



## Preconception Care Utilization and Its Predictors in Women Referring to Teaching Hospitals in Mashhad

Fateme Ghaffari Sardasht<sup>1\*</sup>, Afsaneh Keramat<sup>2</sup>

<sup>1</sup> Student Research Committee, School of Nursing and Midwifery, Shahrood University of Medical Sciences, Shahrood, Iran.

<sup>2</sup> Reproductive Studies and Women's Health Research Centre, Shahrood University of Medical Sciences, Shahrood, Iran.

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### Abstract

**Background:** It has been more than four decades since preconception care was recognized as an important part of women's healthcare. However, most women do not seek preconception care. Therefore, the present study aimed to assess the predictors of receiving preconception care.

**Methods:** This cross-sectional descriptive study was conducted on 1,019 pregnant women who referred to Mashhad teaching hospitals in 2019. The convenience sampling method was used for sample selection and the required data were collected through a questionnaire. Furthermore, the data were analyzed in SPSS software (version 16).

**Results:** This study showed 33% of the women had utilized preconception care. Number of children (AOR: 0.47; 95% CI: 0.38, 0.6), housing status (AOR: 0.45; 95% CI: 0.23,0.91), folic acid consumption (AOR: 14.54; 95% CI: 8.75,24.16), Received information regarding PCC (AOR: 8.67; 95% CI: 5.27,14.26) were significantly associated with preconception care service utilization.

**Conclusions:** According to the results, a different strategy should be adopted from what has been adopted so far to raise public awareness of the importance of pre-pregnancy care. Since a significant relationship has been reported between obtaining information on pre-pregnancy care and receiving this care, modifying information methods to promote public awareness seems necessary.

**Keywords:** Predictor, Preconception care, Utilization of care, Childbearing age women, Teaching hospital, Mashhad.

\*Corresponding to: F Ghaffari Sardasht, Email: ghaffarif891@gmail.com

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## Introduction

There is clear evidence that preconception interventions improve the health of mothers and the outcome of pregnancy and childbirth in all low, middle, and high-income countries. Pregnancy care only improves the outcome of pregnancy and childbirth, while preconception care is essential for the health of a woman during her lifetime.<sup>1</sup>

According to the centers for disease control and prevention (2006), preconception care is a set of interventions in the form of prevention and treatment that aim to identify and reduce the biological, behavioral, and social risks that threaten maternal health and pregnancy outcomes. Today, preconception care is considered necessary due to the golden opportunity it provides for intervention and also the identification of the risk factors leading to the prevention of complications of pregnancy and childbirth.<sup>2</sup> If these interventions are not delivered before pregnancy, mothers will miss the time and opportunity for the elimination or reduction of a series of complications.

Moreover, it will reduce their chances of having an uncomplicated pregnancy and a healthy baby.<sup>3</sup> Based on the previous studies, in most cases, mothers become aware of their pregnancy at the beginning or end of the organogenesis stage which is very sensitive.<sup>4</sup> Therefore, the pre-pregnancy period is the only hope of mothers for the solution or modification of the issues and problems that need their special care with the help of doctors before becoming pregnant.<sup>5</sup>

Today, one of the challenges facing pregnant women all over the world is non-communicable diseases (NCDs). According to global statistics, NCDs are currently the cause of more than 53% of diseases which is expected to increase to 60% by 2020. Moreover, it is predicted that NCDs will be the cause of 73% of deaths worldwide and 80% of deaths in developing countries. Furthermore, in low- and middle-income countries 75% of deaths are caused by NCDs. In Iran, the majority of diseases are caused by NCDs so that it is the cause of 45% and 33% of the total diseases in men and women, respectively. Obesity and overweight, high blood pressure, insufficient physical activity, high cholesterol, and addiction are the five major risk factors that account for 68% of the diseases caused by risk factors and 11% of the total disease which is equal to 1.6 million disability-adjusted life years.<sup>6</sup>

