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Assessment of knowledge, attitude, and practice on preconception care among pregnant women at National Hospital, Thimphu, Bhutan

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ABSTRACT

Introduction: Preconception care provided before conception or between subsequent pregnancies aims to identify and modify risks to women's health or pregnancy through prevention and management. For successful implementation and uptake of preconception care services, adequate level of knowledge and positive attitude of women is important. Therefore this study was undertaken to assess the knowledge, attitude and level of practice of preconception care by our women. **Methods:** This was a hospital based cross sectional study done from July 2021 to December 2021. All pregnant women visiting the Mother and Child Hospital for booking visit were considered for the study. Stringent inclusion and exclusion criteria were utilized during recruitment. Data was collected using an interviewer administered questionnaire. **Results:** A total of 340 pregnant women consented for the study. The mean age of the participants was 28.3 (SD±4.5) years, 57.6% of the pregnant women had higher education and 54.4% were employed. The overall mean knowledge score on assessment of preconception care was 6.96±2.4 and 217(63.8%) had good knowledge. Of the 340 women, 98.2% had positive attitude towards the preconception care with a median score of 27 (Min-Max: 10-30) but 78.2% had poor practice. A significant association was found between good practice of preconception care with their knowledge level ($p=0.012$) but not with positive attitude ($p=0.346$). **Conclusions:** The study found that despite having good knowledge with a positive attitude, the practice of preconception care among the study participants was poor. Therefore, we recommend a further detailed study on factors associated with the poor practice of preconception care among pregnant women.

Keywords: Attitude; Knowledge; Practice; Preconception care.

INTRODUCTION

Preconception care (PCC) is important for a woman to maintain optimal health prior to her pregnancy. PCC is the provision of biomedical, behavioral, and social health interventions to women and couples before conception occurs. It is aimed at improving their health status and reducing risk behaviors that could contribute to poor maternal and child health outcomes. PCC has a positive impact on maternal and child health outcomes^{1,2}.

A woman can be provided with PCC prior to her pregnancy or before subsequent pregnancies². It is a series of interventions which are designed to identify and modify potential risks to a woman's health or pregnancy. The World Health Organization (WHO) recommends a universal package of PCC interventions (e.g. folic acid supplementation, cessation of tobacco and alcohol intake, family planning services)². The PCC interventions are critical to improve both pregnancy and birth outcomes. Globally, preconception health care is not part of mainstream practice and in low income countries, PCC is almost nonexistent²⁻⁴.

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In least developed countries (LDCs), the maternal mortality rate is approximately 462 per 100,000 live births. In 2017, Sub-Saharan Africa and South Asian countries contributed to approximately 86% of the global maternal deaths⁵. Implementation of PCC interventions can contribute to reducing maternal and childhood mortality or morbidity both in high and low-income countries^{3,6}.

In Bhutan, similar to many countries of similar economic status, the leading cause of maternal mortality is primary postpartum hemorrhage followed by medical conditions^{7,8}. PCC can help identify and manage the medical conditions before conception. Adoption of PCC in mainstream practice can help identify and prevent congenital malformations such as fetal alcohol spectrum disorders, congenital heart diseases, neural tube defects and orofacial clefts. According to a birth defect surveillance report from the three referral hospitals in Bhutan, congenital malformations contributed to 20.2% of neonatal mortality in 2016^{9,10}. Around 44% of pregnant women consume alcohol in Bhutan¹¹. Therefore, introduction of PCC may serve in optimizing maternal health and bring out behavioral changes prior to conception, thereby reducing the maternal and neonatal morbidity as well as mortality.

Numerous factors are associated with uptake of PCC,

including knowledge, attitude and practice on PCC by women. For successful implementation and uptake of PCC services, adequate level of knowledge and positive attitude of women are important^{12,13}. With many challenges in developing countries, where practice of PCC is evolving, assessing the level of knowledge, attitude and level of practice is important. Even in Bhutan, there is limited evidence in the current setting. So, this study was undertaken to assess the knowledge, attitude and level of practice of PCC by our pregnant women at the National Referral Hospital.

METHODS

Study design and study population

A hospital-based cross-sectional study was conducted among pregnant women visiting antenatal clinics (ANC) at the National Referral Hospital from July 2021 to December 2021. The aim of the study was to assess the knowledge, attitude, and practice of PCC among pregnant women. All pregnant women attending the first booking visit for antenatal care within the study period were recruited. Teenage pregnancies were excluded from the study. Ethical clearance was granted from REBH via letter number Ref. No.REBH/Approval/2021/057 dated 15th June 2021.

