10,996	8,931
BDHS 2011	600	30	18,072	16,274
BDHS 2014	600	30	17,863	16,350
BDHS 2017-18	675	30	20,127	18,273

30 households per cluster—were selected with an equal probability of systematic selection from the newly created household listing. In these surveys, only ever-married women of age 15-49 were interviewed, an exception was found for BDHS 2011 in which ever-married women aged 12-49 were interviewed. But making it analogous to other datasets, we have only taken information about the women who belong to reproductive age 15-49. Missing observations

have been eliminated, leaving us with a total of 8931, 16274, 16350, and 18723 observations, respectively (Table 1).

Ethics approval and consent to participate

The Institutional Review Board of ICF International, Rockville, Maryland, USA (Macro International is now known as ICF International) reviewed and gave their approval to The Demographic and Health Surveys (DHS) Program. 2007, 2011, 2014, and 2017-18 Bangladesh DHS were categorized under that approval. Furthermore, the 2011 and 2017-18 Bangladesh DHS also received approval from another ethical committee: The Bangladesh Medical Research Council. These BDHS were implemented under the authority of the National Institute of Population Research and Training (NIPORT) of the Government of the People's Republic of Bangladesh with financial support from USAID/Bangladesh. Prior to asking, informed consent was obtained from each survey participant. Respondents who refused to consent were not included in the survey.

Outcome variable

Construction of women's empowerment indices

In the conceptual framework (Fig 1), we proposed a total of nine questions which were classified into two broad dimensions; household decision-making and attitudes toward wife beating [22-27]. BDHS collected information on household decision-making: (1) their own health care, (2) major household purchases, (3) their child's health care (this information is missing in BDHS 2017-18 data), and (4) visits to their family or relatives. For the above decisions, we made four binary variables (yes/no) where "yes" was defined for the responses of "respondent alone", "respondent and husband/partner" or "respondent and other person",

and “no” for otherwise. This index is positively related to women’s empowerment and for analysis purposes, these questions were recoded (i.e., 1 for “yes” and 0 for “no”). The second index, containing five indicators, was used to gauge women's attitudes toward wife beating. Women were asked if they thought a husband had the right to hit his wife if she (1) refused to have sex with him, (2) left the house without his consent, (3) neglected the children, (4) argued with him, or (4) burned the food. The response “yes” to the above questions means that she believes wife-beating is justified and “no” means she rejects wife-beating for that particular reason. As this index is negatively related to women’s empowerment, for the analysis purposes, these questions were recoded oppositely from the first indicator (i.e., 1 for “no” & 0 for “yes”). For creating the women’s empowerment index (WEI), principal component analysis (PCA) has been used with all nine indicators (4 decisions and 5 reasons), where the first principal component was regarded as the women’s empowerment score (WES). The WES was further broken down into 3 quantiles; labeled low, middle, and high for domains below the first, in between the first and second, and above the second quantile, respectively. Finally, our preferred outcome metric is the score index with three ordered categories (i.e., low, medium, and high), where these categories indicate order-wise how empowered a woman is (i.e., low means women have low empowerment) [21, 28].

Fig 1: Conceptual framework for women’s empowerment

Covariates

On the basis of some previous works of literature, the covariates included in this study are age at first marriage, spousal age gap, respondent’s education level, education gap, respondent’s current working status, number of living children, religion, number of household members,

division, place of residence, media exposure, NGO membership, wealth index, husband's occupation, relationship with household head, and sex of household head. All of these variables could not be directly extracted from the survey. We had to construct many of these with the help of directly available variables. The definition and their measurements (including categories) of variables are given in Table 2.

Table 2. Definition and measurements of the variables based on BDHS data (from 2007 to 2017-18)

Covariates	Measurements
Division	Original dataset had eight divisions: Barisal, Chittagong, Dhaka, Khulna, Mymensingh (missing in 2007, 2011, and 2014 BDHS data as then it was not declared as a division), Rajshahi, Rangpur (was not declared as a division at the time of 2007 BDHS), Sylhet.
Place of residence	This variable was categorized as: urban and rural.
Age at first marriage	Age at first marriage was categorized into two categories as: below 18 years and 18 or 18+ years.
Spousal age gap	Spousal age gap was measured by taking the difference between spousal ages.
Respondent's education level	Four categories were created by the survey as: no education, primary, secondary, and higher.
Education gap	The difference between the education levels of the spouses was divided into three categories—no gap, wife with lower education, and wife with higher education.
Number of living children	Number of living children was categorized into four categories: no child, 1-2, 3-4, and 4+ children.
Difference between sons and daughters	This variable was made by deducting the total number of daughters from the total number of sons. Negative results indicate a gap in which there are more daughters, positive numbers indicate more sons, and zero means simply no difference between daughter and son.
Number of household members	Categorized into three categories: 1-4 members, 5-7, and 7+ members.
Wealth index	The original dataset had five categories: poorest, poorer, middle, richer, and richest.

Religion	Islam, Hinduism, Buddhism, and Christianity comprised the four categories of religion in the original dataset. However, for the sake of the study, the religion has been reclassified into two groups: Muslim (Islam) and non-Muslim (Hinduism, Buddhism, and Christianity) [21, 22].
Media exposure	A woman is exposed to the media if she has access to either of the media sources (Categories: Yes/No) based on the variables of watching TV, listening to the radio, and reading newspapers and magazines [28-32].
NGO membership	Women's NGO membership was divided into two groups: "yes" if they are members of any one of the following organizations: Grameen Bank, BRAC, BRDB, ASHA, Proshika, Mother's Club, or other NGOs; and "no" if they are not [28, 30, 31]. However, because NGO activities are considerably declining in Bangladesh, data on these aspects was missing from the most recent BDHS 2017–18 data. The fact that the government offers more facilities than NGOs could be one of the causes [32].
Working status	Working status had two categories: yes and no.
Husband's occupation	Husband's occupation was categorized into seven categories as farmer, labor, service, large business, small business, unemployed and other.
Relationship with household head	Survey created eleven categories as: head, wife, daughter, daughter-in-law, grand-daughter, mother, mother-in-law, sister, other relative, adopted/foster child and other.
Sex of household head	Sex of household head was divided into two groups: male and female.

