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Knowledge and Practice of Preconception Care Among Women of Reproductive-Age in Bheerkot Municipality, Nepal

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Abstract

Background: Preconception care is a crucial aspect of maternal and child healthcare services that aims to mitigate adverse pregnancy outcomes and enhance the desired health outcomes for women, newborns, and children. Despite the continuous multi-sectoral efforts in preconception care, maternal mortality and morbidity remain significant health concerns globally. This study aimed to assess the knowledge and practice of preconception care and its associated factors among women of reproductive age in Bheerkot Municipality, Nepal.

Methodology: A community-based descriptive cross-sectional study was conducted among 215 reproductive-age women to assess knowledge and practice regarding preconception care in Bheerkot Municipality, Nepal. Structured questionnaires were designed in the Nepali language and used in face-to-face interviews. We used a simple random sampling technique to collect quantitative data. In a statistical analysis, we employed the Chi-squared test and logistic regression analysis to identify possible predictors using the odds ratio and considered variables with $p<0.05$ statistically significant at a 95% confidence interval.

Result: Out of the 215 women who participated in the study, only 46.9% had a good knowledge of preconception care. Approximately half (43.7%) of the respondents had never practiced preconception care. Among respondents who had practiced preconception care before, 47.9% reported good practice, and 52.1% reported poor practice. Age of the respondent (χ^2=14.2063, P=0.000823, df=1), marital status (χ^2=17.9851, P=0.000022, df=1), time to reach a health facility (χ^2=30.1371, P=0.00001, df=1), and age at first pregnancy (χ^2=4.7975, P=0.0285, df=1) were statistically associated with knowledge about preconception care. Women who have foreign employment as a major source of family income and whose age is from 25 to 34 years were more likely to have a better practice of preconception care than their counterparts (COR 3.5000, CI 1.3343 to 9.1805, P = 0.0109) and (COR 3.4000, CI 1.1646 to 9.9265, P = 0.0252), respectively. Additionally, out of those who practiced preconception care, most respondents (93.4%) have practiced it in government health facilities.

Conclusion: Respondents had relatively poor knowledge and practice of preconception care. Collaboration of governmental health institutions between multiple sectors at local levels for more education and information and a specific national protocol or policy formulation would be beneficial in improving preconception care in Nepal.

Introduction

Preconception care (PCC) is a complete set of preventive, promotive, and curative health interventions administered to women before their pregnancy to have a healthy mother and newborn. [1] [2] It primarily aims to improve the health status of women by reducing harmful practices, individual behaviors, and environmental factors that contribute to poor maternal and child health outcomes. [2] Preconception care intends to provide health awareness, screening, and health interventions for women of reproductive age to reduce risk factors that might affect future pregnancies.

Globally, every two minutes, a woman dies of pregnancy-related causes; most of these deaths are preventable with necessary care at the right time (WHO report, 2020). [23] Almost 95% of all maternal deaths occurred in low- and lower-middle-income countries. [23] These trends in current maternal mortality reveal an inequity in healthcare systems between and within countries. Sub-Saharan Africa and southern Asia accounted for almost 87% (253,000 deaths per 100,000 live births) of the estimated global maternal deaths. Sub-Saharan Africa alone accounted for approximately 70% of maternal deaths (202,000 deaths per 100,000 live births), while southern Asia accounted for about 16% (47,000 deaths per 100,000 live births) in 2020. [23] In 2010, around 58,000 newborn babies died from neonatal tetanus, and 4 out of 10 women reported that their pregnancies were unplanned. [2] Similarly, maternal undernutrition and iron-deficiency anemia increase the risk of maternal death, accounting for at least 20% of maternal mortality worldwide. [2] Violence against girls and women results in adverse physical, psychological, and reproductive health consequences, as well as an increased risk for premature delivery and low-birth-weight infants. [2]

In Nepal, out of the total 12,976 deaths among women of reproductive age (15-49 years) in 2021, 653 were pregnancy-related, and 622 were confirmed maternal deaths (NPHC report, 2021). Some reports show that 50% of all maternal deaths in Nepal (where abortion was illegal until September 2002) were due to induced abortion. Unsafe, unhygienic, and sometimes fatal natural practices conducted by traditional birth attendants are the reasons for maternal deaths. The Nepal Demographic Health Survey (2006) revealed that 82% of all women gave birth at home, and a skilled professional attended only 18% of births. [3] It is improving in 2022, with only 79% of live births delivered to health facilities in Nepal and still 19% at home (NDHS report, 2022). The maternal mortality ratio is 151 per 100,000 live births in Nepal (NPHC report, 2021). Infant and neonatal mortality are 28 and 21 deaths per 1,000 live births, respectively (NDHS report, 2022). There is also a range of socio-economic and cultural barriers to service use, such as ritual restrictions, belief in traditional healers, disadvantaged ethnicity, lack of knowledge of service utilization and exposure to information, lower women's autonomy, lower economic conditions, negligence in health problems, and poor quality services in government health facilities. [21] [22] Regular health check-ups are considered unnecessary in Nepalese communities, particularly in rural areas, unless there are complications.

