



## Preconception Care Practices and Factors Influencing Pregnant Women in Surakarta: A Cross-Sectional Study

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### ABSTRACT

**Background:** A major reason for the high maternal mortality rates and infant mortality rates is the disparity in healthcare services available to pregnant versus non-pregnant women. Preconception care encompasses various issues, including preventive medical practices and lifestyle changes. Factors such as age, history of antenatal care visits, parity, previous health conditions, and awareness of preconception care are known to affect the preconception care actions of women of childbearing age.

**Method:** This study aims to determine preconception care practices and the factors that influence them. This study is a cross-sectional study. The study was conducted at the Sangkrah Community Health Center, Surakarta. The research instruments were questionnaires on socio-economics and demographics, obstetrics, gynecology and health history, and preconception care practices. Data analysis used the Chi Square statistical test and logistic regression.

**Result:** The results showed that the variables of occupation ( $p=0.024$ ) and level of knowledge ( $p=0.017$ ) had a multivariate effect on the preconception care practices of pregnant women served at the Sangkrah Community Health Center in Surakarta, while the variables of education level, gravida, and parity had  $p$ -values  $>0.05$ . Prenatal care practices were 66.1% influenced by occupational and knowledge level factors, while the remaining 33.9% were influenced by other factors not examined in this study.

**Conclusion:** The conclusion of this study is that the most significant factors influencing prenatal care practices among pregnant women served at the Sangkrah Community Health Center in Surakarta are occupation and knowledge level.

**Keywords:** *Education; Gravida; Knowledge; Occupation; Parity; Preconception*

### INTRODUCTION

Maternal mortality rates and infant mortality rates remain major health issues worldwide.<sup>[1]</sup> Low-income and middle-income countries primarily face health issues related to maternal and newborn

mortality, stemming from disparities in healthcare access between pregnant and non-pregnant women.<sup>[2][3]</sup>

Although antenatal care is part of maternal and child health services, it is often seen as too late because the crucial

stage of embryonic development is missed, since these services typically begin once women are already pregnant. Consequently, the WHO considers pre-pregnancy care during the preconception period as a vital part of continuous care to address this gap.<sup>[1]</sup> However, preconception care practices themselves cannot yet be widely implemented in every country due to several obstacles, such as limited funds, human resources, unskilled professionals, and limited knowledge about preconception care in adolescent health and family planning.<sup>[4][5][6]</sup>

Preconception care involves providing biomedical interventions, behavioral changes, and social modifications to women and their partners before pregnancy happens.<sup>[1]</sup> In lower-middle-income countries such as Indonesia, the uneven provision of preconception care by health professionals, combined with limited understanding of preconception care among women of childbearing age (WCA) and their partners, has contributed to a high rate of maternal health issues in Indonesia.

A five-year study in Indonesia identified health problems in a number of mothers and expectant mothers that could have adverse effects on their babies. Data from the 2018 Basic Health Research (Indonesian Ministry of Health) indicated that 17.3% of non-pregnant women of childbearing age (WCA) suffered from chronic energy deficiency (CED). Additionally, 14.5% of pregnant WCA experienced CED, 21.8% of women over 18 were obese, 32% of adolescents were anaemic, and 48.9% of pregnant women also faced anaemia. Smoking prevalence included 9.1% among those aged 10-18 years, 28.8% among those aged 18 and above, and tobacco use was observed in 62.9% of men and 4.8% of women aged 15 and older.<sup>[7]</sup> Preconception care is seen as the ideal solution to address these health issues. Therefore, interventions to improve women's and families' health management behaviors must begin during the

preconception period.

Preconception care includes a broad array of issues and typically involves preventive medical procedures and lifestyle changes. While primary health facilities are expected to deliver preconception services, this remains underdeveloped because it has not become integrated into everyday primary care routines. Consequently, the health services usually offered by primary care providers, and well understood by the community, still primarily focus on life-saving interventions practices.<sup>[8][9]</sup> The Health Belief Model theory states that providing information about the potential impacts or risks of allowing a risky condition or disease to develop can foster preventive health behaviors in individuals and communities. In addition, psychological support is also considered important to provide to communities so that their belief in the benefits of practicing these health behaviors continues to increase.<sup>[9]</sup> Therefore, it is important to know the position or extent of women's knowledge and practice of preconception care before pregnancy, in order to design and create an effective preconception health care system.