Statistical analyses

Simple descriptive, bivariate, and multivariate statistical analyses were performed to achieve different objectives in this study. The univariate analysis was performed to investigate the individual frequency percentage of the selected covariates. In the bivariate analysis of women's empowerment with different selected variables, the Pearson Chi-square test has been applied as an attempt to find out the unadjusted association between women's empowerment and selected covariates. The covariates that were significantly associated with the outcome

variable, have been included in the regression model. Since we have an ordinal response variable, the ordinal logistic regression model was used to find out the adjusted effects of covariates on women's empowerment.

Ordinal logistic regression model

With qualitative response variables, binary logistic, ordinal logistic, and multinomial logistic regression models can be used for analyzing data. But when analyzing polychotomous data, the ordinal logistic regression model gives a more accurate and efficient estimate of regression coefficients where the response variable acts in an ordinal way with each predictor. In our study, we have response variable (women's empowerment) with three ordered categories (low, medium, and high). Hence, proportional odds model (POM) has been employed in this study. Suppose a response variable Y with categorical outcomes, denoted by $0, 1, 2, \dots, k$, and let \tilde{x} denote a p -dimensional vector of covariates.

If $Pr[Y \geq j | \tilde{x}] = \pi_j$ is the cumulative logistic distribution function,

$$\text{Then,} \quad odds = \frac{Pr[Y \geq j | \tilde{x}]}{1 - Pr[Y \geq j | \tilde{x}]} = \frac{\pi_j}{1 - \pi_j} = \exp(\alpha_j + \tilde{x}'\tilde{\beta}). \quad (1)$$

And the dependence of Y on \tilde{x} for the proportional odds model has the following representation:

$$\text{logit}(\pi_j) = \log \left[\frac{\pi_j}{1 - \pi_j} \right] = \alpha_j + \tilde{x}'\tilde{\beta} = \alpha_j + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p, \quad (2)$$

$$j = 1, 2, \dots, k \text{ \& } i = 1, 2, \dots, p$$

where, α_j is the j^{th} intercept, $\tilde{x} = (x_1, x_2, \dots, x_p)'$ and $\tilde{\beta} = (\beta_1, \beta_2, \dots, \beta_p)'$ is the $p \times 1$ vector of unknown regression coefficients corresponding to \tilde{x} .

From equation (1), odds ratio, $OR = \exp(\beta_i)$ if x_i is coded as (0, 1) as OR for each covariate is being estimated after adjusting for other variables in the model. Note: $Pr[Y \geq 0 | \tilde{x}] = 1$.

The likelihood (L) is the product of marginal contributions,

$$L = \prod_{l=1}^n \prod_{j=0}^k Pr[Y = j | \tilde{x}]^{m_{lj}}$$

where, n is the total number of subjects, $Pr[Y = j | \tilde{x}] = Pr[Y \geq j | \tilde{x}] - Pr[Y \geq j + 1 | \tilde{x}]$,

and

$$m_{lj} = \begin{cases} 1, & \text{if the } l^{th} \text{ subject has } Y = j \\ 0, & \text{if otherwise} \end{cases}$$

The intercept α_j and the parameter vector, $\tilde{\beta}$ can be estimated numerically from the log-likelihood ($\log L$) function using the multidimensional Newton Raphson method and let the vector parameter estimates be $\tilde{b} = (b_1, b_2, \dots, b_i, \dots, b_p)'$.

The estimated odds ratio, $\widehat{OR} = \exp(b_i)$, and the fitted model will be [33-36],

$$\text{logit}(\hat{\pi}_j) = \log \left[\frac{\hat{\pi}_j}{1 - \hat{\pi}_j} \right] = \hat{\alpha}_j + \tilde{x}' \tilde{b}.$$

All the analyses were performed with the help of the statistical software package STATA version 14.0 and SPSS version 20.

Results

Univariate analysis

In this study, we have used various demographic and socio-economic factors that have a strong influence on women's empowerment as covariates. Table 3 reveals the frequency percentages of these covariates (mean score for spousal age gap). This shows how these factors changed over the period of 2007 to 2017-18, in Bangladesh. All the women selected in the survey were between the ages 15 to 49. Results showed that a greater percentage of women (2007=81.32%,

Table 3. Frequency distribution of selected background characteristics

Background characteristics	2007 n=8931	2011 n=16274	2014 n=16350	2017-18 n=18273
Division				
Barisal	1216 (13.62%)	1918 (11.79%)	1960 (11.99%)	1832 (10.62%)
Chittagong	1595 (17.86%)	2619 (16.09%)	2640 (16.15%)	2397 (13.90%)
Dhaka	1889 (21.15%)	2811 (17.27%)	2827 (17.29%)	2612 (15.14%)
Khulna	1378 (15.43%)	2435 (14.96%)	2369 (14.49%)	2297 (13.32%)
Mymensingh	-	-	-	1866 (10.82%)
Rajshahi	1673 (18.73%)	2393 (14.70%)	2295 (14.04%)	2237 (12.97%)
Rangpur	-	2258 (13.87 %)	2363 (14.45%)	2162 (12.53%)
Sylhet	1180 (13.21%)	1840 (11.31%)	1896 (11.60%)	1847 (10.71%)
Place of residence				
Urban	3337 (37.36%)	5658 (34.77%)	5579 (34.12%)	6830 (36.48%)
Rural	5594 (62.64%)	10616 (65.23%)	10771 (65.88%)	11893 (63.52%)
Age at first marriage				
Age < 18	7263 (81.32%)	12624 (77.57%)	12429 (76.02%)	13772 (73.56%)
Age ≥ 18	1668 (18.68%)	3650 (22.43%)	3921 (23.98%)	4951 (26.44%)
Respondent's education level				
No education	2783 (31.16%)	4003 (24.60%)	3612 (22.09%)	2766 (14.77%)
Primary	2763 (30.94%)	4876 (29.96%)	4785 (29.27)	5865 (31.33%)
Secondary	2701 (30.24%)	5986 (36.78%)	6331 (38.72%)	7373 (39.38%)
Higher	684 (7.66%)	1409 (8.66%)	1622 (9.92%)	2719 (14.52%)
Education gap				
No difference	2925 (32.75%)	8419 (51.73%)	8421 (51.50%)	9481 (50.64%)
Wife with lower education	2532 (28.35%)	4065 (24.98%)	3727 (22.80%)	3878 (28.65%)
Wife with higher education	2018 (22.60%)	3790 (23.29%)	4202 (25.70%)	5364 (20.71%)
Number of living children				
No child	197 (2.21%)	1620 (9.95%)	1575 (9.63%)	1905 (10.17%)
1-2	4602 (51.53%)	8297 (50.98%)	8770 (53.64%)	10141 (54.16%)
3-4	2929 (32.80%)	4888 (30.04%)	4718 (28.86%)	5457 (29.15%)
4+	1203 (13.47%)	1469 (9.03%)	1287 (7.87%)	1220 (6.52%)
Difference between sons and daughters				