Thus, preconception care is part of a larger healthcare model that aims to improve the health of mothers, infants, and families. [4] Several preconception care models have been developed and implemented globally. The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists classified the main components of preconception care into four categories: A. Physical Assessment (family history, behavior, obstetric history, and general physical examination); B. Vaccination (rubella, varicella, and hepatitis B); C. Risk Screening (HIV, STD, genetic disorders); and D. Counseling (folic acid consumption, smoking, alcohol cessation, and weight management). Interventions include folic acid supplementation, testing for rubella seronegativity and vaccination if indicated, tight control of pregestational diabetes, careful management of hypothyroidism, and avoidance

of teratogenic agents. [5] Preconception care also addresses environmental hazards, toxins, and unnecessary medications, promotes nutrition, and detects psychosocial concerns, domestic violence, and housing. [6] Using folic acid before three months of conception can minimize the risk of neural tube defects. [24] During the first weeks of pregnancy (before 52 days of gestation), exposure to alcohol, tobacco, and other drugs, a lack of essential vitamins (e.g., folic acid), and workplace hazards can adversely affect fetal development and result in pregnancy complications and poor outcomes for both mother and newborn. [24]

Finally, preconception care is vital in preventing health issues for women and their children, both in the short and long term. Nepal is a diverse country culturally and ethnically with numerous health problems, including reproductive health issues that cause difficulties for women during pregnancy. Preconception care is a new concept in Nepal that has not been comprehensively evaluated. However, we can benefit women, children, and their families by identifying and addressing potential health risks as early as possible, before conception. Therefore, this study aimed to explore the knowledge and practice of preconception care among reproductive-age women and identify its associated factors in the Bheerkot Municipality, Nepal.

Methods

Study Design, Study Area, and Population: The research design used in this study was descriptive cross-sectional, using a quantitative data approach. The study mainly focused on women between the ages of 15 and 49 who are part of the reproductive age group and reside in the Bheerkot Municipality, Syangja District of Nepal.

Sample Size Calculation: We calculated a sample size of 215 participants using the total population of Bheerkot Municipality (N) = 6981, with a 95 % confidence interval (CI).

Total number of reproductive age group (15-49) women in all wards of Bheerkot Municipality (N) = 6981 *[NDHS report, 2022]*

Z= Standard normal variable at 95% confidence interval (1.96)

P= Estimated proportion = 15.42% so, p =0.154 [7] [9] [13]

q = (1-p) = 1- 0.154 = 0.846

d = 0.05 (5% margin of error)

Using the formula for calculating sample size, $n = \frac{z^2 pqN}{d^2(N-1)+z^2 pq}$

Now, putting the value, we get

$$n = \frac{1.96^2 * 0.154 * 0.846 * 6981}{0.05^2(6981-1) + 1.96^2 * 0.154 * 0.846}$$

n = 195

Non-response rate is 10%

Final sample size = n + 0.1*n =195+ 0.1*195 =215

Thus, the final sample size is 215.

Sampling technique: We randomly selected three wards using the simple random sampling technique (lottery method) from among nine wards of the Bheerkot Municipality in Syangja District. We calculated the number of samples from each ward (Ward One = 100 samples, Ward Six = 56 samples, and Ward Seven = 59 samples) to ensure equal representation using proportionate sampling.

Tools and techniques for data collection: A face-to-face interview was conducted for data collection using a structured questionnaire designed in the Nepali language. The questionnaire comprised three sections: Socio-demographic, knowledge-related information, and practice-related information on preconception care. A literature review [13] [15] was used to develop tools and categorize knowledge and practice levels.

The validity and reliability of the study: The data collection tool (questionnaire) and techniques were cross-checked and verified by the supervisor and pretested on a 10% similar target group of homogeneous settings at Walling Municipality. The content validity ratio (CVR = 0.83) and content validity index (CVI = 0.75) confirmed the content validity of the questionnaire. The research was conducted under the close guidance of the research supervisor.

Data management, analysis, and interpretation Procedures: The data collected were reviewed carefully for completeness, coding, and editing and combined into a single dataset. The data was entered into Epi-data V3.1 and exported to IBM SPSS V21 for analysis. In a statistical analysis, we employed the Chi -squared test and logistic regression analysis to identify possible predictors using the odds ratio and considered variables with $p<0.05$ statistically significant at a 95% confidence interval.

Inclusion and exclusion criteria: Women of the reproductive age group of 15–49 years in Bheerkot Municipality were included. Women who refused to participate or could not answer the questionnaire are exclusive criteria.

