Women Health, Empowerment and Its Association with Contraceptive Use

Md. Amanat Ullah [1, 2], S. M. Mostafa Kamal [3], Rokeya Begum [4], Tanzillah Wahid [5]

Abstract

Background: In Bangladesh, the presence of gender disparities impedes women from fulfilling their reproductive requirements, resulting in elevated levels of unintended pregnancies, abortions, and fatalities. Research findings suggest that the empowerment of women has the potential to enhance the proportion of satisfied demand for modern contraceptive methods (MDFPS); however, limited studies have assessed this phenomenon across various aspects of life. Objectives: Our investigation delved into the impact of empowerment on MDFPS utilization among married women of reproductive age (MWRA) in Bangladesh. Methods: We examined data extracted from the 2020 Bangladesh Demographic and Health Survey (DHS) involving 4714 MWRA with reproductive requirements residing in 573 different localities. Utilizing principal component analysis (PCA) and the Cronbach's alpha test, we delved into and evaluated specific and consistently significant elements of women's empowerment within marital unions. Aggregated metrics at the community level were employed to evaluate gender norms and interactions within the societies. Results: Less than one-third (30.8%) of the demand for family planning among MWRA were satisfied with modern methods in general. The components underlying women's agency in marital relationships included participation in household decision-making, freedom in accessing healthcare, and opposition to domestic violence. Conclusion: Empowering women possesses the capacity to diminish gender disparity, enhance women's agency, and boost MDFPS. Such impact could materialize via equitable marital partnerships and just community gender norms and interactions.

Keywords: Women Empowerment, Gender Inequality, Family Planning, Married Women, Bangladesh

Significance | Empowering women diminishes gender inequality, amplifies autonomy, and boosts the adoption of modern contraceptives among married women in Bangladesh.

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Introduction

The achievement of Sustainable Development Goals (SDGs) 3 and 5, which try to enhance gender equality and the well-being of all people, depends on the worldwide reach of sexual and reproductive health and rights(Assembly, 2015). However, merely 52% of those requiring family planning services opt for contemporary methods, resulting in approximately 14 million unintended pregnancies annually, leading to adverse consequences like unsafe abortions, maternal mortality, and socioeconomic repercussions(Rajan, 2021). Bangladeshi women still have a difficult time getting access to the resources they need to meet their family planning needs, even with the money put into family planning initiatives and the rise in educational achievement(Khatun et al., 2023). Various economic, cultural, and geographical disparities not only impede the advancement of family planning initiatives but also obstruct the ability to make informed decisions regarding modern contraceptives. Studies suggest that increasing women's rights and access to resources could enable them to make more informed

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decisions about having children, which would lower the fertility rate(Adebowale et al., 2016). While the process of making contraceptive decisions primarily occurs within marital relationships, it is also influenced by societal norms surrounding gender roles and interpersonal dynamics.

With the aim of achieving a minimum of 75% modern contraceptive prevalence by the year 2030, the Sustainable Development Goals (SDGs) introduced a metric in 2015 for assessing the effectiveness of family planning, specifically the percentage of women's demand for family planning that is satisfied by modern methods(Kraft et al., 2022). An important distinction from the previously used modern contraceptive prevalence rate is that this new indicator focuses solely on women in need of family planning, thus explicitly acknowledging women's fundamental right to make decisions about their own fertility and choose from a range of effective modern methods(Kraft et al., 2022). Currently, among low- and middle-income nations, 52.9% meet the MDFPS target, while West Bangladesh significantly lags behind at 32.9%. The percentage of married women of reproductive age (MWRA) who are unable to obtain the family planning services they need has notably increased in Bangladesh, rising from 26.5% in 1990 to 30.2% in 2020(Adde et al., 2022).

The proportion of multidimensional poverty headcount ratio (MDFPS) stood at a mere 40% in the year 2020. By 2030, estimates point to a rise of 52%, falling short of the two-thirds of the aim in the Sustainable Development Goals (SDGs)(James-Hawkins et al., 2018).

Up until recently, the main focus of study in Bangladesh was on how women's socioeconomic position and the accessibility of family planning services affected their use of contraceptives(Parvin et al., 2022). In Bangladesh for instance, research on the use of modern contraceptives by women was found to positively correlate with wealth, educational attainment, asset ownership, preference for smaller families, monogamous relationships, having a living son, and having a child under the age of one. Living in cities, being close to medical facilities, and interacting with community health professionals are among the factors that have been proven to greatly boost the likelihood of taking contemporary contraception(Khan et al., 2022). However, these investigations often neglected to fully acknowledge women's decision-making power regarding reproductive choices and the influence of community gender norms on these decisions. Recent scholarly works have highlighted the impact of pronounced gender role disparities and relationship dynamics on women's autonomy, consequently impeding their access to reliable contraceptive methods(Shabuz et al., 2022). Metheny and Stephenson discovered that women residing in communities with higher levels of men's educational attainment, lower female employment, increased acceptance of domestic violence, a greater desired number of children, and lower wealth were less inclined to utilize contraceptives(Mutumba et al., 2018). In addition, SDG 5 outlined structural goals for achieving gender equality and empowering all women and girls. These goals include guaranteeing women's access to opportunities and rights and eliminating all forms of violence and discrimination against them(Leal Filho et al., 2023). Despite these findings, there has been a limited number of studies that have concurrently examined the impact of gender on both communities and individuals, along with contemporary contraceptive utilization within the Bangladesh context(Samandari et al., 2020). Moreover, there exists a dearth of understanding regarding systematic indicators of unbalanced marital dynamics and community-level gender disparities that could potentially hinder the empowerment process for women seeking family planning(Mandal et al., 2017).