No difference	1919 (21.49%)	4966 (30.51%)	4944 (30.24%)	5893 (31.47%)
More sons	4572 (51.19%)	5330 (32.75%)	6004 (36.72%)	6767 (36.14%)
More daughters	2440 (27.32%)	5978 (36.73%)	5402 (33.04%)	6063 (32.38%)
Number of household members				
1-4	2978 (33.34%)	6252 (38.42%)	6817 (41.69%)	8053 (43.01%)
5-7	4039 (45.22%)	7209 (44.30%)	7010 (42.87%)	7790 (41.61%)
7+	1914 (21.43%)	2813 (17.29%)	2523 (15.43%)	2880 (15.38%)
Wealth index				
Poorest	1461 (16.36%)	2760 (16.96%)	2928 (17.91%)	3517 (18.78%)
Poorer	1631 (18.26%)	3045 (18.71%)	3088 (18.89%)	3566 (19.05%)
Middle	1708 (19.12%)	3141 (19.30%)	3326 (20.34%)	3623 (19.35%)
Richer	1803 (20.19%)	3464 (21.29%)	3450 (21.10%)	3821 (20.41%)
Richest	2328 (26.07%)	3864 (23.74%)	3558 (21.76%)	4196 (22.41%)
Religion				
Non-Muslim	896 (10.03%)	1827 (11.23%)	1586 (9.70%)	1871 (9.99%)
Muslim	8035 (89.97%)	14447 (88.77%)	14764 (90.30%)	16852 (90.01%)
Media exposure				
No	6962 (84.08%)	5443 (33.45%)	5970 (36.51%)	6457 (34.49%)
Yes	1318 (15.92%)	10831 (66.55%)	10380 (63.49%)	12266 (65.51%)
NGO membership				
No	5469 (61.24%)	11304 (69.46%)	10777 (65.91%)	-
Yes	3462 (38.76%)	4970 (30.54%)	5573 (34.09%)	-
Working status				
No	6401 (71.67%)	14366 (88.28%)	11356 (69.46%)	9870 (52.72%)
Yes	2530 (28.33%)	1908 (11.72%)	4994 (30.54%)	8853 (47.28%)
Husband's occupation				
Farmer	2381 (26.66%)	4609 (28.32%)	4346 (26.58%)	4584 (24.48%)
Labor	3671 (41.10%)	6247 (38.39%)	6614 (40.45%)	8475 (45.27%)
Service	529 (5.92%)	1142 (7.02%)	1151 (7.04%)	1193 (6.37%)
Large business	519 (5.81%)	1027 (6.31%)	501 (3.06%)	479 (2.56%)
Small business	1588 (17.78%)	2772 (17.03%)	3254 (19.90%)	3550 (18.96%)
Unemployed	145 (1.62%)	413 (2.54%)	106 (0.65%)	4 (0.02%)
Other	98 (1.10%)	64 (0.39%)	378 (2.31%)	438 (2.34%)
Relationship with household head				
Head	508 (5.69%)	752 (4.62%)	1039 (6.35%)	1486 (7.94%)
Wife	6522 (73.03%)	11502 (70.68%)	11355 (69.45%)	12384 (66.14%)

Daughter	579 (6.48%)	1239 (7.61%)	1137 (6.95%)	1536 (8.20%)
Daughter-in-law	867 (9.71%)	1818 (11.17%)	1962 (12.00%)	2325 (12.42%)
Granddaughter	4 (0.04%)	21 (0.13%)	24 (0.15%)	38 (0.20%)
Mother	40 (0.45%)	113 (0.69%)	100 (0.61%)	105 (0.56%)
Mother-in-law	22 (0.25%)	26 (0.16%)	23 (0.14%)	28 (0.15%)
Sister	126 (1.41%)	223 (1.37%)	190 (1.16%)	224 (1.20%)
Other relative	255 (2.86%)	566 (3.48%)	502 (3.07%)	583 (3.11%)
Adopted/foster child	4 (0.04%)	4 (0.02%)	5 (0.03%)	7 (0.04%)
Not related	4 (0.04%)	10 (0.06%)	13 (0.08%)	7 (0.04%)
Sex of household head				
Male	8167 (91.45%)	15106 (92.82%)	14886 (91.05%)	16546 (88.37%)
Female	764 (8.55%)	1168 (7.18%)	1464 (8.95%)	2177 (11.63%)
Mean Age Gap (years)	9.5	9.15	9	8.4

2011=77.57%, 2014=76.02%, 2017-18=73.56%) got married before the age of 18. But over the time, this was slowly decreasing, and marriage after the age of 18 was increasing. The mean spousal age gap was around 9.5 years in 2007, 9.15 years in 2011, 9 years in 2014, and 8.4 years in 2017-18. In the survey, most of the selected women (2007=62.64%, 2011=65.23%, 2014=65.88%, 2017-18=63.52%) were from rural areas of Bangladesh, and the rest of them were selected from urban areas. The percentage of women working outside the home had highly increased over the years. According to the surveys, in 2007, 28.33% of women used to work outside the home. But in 2011, it decreased to 11.72%. Again, in 2014, it increased to 30.54%, and in 2017-18, it became 47.28%, which was higher than ever. A very positive change in women's educational status over time can also be seen from the results. The percentage of women with no education had decreased over time (2007=31.16%, 2011=24.60%, 2014=22.09%, 2017-18=14.77%). The percentage of women completing primary education was more or less constant (2007=30.94%, 2011=29.96%, 2014=29.27%, 2017-18=31.33%). We can see a slight increase in completing secondary (2007=30.24%, 2011=36.78%, 2014=38.72%, 2017-18=39.38%), and higher level of education (2007=7.66%,

2011=8.66%, 2014=9.92%, 2017-18=14.52%). In most of the cases, there was no difference in educational status between husband and wife (2007=32.75%, 2011=51.73%, 2014=51.50%, 2017-18=50.64%). Most of the women in the surveys had 1 to 2 children (2007=51.53%, 2011=50.98%, 2014=53.64%, 2017-18=54.16%). Media exposure such as reading newspapers, watching television, or listening to the radio has also increased. In 2007, only 15.92% of women were exposed to media but in 2017-18, it became 65.51%. 38.76% of women were involved in some type of NGO in 2007. It decreased to 30.54% in 2011 and again increased in 2014 and became 34.09%. For 2017-18, the data was unavailable.