Time Frame of the Study: The study period was from April 2022 to November 2022 (8 months). This period was for developing the research design, preparing the data collection tools, analyzing the data, and submitting the final report to the concerned authority.

Operational Definitions:

1. *Preconception care:* Preconception care refers to a set of interventions aimed at identifying and modifying biomedical, behavioral, and social risks to women's health or pregnancy outcomes through prevention and management before conception.
2. *Reproductive-aged women:* Reproductive women are those between the ages of 15 and 49, ranging from menarche to menopause.
3. *Knowledge of preconception care:* The level of knowledge of preconception care is determined by the correct responses to questions provided by the women. A literature review [13] [15] was used to categorize knowledge levels. Women's knowledge was measured using 16 questions, with each correct answer earning one point and each incorrect answer earning zero points. The total score ranged from 0 to 16 points.
4. *Good Knowledge and Poor Knowledge:* Those scoring ≥9 were labeled as having "good knowledge," while those scoring ≤8 were labeled as having "poor knowledge" to preconception care knowledge questions.
5. *Practice of preconception care:* The practice of preconception care is evaluated based on the respondent's actions towards the services used. A set of 16 questions were scored either '1' (correct) or '0' (incorrect) to determine the minimum and maximum possible total practice scores for each participant, which were '0' and '16,' respectively.
6. *Good Practice and Poor Practice:* The preconception care practice was categorized as "good practice" (≥9) or "poor practice" (≤8) using the mean practice score as a cutoff point for preconception care practice questions. [13] [15]

Results

Socio-demographic information of the respondents

This study of 215 respondents showed that most were aged 35-49 (63.7%) and had completed secondary education (59.5%). The majority were from nuclear families (78.1%) and earned income from foreign employment (35.8%) or agriculture (28.4%). Over half (54.9%) reported a monthly income of NPR 30000-60000. About 63.7% of the respondents were unemployed. Similarly, of those with pregnancy experience (161 respondents), 64% had one pregnancy, and 36% had two or more. Of those who have ever been pregnant, 6.9% of the respondents experienced their pregnancy under the age of 20 years. However, 62.8% of respondents have access to health facilities less than one hour (on foot) from their residence. (Table 1)

Table 1. Socio-demographic information of the respondents

Variables	Frequency (n=215)	Percentage (%)
Age of the respondents		
15 to 24 years	55	25.6
25 to 34 years	23	10.7
35 to 49 years	137	63.7
Ethnicity		
Brahmin	42	19.5
Chhetri	126	58.6
Dalit/Janajati	47	20.9
Marital status		
Married	166	77.2
Unmarried	49	22.8
Educational status of respondents		
Illiterate	28	13
Primary level	53	24.7
Secondary level	128	59.5
Bachelor and above	6	2.8
Family type		
Nuclear	168	78.1
Joint/Extended	47	21.9
Employment status of respondents		
Unemployed*	137	63.7
Employed**	78	36.3
The major source of family income		
Agriculture	61	28.4

Business	46	21.4
Job/Service	14	6.5
Foreign employment	77	35.8
Others	17	7.9
Average monthly income of the family (NPR) * **		
Less than NPR 30000	83	38.6
NPR 30000 – NPR 60000	118	54.9
NPR 60000 – NPR 100000	6	2.8
More than NPR 100000	8	3.7
Number of previous pregnancy (n=161)		
One	103	64
Two or more	58	36
Age at first pregnancy (n=161)		
Below 20 years	11	6.9
Above 20 years	150	93.1
Time to reach health facility (on foot) from residence		
Near (less than one hour)	135	62.8
Far (more than one hour)	80	37.2

Note: Unemployed (House maker/housewife)*, Employed (Service/job holder)**

Respondent's knowledge of the general concepts of preconception care

All (100%) respondents had prior knowledge about preconception care, but 25.6% were unsure of its exact meaning or purpose. Among the components of preconception care, most respondents knew about having a balanced diet, avoiding self-medication, testing for STIs, HIV counseling and testing, monitoring weight and blood pressure, and intake of iron tablets. More than half of the respondents (86.5%) got this information from their family/friends. However, they had the least knowledge about Immunization (JE, Rubella, and Hepatitis B) and Prophylaxis (Filariasis, Typhoid, Malaria, and Cholera) with 5.6% and 9.3%, respectively. About 62.8% of the respondents did not have a general understanding of the health problems during pregnancy. (Table 2)

Table 2. Respondent's knowledge on the general concept of preconception care

Variables	**Frequency (n=215)**	**Percentage (%)**
Heard about preconception care (n=215)		
Yes	215	100
No	0	0
If yes, source of information (n=215)**		
Family/Friends	186	86.5