Studies on the pregnancy complications and underlying diseases in Iranian women also confirms the previous statements since in Iran the prevalence rates of gestational diabetes,<sup>7</sup> metabolic syndrome,<sup>8</sup> obesity in the population of women over 18,<sup>9</sup> and preterm birth<sup>10</sup> are 3.41%, 36%, 14%, and 9.2%, respectively. Furthermore, the prevalence of preeclampsia in Iran has been reported to be 4%, however, according to the world health organization, its exact statistics is 7-8%.<sup>11</sup> Moreover, based on the results of a study performed by Azami, the prevalence of anemia in pregnant women in rural and urban areas were 17.6% and 22.1%, respectively.<sup>12</sup> Therefore, due to the early effects of these diseases on the pregnancy outcome, they should be diagnosed and controlled before pregnancy.<sup>4</sup>

Diabetes is one of the most common chronic diseases; however, the positive effects of pre-pregnancy care on gestational diabetes are proven and undeniable.<sup>13</sup> Tripathi et al. (2010) examined and compared the pregnancy outcome of 588 women with pre-pregnancy diabetes, about half of whom had been receiving pre-pregnancy counseling. In women who had received counseling, the pre-pregnancy glycemic control status was better before the pregnancy and during the first trimester while their folate intake was higher during the pre-pregnancy period, and they had faced less adverse outcomes, compared to others (prenatal death or major birth defect).<sup>2</sup>

Preconception care in Iran has been implemented on a trial basis since 2003. Consequently, after being revised by service providers and family healthcare managers, this plan was fully implanted almost all over the country since 2006.<sup>14</sup>

Elizabeth Mason et al. (2014) in their study introduced effective methods for the provision of pre-pregnancy care in low- and middle-income countries. These approaches include the integration of preconception care with other existing health programs, assignment of the task of pre-pregnancy health promotion to the healthcare workers, improvement or promotion of preconception services, engagement of the media, usage of healthcare information technology, maximizing demand for and uptake of preconception interventions, especially by adolescents.<sup>15</sup>

Despite all the confirmed benefits of pre-pregnancy care, the prevalence of its usage is not satisfactory. Jahani et al.<sup>16</sup> and Ebadi<sup>17</sup> in their studies reported that 17.5% and 32% of pregnant mothers who referred to healthcare centers had received pre-pregnancy care, respectively. Similarly, the reception of pre-pregnancy care is also not very common in other parts of the world. For instance, based on the findings of the studies conducted by Asresu<sup>18</sup> and Betra,<sup>19</sup> 18.2% and 29.7% of people seek pre-pregnancy care programs. Therefore, this study aimed to investigate the predictors of pre-pregnancy care in pregnant women who referred to Mashhad teaching hospitals.

## Materials and Methods

The present descriptive study was conducted during May-August 2019 on 1,019 Iranian Persian-speaking pregnant women who had referred to teaching hospitals in Mashhad for control and care. The participants were selected using the convenience sampling method. The inclusion criteria consisted of 1) Iranian nationality, 2) ability to speak and answer questions, 3) childbearing age, and 4) referred to teaching hospitals in Mashhad for pregnancy visit. On the other hand, the exclusion criteria were non-Iranian nationality, inability to speak, infertility, and non-pregnancy.

The present research was conducted in 5 teaching hospitals (Ghaem, Imam Reza, Hasheminejad, Um-al-Banin, and Shariati) which are located in different parts of Mashhad. The required data were collected through questionnaires and interviews. Moreover, the sample size was calculated based on the sample size formula with a 95% confidence interval and 2% accuracy. It should be noted that the Pvalue was obtained from similar studies and is included in the formula. Moreover, a sample attrition rate of 5% was also considered in the calculation of the sample size.

The instruments used in this study included a sample selection form, questionnaires about their demographic and pregnancy information and awareness of pre-pregnancy care which were completed through interview with the participants. The demographic characteristics form included 10 questions about age, occupation, education level of wife and husband, marriage duration, income, place of residence, and insurance status. Pregnancy questionnaire included 21 questions about contraception methods, history of pregnancy, gravidity, history of delivery, number of deliveries, number of children, history

of miscarriage and stillbirth, history of infant death, contraceptive method, History of unwanted pregnancy. Moreover, the pre-pregnancy care questionnaire included six questions about the reception of pre-pregnancy care and its location, pre-pregnancy folic acid intake, information about pre-pregnancy care and its source, and the attitudes toward the need for pre-pregnancy care.