Bivariate analysis

In the bivariate analysis, an attempt has been made to out find the significant exposure factors to women's empowerment. To evaluate how much a woman's background characteristics influence her level of domestic empowerment in Bangladesh, Pearson Chi-square test was applied.

Results from Table 4 confirmed that all the selected covariates were statistically significant with p-value < 0.05 implying that before adjusting for other factors, those exposure variables have been identified as important factors. The final multivariate analysis also included all the significant variables obtained from the bivariate analysis.

Table 4. Bivariate analysis (Chi-square test) of women's empowerment in Bangladesh with selected covariates

Background characteristics	Pearson chi-square			
	2007	2011	2014	2017-18
Division	297.43***	346.89***	260.25***	194.94***
Place of residence	126.87***	261.12***	156.03***	204.35***
Age at first marriage	60.95***	33.05***	51.49***	48.86***
Respondent's education level	242.52***	296.88***	195.54***	153.20***

Education gap	14.32***	17.34***	13.04**	22.34***
Number of living children	93.88***	527.05***	496.74***	247.10***
Difference between sons and daughters	0.12	63.93***	82.67***	20.90***
Number of household members	78.31***	207.13***	188.29***	234.94***
Religion	6.51**	28.30***	25.56***	32.12***
Media exposure	121.75***	163.33***	206.81***	123.48***
NGO membership	7.67**	15.14***	15.72***	-
Wealth index	268.10***	412.13***	384.94***	215.46***
Working status	60.80***	172.21***	59.94***	123.67***
Husband's occupation	217.47***	202.50***	211.79***	118.19***
Relationship with household head	158.04***	570.67***	473.02***	883.65***
Sex of household head	42.77***	51.22***	70.63***	27.99***

Significance: *** p<0.01, ** p<0.05

Multivariate analysis

A summary of the multivariate analysis results that were obtained by fitting the proportional odds model is compiled in Table 5. It demonstrates the adjusted odds ratios for women's empowerment from BDHS 2007 to 2017-18. All the covariates except the sex of the household head were found to have a significant effect on women's empowerment in at least any study year though the sex of the household was significant in the study before adjusting for other factors. Divisions gave different results for different years. For the significant difference of women from Dhaka with women from any other division, it was seen that women from Barisal (insignificant in 2011), Chittagong (insignificant in 2017-18), Khulna (significant in only 2014), Rajshahi (significant in 2011 & 2014), and Sylhet (highly significant in all study years

Table 5. Association between different background characteristics with women's empowerment obtained from adjusted proportional odds model (POM)

Background characteristics	Odds Ratio (OR)			
	2007	2011	2014	2017-18
Division				
Dhaka (Ref)	1.000	1.000	1.000	1.000
Chittagong	0.658***	0.730***	0.772***	0.937
Barisal	0.597***	1.014	0.593***	0.770***
Khulna	0.999	1.053	0.658***	0.908
Mymensingh	-	-	-	1.475***
Rajshahi	0.998	0.605***	0.693***	0.949
Rangpur	-	1.336***	0.900	0.967
Sylhet	0.641***	0.670***	0.643***	0.765***
Place of residence				
Urban (Ref)	1.000	1.000	1.000	1.000
Rural	0.874***	0.838***	0.921**	0.758***
Age at first marriage				
Age<18 (Ref)	1.000	1.000	1.000	1.000
Age≥18	1.165***	1.059	1.126***	1.090**
Spousal age gap				
	0.997	1.005**	0.992***	1.001
Education level (respondent)				
No education (Ref)	1.000	1.000	1.000	1.000
Primary	1.033	1.055	1.033	1.166***
Secondary	1.144**	1.318***	1.246***	1.396***
Higher	2.083***	2.201***	1.794***	1.935***
Education gap				
No difference (Ref)	1.000	1.000	1.000	1.000
Higher than partner	0.915	0.954	0.995	.883***
Lower than partner	1.009	1.065	1.044	1.020
Number of living children				
No child (Ref)	1.000	1.000	1.000	1.000
1-2	1.817***	2.853***	2.503***	1.809***
3-4	1.978***	3.191***	3.119***	2.095***
4+	1.815***	3.154***	2.950***	2.100***
Difference between sons and daughters				
No difference (Ref)	1.000	1.000	1.000	1.000
More sons	0.970	0.869***	0.967	0.892***

More daughters	0.962	0.902**	0.968	.890***
Number of household members				
1-4 (Ref)	1.000	1.000	1.000	1.000
5-7	0.876**	0.838***	0.848***	0.884***
7+	0.805***	0.746***	0.700***	0.813***
Religion				
Non-Muslim (Ref)	1.000	1.000	1.000	1.000
Muslim	0.936	0.845***	0.770***	0.759***
Media Exposure				
No (Ref)	1.000	1.000	1.000	1.000
Yes	1.137**	1.104***	1.103**	1.115***
NGO membership				
No (Ref)	1.000	1.000	1.000	-
Yes	0.961	1.073**	1.082**	-
Wealth index				
Poorest	1.056	0.931	.799***	1.013
Poorer	0.952	0.940	0.918	0.996
Middle (Ref)	1.000	1.000	1.000	1.000
Richer	1.110	1.122**	1.026	0.980
Richest	1.446***	1.512***	1.377***	1.26***
Working status				
No (Ref)	1.000	1.000	1.000	1.000
Yes	1.271***	1.529***	1.161***	1.283***
Husband's occupation				
Farmer (Ref)	1.000	1.000	1.000	1.000
Labor	1.060	0.948	1.025	1.013
Service	1.543***	1.088	1.258***	1.184**
Large business	1.037	0.973	1.115	1.001
Small business	0.972	0.928	0.937	0.926
Unemployed	1.224	0.890	0.791	2.972
Others	1.428	0.928	0.905	1.043
Relationship with household head				
Head (Ref)	1.000	1.000	1.000	1.000
Wife	0.501***	0.490***	0.642***	0.681***
Daughter	0.524***	0.443***	0.631***	0.634***