Teacher /Mentor	92	42.8
Media/Newspaper	19	8.8
Health personnel	4	1.9
Knowledge regarding the meaning or purpose of preconception care (n=215) ****		
Health Promotion and Prevention: (Immunization)	37	17.2
Risk Assessment: *(screening of HIV, STD, genetic disorders)*	22	10.2
Physical examination: *(know the present health condition of the woman)*	76	35.4
Counseling: *(Genetic, substance abuse, alcohol, diet)*	25	11.6
Don't know	55	25.6
Knowledge regarding the timing for preconception care (n=215) ****		
Before pregnancy	93	43.3
In between pregnancy	157	73
After delivery	33	15.4
Don't know	33	15.4
Knowledge regarding the benefits of preconception care (n=215) ****		
Reduced child and maternal mortality	195	90.7
Prevent pregnancy complications	131	60.9
Don't know	5	2.3
Knowledge regarding the institution of preconception care service provider (n=215) ****		
Government Health Facilities	212	98.6
Private Health Facilities	70	32.6
Home	5	2.3
Knowledge regarding the preconception care components (n=215) ****		
1. Proper balance diet	213	99.1
2. Monitor weight	124	57.7
3. Iron tablet supplementation	119	55.3
4. Screening for Anemia, Calcium, and Vitamin D deficiency	66	30.7
5. Carrier Screening, family history	61	28.4
6. Immunization for Japanese Encephalitis (JE), Rubella, and Hepatitis B	12	5.6
7. Deworming Use	115	53.5
8. Prophylaxis for Filariasis, Typhoid, Malaria, and Cholera	20	9.3
9. Blood test for Hepatitis B, C, Uric acid, Cholesterol	97	45.1

11. Avoid self-medication	184	85.6
12. HIV counseling and testing	179	83.3
13. Screening for chronic disease	125	58.1
14. Avoid occupational exposure	63	29.3
15. Check blood sugar	113	52.6
16. Monitor blood pressure	166	77.2

Note: Multiple response***

Respondent's practice of preconception care utilization

Only 121 (56.3%) of the respondents have practiced preconception, and the majority of the respondents (93.4%) took preconception services from government health institutions. Regarding the reasons for not taking preconception care, 40.4% lacked proper knowledge, and nearly half of the respondents also mentioned not prioritizing preconception care (46.8%) in their families and communities. Among the mentioned components of preconception care, most respondents practiced a Balanced Diet, Avoided self-medication, testing for STIs, HIV Counseling and testing, Monitoring Weight and Blood Pressure, and Intake of Iron Tablets. (Table 3)

Table 3. Respondent's practice of preconception care utilization

Variables	**Frequency**	**Percentage (%)**
Practice of Preconception care (n=215)		
Yes	121	56.3
No	94	43.7
Institutions for the practice of preconception care (n=121) ****		
Government Health Facilities	113	93.4
Private Health Facilities	14	11.6
Home	14	11.6
Reasons for not taking preconception care (n=94) ****		
Lack of proper knowledge	38	40.4
Less time management	24	25.5
Less priority for preconception care	44	46.8
No family culture for preconception care	42	44.7
Others	50	53.2
The practice of preconception care service components (n=121) ****		
1. Proper balance diet	109	90.1
2. Monitor weight	74	1.2
3. Iron tablet supplementation	70	57.9
4. Screening for Anemia, Calcium, and Vitamin D deficiency	45	37.2
5. Carrier Screening, family history	37	30.6
6. Immunization for Japanese Encephalitis (JE), Rubella, and Hepatitis B	16	13.3

7. Deworming Use	93	76.9
8. Prophylaxis for Filariasis, Typhoid, Malaria, and Cholera	14	11.6
9. Blood test for Hepatitis B, C, Uric acid, Cholesterol	43	35.5
10. Test for STI	105	86.8
11. Avoid self-medication	99	81.8
12. HIV counseling and testing	93	76.9
13. Screening for chronic disease	0	0
14. Avoid occupational exposure	51	42.1
15. Check blood sugar	79	65.3
16. Monitor blood pressure	97	80.2

Note: Multiple response***

Overall knowledge and practice level of respondents on preconception care Service Components

Out of the 215 women who participated in the study, only 46.9% (101) had a good knowledge of preconception care. Shockingly, 43.7% (94) of the respondents never practiced preconception care, even a single component. Among the respondents who had practiced preconception care before, only 47.9% (58) reported good practice, while 52.1% (63) reported poor practice. (Table 3, 4)

Table 4. Overall knowledge and Practice level of respondents on preconception care Service Components

Level	Frequency	Percentage (%)	Mean Frequency ±SD	Mean Percentage ±SD
Knowledge of preconception care Service Components (n=215)				
Poor knowledge (0≥8)	114	53.1 %	114.625 ±59.48	53.31875±27.67
Good knowledge (9≥16)	101	46.9 %		
The practice of preconception care Service Components (n=121)				
Poor Practice (0≥8)	63	52.1 %	64.0625 ±35.27	52.9625±29.15
Good Practice (9≥16)	58	47.9 %		