Our theoretical framework was based on socioecological theory, which acknowledges the significant impact of factors at the individual, household, and community levels on health behaviors(Moyehodie et al., 2022). Within the realm of gender inequality, the conventional allocation of gender roles and dynamics based on biological sex constrains women's access to resources and utilization of modern contraceptives, despite their need for family planning. These constraints can manifest as violence against women, denial of rights and opportunities enjoyed by women within communities, and an imbalance in marital relationships. The process of women's empowerment revolves around attaining the capability to make independent choices, autonomous decisions, and achieve desired outcomes despite inherent limitations. Women's empowerment is frequently conceptualized in terms of resources, agency, and accomplishments(Parvin et al., 2022). Resources encompass both tangible and intangible assets that facilitate agency and subsequently transform choices into accomplishments. Agency, a pivotal component of the empowerment journey, pertains to women's capacity to delineate their objectives and take action towards them(Adebowale et al., 2016). Enhancing women's access to resources through gender equality would not result in empowerment unless women actively engage as agents of change rather than passive recipients. Nevertheless, the exercise of agency acquires significance when it contributes to enhancing women's well-being either through collective efforts or a shift in gender dynamics(Asiimwe et al., 2014).

Measuring women's empowerment presents a significant challenge due to the intrinsic and context-specific characteristics of agency. Through the utilization of factor analysis, a comprehensive investigation into women's agency revealed various domains such as involvement in family decision-making, freedom of movement, and expression of more gender egalitarian beliefs(Zegeye et al., 2021). Nevertheless, the correlation between these domains and modern contraceptive usage has yielded conflicting findings,

prompting a reevaluation of their significance and consistency, particularly within the context of Bangladesh. The pronatalist norms prevalent in Bangladeshi societies enforce rigid gender roles and dynamics that restrict women's access to resources, rights, and opportunities for economic engagement while confining them to reproductive responsibilities(MacQuarrie & Aziz, 2022).

We examine this matter in the context of Bangladesh, where gender inequality indices are notably high, and the MWRA face challenges in fulfilling their family planning requirements(James-Hawkins et al., 2018).

The objective of this investigation is to initially examine and pinpoint pertinent and consistent elements of women's agency within marital partnerships, subsequently evaluate community-level gender norms and connections, and ultimately analyze their correlation with contemporary contraceptive utilization among MWRA in Bangladesh. This methodology facilitates a more comprehensive depiction of how gender parity can impact women's capacity to make determinations regarding contemporary contraceptive utilization. This awareness could potentially contribute to the development of all-encompassing initiatives aimed at expediting universal availability of modern contraceptives, thereby advancing progress towards the SDGs.

2. Materials and Methods

Data were obtained from the individual records of women accessible through the 2020 Bangladesh Demographic and Health Survey (DHS). This particular survey gathered data that is nationally representative concerning women's empowerment, modern contraceptive usage, and socioeconomic attributes. It utilized a two-phase cluster design that was categorized by urban and rural distinctions. The initial phase involved the selection of sampling clusters based on the enumeration areas (EAs) outlined in the 2014 population and housing census. A total of 574 clusters were chosen using probability proportional to size sampling, with 176 clusters in urban regions and 378 in rural areas. Nonetheless, one EA situated in the Sylhet region was not included in the survey. The second phase encompassed a systematic sampling approach of approximately 25 households from each cluster, resulting in a total sample of 14,947 households, out of which 14,424 were successfully interviewed. The study found that all women in these families between the ages of 15 and 49 were eligible. As a result, a total of 17,087 women from 14,242 households and 573 clusters made up the sample, and their response rates were 99.8%, 99.2%, and 98.4%, respectively.

The utilization of contraceptive techniques was assessed among women of reproductive age (MWRA) between 15 and 49 years who have family planning requirements, specifically those desiring to prevent unintended pregnancies. As indicated by the Demographic and Health Surveys (DHS), MWRA pertain to women who are biologically capable of reproduction, presently in a marital union, and seeking to delay their subsequent childbirth for a duration of two years or more, or cease childbearing entirely. Nonetheless, the scope of this definition extends to encompass expectant women with mistimed or unwanted pregnancies, as well as women experiencing amenorrhea whose most recent childbirth was mistimed or whose last offspring was undesired. Following the elimination of incomplete data entries, the unweighted final sample population comprised 4714 MWRA who were either susceptible to or had encountered unintended pregnancies.