Sample size

In the absence of prior evidence or assessment, prevalence of 50% respondent might have good knowledge and practice of PCC. The sample size was calculated for proportions considering a 95% confidence level and 5% margin of error, based on the sample selected from a finite population of 1567 pregnant women who had booking visits in the previous year at the hospital¹⁴ and adding a non response rate of 10%. The sample size calculated was 340.

Sampling method

A systematic random sampling technique was used where pregnant women visiting antenatal care unit were invited randomly to take part in the study as explained in the flow chart below (Figure 1)

For data collection, four nurses were trained (to read and interpret the questions in relation to knowledge, attitude and practice in the local dialect) and an interviewer-administered questionnaire was utilized to collect the data from the study participants. All the interviews were conducted in a separate room to ensure privacy before the antenatal registration and assessment. The principal investigator closely supervised and monitored the data collection process.

Data collection tool

The questionnaire was designed based on a thorough review of literatures on PCC and on knowledge, attitude, and practice (KAP) tools^{12,13,15}. The questionnaire was then reviewed by a team of experts which included two gynecologists, a family physician, and a medical officer for its content and construct validity. It was followed by pilot testing of the questionnaires on

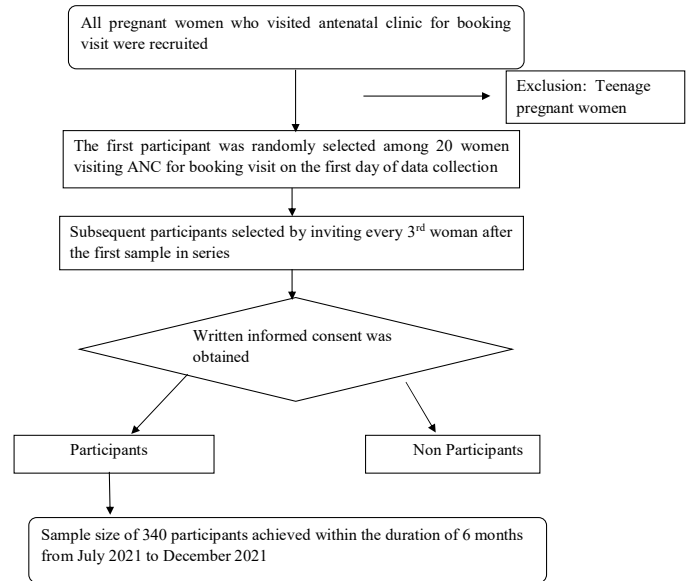


Figure 1. Flow chart on sampling method of pregnant women who were interviewed on preconception care at National Referral Hospital in Bhutan between July 2021 to December 2021

10 early pregnant mothers who visited the general gynecological outpatient department, and were thereafter corrected and modified for clarity. This group of pregnant women were not included in the study population. The cronbach's alpha coefficient of the questionnaire was 0.72 in our sample, indicating acceptable internal consistency.

Pregnant women's' knowledge of PCC was assessed using the individual response to 10 closed ended questions (timing of care, relation to marital status, preconception folic acid intake, risk of congenital malformations, screening for medical diseases, screening of STIs, risk of mental disorders, avoiding smoking, avoiding consumption of alcohol, and vaccination against rubella). A score of 1 for correct and 0 for incorrect answer and don't know answers were used. A score of 0-3 was poor, 4-6 was average and 7-10 was identified as good knowledge.

Pregnant women's' attitude towards PCC was assessed using 10 questions, and a 3-point likert scale was used for assessment of attitude. The overall attitude was scored using median. Each question was scored 3 for agree, 2 for neutral and 1 for disagree for the 10 questions. The score ranged from 10 - 30. A score of ≥ 15 was indicative of a positive attitude and a lower score were counted as negative attitude.

The practice part was assessed on the following 10 items (visited for PCC, taken preconception folic acid, screened for medical disorders, vaccinated for rubella, practiced family planning methods, balanced diet, avoided alcohol, avoided smoking, maintained body weight, and screened for sexually transmitted diseases). Each item was assessed, wherein yes was scored 1 and no, don't remember or not applicable was scored 0. The total score on practice was from 0 to 10. The total score were

then converted to percentages. A score of $\leq 60\%$ were considered as poor practice.

Data processing and analysis

After data cleaning and quality check, questionnaires were coded and the collected data was double entered into Epidata 3.3 (EpiDataAssociation. Odense, Denmark) and exported to STATA version 13 (StataCorp, Stata Statistical Software) for analysis. The response to assessment of knowledge, attitude, and practice were measured as frequencies and percentages for categorical variables while continuous variables were expressed as mean \pm standard deviation. Median was also calculated wherever applicable. The total scoring for KAP was calculated by dividing the actual score of an item or total items by the total items score and then multiplied by 100%. The Pearson’s Chi-square test or Fisher Exact test was used to determine relationship among categorical variables. *p*-value < 0.05 was considered statistically significant.