After the study was confirmed by the Ethics Committee of Shahroud university of medical sciences, the researcher obtained a letter of introduction from the School of nursing and midwifery. Subsequently, the researcher presented the letter to the deputy of treatment of Mashhad and the head of Mashhad teaching hospitals (Ghaem, Imam Reza, Um-al-Banin, Hasheminejad, and Shariati) to obtain their permission. Afterward, every morning she was present at the pre-pregnancy care clinic of these hospitals to find eligible subjects and collect the required data.

The researcher first introduced herself and obtained the consent of the mothers. Therefore, she completed the sample selection form and if the mother was eligible, her written consent was obtained. Furthermore, the researcher assured them that their information will be kept confidential and explained the objectives, stages, procedures, and the method of answering the questions. Then the researcher completed the questionnaires through interviews with the participants. The content reliability of the tools used in this study was verified. Also, the statements in the demographic and pregnancy information forms were clear. Besides, they were prepared based on similar studies and consultation with the supervisors and counselors. Therefore, it can be concluded that its validity was confirmed as well.

The collected data in this study were both qualitative and quantitative and were analyzed using descriptive statistics. After collection, the data were coded and entered into SPSS software (version 20) for the analysis. The demographic and pregnancy information were described using statistical indicators, such as mean, standard deviation, and frequency distribution. The relationship between qualitative and quantitative data was determined using the chi-square test, while the association between qualitative and quantitative data was determined through the Mann-Whitney test. The logistics regression test was also used to examine the factors influencing pre-pregnancy care. It is noteworthy that in the performed statistical tests,  $\alpha=0.05$  was considered statistically significant.

## Results

Of the 1019 participants, about 90 percent of the mothers (81.6%) were within the age group 18-35 years and ranged from 13 to 47 years. The mean age of the participants was  $28.15 \pm 6.40$  years (table 1). The majority of study participants (97%) were housewives by occupation. Two-third of participants (60.3%) had a middle school education.

Assessment of obstetric and reproductive health characteristics revealed that about 617(60.5%) participants had between one to three pregnancies. Concerning parity, two-third (650; 63.8%) of participants were multipara. Six out of ten (691; 67.8%) respondents had a history of family planning use. Moreover, 67.5% of women used a contraceptive method while 70.7% reported that they had pregnancy was planned.

**Table 1. Socio-demographic characteristics of respondents and utilization of preconception care**

Variable		Utilization of preconception care			Pvalue
		N(1019)%	No	Yes	
Mean Age(SD)	28.15±6.4	-	29.22±6.08	28.82±5.71	P=0.55
Mean Husband age(SD)	32.36±6.47	-	33.32±6.25	32.84±5.53	P=0.65
Mean duration of marriage(SD)	8.55±5.6	-	9.96±5.61	9.08±4.9	P=0.37
Mean number of children(SD)	1.13±1.13	-	1.52±1.13	1.26±0.99	P<0.001
Education level					P=0.54
– Illiterate and primary education		270(26.5)	187(27.6)	83(24.3)	
– Guidance cycle to diploma		614(60.3)	402(59.3)	212(62.2)	
– University education		135(13.2)	89(13.1)	46(13.5)	
Husband Education level					P=0.002
– Illiterate and primary education		338(33.2)	250(36.9)	88(25.8)	
– Guidance cycle to diploma		363(35.6)	224(33)	139(40.8)	
– University education		318(31.2)	204(30.1)	114(33.4)	
Women occupation					P=0.53
– Housewife		988(97)	659(97.2)	329(96.5)	
– Employee		31(3)	19(2.8)	12(3.5)	
Husband occupation					P=0.86
– Laborer		357(35)	241(35.5)	116(34)	
– Self-employed		526(51.6)	346(51)	180(52.8)	
– Other		136(13.3)	91(13.4)	45(13.2)	
Household income					P=0.002
– Insufficient		644(63.2)	451(66.5)	193(56.6)	
– Desirable		375(36.8)	227(33.5)	148(43.4)	
Housing status					P=0.01
– Personal		334(32.8)	204(30.1)	130(38.1)	
– Rental		537(52.7)	378(55.8)	159(46.6)	
– Other		148(14.5)	96(14.2)	52(15.2)	
Covered by insurance					P=0.05
– Yes		825(81)	537(79.2)	288(84.5)	
– No		194(19)	141(20.8)	53(15.5)	
Experienced pregnancy					P=0.28
– Yes		724(71.1)	489(72.1)	235(68.9)	
– No		295(28.9)	189(27.9)	106(31.1)	
Experienced abortion					P=0.75
– Yes		247(33.7)	165(33.3)	82(34.5)	
– No		487(66.3)	331(66.7)	156(65.5)	
Experienced childbirth					P=0.03
– Yes		657(54.5)	451(92.4)	206(87.7)	
– No		66(6.5)	37(7.6)	29(12.3)	
Pregnancy-related complications					P=0.94
– Yes		614(60.3)	409(60.3)	205(60.1)	
– No		405(39.7)	269(39.7)	136(39.9)	
Have underlying diseases					P=0.95
– Yes		264(25.9)	176(26)	88(25.8)	
– No		755(74.1)	502(74)	253(74.2)	
Received information regarding PCC					P<0.001
– Yes		415(40.7)	163(34)	252(73.9)	
– No		605(59.3)	515(76)	89(26.1)	
Contraception failure					P<0.001
– Yes		267(38.6)	209(45.2)	58(25.3)	
– No		424(61.4)	253(54.8)	171(74.7)	
Intended pregnancy					P<0.001
– Yes		715(70.2)	436(64.3)	279(81.8)	
– No		304(29.8)	242(35.7)	62(18.2)	
Used folic acid before pregnancy					P<0.001
– Yes		330(32.4)	74(10.9)	256(75.1)	
– No		689(67.6)	604(89.1)	85(24.9)	
Genetic disorder in blood relatives					P=0.12
– Yes		188(18.4)	116(17.1)	72(21.1)	
– No		831(81.6)	562(82.9)	269(78.9)	
Necessity of preconception care					P<0.001
– Yes		628(61.6)	351(51.8)	277(81.2)	
– No		62(6.1)	46(6.8)	16(4.7)	
– I don t Know		329(32.3)	281(41.4)	48(14.1)	
First prenatal visit					p<0.001
– Below 12 weeks		890(87.3)	566(83.5)	324(95)	
– 12 to 20 weeks		105(10.4)	91(13.4)	14(4.1)	
– After 20 weeks		24(2.3)	21(3.1)	3(0.9)	

