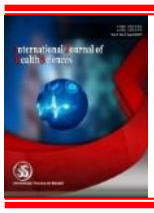

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Determinants of Pre-Conception Care Awareness among Young and Middle-Aged Women in the Morena District of Madhya Pradesh: A Cross-Section Study

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Abstract

Pre-conception care pertains to any preventive, promotive, and curative interventions for improving the health outcomes of women. Contrary to the growing burden of intergenerational transmission of chronic diseases, women lacked awareness and access to services for pre-conception care. Considering this, we conducted a cross-sectional study to assess the awareness, perceptions, and practices of pre-conception care among women from young and middle-aged groups in the Morena district of Madhya Pradesh. It was a cross-sectional study conducted with 383 women of reproductive age group (15-40 years) using a structured and pre-validated quantitative questionnaire. Out of 383 women, 171 belonged to the younger age group (15-24 years) and 212 to the middle-aged group (25-40 years). More than 50% of women had not heard of pre-conception care, and more than 90% of women in both groups had low dietary diversity. Middle-aged women had higher pre-conception care compared to younger women (βeta coefficient (95% Confidence Interval); p-value: 0.49 (0.03, 0.95); 0.03).

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1 Introduction

Pre-conception care is defined as any preventive, promotive, or curative interventions that aim to improve health-related outcomes of women and children and are provided before and up to 2 years after pregnancy (Dean et al., 2013). Early identification and modification of behavioral, biomedical, and social risks to women's health and pregnancy outcomes form the core of its interventions (Pimple & Ashturkar, 2016). World Health Organization listed twelve major risk factors for women's health during the pre-conception period (World Health Organization, 2013).

The notable pre-conception interventions for the identified risk factors include family planning, nutrition, physical activity, identification of non-communicable diseases and genetic disorders, substance abuse reduction, screening of mental health problems and infertility, etc (Bortolus et al., 2017). Pre-conception care includes a variety of services ranging from screening, counseling, and management of risk factors to therapeutic and behavioral interventions (Seshadri et al., 2012). Lifestyle behavior modifications, vaccination, use of pharmacological and non-pharmacological treatments for non-communicable diseases, and genetic screening are some of the interventions proven to improve pregnancy outcomes (Hemsing et al., 2017).

Around 63% of women who were anemic were smoking, 24% of women were obese, 28% of obese women were hypertensive, and 20% of obese women had raised blood glucose levels (>140 mg/dl) in India. Furthermore, 57% of women were anemic, only 44% consumed iron-folic acid tablets, and 9% of women had an unmet need for family planning in India (Iips, 2021). This highlights the increased risk of women in the reproductive age group to chronic diseases and intergenerational transmission of diseases. However, despite its need and importance, women are unaware of pre-conception care and do not access health services for preventive or curative services.

There is empirical evidence that more than half of the women had incomplete knowledge about pre-conception care, its services, and long-term benefits (Nepaliv & Sapkota, 2017; Kedzior et al., 2024; Idris et al., 2013). On the contrary, some studies highlighted that though the awareness is high, the practice of pre-conception care is poor (Akinajo et al., 2019). Besides the lack of awareness, there are misconceptions about its need and utility (Umar et al., 2019). Clinics are the primary source of accessing pre-conception services; however, the negative attitude towards it resulted in decreased uptake of services among couples (Umar et al., 2019; Olowokere et al., 2015).

Most of the evidence on pre-conception care is available from countries other than India, and most of the studies have explored pre-conception awareness among women within a wide range of age groups.[6] Researchers have not explored pre-conception care among younger women compared to its greater benefits, ease, and convenience. Women in the younger age group (18-25 years) are easily accessible and have the potential to demonstrate sustainable behavior change. Besides, women in the younger age group tend to adopt unhealthy lifestyle behaviors and habits with long-term impacts on maternal and child health (Skouteris & Savaglio, 2021).

Hence, considering the lack of data and the need to address the lack of awareness of pre-conception care, we aimed to conduct a study. The study aimed to assess the awareness, perceptions, and practices of pre-conception care among women from young and middle-aged groups in one of the districts of Madhya Pradesh. The study was a part of the baseline study of a community-based intervention to improve maternal and child health among marginalized populations.

2 Materials and Methods

Study design and study population

The present study was a part of the baseline cross-sectional study with women of reproductive age carried out in 2 blocks of the Morena district of Madhya Pradesh. Situated in the northern part of Madhya Pradesh, Morena has a population of 1,965,970 and a sex ratio of 839 females per 1000 males (Sharma et al., 2021).