A previous study mentioned that the practice of preconception care for women in Southern Ethiopia is still low. Several factors that influence the practice of preconception care are the level of education, knowledge about preconception care, and previous experience of receiving preconception care.<sup>[10][11][12]</sup> Another study examining mothers' readiness for pregnancy in Indonesia states that factors influencing mothers' readiness for pregnancy include: the husband's level of education, the household income level, the mother's knowledge, and exposure to information about preconception care.<sup>[13]</sup> A study and meta-analysis in Ethiopia also highlighted that factors such as age, education level, and prior ANC experience can influence preconception care practices.<sup>[14]</sup> Studies on preconception care knowledge and practices have been

conducted extensively in other countries. However, in Indonesia, such studies are still very limited. Therefore, researchers wanted to find out about the preconception care practices of pregnant women in Surakarta and the factors that influence them.

## METHODS

This study is a quantitative study with a cross-sectional design. The study was conducted at the Sangkrah Community Health Center, Surakarta, in May 2024. The study sample consisted of 40 pregnant women at the Sangkrah Community Health Center, Surakarta, who met the inclusion and exclusion criteria. This study set the following inclusion criteria: 1) pregnant women who underwent ANC at the Sangkrah Community Health Center in Surakarta, 2) pregnant women who resided in the working area of the Sangkrah Community Health Center in Surakarta, 3) pregnant women who attended pregnancy classes at the Sangkrah Community Health Center in Surakarta, 4) pregnant women who were willing to be respondents, and 5) pregnant women who could communicate well. The exclusion criteria established in

this study were: 1) pregnant women who did not participate in the study until the end, 2) pregnant women who did not complete the data, and 3) pregnant women who were not present when the study was conducted.

This study used instruments, namely socio-economic and demographic questionnaires, obstetrics, gynecology, and health history and preconception care knowledge, as well as preconception care practices. The research instruments have been tested for validity and reliability. The results of the Cronbach's Alpha test showed a value of 0.85 for all statement items known to be valid. Data analysis used the Chi-Square Test and Logistic Regression Test.

## RESULT

The study was conducted in May 2024 on 40 pregnant women who attended pregnancy classes at the Sangkrah Surakarta Community Health Center. Data collection was carried out four times, namely on May 19, 20, 24, and 26, 2024. The results of the study are presented in the following table:

**Table 1.** Socioeconomic and Demographic Characteristics of Pregnant Women in the Working Area of the Sangkrah Community Health Center, Surakarta

Variabel	Category	Frequency (N)	Percentage (%)
	Mean = 29 years old		
Respondent Age	High risk (<20 years old or ≥ 35 years old)	10	25
	Not High risk (20-34 years old)	30	75
Religion	Islam	38	95
	Christian	2	5
Place of Residence	Rural	0	0
	Urban	40	100
Education Level	Low (elementary-junior high school)	15	37,5
	High (senior high school-university)	25	62,5
Occupation	Unemployed	21	52,5
	Employed	19	47,5
Marital Status	Unmarried	0	0
	Married	40	100

**Table 2.** Obstetric and Gynecological Data of Pregnant Women in the Working Area of the Sangkrah Community Health Center, Surakarta

Variabel	Category	Frequency (N=40)	Percentage (%)
Gravida	Primigravida	17	42,5
	Multigravida	23	57,5
Parity	Nullipara	18	45
	Primipara, Multipara	22 (10, 12)	55 (25, 30)
History of ANC Visits	Never	2	5
	1 time	5	12,5
	2 times	8	20
	3 times	7	17,5
	4 times/more	18	45
History of Family Planning	No contraception	25	62,5
	Contraception	15	37,5
Current Pregnancy Status	Unplanned	17	42,5
	Planned	23	57,5

Based on Table 1, it is known that the majority of respondents were aged 20-34 years (not retired) totaling 30 people (75%), Muslim totaling 38 people (95%), all of whom live in urban areas, totaling 40 people (100%), with a highest level of education of high school or higher education, totaling 25 people (62.5%), unemployed, totaling 21 people (52.5%), and all of whom are married, totaling 40 people (100%).

Based on Table 2, the results show that the majority of respondents were multigravida, totaling 23 people (57.5%), had given birth 22 times (55%), consisting of 10 people (25%) who were primigravida and 12 people (30%), had attended 4 or more ANC visits during their previous pregnancy 18 times (45%), 25 women (62.5%) did not use contraception, and 23 women (57.5%) planned their current pregnancy.