The dependent variable analyzed in this study was MDFPS among MWRA. An evaluation of contraceptive practices was conducted by the DHS, starting with inquiries regarding current contraceptive usage and the specific method employed. Modern contraceptive techniques, as defined by the DHS, encompass a range of options such as female and male sterilization, intrauterine devices, injectables, implants, the pill, male and female condoms, the lactational amenorrhea method, emergency contraception, diaphragms, foams, and jellies. Traditional methods, on the other hand, include rhythm and withdrawal. The dependent variable in this analysis is dichotomous, with a value of "0" assigned if a woman utilized a traditional method or refrained from contraceptive use, and a value of "1" if a modern method was employed.

Our primary independent variable under investigation is empowerment, operationalized at the community level by indicators of gender-based discrimination and opportunities, and at the level of marital relationships by women's agency.

Drawing upon prior studies, we investigated the specific elements of women's agency that are relevant to the context, such as their influence in family decision-making, attitudes towards domestic violence, and freedom of movement in public spaces. In the 2020 DHS survey, the capacity to engage in household decision-making was identified as a crucial indicator of agency(Some et al., 2021). This was evaluated based on women's autonomy, either jointly or independently, in making decisions regarding their own healthcare, significant household purchases, and visits to family or relatives. Nonetheless, this autonomy could be compromised in instances of domestic violence. Another segment of the survey instrument gauged women's perspectives on domestic violence by inquiring whether a husband is justified in hitting or physically harming his wife in various scenarios(Blackstone, 2017). These scenarios encompassed situations where the wife burns food, engages in arguments, leaves the house without informing her husband, neglects the children, and refuses to engage in sexual intercourse(Efendi et al., 2023).

Moreover, there could be various other factors that might impede women's access to healthcare services during their reproductive years. In order to evaluate these challenges, a specific section inquired whether each of the factors listed would pose a significant

obstacle for women in obtaining healthcare, such as the need for permission, financial constraints, proximity to a healthcare facility, and a preference not to go unaccompanied(Seidu et al., 2022). These components focusing on the capabilities of women were consistently integrated into all Demographic and Health Surveys (DHS) across different nations, without a thorough evaluation of the reliability and uniformity of the tool (Some et al., 2021).

In the realm of gender-based disparities within communities, we extrapolated community-level indicators of inequality from individual-level data, as the Demographic and Health Surveys (DHS) does not gather data at the cluster level. Prior research examining the impact of communities on contraceptive utilization have combined the metrics of all individuals within a cluster or Primary Sampling Unit (PSU) to establish a community average(James-Hawkins et al., 2018). These PSUs offer a more accurate representation of the true community. The level of bias against women was evaluated based on the cluster averages concerning acceptance of domestic violence, early marriage, female genital mutilation, unpaid labor, and high fertility expectations. Conversely, the availability of opportunities for women was assessed using cluster averages for property ownership, secondary education, exposure to family planning messages, and interaction with family planning personnel(Alano & Hanson, 2018). Control variables

We considered the socioeconomic variables within each group by controlling for the age and educational background of the women, along with their household wealth and geographical location.

The weighting, stratification, and clustering factors as defined by the DHS were utilized in the analyses, with the exception of their application in component analysis and Cronbach's alpha testing. The examination included descriptive statistical analyses of MDFPS, indicators of empowerment, and socioeconomic factors. All statistical analyses were executed using Stata version 14.

First, an examination of principal component analysis and Cronbach's alpha test was conducted to investigate the components and evaluate the consistency of agency among married women in the specific context of Bangladesh. Then, assuming that people from the same community are more similar to each other than those from different communities, a study of gender equality indicators at the community level was conducted. The community averages were categorized into "high" and "low" groups based on national medians for descriptive purposes (refer to Table 2); these categories were treated as continuous variables in the logistic regression analysis (see Table 3). The association between two variables was also investigated using the chi-square test. Additionally, multicollinearity was evaluated by analyzing the variance inflation factor (VIF), with a predefined cutoff of less than five (< 5).

The hierarchical configuration of the DHS data necessitates the consideration of clustering within communities. The proportion of variability attributed to clustering is demonstrated by intraclass correlation (ICC), which is calculated from the baseline model where solely the cluster variable was incorporated as a random-effect factor. We addressed latent community-level variations through the implementation of multilevel analysis.

The methodology of regression employed the fitting of three models. The initial model (Model 1) encompassed the elements of agency within marital partnerships. The second model (Model 2) incorporated community-level indicators of gender equality as continuous variables. The third model (Model 3) adjusted for socioeconomic variables. Robust standard errors were employed.