Sample size and sampling

We adopted the sample size formula for the cross-sectional study:

$$N=\frac{4p(1p)}{L2}$$

Where p is the prevalence calculated from the previous studies (p=29%), (Gautan & Dhakal, 2016), and L is the absolute error of 5%. For 80% power and at a 0.05 significance level, the sample size was calculated at 330. We adopted a two-stage sampling technique where 12 villages (primary sampling unity, PSU) were selected from the district using the Probability Proportional to Size (PPS) technique in the first stage, and 32 eligible respondents were randomly selected per village in the second stage.

Study tool

It was a structured and pre-validated quantitative questionnaire. We obtained data from women of reproductive age group, including questions on age at the time of the survey, age at marriage, education status, religion, social castes, possession of the type of ration cards, monthly family income, and access to a toilet. We asked about their awareness of anemia, contraceptives, pre-conception care, suitable age at marriage, and the gap between two pregnancies. The questions on suitable age at marriage and the gap between two pregnancies were open-ended, and the results were dichotomized. The suitable age at marriage was segregated into lower (≤20 years) and higher (>20 years) categories. Likewise, the gap between two pregnancies was dichotomized into three or more years and less than 3 years. Participants were asked about the frequency of consumption of major food groups daily, including grains/roots and tubers, pulses and beans, green leafy vegetables, vitamin A-rich fruits and vegetables, other fruits, vegetables, fish and meat, milk and milk products, nuts and seeds, eggs. The food groups consumed daily were scored 1; otherwise, 0. The individual scores were summed up to calculate total dietary diversity, such that the maximum score could be 10 and the minimum could be 0. We dichotomized the total diversity score into low (score between 0-4) and high (score between 5-10).

Similarly, there were 6 questions on interspousal communication, including women's relationship with their partners, comfort in sharing their views, role in decision-making for household purchases, satisfaction with their partner's affection and time, role in deciding family planning, and influence on changing partner's decisions. The responses were graded from the best (highest score) to the worst (lowest score) response. The individual responses were summed up to calculate the total score, such that the highest score was 23 and the lowest was 6. The total score was dichotomized into low (score ≤19) and high (>19).

Furthermore, a composite indicator was created after merging 9 variables, including dichotomized dietary diversity score, dichotomized interspousal communication score, awareness about anemia, contraceptives, pre-conception care, suitable age at marriage, and the gap between two pregnancies. The lower or incorrect responses were given a score of 1, and the higher or correct responses were scored 2. The individual scores of all 9 variables were summed up to calculate the composite indicator, such that the minimum score was 9 and the maximum score was 18. The reliability coefficient of the composite indicator was 0.64. The results were segregated based on the age of women at the time of the survey (younger with age between 15-24 and middle-aged with age between 25-40 years).

Statistical analysis

We displayed numerical variables as median (interquartile range; IQR) and categorical variables as frequency (percentages). The numerical variables were normally distributed, except for the monthly family income. We performed stepwise linear regression analysis to find the association between the composite indicator of 9 variables and the independent socio-demographic variables. In Model I, we only adjusted for the age of the women at the time of the survey. In Model II, we adjusted for other variables, including caste, religion, type of cards, and education status, and in Model III, we adjusted for age at marriage in addition to the factors adjusted in Model I and II. The strength and direction of the association were expressed as a beta coefficient (β) and 95% confidence interval (CI). A p-value less than 0.05 was considered a statistically significant value. All the analyses were performed using STATA version 14.2.

Ethical clearance

The ethical clearance for the study was obtained from the MAMTA Ethical Review Board (MIRB/December 2019/002). Written informed consent was obtained from the study participants.

3 Results and Discussions

A total of 383 women were included in the study (Table 1). Out of 383, 171 belonged to the younger age group (15-24 years) and 212 to the middle-aged group (25-40 years). Around 97% of the women in both age groups belonged to the marginalized classes (scheduled tribe or class or other backward classes). Open defecation was widely prevalent in the area, as more than 50% of women defecated in the open.

More than 50% of women had not heard of pre-conception care, and more than 90% of women in both groups had low dietary diversity (Table 2). Around 35% of women in the middle-aged group heard of anemia compared to 27% in the younger age group. Similarly, 39% of women in the middle-aged groups heard of contraceptives compared to the younger age group.

Middle-aged women had higher pre-conception care compared to younger women (β (95% CI); p-value: 0.49 (0.03, 0.95); 0.03) (Table 3). There is an increase in pre-conception care with an increase in the age at marriage ($p<0.001$). On the contrary, women from other backward classes had lower pre-conception care compared to women from the scheduled caste or tribe (Glasier et al., 2011; Chiou et al., 2003; Curtis et al., 2002; Goonewardene et al., 2012; Mulyani et al., 2017).