Association of knowledge and practice level on preconception care with demographic variables

Age of the respondent ($\chi2$=14.2063, P=0.000823), marital status ($\chi2$=17.9851, P=0.000022), time to reach a health facility ($\chi2$=30.1371, P=0.00001), and also age at first pregnancy ($\chi2$=4.7975, P=0.0285) were statistically associated ($p<0.05$) with knowledge about preconception care. Similarly, the number of previous pregnancies ($\chi2$ = 18.406, P = 0.000018), age of the respondent ($\chi2$ = 8.337, P = 0.015476), and source of family income ($\chi2$ = 10.8392, P = 0.028432) were statistically associated ($p<0.05$) with preconception care practice. Further, women who have foreign employment as a major source of family income and whose age is from 25 to 34 years were more likely to have a better practice of preconception care than their counterparts (COR 3.5000, CI 1.3343 to 9.1805, P = 0.0109) and (COR 3.4000, CI 1.1646 to 9.9265, P = 0.0252), respectively. (Table 5)

Table 5. Association of knowledge and practice level on preconception care with demographic variable

Variables	Respondent's Knowledge level of preconception care (n=215)						Respondent's practice level of preconception care (n=121)					
	Poor knowledge n (%)	Good knowledge n (%)	COR (95% CI)	Chi-square Value (χ2)	df	p-value	Poor practice n (%)	Good practice n (%)	COR (95% CI)	Chi-square Value (χ2)	df	p-value
Age of the respondent												
15 to 24 years	41 (74.6)	14 (25.4)	1	14.2063	1	0.000823*	30 (54.6)	25 (45.4)	1	8.337	1	0.015476*
25 to 34 Years	12 (52.1)	11 (47.9)	2.6845 (0.9694 to 7.4340)				6 (26.1)	17 (73.9)	3.4000 (1.1646 to 9.9265)			
35 to 49 years	61 (44.6)	76 (55.4)	3.6487 (1.8228 to 7.3036)				27 (62.8)	16 (37.2)	0.7111 (0.3148 to 1.6064)			
Ethnicity												
Brahmin	22 (52.4)	20 (47.6)	1	0.0086	1	0.995685	6 (54.6)	5 (45.4)	1	0.1876	1	0.910465
Chhetri	67 (53.2)	59 (46.8)	0.9687 (0.4813 to 1.9494)				40 (50.7)	39 (49.3)	1.1700 (0.3298 to 4.1502)			
Dalit/ Janjati	25 (53.2)	22 (46.8)	0.9680 (0.4206 to 2.2281)				17 (54.9)	14 (45.1)	0.9882 (0.2482 to 3.9346)			
Marital status												
Married	75 (45.1)	91 (54.9)	1	17.9851	1	0.000022*	62 (52.1)	57 (47.9)	1	0.0035	1	0.95297
Unmarried	39 (79.6)	10 (20.4)	0.2113 (0.0989 to 0.4514)				1 (50)	1 (50)	1.0877 (0.0665 to 17.7996)			
Educational status of respondents												
Illiterate	20 (71.4)	8 (28.6)	1	5.1863	1	0.158652	10 (45.4)	12 (54.6)	1	3.1666	1	0.366645
Primary level	26 (49.1)	27 (50.9)	2.5962 (0.9734 to 6.9241)				15 (65.2)	8 (34.8)	0.4444 (0.1338 to 1.4760)			
Secondary level	66 (51.6)	62 (48.4)	2.3485 (0.9642 to 5.7200)				37 (51.4)	35 (48.6)	0.7883 (0.3024 to 2.0548)			
Bachelor and above	2 (33.3)	4 (66.7)	5.0000 (0.7591 to 32.9340)				1 (25)	3 (75)	2.5000 (0.2237 to 27.9409)			
Family type												
Nuclear	90 (53.6)	78 (46.4)	1	0.0927	1	0.760757	50 (51.6)	47 (48.4)	1	0.0529	1	0.818043
Joint/ Extended	24 (51.1)	23 (48.9)	1.1058 (0.5788 to 2.1125)				13 (54.2)	11 (45.8)	0.9002 (0.3673 to 2.2058)			