The analysis presented was granted an exemption from evaluation according to the guidelines outlined in the regulatory policies established by the Institutional Review Board at National University Bangladesh.

3. Results and Discussion

Less than one-third (30.7%) of the total 4714 MWRA who required family planning assistance opted for modern contraceptive methods. Conversely, a noteworthy segment of two-thirds (66.9%) did not utilize any kind of contraception, although a minor proportion (2.4%) relied on conventional methods of contraception.

In the examination of the dimensionality of agency among married women, three components were preserved. These three components aligned with the three sections of the DHS focusing on participation in household decision-making, issues related to accessing healthcare, and attitudes towards domestic violence; the eigenvalues were 1.7, 2.2, and 3.1, respectively. Cronbach's alpha coefficients of 0.65, 0.83, and 0.70 were obtained for participation in household decision-making, difficulties obtaining healthcare, and attitudes toward domestic violence, respectively, based on the internal consistency assessment of each component (Table 1). Subsequent to this analysis, each dimension was categorized into higher and lower levels of agency. For example, women who engaged solely or jointly in decision-making (regarding family visits, their own healthcare, or household purchases), encountered minimal challenges in accessing healthcare (such as permission to seek treatment, financial constraints, distance to healthcare facilities, or reluctance to go alone), or disapproved of domestic violence in all mentioned scenarios (like leaving home without informing the husband, neglecting children, quarreling with the husband, refusing intimate relations, or mishandling food) were identified as possessing higher levels of agency (Table 2).

Overall, 61% of MWRA were involved in decision-making within the family unit, with 22% of them encountering no difficulties in accessing healthcare, whereas 56% expressed

complete disagreement with instances of domestic violence. All three facets exhibited a positive correlation with MDFPS. In terms of the community-level markers of gender parity, regions with elevated levels of tolerance towards domestic violence, premature marriage, female genital mutilation, unpaid labor, fertility preferences, and asset ownership displayed diminished proportions of MDFPS. Conversely, areas characterized by a higher prevalence of secondary education and exposure to family planning communications exhibited an increased prevalence of MDFPS. Regarding socioeconomic variables, a greater prevalence of MDFPS was documented among females residing in affluent households, urban locations, older age brackets, and those with higher levels of education.

In the regression methodology employed, components pertaining to women's agency within marital unions were incrementally included (Model 1), followed by the incorporation of community-level factors reflecting gender parity in terms of discriminatory practices and availability of opportunities for women (Model 2), and lastly, the integration of socioeconomic variables (Model 3). The outcomes are presented in Table 3.

Model 1 demonstrated significant positive correlations between all three components of agency and MDFPS. The likelihood of MDFPS occurrence rose by 30%, 62%, and 36% for females engaging in certain family decisions, encountering no obstacles in healthcare access, and expressing opposition towards any form of domestic violence, respectively. The estimates from Model 1 were lower in Model 2 due to the community-level indicators included in it; nonetheless, the results' directionality and statistical significance did not alter. The likelihood of reporting MDFPS was considerably higher among women who lived in communities where female genital mutilation was more common (OR: 2.59; 95% CI [1.60–4.18]). In contrast, there was a lower likelihood of reporting MDFPS for those residing in communities with higher fertility expectations (OR: 0.70; 95% CI [0.60–0.82]). Living in an area where there is better average access to secondary education (OR: 4.91; 95% CI [2.08–11.55]) and family planning messaging exposure (OR: 2.95; 95% CI [1.83–4.74]) also shows a favorable link with MDFPS In conclusion, upon the inclusion of socioeconomic variables in Model 3, there was a notable decrease in the impact size and statistical significance of agency components, while their alignment remained consistent. Despite the diminishing significance of taking a stand against domestic violence and involvement in family decision-making, they displayed a marginal yet positive correlation with MDFPS. Conversely, the previous evaluations of community-level metrics mostly retained their significance and directionality, with the exception of secondary education. Additionally, household wealth, women's age, and education level exhibited a positive relationship with MDFPS.

When comparing the community-level indicators of the three models to those of the null model, there were notable differences ($\sigma 2 = 0.82$, 95% CI 0.64 to 1.05). Model 2 showed a better fit than model 1 [$\chi 2\ (9) = 201.7$; $p < 0.001$], while model 3 showed a better fit than model 2 [$\chi 2\ (7) = 110.9$; $p < 0.001$], according to the log likelihood test. Furthermore, the modeling procedure revealed that for models 1, 2, and 3, the percentage of variance change (PVCs) from the null model were, respectively, 15, 65, and 66%.