Table 1
Socio-demographic characteristics of young and middle-aged women

Socio-demographic characteristics	Young women (15-24 years) N (%) (n=171)	Middle-aged women (25-40 years) N (%) (n=212)
Age at marriage (years); median (IQR)	19 (18-19)	18 (18-18)
Missing	10	4
Education status		
Illiterate	22 (12.9)	53 (25.5)
Primary (1st to 4th std)	58 (34.1)	62 (29.8)
Upper primary (5th to 8th std)	51 (30.0)	55 (26.4)
Secondary (9th to 10th std)	27 (15.9)	21 (10.0)
Higher secondary and above (11th std & above)	12 (7.0)	17 (8.2)
Missing	1	4
Religion		
Hindu	169 (98.8)	202 (95.7)
Muslim	2 (1.2)	9 (4.2)
Missing	0	1
Social caste		
Scheduled caste/tribe	34 (20)	65 (31.5)
Other backward class	131 (77)	136 (66)
General	5 (3)	5 (2.5)
Missing	1	6
Type of card		
Above the poverty line card	38 (22.8)	61 (30.8)
Below the poverty line card	46 (27.5)	55 (27.8)
Don't know/no card	83 (49.7)	82 (41.4)
Missing	4	14
Monthly family income (INR); Median (IQR)	5000 (3000-8000)	5000 (3000-8000)
Missing	10	10
Open defecation		
Yes	90 (52.6)	109 (51.4)
No	81 (47.4)	103 (48.6)

Abbreviations: IQR: Interquartile Range; INR: Indian Rupees; std: standard

Table 2
Distribution of outcomes between young and middle-aged women

Socio-demographic characteristics	Young women (15-24 years) N (%) (n=171)	Middle-aged women (25-40 years) N (%) (n=212)
Dietary diversity		
Low (0-4)	160 (93.6)	192 (90.6)
High (5-10)	11 (6.4)	20 (9.4)
Heard of pre-conception care		
Yes	77 (45.0)	102 (48.0)
No	94 (55.0)	110 (52.0)
Pre-conception care needed for:		
Wife or husband	16 (9.4)	19 (9.0)
Both	61 (35.7)	83 (39.1)
None	94 (54.9)	110 (51.9)
Pre-conception care is essential to:		
Baby or mother	8 (4.7)	15 (7.1)
Both	69 (40.3)	87 (41.0)
None	94 (55.0)	110 (52.0)
Suitable age at marriage		
Lower (≤20 years)	80 (48.8)	92 (46.5)
Higher (>20 years)	84 (51.2)	106 (53.5)
Missing	7	14
Aware of anemia		
Yes	45 (27.1)	74 (35.4)
No	121 (72.9)	135 (64.6)
Missing	4	3
Heard of contraceptives		
Yes	51 (29.8)	84 (39.6)
No	120 (70.2)	128 (60.4)
Gap between pregnancies		
3 or more years	64 (38.3)	95 (47.0)
Less than 3 years	103 (61.7)	107 (53.0)
Missing	4	10
Interspousal communication		
Median (IQR)	20 (18-21)	20 (18-21)
Missing	5	6
Interspousal communication		
Low (≤19)	82 (49.4)	88 (42.7)
High score (>19)	84 (50.6)	118 (57.3)

Abbreviations: IQR: Interquartile Range

Table 3
Multiple corresponding analysis of the composite indicator of pre-conception care as the dependent variable and its socio-demographic determinants as independent variables

Variables	β coefficient (95% CI); p-value	β coefficient (95% CI); p-value	β coefficient (95% CI); p-value
Age (years)			
Middle-aged (25-40 years)	0.47 (0.02, 0.92); 0.04	0.48 (0.01, 0.94); 0.04	0.49 (0.03, 0.95); 0.03
Younger (15-24 years)	*Reference*	*Reference*	*Reference*
Education status	-		
Primary (1st-4th std)		-0.007(-0.662, 0.648); 0.9	-0.09(-0.74, 0.54); 0.76
Upper primary (5th-8th std)		0.25(-0.42, 0.92); 0.46	0.12 (-0.54, 0.79); 0.71
Secondary (9th-10th std)		0.46(-0.34, 1.26); 0.26	0.21 (-0.59, 1.01); 0.60
Higher secondary & above		1.11(0.08, 2.15); 0.03	0.79 (-0.22, 1.79); 0.12
Illiterate		*Reference*	*Reference*
Caste	-		
Other backward class		-1.26(-1.81, -0.71); <0.001	-1.11(-1.65, -0.57);
General		-0.23(-1.80, 1.34); 0.77	<0.001
Scheduled caste/tribe		*Reference*	-0.35(-0.87, 1.17); 0.65
			Reference
Religion	-		
Muslim		0.67(-0.80, 2.15); 0.37	0.65(-0.78, 2.09); 0.37
Hindu		*Reference*	*Reference*
Cards	-		
BPL card		0.42 (-0.20, 1.04); 0.18	0.36(-0.26, 0.98); 0.25
Don't know/no card		0.48 (-0.07, 1.02); 0.09	0.34(-0.21, 0.89); 0.22
APL card		*Reference*	*Reference*
Age at marriage (years)	-	-	0.28(0.16, 0.39); <0.001
Adjusted R^2	1%	9.2%	14.5%