The major source of family income												
Agricul-ture	38 (62.2)	23 (37.3)	1	5.4744	1	0.24199	21 (70)	9 (30)	1	10.8392	1	0.028432*
Business	26 (56.5)	20 (43.5)	1.2709 (0.5828 to 2.7716)				15 (68.2)	7 (31.8)	1.0889 (0.3315 to 3.5771)			
Job/ Service	6 (42.8)	8 (57.2)	2.2029 (0.6780 to 7.1575)				3 (37.5)	5 (62.5)	3.8889 (0.7615 to 19.8589)			
Foreign employ-ment	38 (49.4)	39 (50.6)	1.6957 (0.8557 to 3.3601)				20 (40)	30 (60)	3.5000 (1.3343 to 9.1805)			
Others	6 (35.3)	11 (64.7)	3.0290 (0.9869 to 9.2968)				4 (36.4)	7 (63.6)	4.0833 (0.9524 to 17.5067)			
Average monthly income of the family (NPR)												
Less than NPR 30000	44 (53.1)	39 (46.9)	1	2.496	1	0.476008	27 (54)	23 (46)	1	0.129	1	0.988144
NPR 30000 – NPR 60000	62 (52.6)	56 (47.4)	1.0190 (0.5806 to 1.7884)				33 (50.7)	32 (49.3)	1.1383 (0.5438 to 2.3829)			
NPR 60000 – NPR 100000	2 (33.4)	4 (66.6)	2.2564 (0.3916 to 13.0015)				2 (50)	2 (50)	1.1739 (0.1530 to 9.0045)			
More than NPR 100000	6 (75)	2 (25)	0.3761 (0.0717 to 1.9727)				1 (50)	1 (50)	1.1739 (0.0695 to 19.8349)			
Understanding of health problems during pregnancy												
Yes	17 (21.3)	63 (78.7)	1	51.6379	1	0.00001*	8 (14.5)	47 (85.5)	1	56.8784	1	0.00001*
No	97 (71.8)	38 (28.2)	0.1057 (0.0550 to 0.2033)				55 (83.3)	11 (16.7)	0.0340 (0.0126 to 0.0917)			
Time to reach health facility (on foot) from residence												
Near (less than one hour)	91 (67.40)	44 (32.60)	1	30.1371	1	0.00001*	60 (52.2)	55 (47.8)	1	0.0108	1	0.917237
Far (more than one hour)	23 (28.75)	57 (71.25)	5.1255 (2.8037 to 9.3699)				3 (50)	3 (50)	1.0909 (0.2113 to 5.6330)			
Number of previous pregnancy (n=161 for Knowledge, n=91 for Practice)												
One	67 (65)	36 (35)	1	0.2554	1	0.613301	14 (31.8)	30 (68.2)	1	18.406	1	0.000018*
Two or more	40 (68.9)	18 (31.1)	0.8375 (0.4209 to 1.6666)				36 (76.6)	11 (23.4)	0.1426 (0.0565 to 0.3601)			
Age at first pregnancy (n=161 for Knowledge, n=91 for Practice)												

Below 20 years	4 (36.4)	7 (63.6)	1	4.7975	1	0.0285*	3 (75)	1 (25)	1	0.6798	1	0.40967
Above 20 years	103 (68.6)	47 (31.4)	0.2607 (0.0728 to 0.9341)				47 (54)	40 (46)	2.5532 (0.2554 to 25.5209)			

Significant at $p < 0.05$ (Chi-squared Test)*

Discussion

The rapid change in social dynamics in Nepal, geographical variations, healthcare service accessibility, and educational advancement of the country determine the health-seeking behavior and service utilization pattern among community people. In this study, the mean age of respondents was 35.0349 ±1.285 years, and 59.5% had at least a secondary education. The majority (78.1%) came from nuclear households and made their living through agriculture (28.4%) or foreign employment (35.8%). Over half (54.9%) reported a monthly income of NPR 30000–60000. About 63.7% of the respondents were unemployed. Sixty-four percent of the 161 respondents who had given birth had only one child, and 36 percent had two or more. Among them, 6.9% of the respondents were under 20 when they became pregnant. Although 62.8% of respondents found they could reach a health facility within an hour (by foot) from home, these findings align with a previous study conducted in Tokha municipality-10, Kathmandu, by Laxmi D. Khanal (2020). [8]

Level of knowledge of respondents

Our study revealed that all (100%) respondents heard about preconception care, which is higher than the previous study (28.63%) conducted in Nepal by Prashansa Gautam and Rojana Dhakal [9]. The reason could be that the education status at the secondary level in our recent study is higher (59.5%) than in the comparing study (46.62%). However, only 46.9% had good knowledge of preconception care, while 53.1% had poor knowledge in our recent study. This study contradicts the findings of a previous study where the majority (84.58%) had an average level, and only 15.42% had a good level of knowledge [13], which is less than our study. The overall preconception care knowledge of reproductive age group women in our study (46.9%) was also higher than studies carried out in Sudan (11.1%) [17], Iran (10.4%), and Nepal (15.6%) [16, 9]. Likewise, in another study from Nigeria, about 65.3% of respondents had an 'average level of knowledge, and only 15.42% had good knowledge of preconception care. [10] It may be because only married women were chosen [9], whereas both married and unmarried women were selected for our recent study, and because the participants' educational levels were also varied. A previous study also showed that the percentage of individuals with PCC knowledge in Japan significantly increased three months after the health education seminar among female workers of reproductive age, and it remained at this level even six months after the education seminar [14].