To the best of our understanding, this research represents the primary investigation into the influence of women's empowerment on maternal death and fistula prevention strategies, both within marital partnerships and across communities in Bangladesh. It was anticipated that the rate of maternal death and fistula prevention strategies was below the desired level among women of reproductive age; nonetheless, alongside traditional methods like enhancing healthcare accessibility, advancements can be achieved through the empowerment of women and the advocacy of gender equality(Asaolu et al., 2017). Simultaneously, within communities, facilitating women's access to productive resources (such as assets and family planning information) rather than focusing solely on reproductive roles (characterized by high fertility expectations) may also enhance maternal death and fistula prevention strategies(Crissman et al., 2012). A notable exception to the general trend described earlier was the discovery that residing in communities with a higher prevalence of female genital mutilation was linked to an increased likelihood of maternal death and fistula prevention strategies(Yaya et al., 2018).

Less than thirty-three percent of MWRA individuals who required family planning services were capable of utilizing contemporary contraceptive methods. In a study conducted in Bangladesh, study identified that 40% of MDFPS participants were included, yet the rate of progression was three times slower than the necessary pace to achieve a 75% coverage by the year 2030.

Similar to prior studies, it was observed that engagement in household decision-making, absence of barriers in accessing healthcare, and unfavorable perspectives on domestic violence were identified as distinct facets of women's agency. Furthermore, the variables corresponding to each component exhibited a high level of consistency within the demographic under our research analysis(Patrikar et al., 2014). Additionally, a significant proportion of the MWRA cohort demonstrated either active involvement in household decision-making or harbored pessimistic attitudes towards domestic violence, with a minority facing challenges in accessing healthcare services. Within the context of Bangladesh, a limited number of married women possess a sense of empowerment, with merely 59% engaging in decision-making processes, while 61% endure psychological stressors. Moreover, our research unveiled a notable increase in the likelihood of MDFPS occurrence with the presence of

various aspects of women's agency, particularly the ability to avail healthcare services(Dhak et al., 2020). The linkages between women's agency and contraceptive practices have been subject to comprehensive investigation and predominantly exhibit favorable outcomes. However, no research has comprehensively addressed the dimensional aspects and reliability of measures of agency in relation to MDFPS. Taking into account these factors in our analysis not only enhanced the findings but also brought to light the challenges that MWRA have faced in preventing unintended pregnancies. Furthermore, our investigation may have highlighted the significance of autonomy in accessing healthcare as a crucial element in the association between women's agency and MDFPS. Nevertheless, previous definitions of empowerment have typically viewed women's mobility as boundless within the context of Bangladesh.

The health-seeking behavior of married women is a intricate occurrence, affected by their economic self-sufficiency and the power dynamics in their marriages. Recent studies in Bangladesh have shown that women who possess assets like home ownership or bargaining power are more likely to access healthcare services that may not be immediately apparent to their husbands, such as contraception. It is imperative to stress that these aspects of agency can also be determined by the levels of inequality present in communities(Do & Kurimoto, 2012).

The assimilation of gender equality at the community level has been evidenced to lessen the impact of women's agency on Maternal, Neonatal, and Child Health (MNCH) especially in relation to engagement in household decision-making and viewpoints on domestic violence. Prior studies have indicated that in societies that prioritize traditional gender norms and dynamics, the perceived advantages of utilizing family planning methods decrease(Hameed et al., 2014). It is plausible that women who engage in decision-making within their households and uphold fair gender norms may carefully contemplate, beyond the health hazards, the societal repercussions of compromising their autonomy as a result of adopting modern contraceptive practices. In contrast, the absence of a significant decrease in the impact of women's access to healthcare could suggest a less stringent regulation of community gender norms and interactions on women's health-seeking conduct(Blackstone, 2017). On the other hand, in Bangladesh, women with elevated decision-making authority and moderate tolerance for spousal abuse continue to exhibit higher chances of utilizing contraception, even after adjusting for societal and national economic variables. The authors, however, have directed their attention towards the examination of previous contraceptive experiences, regardless of the specific methods employed. This particular approach may have failed to account for the impact of past contraceptive experiences on the process of empowerment. Additionally, the utilization of modern or traditional contraceptive methods may entail varying degrees of empowerment(Seidu et al., 2022). Additionally, our study findings have emphasized the significance of taking into account the influence of gender equality within communities, as opposed to solely concentrating on crude socio-economic factors, with regards to the use of modern contraceptives.

Gender inequality at the community level was found to be consistent with socioecological theories in influencing the use of modern contraceptive methods. Prior studies have demonstrated that gender discrimination has a detrimental impact on the acceptance of modern contraception, whereas increased opportunities for women have a counteracting effect(Zegeye et al., 2021). Women residing in communities with higher expectations regarding fertility were notably less inclined to utilize modern family planning methods. This particular discovery highlights the prevalence of pronatalism in Bangladesh, which often prioritizes women's reproductive duties and restricts their ability to control their own fertility.