Daughter-in-law	0.301***	0.249***	0.370***	0.265***
Grand-daughter	0.505	0.125***	0.689	0.591
Mother	0.306***	0.383***	0.604**	0.517***
Mother-in-law	0.644	0.589	0.727	0.861
Sister	0.438***	0.411***	0.773	0.764

Relationship with household head

Other relative	0.418***	0.340***	0.491***	0.456***
Adopted child	0.086**	0.893	1.140	0.284**
Not related	0.380	0.384	0.457	0.627

Sex of household head

Male (Ref)	1.000	1.000	1.000	1.000
Female	0.966	0.953	1.032	1.032

Intercepts

$\hat{\alpha}_1$	-0.910	-0.805	-0.747	-1.250
$\hat{\alpha}_2$	0.586	0.873	0.805	0.004

Significance: *** p<0.01, ** p<0.05

with p-value < 0.01) had lower odds of gaining empowerment as compared to Dhaka dwellers women. On the other hand, women from Mymensingh and Rangpur were found significant in 2017-18 and 2011, respectively and the odds of empowerment were 47.5% higher for Mymensingh (2017-18) and 33.6% higher for Rangpur (2011) than women from Dhaka. This study revealed that women from rural areas had significantly lesser influence (12.6%, 16.2%, 7.9%, and 24.2% lower odds, respectively) in receiving empowerment than those who were from urban areas.

Although the age at first marriage was insignificant in BDHS 2011, for the rest of the study years, the women of reproductive age who married at their legal age of 18 years or higher were more likely to have empowerment compared to those who married below 18 years. This is due to the immaturity and dependence of the young married women (those under the age of 18) [37]. Spousal age gap had negative relation with women's empowerment in 2007 and 2014 (significant at 1%) but for 2011 (significant at 5%) and 2017-18, it seemed positive. The

increasing spousal age difference was more likely in 2011 but less likely in 2014 to have women's empowerment.

Women who completed secondary education in 2007, 2011, 2014, and 2017-18, respectively have 14.4%, 31.8%, 24.6%, and 39.6% higher odds of having empowerment compared to those who were uneducated. Women with higher education in the four BDHS waves, respectively were 2.083, 2.201, 1.794 and 1.935 times as likely to have empowerment compared to those who had no education but except in 2017-18 (OR= 1.166, p-value < 0.01), there was no significant difference between primary educated and no educated women. Education gap was found insignificant in BDHS 2007 to 2014 but in 2017-18, highly educated women with respect to their partner had 11.7% lower odds of getting empowerment than those who had no education gap between them, whereas lower educated women with respect to their husband had no significant effect on women's empowerment. Though it is expected that women with higher education with respect to partners will have higher odds of empowerment than those who have no spousal education gap but surprisingly, we observed the opposite direction in our analysis.

Number of living children has been seen as one of the most important covariates in this study with p-value (<0.01). The likelihood of having 3-4 children than those couples who had no children from 2007 to 2017-18 BDHS, respectively was 1.978, 3.191, 3.119, and 2.095 times as likely to have empowerment. Similarly, couples with 1-2 children and 4+ children, respectively were more likely to have empowerment than couples with no children. The reason for this is that mothers benefit more psychologically from having children, as well as mothers also have more power when they have children [37]. The effect of the difference between number of daughters and sons on women's empowerment after adjusting for other factors was deemed important for 2011 & 2017-18 but the opposite result was found for the rest of the study years. The likelihood of being empowered was lower for both groups of women, such as

women with more daughters as well as women with more sons, when compared to women who had an equal number of daughters and sons. It is generally believed that women who have more sons will be more likely to be empowered than women who have an equal number of daughters and sons, however, the findings of our study indicated otherwise. Although women with 5-7 family members and 7+ family members were less likely to be empowered than those women with 1-4 family members, in comparison to the two groups of women with 5-7 members and 7+ members, the odds of empowerment was lower for women with 7+ family members. Therefore, women who belong to small size families have a better chance to establish empowerment.

The women from higher wealth quintiles (i.e., richest) had 44.6%, 51.2%, 37.7% and 16% higher odds to be empowered, respectively from BDHS 2007 to 2017-18 as compared to women from middle-class families. Besides women who belong to richer families were found to be significant in 2011 and it was more likely to have empowerment. In 2014, the poorest women were significantly less likely to be empowered than women who belong to middle-class families. Empowerment odds for Muslim women was 15.5%, 23%, and 24.1% lower than those of their counterparts, respectively in BDHS 2014 to 2017-18. The religious convictions of Bangladeshi Muslim women may be responsible for it [32]. An expected outcome for media exposure was discovered. The likelihood of getting empowerment for women who were exposed to mass media was 13.7%, 10.4%, 10.3%, and 11.5% higher than their counterparts. NGO membership was found to be important in the 2011 and 2014 surveys. Women who participate in NGOs have better odds of empowerment than non-NGO members, which were 7.3% in 2011 and 8.2% in 2014, respectively.

As expected, the employment status of women in Bangladesh was strongly associated (p-value < 0.01) with their empowerment. More precisely, the likelihood of being empowered was 1.271, 1.529, 1.161, and 1.283 times as likely for employed women for the study years,

respectively, compared to homemakers. Moreover, in BDHS 2014, women whose husbands worked in other professions did not significantly differ in terms of having empowerment from those whose husbands were farmers but in the remaining three study years, the probabilities of women receiving empowerment over those whose husbands were farmers, were 54.3%, 8.8%, 25.8%, and 18.4% greater for those whose husbands were employed in service-related employment.

Relationship with the household head was thought to be an important factor for women's empowerment and this study confirmed it. Comparing women who themselves are head of the household with those who have other relationship (i.e., wife, daughter, daughter-in-law, sister etc.) with household head were less likely to have empowerment in household decision-making as well as attitudes toward wife beating.

Discussion

Women's empowerment is a current hot topic across the globe as it's thought of as both a requirement for attaining sustainable development and a key source of power in society [30,38, 39]. There have been many analyses on women's empowerment directly or indirectly through decision-making power or attitudes toward wife beating or using both indicators.