Abbreviations: IQR: Interquartile Range; APL: Above the poverty line card; BPL: Below the poverty line card; β: beta coefficient; 95% CI: 95% Confidence Interval; R^2: Regression coefficient
A p-value <0.05 was highlighted in bold

Discussion

Among the study participants, knowledge of pre-conception healthcare was found to be around 45%. Other studies conducted in Ethiopia (53%), (Ayalew et al., 2017) Malaysia (51.9%), (Zhao et al., 2014), Qatar (53.7%), (Yu & Li, 2008), and Southern Ethiopia (55%) (Fikadu et al., 2022), also reported low levels of awareness regarding pre-conception care, though slightly higher percentage compared to the present study. However, the figure of the present study is higher compared to other studies conducted in Ethiopia (27.5%) (Ayalew et al., 2017), Saudi Arabia (42.8%) (Madanat & Sheshah, 2016), Nigeria (20.6%) (Manar et al., 2019), and India (6%) (Patel & Shah, 2019). Notably, we found that significantly more women in the older age group had a better awareness level compared to their younger counterparts. This may be attributed to the effects of age, which can enhance women's capacity to make positive changes and lead to a better understanding of preconception healthcare.

Preconception knowledge within our study sample is lower than that found in high-income countries such as China (90%) (Ding et al., 2015), Canada (70%) (Einarson & Koren, 2006), and the United States (76%) (Coonrod et al., 2009). The reduced level of knowledge among our participants may stem from the greater access to information experienced by women in higher-income countries, which can be attributed to advanced information and communication technology (ICT) and more extensive healthcare infrastructure. Improved

healthcare systems facilitate greater participation by women in various programs, which further contributes to enhanced knowledge and awareness.

The findings of this study indicate that awareness of pre-conception care increases with the age of marriage. Older brides have the opportunity to prepare for marriage and childbirth, leading them to seek more information about conception before marriage and pregnancy. The information-seeking behavior allows them to gain a deeper understanding of pre-conception health. Additionally, a higher age of marriage enables young women to pursue higher education. The present study also confirms that higher education significantly correlates with increased awareness of pre-conception care. Numerous studies conducted in Ethiopia (Ayalew et al., 2017), China (Zhao et al., 2014), Nigeria (Manar et al., 2019), Sudan (Ahmed et al., 2015), and Iran (Jafari & Rashidi, 2017), have demonstrated that educated women possess a better understanding of pre-conception care and hold positive attitudes toward utilizing pre-conception health services, which facilitates improved access to maternal and reproductive health services, resulting in healthier pregnancies and children. This suggests that women with advanced education are likely to have better access to relevant information, enhancing their understanding and intention to prepare for planned pregnancies (Miller et al., 2011).

Increased knowledge of preconception was found to have a significant association with the utilization of pre-conception care in several studies (Asresu et al., 2019; Adeyemo & Bello, 2021; Paradis et al., 2017). Women who possess greater knowledge and awareness of pre-conception care are more likely to seek out services related to pre-pregnancy and pregnancy care. A solid understanding of pre-conception care enables women to recognize the importance of essential healthcare services, leading to improved service utilization (de Lima et al., 2016; Goossens et al., 2016; Dunlop et al., 2008; Sitruk-Ware et al., 2013; Dugdale, 2001).

Limitations of this study

One limitation of this study is that self-reported data may be influenced by social desirability and recall biases. However, these biases were mitigated by conducting one-on-one interviews in a comfortable home setting and limiting the reporting period to 24 months to minimize recall bias. Additionally, the data collectors underwent comprehensive training. Conversely, the study did not investigate supply-side factors related to awareness of pre-conception care. Therefore, future research should consider examining healthcare providers and institutional factors. The study was limited to two administrative blocks within a single district, so the findings cannot be generalized. Lastly, the cross-sectional design of the study restricts the ability to establish causal relationships between the variables.

4 Conclusion

The study found that fewer than half of the women surveyed had some knowledge of pre-conception healthcare. Factors such as a woman's age, age at marriage, education level, and tribe/caste status were significantly associated with their understanding of pre-conception health. Promoting women's education, especially in their younger days, and delaying marriage age are essential steps to enhance this knowledge. Consequently, it is vital to implement collaborative initiatives involving various stakeholders, including government health departments and other line departments, non-governmental organizations, and community mobilization efforts, to effectively address all aspects of pre-conception care.

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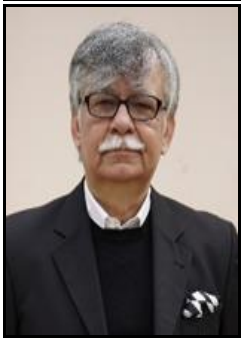

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