Women may conform socially, leading them to follow the current societal expectations regarding fertility and choosing not to utilize contemporary contraceptive methods. Moreover, women may adhere to the predominant fertility standards in order to obtain societal approval and prevent violence. In alignment with prior studies, there was no significant correlation found between the justification of violence at the communal level and the utilization of modern contraceptives. Although there is an overall adverse connection between the acceptance of domestic violence and the use of modern contraceptives in Bangladeshi societies, variations within countries may persist. Indeed, comprehending the intricate influence of both acceptance and encounter with violence on women's contraceptive practices is challenging due to the associated stigma, which could result in under-reporting. Additional research is imperative to devise tools capable of capturing specific and dependable aspects of violence within communities.

Unexpectedly, a heightened prevalence of female genital mutilation within the societal framework exhibited a positive correlation with the utilization of contemporary contraceptive methods. By mitigating the likelihood of the ecological fallacy, we established a framework that accounted for the individual-level status of genital mutilation. Given the perception of female genital mutilation as an emblem of gender-based rights transgressions, our anticipation was to uncover an adverse relationship with modern contraceptive practices. Even though female genital mutilation is intrinsically discriminatory against women, some people may have had the surgery done in order to conform to social expectations; some groups in Bangladesh even take pride in this practice. Therefore, the practice of female genital mutilation might not serve as a deterrent for households in utilizing modern contraceptives. On the other

hand, it is conceivable that in cultures where female genital mutilation is common, women may choose more effective forms of contraception due to a greater awareness of the risks associated with becoming pregnant and giving birth. The impact of additional community-level factors that may have an impact on the association between contemporary contraception use and female genital mutilation has to be further investigated. Our findings regarding the relationship between community-level access to rights and resources for women and MDFPS were unsurprisingly consistent with existing literature. It was observed that increased access to assets and exposure to family planning messages within the community correlated with higher odds of MDFPS. The results of our study suggest that there are distinct impacts of community-level rights, opportunities for women, as well as instances of violence and discrimination against women on MDFPS. Therefore, any efforts to expand MDFPS should consider various community factors, including political shifts, and address cultural obstacles related to gender equality.

It is also crucial to consider how women's access to resources and rights differs from men's. Indeed, a rise in the male-to-female ratio could indicate greater gender inequality and favoring the reproductive roles of women over their productive roles.

This research utilized a socioecological framework, a systematic analytical approach, and rigorous statistical techniques to evaluate MDFPS and its correlation with women's empowerment. Nevertheless, it is crucial to acknowledge various restrictions. Owing to insufficient data availability, we encountered challenges in controlling for the community-level access to family planning, which remains unexplored. Moreover, a significant portion of the empowerment measures in the DHS questionnaire originated in South Asia. Consequently, these empowerment metrics may not entirely capture the nuances of the Bangladeshi context. Future research could potentially investigate ethnographic evidence and utilize more suitable variables. Moreover, given that this is a cross-sectional study, it does not lend support to draw any inferences about the causal link between women's empowerment and the utilization of modern contraceptives. A longitudinal study could improve our comprehension of the dynamic interplay among the various facets of empowerment and socioeconomic elements. Lastly, indicators of gender inequality derived from the community are founded on physical demarcations, which might not entirely capture the essence of a community in terms of its socio-cultural identity. Despite the constraints, this research also possesses notable strengths. Primarily, the extensive national survey utilizing representative sampling facilitated multilevel analyses, thereby offering a more thorough framework for comprehending the impact of gender disparity on the reproductive patterns of women, particularly in nations with limited resources. This research endeavored to conceptualize power dynamics across various hierarchies and subsequently delineated numerous pertinent facets of female agency within the specific context of Bangladesh. These results may provide insightful information for conceptualizing, quantifying, and interpreting women empowerment in the future. The study population was restricted to individuals exhibiting interest in family planning based on the selection criteria. It is possible that we overlooked the necessity for family planning in the subgroup that was not chosen. As a result, we compared the socioeconomic indicators, women's agency, and empowerment between the groups that were chosen and those who weren't. Our results revealed that married women of reproductive age in the non-selected group reported notably lower levels of involvement in household decision-making, accessibility to healthcare, and resistance to domestic violence.

Furthermore, a significantly higher proportion of non-selected women were identified to reside in communities characterized by elevated levels of acceptance towards domestic violence, early marriage, female genital mutilation, unpaid work, and fertility expectations. Conversely, non-selected women were found to more frequently inhabit areas with limited access to secondary education and exposure to family planning messages. Additionally, women belonging to the non-selected group were notably poorer, younger, less educated, and predominantly located in rural regions. It is plausible that these women did not view family planning as a favorable or feasible option, highlighting the crucial need for women empowerment and gender equality initiatives beyond the scope of this study's findings. In the end, this study highlights the need for a comprehensive, multidimensional strategy to be put into place in order to address problems with socioeconomic growth, gender inequality, and sexual and reproductive rights.