This study aimed at focusing on influential determinants of women's empowerment in Bangladesh using both of the indicators as well as tried to see the trends of experiencing empowerment among women aged 15-49 years using data of one decade (BDHS 2007 to 2017-18). To serve this purpose, several covariates were selected by reviewing previous studies [20, 21, 26-32, 37, 39-47], and frequency distributions of the selected covariates, Chi-square test, and adjusted proportional odds model have been employed here to see the individual percentages, bivariate association and adjusted association with women's empowerment,

respectively. In the case of bivariate analysis, the result signified a strong association between selected covariates and women's empowerment. Results showed that several factors like marriage at the legal age (at 18 or over), secondary and higher education, the number of living children, more sons and daughters, urban dwellers, non-Muslim women, NGO members, media exposure, employment, having higher socioeconomic status, being head of household, and having a female head of household have a positive relationship with women's empowerment which is consistent with the findings from other studies [28, 30, 37]. When it comes to seeing the association after adjusting for other factors, adjusted odds ratios have been used to interpret the results.

The capital of Bangladesh, Dhaka, provides the majority of its prospects, including improved healthcare, income sources, educational prospects, and law enforcement. Hence the result revealed that women from other divisions have experienced lesser empowerment (an exception was found for Rangpur (2011) & Mymensingh (2017-18)) as compared to Dhaka. Place of residence was seen as significantly associated with women's empowerment implying that women from urban areas were found to have more empowerment than their counterparts [28].

Intimate partner violence and decision-making are interlinked with women's education and marital age, which determine their maturity [47, 48]. In Bangladesh, women are frequently abused by their partners in patriarchal households because of the high rate of underage marriage (more than 73% of the participants in our survey were married before the age of 18) and poverty [49], and this situation is aggravated with the increased concentration of dowry, which pushes women to marry young and being treated as children in their in-laws' house. This makes the issue worse and limits their ideas on empowerment and spousal violence resistance [50] which is also consistent with our study. Multiple research conducted in the past found a significant correlation between empowerment and educational success [30, 39, 51-53]. Study findings showed the same i.e., women who have higher education can take part in more decision-making

as well as can protest against the beating of their partners' on them. Women are forced to live dependent lives and keep quiet about intimate partner violence because they lack education and resources, which they eventually come to accept [54]. On the other hand, couples with higher educated wives were negatively associated with women's empowerment which contrasts the findings from other two studies, where couples with higher educated wives showed a significantly lower likelihood of experiencing less severe violence and more likely to have women's autonomy in decision-making, respectively [37, 44].

The result expressed the number of household members to be a potential factor in empowering women. Bangladesh is a densely populated country and as per tradition, among the three categories, most of the families (more than 41%) were found to have family sizes of 5 to 7 members but multivariate analysis exhibited that in small families, women experienced more empowerment. The difference between sons and daughters also revealed a similar result of having lower empowerment than the benchmark category, whereas the number of children has similarities with family size in the case of percentage distribution but the adjusted result gave the opposite direction likewise, more children will help a woman to be more empowered having consistency with North India [55] and Rwanda [16].

Having majorities (89.97% in 2007, 88.77% in 2011, 90.30% in 2014 & 90.01% in 2017-18) belong to Muslim families, findings came up differently. Muslim women appeared to endure more physical abuse and less involvement in decision-making than non-Muslim women, which may have been influenced by religious limitations on economic activity participation and mobility in specific sectors of society [41, 56, 57]. One reason can also be that the traditionally conservative society of Bangladesh discourages women from speaking out against the "anticipated norm" that their mothers or grandmothers have upheld; this, in turn, encourages acceptance of spousal physical violence [47, 58].

BDHS from 2007 to 2017-18 contained 15.92%, 66.55%, 63.49%, and 65.51% of women, respectively, who were exposed to mass media. It exhibited a clear pattern that as time goes by, women are exposed to media more and more because of digitalization and technological betterment. On the contrary, the employment status of women is decreasing. In a study in Ethiopia, there has been found to be a significant correlation between empowerment with employment status, media exposure [52], and NGO membership, which is compatible with our study. Employed women were more empowered than their respective benchmark group. Similarities were seen for women who were media exposed as well as NGO members. According to this study, women with higher economic status experienced more empowerment than other groups. A husband's occupation is related to the financial stability of a family which plays an important role affecting women's empowerment. Wives of farmers were less empowered than those whose husbands were in service. The rest of the occupations were found insignificant. In Asia, especially in low-income, illiterate households, beating and domineering wives are frequently seen as a husband or partner's "right" to "fix" their spouse [59]. Our study revealed that when women are head of the household, they have more chances to be empowered as compared to other relationships with the household head. But, the percentage of the household head who were women was seen so much low (5.69%, 4.62%, 6.35%, and 7.94%, respectively from BDHS 2007 to 2017-18) in Bangladesh. This is because Bangladesh is such a country where most families are patriarchal. Bangladesh is a developing country with a predominance of men [38, 39, 60]. A previous study in Bangladesh found that whether women are valued as contributing members of the family or remain a dependent, subordinate members of it depends on the household's economic situation and their engagement in the working population [61]. The standing of women in the household has an impact on their ability to make decisions. The number of children has a great impact as children are the strength of mothers. If a woman has a job, is educated, and is married to an

educated guy, she is more probable to make significant decisions for the home either by herself, with her husband, or with other family members [62].

Major findings of this study

To see how the situation involving women's empowerment improved over the years, we used the percentage distribution of variables regarding decision-making and attitudes toward violence. As mentioned earlier, the decision and violence related variables are created by aggregating variables regarding women's decision-making freedom and their attitudes toward violence in various situations. Fig 2 and Fig 3 represent how the percentage changed over the study years (BDHS 2007 to 2017-18), regarding decision-making and attitudes toward violence respectively.

Fig 2. Percentage distribution of freedom of decision-making

Fig 3. Percentage distribution of attitudes toward justification of violence

From Fig 2, we can see that in 2007, 86.8% of women said they had freedom of decision-making, which decreased in 2011 to 82.2%. But in 2014, it increased to 83.1%, and in 2017-18, it became an all-time high at 88.1%. It can be said that, over time, the decision-making power of women has increased. From Fig 3, it is seen that 68.8% of women were against violence towards them in 2007, which jumped to an all-time high percentage, 97.7% in 2011. In 2014, it decreased to 71.1%. But again in 2017-18, it increased to 80.4%. While there was a spike in 2011, we can claim that over time women's attitudes toward the justification of violence are improving.