RESULTS

Socio-demographic characteristics

A total of 340 pregnant women participated in this study with a response rate of 100%. All were included in the final analysis. The mean age of the participants was 28.33 (SD \pm 4.5) years and 41.2% of the pregnant women were primigravida. One hundred and ninety-six pregnant women (57.6%) had higher level of education like diploma, bachelor’s degree or higher. 185 pregnant women (54.4%) were employed; 18.8% in private business, 17.1% in government jobs, and 18.5% in the private sector. One hundred and eight pregnancies (31.8%) were unplanned (Table 1).

The sources of information on PCC were from family and friends (47.71%) followed by social media (39.19%) and health workers (38.19%). Some of the participants had received information from more than one source (Figure 2).

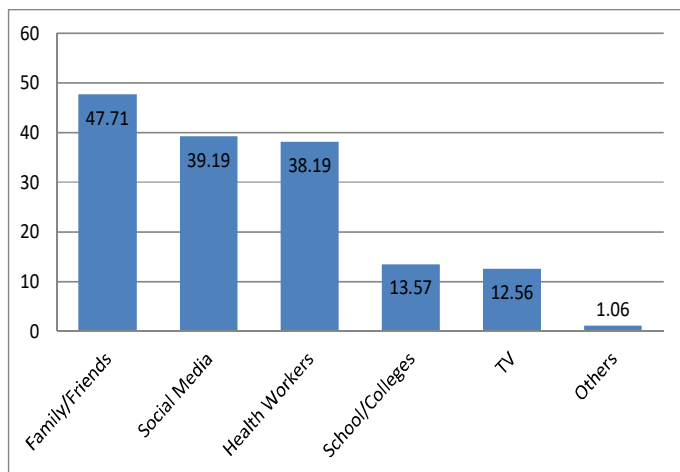


Figure 2. Sources of information on preconception care among participants visiting the National Referral Hospital from July 2021 to December 2021

Table 1. Socio-demographic characteristics of the participants who were interviewed on preconception care at the National Referral Hospital in Bhutan from July 2021 to December 2021 (n=340)

Characteristics	n	(%)
Age (Mean \pm SD)	28.33	(4.5)
19 to 24 years	72	(21.1)
25 to 34 years	229	(67.4)
35 to 44 years	33	(9.7)
45 years and older	6	(1.8)
Marital status		
Married	318	(93.5)
Divorced	1	(0.3)
Live in relationship	21	(6.2)
Gravida		
1	140	(41.2)
2	123	(36.2)
3 or more	77	(22.6)
Level of education		
Illiterate	6	(1.8)
Non –Formal education	5	(1.5)
Primary education	6	(1.8)
Secondary education	127	(37.3)
Higher education (Diploma, degree or higher)	196	(57.6)
Occupation		
House wife	121	(35.6)
Private business	64	(18.8)
Government employee	58	(17.1)
Private employee	63	(18.5)
Others	34	(10.0)
Pregnancy		
Planned	232	(68.2)
Unplanned	108	(31.8)

Knowledge on Preconception Care

Three hundred and twenty four pregnant women (95.3%) knew that smoking and 85.6% knew that alcohol intake adversely affects pregnancy outcome. Two hundred and eighty six pregnant women (84.1%) felt they should be screened for sexually transmitted diseases before conception. However, less than 50% of participants knew about preconception folic acid supplementation and reduction of congenital malformation of fetus with it. Two hundred and twelve pregnant women (62.4%) knew that PCC had to be done before conception. Out of 340, 217 (63.8%) pregnant women had good knowledge on PCC, with a mean knowledge score of 6.96 \pm 2.4 (Table 2).

Table 2. Assessment of Knowledge on preconception care among participants visiting the National Referral Hospital in Bhutan from July 2021 to December 2021 (n=340)

Components on knowledge of preconception care	n	(%)
Preconception care should be done before becoming pregnant	212	(62.4)
Every woman of reproductive age should get preconception care	216	(63.5)
Pre-conception folic acid supplementation should be started one month before conception	160	(47.1)
Folic acid supplementation is associated with reduction of congenital malformation of baby	163	(47.9)
Untreated health problems like heart diseases affect the outcome of the pregnancy	238	(70.0)
Stress and depression affects the outcome of pregnancy	282	(82.9)
Alcohol consumption leads to bad pregnancy outcome	291	(85.6)
Smoking during pregnancy affects the fetus	324	(95.3)
All women should be screen for sexually transmitted diseases before becoming pregnant	286	(84.1)
Women should be vaccinated against Rubella infection before she conceives	164	(48.2)
Final knowledge Score	n	(%)
Poor (0-3)	28	(8.3)
Average (4-6)	95	(27.9)
Good (7-10)	217	(63.8)
Total Knowledge score (Mean ±SD)	6.96 ± 2.4	