4. Conclusion

Gender disparities and power differentials within marital partnerships constrain women's agency in making significant life decisions, such as opting for contemporary contraceptive methods for family planning purposes. The outcomes of this novel investigation underscore a variety of indices or elements across various spheres that warrant attention, not solely in the realm of family planning initiatives, but also in the domains of gender equality, demographic trends, and developmental strategies. Indeed, in order to expedite advancements towards ensuring universal availability of family planning services, interventions must optimize their effect on enhancing women's autonomy. Hence, a holistic approach becomes imperative to concurrently address the existing fertility patterns and gender norms prevailing at the communal level, while fostering collaborative decision-making within households.

Table 1. Factor loadings of the dimensions of women's agency in marital relationships before varimax rotation and the Cronbach's alpha test

Women's agency	Factors loadings (Dimensionality)			Cronbach's alpha coefficients (Consistency)
	Attitudes toward domestic violence	Participation in household decision-making	Problems accessing healthcare	
Participation in household decision-making				0.65
Family visits	0.1586	0.6136	0.1564	
Own healthcare	0.1500	0.5701	0.2019	
Household purchases	0.0980	0.3495	0.2463	
Problems accessing healthcare				0.70
Needs permission to go	0.0799	−0.2277	0.4930	
Needs money for treatment	0.0667	−0.0601	0.3568	
Is prohibited by the distance to health facility	0.0973	−0.2318	0.4412	
Is not willing to go alone	0.0913	−0.1962	0.4984	
Attitudes toward domestic violence				0.83
If the wife goes out without telling her husband	0.4440	−0.0881	−0.0951	
If the wife neglects the children	0.4536	−0.0946	−0.1087	
If the wife argues with her husband	0.4552	−0.0581	−0.1306	
If the wife refuses sex	0.4087	−0.0345	−0.1354	
If the wife burns food	0.3701	−0.0859	−0.0664	
Eigen values	3.1	1.7	2.2	
Variance explained (%)	25.7	18.5	14.0	

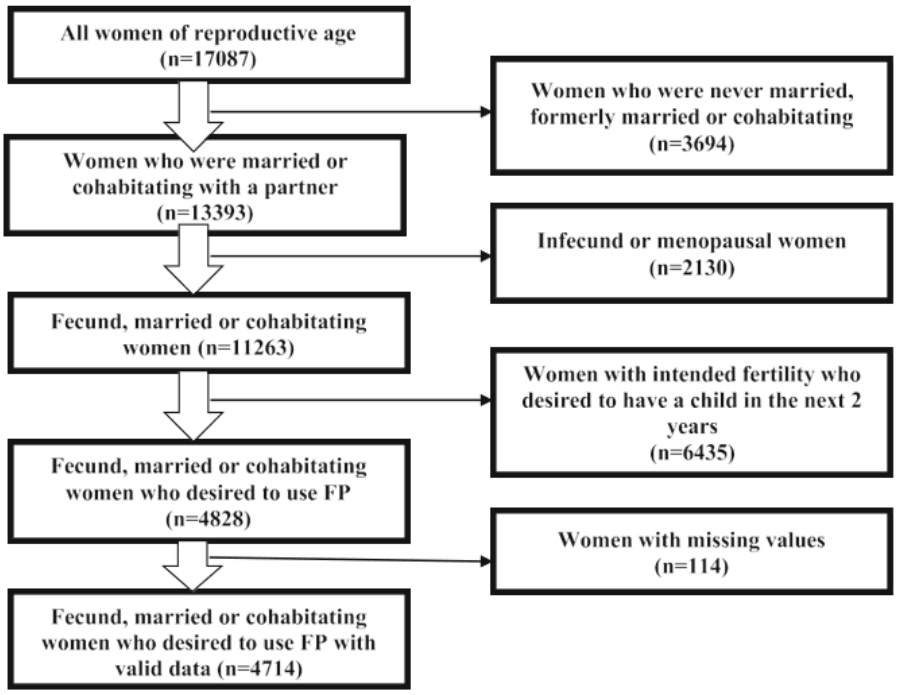

Figure 1. Flow chart of the sample

Table 2. Demand for family planning satisfied with modern methods (MDFPS) in relation to marital relationships, gender inequality in communities, and socioeconomic characteristics