Conclusion and recommendations

In the 21st century, one of the key goals for a nation's sustained development is the empowerment of women [40]. According to the 2022 census, Bangladesh has a population of 165,158,616 people, almost half of whom are women (83,347,206) [15]. This means that the overall development of Bangladesh depends just as much on women as it does on men, and so empowering women can be a key factor in our country's global advancement. Though the high prevalence of early marriage, very low employment of women, and few NGO memberships have become the reason for women to be abundant in decision-making as well as facing violence by partners which is a hindrance to women being empowered, this study revealed that the evaluation of women's empowerment is getting better over the years (from 2007 to 2017-18). Various factors regarding empowerment are drastically changing. Such as, women are now more concerned about the consequences of early marriages and the media is playing a huge role in this case. Early marriage is declining because of the Child Marriage Restraint Act, 2017 (CMRA), which sets the minimum age of marriage for a male at 21 years and a female at 18 years. Over time, if the law is successfully implemented in Bangladesh's remote areas, we should be able to observe better results. Due to the stipend that the government solely provides for women, the literacy rate among women is rising. More people will have access to it and be keen to send their daughters to school if the distribution method of the fellowships is made simpler and more controlled. A rise in the propensity to work outside the home can be observed from this study, which is a result of the rising industrialization and urbanization of society. This can be a great way for women to leave their mark in the economic sector. It is a great way for women to leave their mark in the economic sector. But in most cases, women are underpaid for their jobs. If policies to reduce wage discrimination are made, more and more women will be

interested in working outside the home. There are a lot of cases where women are contributing to the agriculture sector. If proper training and flexible loans are provided, they can have a greater impact on the agriculture sector. Further, evidence from this study showed that fewer and fewer women are justifying violence. Bangladesh has many laws that protect the rights of children and women, such as the Constitution, the Penal Code, the Children's Act of 1974, and the Women and Children Repression Prevention Act of 2000, among others [63]. These laws make it possible for our women to speak out against violence, stand up for their rights, and work outside the home. Ensuring further steps, raising awareness among women, and providing more facilities can accelerate women's empowerment rapidly and in a better way.

Limitations

Our study is not beyond limitations. Firstly, this study used data extracted from BDHS having in responses only from women which introduced biases to some extent. Secondly, women's empowerment was defined in our analysis using only two indicators (household decision-making and attitudes toward wife beating) but this could be more strongly defined using more indicators like economic decision-making, access to healthcare, physical mobility, the decision on family planning, assets ownership, etc. Due to lack of data, some important covariates were not considered in this study.