**Table 3.** Preconception Care Practices for Pregnant Women in the Working Area of the Sangkrah Community Health Center, Surakarta

Variabel	Category	Frequency (N=40)	Percentage (%)
Consultation with Health Workers	No	11	27,5
	Yes	29	72,5
Prepare a variety of foods	No	4	10
	Yes	36	90
Get TT immunization	No	8	20
	Yes	32	80
Reduce/stop chewing tobacco and qat	No	40	100
	Yes	0	0
Reduce/stop smoking	No	40	100
	Yes	0	0
Consume nutritious supplements	No	1	2,5
	Yes	39	97,5
Take TTD	No	8	20
	Yes	32	80
Take folic acid	No	1	2,5
	Yes	39	97,5
Get tested for HIV	No	40	100
	Yes	0	0
Getting a Hypertension Checkup	No	25	62,5
	Yes	15	37,5
Getting an Anemia Checkup	No	11	27,5
	Yes	29	72,5
Getting a Blood Type Checkup	No	40	100
	Yes	0	0

Variabel	Category	Frequency (N=40)	Percentage (%)
Getting a Diabetes Checkup	No	40	100
	Yes	0	0
Monitoring Weight	No	8	20
	Yes	32	80
Getting a Hepatitis B Checkup	No	40	100
	Yes	0	0
Husband Getting a Health Checkup for Current Pregnancy	No	28	70
	Yes	12	30
Getting PMS Screening	No	40	100
	Yes	0	0
Comprehensive Preconception Care Practices	Poor	14	35
	Good	26	65

According to the results of the analysis in Table 3, it was found that of the 40 pregnant women served at the Sangkrah Surakarta Community Health Center, 26 (65%) had good preconception care practices. Furthermore, it was found that 29 (72.5%) consulted a health worker, 36 (90%) prepared a variety of foods, 32 women (80%) received TT immunization, 40 women (100%) did not reduce/stop chewing tobacco/qat, 40 women (100%) did not reduce/stop smoking, 39 women (97.5%) consumed nutritious supplementary foods, 32 women (80%) consumed iron tablets (TTD), 39 people (97.5%) consumed folic acid, 40 people (100%) did not undergo HIV testing, 25 people (62.5%) did not undergo

hypertension testing, 29 people (72.5%) underwent anemia testing, 40 people (100%) did not undergo blood type testing, 40 people (100%) did not undergo DM testing, 32 people (80%) monitored their weight, 40 people (100%) did not undergo Hep.B testing, 28 people (70%) whose husbands did not undergo testing for the current pregnancy, and 40 people (100%) did not undergo PMS testing. All respondents did not reduce/stop chewing tobacco/qat, smoking, undergoing HIV testing, undergoing blood type testing, undergoing DM testing, undergoing Hep.B testing, and undergoing PMS testing because they felt they had no reason/indication to undergo such tests.

**Table 4.** Bivariate Analysis of Factors Affecting Preconception Care Practices Among Pregnant Women in the Working Area of the Sangkrah Community Health Center, Surakarta

Variabel	Category	Preconception Care Practices		p-Value	COR (95%CI)
		Poor (%)	Good (%)		
Respondent Age	High risk (<20 years old or ≥ 35 years old)	3 (21,4)	7 (26,9)	0,702	0,740 (0,158-3,463)
	Not High risk (20-34 years old)	11 (78,6)	19 (73,1)		
Religion	Islam	12 (85,7)	26 (100)	0,117	0,316 (0,198 – 0,504)
	Christian	2 (14,3)	0 (0)		
Education Level	Low (elementary-junior high school)	9 (64,3)	6 (23,1)	0,010	6,000 (1,445-24,919)
	High (senior high school-university)	5 (35,7)	20 (76,9)		
Occupation	Not working	12 (85,7)	9 (34,6)	0,002	

Variabel	Category	Preconception Care Practices		p-Value	COR (95%CI)
		Poor (%)	Good (%)		
Gravida	Working	2 (14,3)	17 (65,4)	0,007	11,333 (2,068-62,105)
	Primigravida	10 (71,4)	7 (26,9)		6,786 (1,596-28,858)
	Multigravida	4 (28,6)	19 (73,1)		5,625 (1,349 – 23,449)
Parity	Nulipara	10 (71,4)	8 (30,8)	0,014	
	primipara, multipara	4 (28,6)	18 (69,2)		
History of ANC Visits	Never	0 (0)	2 (7,7)	0,281	-
	1 time	3 (21,4)	2 (7,7)		
	2 times	1 (7,1)	7 (26,9)		
	3 times	2 (14,3)	5 (19,2)		
	4 times/more	8 (57,1)	10 (38,5)		
History of Family Planning	No contraception	8 (57,1)	17 (65,4)	0,608	0,706 (0,186-2,673)
	Contraception	6 (42,9)	9 (34,6)		
Current Pregnancy Status	Unplanned	8 (57,1)	9 (34,6)	0,169	2,519 (0,665-9,538)
	Planned	6 (42,9)	17 (65,4)		
Knowledge of Preconception Care	Poor	13 (92,9)	8 (30,8)	0,000	29,250 (3,248-263,415)
	Good	1 (7,1)	18 (69,2)		

Table 4 shows the results of bivariate analysis, namely factors that are associated with preconception care practices in bivariate terms, including: highest level of education, occupation, gravida, parity, and

level of knowledge about preconception care. Furthermore, variables with a p-value <0.25 will be continued into multivariate analysis.