Regarding the meaning of preconception care, 35.4% of the respondents mentioned physical examination as the meaning or purpose of preconception care, and 17.2% mentioned health promotion and prevention (immunization), where all options were multiple choice. About 25.6% were unsure of the exact meaning or purpose of preconception care in our study. However, in another study conducted in Kathmandu, 94.5% of the respondents mentioned health promotion as the meaning of preconception care. [8] This result also contradicts another study done in Nepal in 2016, where 90.3% of respondents mentioned health promotion as the component or meaning of preconception care, 33.9% mentioned that

preconception care is beneficial to promote the health of future children, 80.18% mentioned that preconception care is needed to have a safe pregnancy, 47.15% suggested that preconception care should focus on both married and unmarried people, and 55.94% mentioned the correct answer of preconception care, which is care provided to a couple before conception. [9] It clearly shows that there is still some confusion, and rural women are unsure about the meaning and components of preconception care.

Most respondents (73%) mentioned that the preconception period is between pregnancy (after the onset of pregnancy and delivery), and only 43.3 of the respondents mentioned it before pregnancy in our recent study. However, in a previous study, most respondents (81%) said the preconception period is between plans and the onset of pregnancy (about three months before pregnancy), which is the correct answer in our study too. [8] This difference might be because the previous study was carried out in urban areas, where social media is widely utilized, but the current study was done in rural areas, where social media is less used. It also clearly shows that the meaning or purpose of preconception care is not clear among reproductive-aged women.

Furthermore, in our study, regarding the benefits of preconception care, 90.7% of respondents mentioned reduced child and maternal mortality, and only 60.9% mentioned it prevented pregnancy complications. However, in a previous study, most respondents (98.4%) mentioned that preconception care is needed for a safe pregnancy, delivery, and healthy newborn, followed by improving the couple's and child's health (83.9%). [8] Additionally, more than half of the respondents (86.5%) got this information from their family/friends. In a similar study conducted in the Kaski district by Krishma Giri, less than one-quarter of the respondents (20.5%) got information from the radio/television, whereas 5.5% were from family/ friends. [13] Thus, we can claim that sensitizing family members regarding preconception care would help to increase maternal and child health promotion in rural Nepal.

Level of Practice of Respondents

Only 56.3% of respondents have practiced preconception care, and almost 43.7% have never practiced it, not even a single component. It is higher than a similar previous study, which revealed that 46.6% of Iranian women who intended to become pregnant followed preconception care. [11] Among the respondents who reported practicing preconception care before, only 47.9% reported good practice, while 52.1% had poor practice in our recent study. This result is also supported by a study conducted in Kelantan, Malaysia, in which 45.2% of women had poor preconception care practices. [12] In another study on the utilization of preconception care, nearly all (98%) respondents had low utilization, and 2% had high utilization levels of preconception care. [8] This is probably because the educational status, employment, and family income levels were higher in our recent study.

Regarding the reasons for not taking preconception care, about 40.4% lacked proper knowledge about it, and nearly half (46.8%) of the respondents also mentioned prioritizing less preconception care in their families and community. It is similar to results from a study conducted among reproductive-aged women in Kaski, Nepal, that showed approximately one-third (37.3%) of respondents mentioned a barrier to preconception care was a lack of awareness, and one-fourth (25%) of respondents mentioned limited access to health services [13], which supports the present study. In our recent study, most respondents (93.4%) took preconception services from government health institutions. Most rural people in Nepal cannot afford private health institutions to practice PCC services as needed, where the service cost is relatively higher than that of government health institutions. Unfortunately, government health institutions do not provide a complete package of PCC to reproductive-aged women, and it is difficult to practice as they require it at the local level.

Among the 16 components of preconception care, most (90.1%) of the respondents practiced a proper balanced diet, about 86.8% tested for STIs, 81.8% avoided medicine without a medical prescription, and 80.2% regularly monitored blood pressure as part of preconception care. Moreover, the majority of the respondents (76.9%) used deworming tablets, checked blood sugar levels (65.3%), and supplemented with iron tablets (57.9%), despite only 13.3% having immunization (JE, Rubella, and Hepatitis B) and 11.6% having prophylaxis (Filariasis, Typhoid, Malaria, and Cholera) before pregnancy. This result is supported by the findings of a previous study conducted among women attending appointments at a rural clinic in Kelantan, in which only 7.4% of the respondents consumed drugs without doctors' advice. [12] However, in contrast to a study by Khanal et al. conducted among women in Kathmandu, only 19% monitored blood pressure, followed by deworming (18%), checking blood sugar levels (14%), iron tablet supplementation (4.0%), and testing for STI (1.5%). [8]