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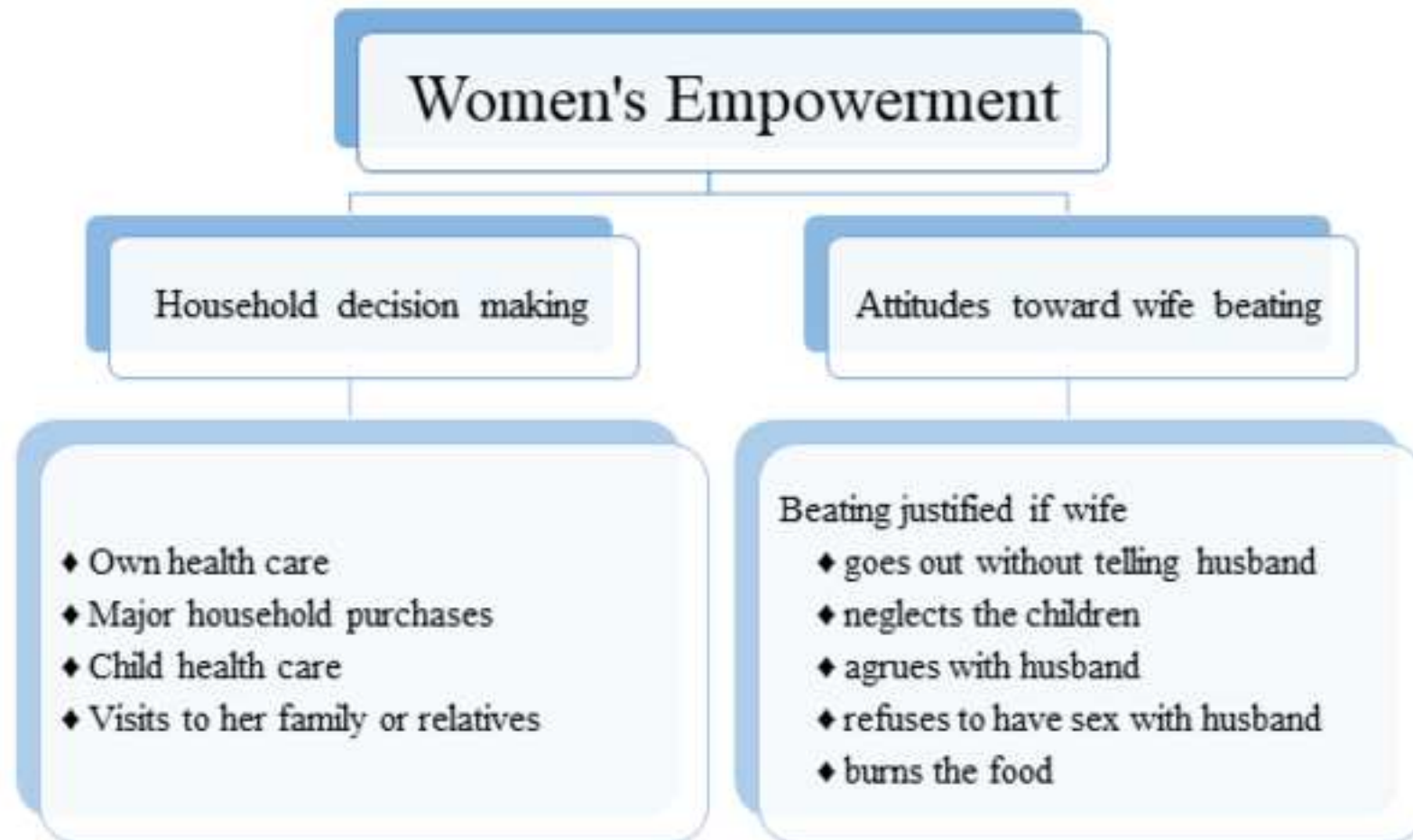
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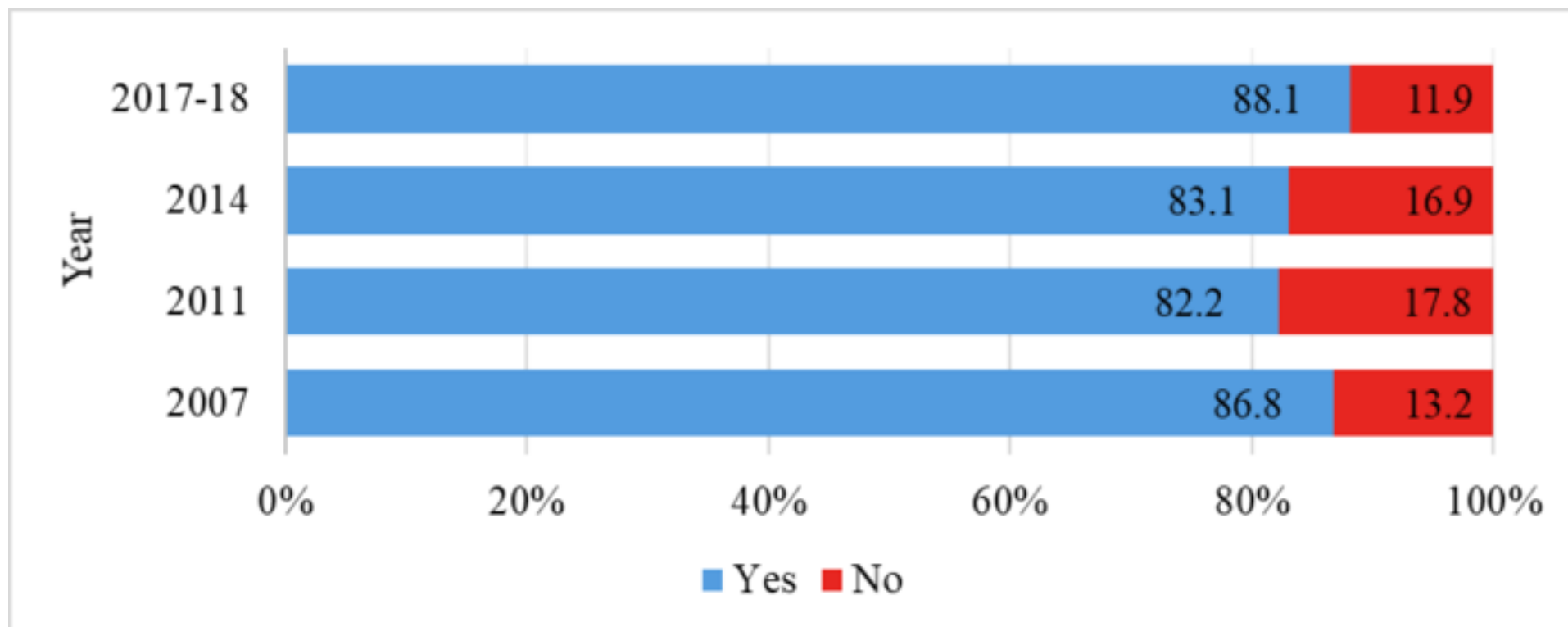
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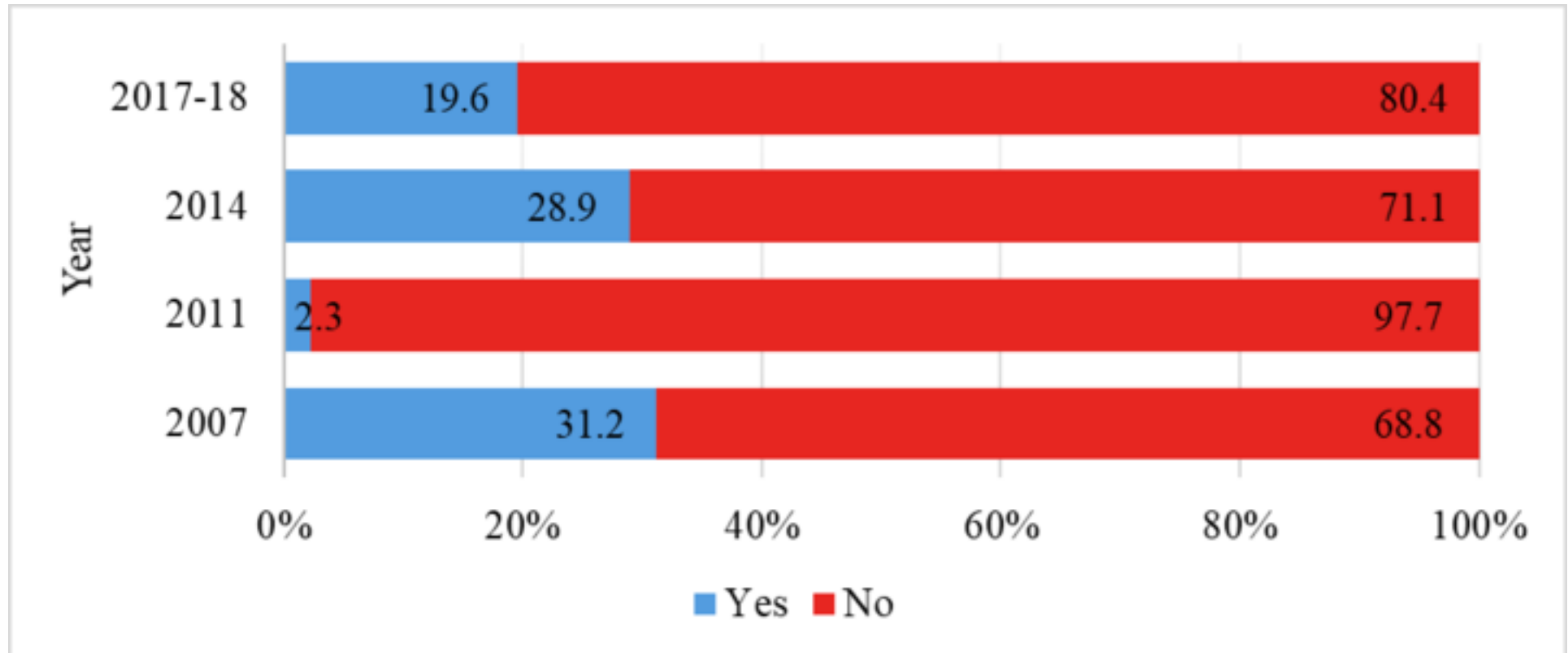
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