Attitude on preconception care

Three hundred and eight participants (90.6%) of the study participants perceived that PCC will be good for better outcome of the future pregnancy and the fetus. Three hundred and fifteen (92.7%) participants agreed that health workers and health facilities are best suited to provide PCC services. However, only 79.7% felt that they have the time to go to hospital. Out of 340, 334 (98.2%) had a positive attitude towards PCC with a median score of 27 (10-30) as shown in Table 3.

Practice on use of preconception care services

Two hundred and sixty three pregnant women (77.4%) and 239 pregnant women (70.3%) had avoided alcohol and smoking as preconception behavioral changes. One hundred and eighty seven pregnant women (55%) did get advised on balanced diet. One hundred and thirty five pregnant women (39.7 %) had undergone screening for sexually transmitted diseases before becoming

Table 3. Attitude on the utilization of preconception care services amongst pregnant women visiting the National Referral Hospital in Bhutan from July 2021 to December 2021 (n=340)

Components related to Attitude on Preconception care	n	(%)
Preconception care is important for planning your pregnancy		
Agree	278	(81.8)
Preconception care is for better outcome of my future pregnancy and the fetus		
Agree	308	(90.6)
Preconception care helps us to prepare better for future pregnancy outcome		
Agree	298	(87.7)
When I undertake preconception care, I will have better outcome for my baby		
Agree	289	(85.0)
Health facilities are the best place to provide preconception care		
Agree	315	(92.7)
Preconception care /clinic will help to identify the risk and treat		
Agree	310	(91.2)
Health workers are best person to provide preconception care		
Agree	314	(92.4)
I have time to go to hospital for preconception care services		
Agree	271	(79.7)
I should be screened for sexually transmitted diseases in the preconception clinic		
Agree	271	(79.7)
Recommend other women to go for preconception care clinic		
Agree	301	(88.5)
Final score for attitude		
Positive attitude (15-30)	334	(98.2)
Negative attitude (10-14)	6	(1.8)
Overall attitude score, Median= 27 (Min-Max: 10-30)		

pregnant. While 160 had visited health facilities to avail PCC, only 86 (25.3%) of the participants had taken preconception folic acid tablet. Overall, only 74 (21.8%) of the study participants had good practice and the rest (78.2%) had poor practice on PCC (Table 4).

Relationship between the practice of preconception care with the level of knowledge and attitude on preconception care

There was a significant association between the level of good practice of PCC of the participants with their knowledge level (p=0.012), but no significant association was found between the

Table 4. Practice on the use of preconception care services amongst participants visiting the National Referral Hospital in Bhutan from July 2021 to December 2021 (n=340)

Practice related components on Preconception care	n	(%)
Did you visit the health care facilities before this pregnancy?		
Yes	160	(47.1)
No	180	(52.9)
Did you take preconception folic acid?		
Yes	86	(25.3)
No	254	(74.7)
Did you get screened for any medical diseases or illness and treated?		
Yes	124	(36.5)
No	216	(63.5)
Did you get vaccinated for rubella?		
Yes	186	(54.7)
No	74	(21.8)
Don't Remember	80	(23.5)
Did you visit family planning clinic to avail any family planning method?		
Yes	128	(37.7)
No	212	(62.4)
Did you get advised on diet during pregnancy?		
Yes	187	(55.0)
No	153	(45.0)
Did you avoid taking alcohol?		
Yes	263	(77.4)
No	35	(10.3)
Not Applicable	42	(12.4)
Did you avoid smoking?		
Yes	239	(70.3)
No	29	(8.5)
Not Applicable	72	(21.2)
Did you maintain or adjust your weight before pregnancy for the sake of this pregnancy?		
Yes	97	(28.5)
No	243	(71.5)
Did you get screened for sexually transmitted diseases before becoming pregnant?		
Yes	135	(39.7)
No	205	(60.3)
Good practice (7-10)	74	(21.8)
Poor practice (0-6)	266	(78.2)

Table 5. Association of knowledge, attitude and practice of preconception care among participants visiting the National Referral Hospital in Bhutan from July 2021 to December 2021 (n=340)

Variables	Poor practice of preconception care N (%)	Good practice of preconception care n (%)	p-value
Knowledge			
Poor knowledge	24 (9.0)	4 (5.4)	0.012* Fisher Exact Test
Average knowledge	83 (31.2)	12 (16.2)	
Good knowledge	159 (59.8)	58 (78.4)	
Attitude			
Negative attitude	6 (2.3)	0 (0.0)	0.346 Fisher Exact Test
Positive attitude	260 (97.7)	74 (100)	

*indicates statistical significance at p value less than 0.05

good practice of PCC with positive attitude of the participants (p=0.346) (Table 5).