Regarding access to PCC, about one-third of reproductive women (341; 33.5%) received the care from health care centers. Furthermore, figure 1 shows the locations that provided pre-pregnancy care for the subjects of the study. 32.4% of the subjects had used folic acid before their pregnancy based on the results, 40.7% of participants had information about pre-pregnancy care. Furthermore, 61.6% of the subjects believed that pre-pregnancy care was necessary. The source of the information is shown in figure 2.

In this study, results of the bivariable logistic regression showed that the number of children, level of husband education, monthly income, failure of contraceptive, history of childbirth, consumption of folic acid and received information

regarding PCC were associated with utilization of PCC. Through multivariable logistic regression, number of children, housing status, folic acid consumption, received information regarding PCC was found to have a significant statistical association with the utilization of PCC.

Regarding the relationship between demographic characteristics of women and utilization of pre-pregnancy care, the logistic regression test showed that reception of pre-pregnancy care is associated with the number of children (Pvalue<0.001), living in a rental house (Pvalue=0.02), folic acid consumption (Pvalue<0.001), and their information about pre-pregnancy care (Pvalue<0.001). (Table 2)

### place of PCC received

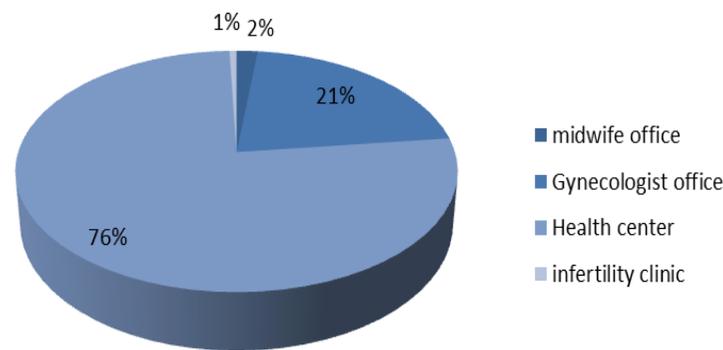


Figure 1. Percentage of places that women received preconception care

### source of information

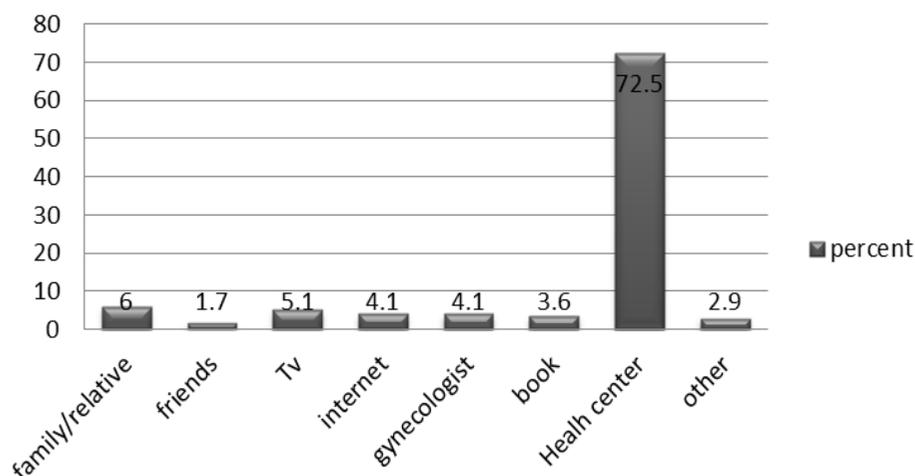


Figure 2. Percentage of respondents who ranked each source of information

**Table 2. Logistic regression analysis for correlates of preconception care utilization.**

Variable	Utilization of preconception care			
	Crude B (95%CI)	Pvalue	Adjusted B (95% CI)	Pvalue
Number of children	0.78(0.69,0.88)	<0.001	0/47(0/38,0/6)	<0.001
Coverage by insurance				
– Yes	1.42(1.009,2.01)	0.04	-	-
– No	-	-	-	-
Housing income				
– Insufficient	0.65(0.5,0.85)	0.002	-	-
– Desirable	-	-	-	-