Association between levels of knowledge and practice with demographic variables

The respondent's age, marital status, time to reach a health facility, and age at first pregnancy were statistically highly associated ($p<0.05$) with knowledge about preconception care. However, it contradicts a previous study, where there was a statistically significant association between the level of knowledge of preconception care and education, occupation, number of children, hearing previously about preconception care, and source of information. [13] However, time to reach a health facility was statistically associated with knowledge of PCC in another study. [15] Similarly, in this study, the number of previous pregnancies, respondent's age, and family income source were statistically associated ($p<0.05$) with preconception care practice. Furthermore, knowledge and practice of preconception care were also significantly associated with understanding possible health problems during pregnancy.

Government programs and policies on preconception care

As it is a new concept in Nepal, there are no specific national policies and protocols to support and emphasize preconception care packages. However, some of the PCC services (checkups or counseling) are freely available (including reproductive planning, folic acid, contraception, family and genetic history, weight monitoring, chronic disease management, social and behavioral history, immunizations, medication, STIs, and physical, sexual, and emotional abuse) in the government health institutions in Nepal. [18] Somehow, it also tried to address the safe motherhood program (under the birth preparedness package), but not specifically for the PCC. [19] It is also mentioned in the Right to Safe Motherhood and Reproductive Health Act, 2075 (2018), under chapter 2, " Every woman and teenager shall have the right to obtain an education, information, counseling, and service relating to sexual and reproductive health." [20] However, it also could not address the issue and importance of PCC specifically. There are also some government tools (standard protocols and job aids on a balanced diet, deworming use, avoiding self-medication, checking blood sugar, iron tablet supplementation, etc.) for counseling on PCC components to the targeted reproductive-aged women and their utilization; however, it seems they are not being used properly or prioritized due to not having a specific package or policy in PCC at local levels in government health institutions. PCC is still taken as an optional choice of service or care in the reproductive health care system in Nepal.

Conclusion and Recommendation

The study reveals that approximately half of respondents had a good knowledge of preconception care. Most participants understood the importance of maintaining a balanced diet and avoiding self-medication as preconception care but had limited knowledge regarding immunization and prophylaxis. About 43.7%

of the respondents never practiced preconception care, even a single component. Among the respondents who had practiced preconception care before, only 47.9% had good practice, while 52.1% had poor. Approximately 25.6% of women were still unsure about the meaning or purpose of preconception care. Factors such as age, marital status, time taken to reach health facilities, and age at first pregnancy were statistically associated with knowledge about preconception care. The study found a statistical relation between previous pregnancies, age, and family income with the practice of preconception care. More education and information on various aspects of preconception care and better counseling on its utilization at healthcare delivery points for reproductive-age women might be essential. Preconception care is still taken as an optional choice of service or care in the reproductive health care system. The study suggests that collaboration between local governments from multiple sectors and specific national protocols or policy formulation would be beneficial in improving preconception care in Nepal.

Abbreviations

DNA: Deoxyribonucleic acid

HIV: Human immunodeficiency virus

JE: Japanese Encephalitis

MM: Maternal Mortality

NPR: Nepalese rupee

PCC: Preconception care

PRAMS: Pregnancy Risk Assessment Monitoring System

STD: Sexually transmitted disease

STI: Sexually transmitted infection

SBA: Skilled Birth Attendant

SPSS: Statistical Package for Social Science

WHO: World Health Organization

Strengths and Limitations of this Study

This research delves into the reproductive-age female population and provides crucial foundational baseline data on preconception care for this demographic. As conducted within a community setting, the findings have broad applicability, generalizing to a larger population. However, the study's cross-sectional design precludes establishing a cause-effect relationship between outcome variables and predictors.

Declarations

Ethical Approval and Consent to Participate

Before collecting data, we diligently sought permission from the Department of Public Health at LA GRANDEE International College, Bheerkot Municipality (Ref. 209), and the selected ward office. Furthermore, the participants (legal guardians or next of kin) provided written informed consent to participate in this study. We also reassured the respondents to keep their information confidential and to be free to opt out of the study at any time.

Availability of data and materials

Datasets used in the current study are available from the corresponding author upon reasonable request.

Conflict of Interest

None

Funding Source

None

Author Contribution

MG contributed significantly to the research concept and design, data gathering, acquiring, analyzing, interpreting, and drafting of the article. KS made a central contribution to drafting the research article, critically revised it for important intellectual content, acquired, analyzed, or interpreted data, and approved the version to be published. KRA supervised and suggested all the activities throughout the research period, including proposal writing, tool development, data collection, analysis, and report writing.

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