DISCUSSION

The findings of this study showed that the overall level of knowledge on PCC among these pregnant women was good (63.8%) with positive attitude (98.2%) but poor practice (78.2%) of PCC services.

Out of 340 pregnant women, 63.8% had good knowledge, which was higher than some of the studies done in Hawassa city (20%), North Ethiopia (27.5%), Malawi(57.7%) and Nepal (30.5%)^{4,13,16}. The finding was comparable to a study done in Sri Lanka (60.4%) but lower than a study done in China (71.2%)^{18,19}. The difference in the knowledge level could be due to study setting, socioeconomic status and level of education of the participants. Studies have shown that women with higher educational status were more likely to have good knowledge than women who had lower educational status^{16,20,21}. Our study was done in an urban set up where majority of our participants were educated above secondary or degree level and majority were employed.

Although the overall knowledge was good, knowledge on the preconception folic acid supplementation was low (47.1%) in our study when compared to a study done in Sri Lanka where 94.3% of the women were aware of preconception folic acid supplementation²². This could be due to the sources

of information on PCC in our study where major sources were from friends, family and social media, rather than from health workers. Due to this, the importance of preconception folic acid supplementation could have been missed.

The attitude of the participants towards PCC was also assessed in this study. Attitude is an important factor that enhances the utilization of PCC services and knowledge level. Majority (98.2%) of the participants in our study had a positive attitude towards PCC, which was better than a study done in Malawi (74.7%)¹³. Most of the participants (90.6%) agreed that PCC is for risk identification and for better outcome of the pregnancy and the fetus. Majority of the participants (88.5%) agreed that they will recommend other for PCC. This positive attitude was associated with high level of good knowledge and influence the utilization of PCC services, similar to that reported in many studies done in Nigeria, Malawi, and China^{12,13,19}.

The good practice of PCC among the participants in this study was 21.8%, which was higher when compared to the level of practice of PCC in low income countries like Nigeria (10.3%), Ethiopia (18.2%) and Nepal (2%) but lower compared to studies done in China (42%), Sri Lanka (27.2%) and the Netherlands (53%)^{12,17-19,23,24}. Less than half (47.1%) of our participants had visited health facilities to avail PCC services. This may be due to a lack of awareness on availability or accessibility of PCC service in our setup and also around half of our participants had unplanned pregnancies.

In this study, only 25.3% of our participants had taken preconception folic acid supplementation which was lower than some of the studies carried out in Sri Lanka (44.9%) and China (37.9%)^{19,22}. The reason for this low level of practice of preconception folic acid supplementation was that our participants had low level of knowledge on preconception folic acid usage and its benefits on reduction of congenital malformation by folic acid supplementation. Many studies have shown that despite good knowledge and attitude, there are several factors that contribute to low practice or uptake of PCC services. These factors include lack of information on the availability and accessibility of such services in the health facilities, lack of proactive health workers, confusion about the reasons for use, and timing of preconception folic acid supplementation^{12,25,26}.

Strengths and limitations

This is probably the first study assessing knowledge, attitude and practice on PCC amongst the Bhutanese population. This study has its own limitations. This study was hospital based involving the urban population. In the assessment of knowledge, there could be recall bias and selection bias with more multiparous pregnant women participating in the study which could have affected the assessment of the knowledge level. The factors associated with the poor practice of PCC were not explored in this study.

CONCLUSIONS

The study found that the participants possessed good knowledge and had positive attitude towards PCC. However, the practice of the PCC was poor. Considering the findings, a study on factors associated with poor practice of PCC among the Bhutanese women could be taken as next step. The findings from this study can be used as baseline data for program design targeting at up-scaling of preconception health education, establishment of PCC clinics and creating public awareness on such services to improve the uptake of PCC services.

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AUTHORS CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

SG: Concept, design, data collection and analysis, manuscript writing

KT: Concept, design, data analysis, manuscript writing and review

PCB: Concept, design, data analysis, manuscript review

TT: Concept, design, manuscript review

TC: Concept, design, data analysis, manuscript writing and review

Author agree to be accountable for all respects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

None

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None