Housing status				
– Personal	1.17(0.78,1.76)	0.42	0.78(0.39,1.59)	0.5
– Rental	0.45(0.23,0.91)	0.19	0.45(0.23,0.91)	0.02
– Other	-	-	-	-
Husband education level				
– Illiterate and primary education	0.63(0.45,0.88)	0.007	-	-
– Middle and secondary education	1.11(0.81,1.51)	0.51	-	-
– University	-	-	-	-
Childbirth experiences				
– Yes	0.58(0.34,0.97)	0.03	0.36(0.11,1.15)	0.08
– No	-	-	-	-
Intended pregnancy				
– Yes	0.85(0.64,1.13)	0.28	-	-
– No	-	-	-	-
Folic acid consumption				
– Yes	24.58(17.42,34.68)	<0.001	14.54(8.75,24.16)	<0.001
– No	-	-	-	-
Contraception failure				
– Yes	0.4(0.28,0.58)	<0.001	-	-
– No	-	-	-	-
Received information regarding PCC				
– Yes	8.94(6.63,12.06)	<0.001	8.67(5.27,14.26)	<0.001
– No	-	-	-	-
Necessity the PCC				
– Yes	4.62(3.27,6.51)	<0.001	-	-
– No	2.03(1.06,3.88)	0.03	-	-
– I don t Know	-	-	-	-
First prenatal visit				
– Under 12 weeks	4.007(1.18,13.53)	0.02	4.41(0.73,26.16)	0.1
– 12 up to 20 weeks	1.07(0.28,4.08)	0.91	1.52(0.2,11.52)	0.68
– After 20 weeks	-	-	-	-

## Discussion

According to the findings of the present study, 33% of the participants had received pre-pregnancy care. In other words, only one-third of women sought pre-pregnancy care before their pregnancy. Based on the findings of another study performed by Jahani et al. (2014), 17.5% of the subjects had received pre-pregnancy care<sup>16</sup> which is not consistent with those of the present study. This discrepancy could be due to the interval between the two studies.

In a study conducted in 2019 in Gorgan, Ebadi reported that the rate of pre-pregnancy care reception in women was 32.7%<sup>17</sup> which is line with the results of the present study. In the above-mentioned study, pre-pregnancy care had a significant relationship with the level of education of women and their income which is not consistent with the findings of the present study. Moreover, in the aforementioned study, 39.3% and 36.8% of women had high school and academic education, respectively. Furthermore, 54% of them had reported their income as normal, while 63.2% of them reported their income less than adequate.