Variables	N	%	MDFPS (%)	P-value
Contraceptive prevalence				
Modern methods			30.7	
Traditional methods			2.4	
Women's agency	N (4, 714)			
Participation in household decision-making				0.0001
No: No participation (0)	1, 903	39.1	26.5	
Yes: Maybe (1–3)	2, 811	60.9	33.5	
Problems accessing healthcare				0.0001
Yes: Maybe (0–3)	3, 639	77.7	27.8	
No: No problems (4)	1, 075	22.3	41.0	
Attitudes toward domestic violence				0.0001
Agree: Maybe agree (0–4)	2, 040	43.9	26.0	
Opposed: Do not agree (5)	2, 674	56.1	34.4	
Community-level of gender equality	N (573)			
Violence and discrimination against women				
Acceptance of domestic violence				0.0001
Low	283	49.4	35.7	
High	290	50.6	25.7	
Early marriage				0.0001
Low	285	49.7	38.5	
High	288	50.3	23.8	
Female genital mutilation				0.0025
Low	282	49.2	33.8	
High	291	50.8	27.6	
Unpaid work				0.0001
Low	287	50.1	35.3	
High	286	49.9	26.1	
Fertility expectations				0.0001
Low	287	49.7	38.7	
High	286	50.3	22.0	
Access to opportunities and resources for women				
Asset ownership				0.0692
Low	286	49.9	32.6	
High	287	50.1	28.9	
Secondary education				0.0001
Low	284	49.6	21.5	
High	289	50.4	40.0	
Exposure to family planning messages				0.0001
Low	285	49.7	22.8	
High	288	50.3	40.0	
Contact with family planning health worker				0.7080
Low	287	50.1	31.1	
High	286	49.9	30.4	
Variables	N	%	MDFPS (%)	P-value
Socioeconomic factors				
Wealth				0.0001
Poor	1516	33.9	19.2	
Middle	906	19.0	21.8	
Rich	2292	47.1	42.7	
Residence				0.0001
Urban	1522	27.3	48.2	
Rural	3192	72.7	24.2	

Women's age				0.0471
15–24	1162	25.0	27.5	
25–39	1900	40.7	32.0	
40–49	1652	34.3	31.6	
Women's education level				0.0001
No education	3596	76.7	25.3	
Primary	674	13.7	40.5	
Secondary & Higher	444	9.6	60.4	

Table 3. Multilevel logistic modeling of women's empowerment and demand for family planning satisfied using modern methods adjusting for socioeconomic characteristics

Regressions	**Model 1**			**Model 2**			**Model 3**	
Women's agency	aOR	95% CI		aOR	95% CI		aOR	95% CI
Participation in household decision-making (No) Maybe participation	1.30**	[1.11–1.53]		1.20*	[1.03–1.41]		1.09	[0.93–1.28]
Problems accessing healthcare (Maybe) No problems Attitudes toward domestic violence (Agree) Opposed	1.62*** 1.36***	[1.36–1.93] [1.16–1.60]		1.45*** 1.23*	[1.22–1.73] [1.04–1.46]		1.27** 1.13	[1.06–1.51] [0.95–1.35]
Community-level of gender equality Violence and discrimination against women				1.0	[0.63–1.59]		0.91	[0.58–1.44]
Acceptance of domestic violence								
Early marriage	0.91				[0.42–1.96]		0.99	[0.45–2.16]
Female genital mutilation	2.59***				[1.60–4.18]		2.46***	[1.52–3.99]
Unpaid work	0.84				[0.61–1.16]		0.85	[0.61–1.19]
Fertility expectations	0.70***				[0.60–0.82]		0.75***	[0.64–0.87]
Women's rights and opportunities Asset ownership	 1.67*				 [1.10–2.53]		 1.72*	 [1.13–2.61]
Secondary education	4.91***				[2.08–11.55]		1.98	[0.76–5.20]
Exposure to family planning messages	2.95***				[1.83–4.74]		2.68***	[1.64–4.36]
Contact with family planning health workers	1.40				[0.75–2.63]		1.43	[0.77–2.66]
Socioeconomic factors Wealth (Poor)								
Middle	1.09				[0.87–1.35]			
Rich	1.68***				[1.35–2.08]			
Residence (Rural)								
Urban	0.87				[0.65–1.16]			
Women's age (15–24)								
25–39	1.25*				[1.03–1.52]			
40–49	1.38**				[1.11–1.71]			
Women's education level (No education) Primary				1.26*	[1.17–1.85]			
Secondary & Higher				1.38**	[1.11–1.72]			
Model statistics								
Log likelihood	– 2783.11		– 2682.2		– 2659.6			
Chi-square	60.4		276.9		335.6			
Comparison to previous model Chi-square	 201.7***			 110.9***				
Degrees of freedom	9			7				
Random variance								
ICC Null = 0.20 95% CI [0.16–0.24]	0.17	[0.14–0.22]	0.08	[0.06–0.12]	0.07	[0.05–0.12]		
Variance between clusters Null: 0.82 95% CI [0.64–1.05]	0.70	[0.54–0.91]	0.29	[0.19–0.44]	0.28	[0.19–0.43]		
PVC (%)	15		65		66			

*a OR Adjusted Odds Ratios, CI Confidence Interval, Intra-class correlation (ICC) measures the degrees of clustering with random intercepts. The correlation of the 2- level multilevel logistic regressions is calculated by σμ2/ [σμ2+ π2/3], where σμ2 denotes community-level variance; PVC Proportional Variance Change; * p < 0.05; ** p < 0.01; *** p < 0.001*

Author contributions

M.A.U. formulated the study objectives, constructed the hypotheses, and revised the manuscript. S.M.M.K. conducted the literature review, while R.B. was responsible for data collection and analysis. T.W. wrote the results and conclusion sections.

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Competing financial interests

The authors have no conflict of interest.

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