The results of the present study indicated that with the addition of one child to the children of the participants, the chance of receiving pre-pregnancy care decreased by 47% in them, which was statistically significant. The results of the present study are consistent with those of the study performed by Ebadi. In the study conducted by Ebadi, women who did not have children or whose pregnancies had not resulted in a live birth had received pre-pregnancy care more than other women.<sup>17</sup>

Based on the findings of a study carried out by Asresu, 18.2% of Ethiopian women received pre-pregnancy care<sup>18</sup> which is not consistent with the results of the present study. The reason for this inconsistency may be due to the policies set by the Ethiopian ministry of health regarding the pre-pregnancy care, the awareness-raising, the level of public awareness, and its implementation method. The aforementioned study was conducted in 2019 on 564 women, 34% and 17.1% of whom had high school and academic education, respectively. However, the results indicated that the level of education was not associated with the reception of pre-pregnancy care, which was in line with the findings of the present study.

A study by Stephenson in 2014 found that 73% of British women referred to hospitals for pre-pregnancy care<sup>20</sup> which is inconsistent with the findings of the present study. In the present study, one-third of the participants and in the abovementioned study more than two-thirds of women received pre-pregnancy care. The demographic characteristics of the participants and the prevailing conditions of their country, which is considered one of the developed countries, are different from the present study. In the above-mentioned study, 64% of women were employed, while in the present study, 97% of participants were housewives. Moreover, in the study by Stephenson, 41% of women were between 30 and 34 years old and 31% of women were over 35 years old, while in the present study, 3.9% were under 18 years old and about 82% were between 18 and 35 years old. Furthermore, the discrepancy in the results of these studies could be due to the easy access to accurate information on pre-pregnancy care caused by the differences in the type of provision of the information and the quality of pre-pregnancy care between the two countries.

In 2018, Talib reported that 44% of Malaysian women received pre-pregnancy care and deemed this percentage as very low.<sup>21</sup> Talib reported that the higher levels of education and occupation as a housewife had a significant relationship with pre-pregnancy care, which is not in line with the findings of the present study. In the above-mentioned study, 25.6% of women had an academic education. Furthermore, about 56% of them were employed, while in the present study, almost all the cases were housewives.

Yan Ding reported that 40% of Chinese women received pre-pregnancy care and 90% of them were aware of pre-pregnancy care.<sup>22</sup> The findings of the above-mentioned study were almost consistent with those of the present study. In the aforementioned study, the level of education and income had a significant relationship with receiving pre-pregnancy care, which is not consistent with the results of the present study. In another study, Betra reported that 29.7% of women in Los Angeles received pre-pregnancy care<sup>19</sup> which is consistent with the present study.

The results of the present study revealed that women who had information about pre-pregnancy care were 8.67 times more likely to seek it, compared to others. Therefore, there is a need for the provision of proper information on pre-pregnancy care. In this regard, Milani has reported that one of the obstacles to the reception of pre-pregnancy care was the lack of information about it.<sup>23</sup> Talib and Asresu have also reported a statistically significant relationship between information about pre-pregnancy care and reception of such care (21 and 18).

In the present study, a relationship was observed between folic acid consumption and pre-pregnancy care since women who received pre-pregnancy care were 14.54% more likely to consume folic acid, compared to women who did not receive pre-pregnancy care. According to the results of a study performed by Goshu, 9% of women received pre-pregnancy care, but none of them took folic acid before pregnancy. Therefore, the findings of the present study are not consistent with those of the study conducted by Goshu.<sup>24</sup> This could be due to the fact that 92% of Ethiopian pregnant women did not

want to become pregnant, while 70.2% of women in the present study were willing to become pregnant.

Based on the results of the present study it can be concluded that despite the passage of several years after the implementation of pre-pregnancy care in Iran, only about 40% of women had obtained information about it and only one-third of women had received such care. Since there is a significant relationship between obtaining information and receiving pre-pregnancy care, it is necessary to provide more effective information in this regard. These results have been confirmed by other studies since one of the most important obstacles to the increase of pre-pregnancy care usage is the lack of proper information and public awareness especially in the target group about the provision of pre-pregnancy care and services in healthcare centers.

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## Conflict of Interest

The authors declare that they have no conflict of interest.

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