**Table 5.** Multivariate Analysis of Factors Affecting Preconception Care Practices among Pregnant Women in the Working Area of the Sangkrah Community Health Center, Surakarta

Variable	Category	Preconception Care Practices		COR (95%CI)	AOR (95%CI)	p-Value
		Poor (%)	Good (%)			
Level of Education	Low (elementary-junior high school)	9 (64,3)	6 (23,1)	6,000 (1,445-24,919)	0,349 (0,033-3,749)	0,385
	High (senior high school-university)	5 (35,7)	20 (76,9)			
Occupation	Not working	12 (85,7)	9 (34,6)	11,333 (2,068-62,105)	0,082 (0,009-0,720)	0,024
	Working	2 (14,3)	17 (65,4)			
Gravida	Primigravida	10 (71,4)	7 (26,9)	6,786 (1,596-28,858)	0,159 (0,020 – 1,241)	0,079
	Multigravida	4 (28,6)	19 (73,1)			
Parity	Never given birth	10 (71,4)	8 (30,8)		-	1,000

Variable	Category	Preconception Care Practices		COR (95%CI)	AOR (95%CI)	p-Value
		Poor (%)	Good (%)			
Knowledge of Preconception Care	Given birth (primipara, multipara)			5,625 (1,349 – 23,449)		
	Poor	4 (28,6)	18 (69,2)	29,250 (3,248- 263,415)	0,052 (0,005 – 0,585)	0,017
	Good	13 (92,9)	8 (30,8)			
			1 (7,1)	18 (69,2)		

\*Nagelkerke R<sup>2</sup>= 66,1%

Based on the results of multivariate analysis in Table 5.5, it is known that the variables that influence preconception care practices are occupation and level of knowledge of preconception care, with multivariate p-values of p=0.024 and p=0.017, respectively. Occupation has a greater influence on preconception practices than level of knowledge. Occupation has an OR value of 0.082 (0.009-0.720), meaning that occupation is a protective factor. Pregnant women who do not work are 12 times less likely (1/0.082) to have poor preconception care practices than working women, or working pregnant women can reduce the risk of poor preconception care practices by 0.082 times. Meanwhile, the knowledge level variable has an OR = 0.052 (0.005–0.585), meaning that the knowledge level variable is also a protective factor. Pregnant women with low knowledge levels are 19 times more likely (1/0.052) to have inadequate preconception care practices than pregnant women with good knowledge levels, or pregnant women with good preconception care knowledge can reduce the risk of having inadequate preconception care practices by 0.052 times. The Nagelkerke R<sup>2</sup> value of 66.1% means that if applied in the community, 66.1% of preconception care practices are influenced by occupational factors and knowledge levels, while the remaining 33.9% are influenced by other factors that were not studied.

### DISCUSSION

Preconception care has a broad health impact on communities by reducing morbidity and mortality rates among

mothers, infants, and children.<sup>[15]</sup> The health status of a woman of childbearing age during the preconception period determines the quality of pregnancy outcomes and the health of future generations. Preconception health practices result in healthy women who will in turn produce healthy mothers and children.<sup>[10]</sup> This study found that the majority of pregnant women served at the Sangkrah Community Health Center in Surakarta, Indonesia, had good preconception care practices, namely 26 women (65%). The results of this study were compared with the results of a similar study in Manna, Ethiopia in 2019, which showed lower results, with only 39 (6.3%) of 623 pregnant women respondents having good preconception care practices.<sup>[10]</sup> Another study in Wolkit, Southern Ethiopia in 2020 yielded similar results, with only 38 people (6.4%) receiving the full range (10 services) of preconception services provided.<sup>[16]</sup> The lower prevalence of preconception care practices in the two previous studies may be due to differences in healthcare systems, populations, and lifestyles. In addition, differences in education and economic levels between Ethiopia and Indonesia may be one of the reasons for the higher prevalence of preconception care practices in this study.

However, another study conducted in Jordan, Saudi Arabia in 2022 showed better results than the study in Ethiopia, with 643 people (47%) out of 1,386 WUS having good preconception care practices.<sup>[17]</sup> Although good preconception care practices in the study did not reach

≥50% of the sample, the study provided fairly high results similar to those obtained in this study. Another study of 35 WUS in Sawunggaling, Darmo, Surabaya, Indonesia, found that the average preconception care practices of WUS in the study were in the occasional and frequent categories. Although the number of WUS who practiced preconception care in each aspect was not shown, the study explained that the most frequently practiced aspect of preconception care in the study was the implementation of a healthy lifestyle, and the most frequently neglected aspect of preconception care in the study was screening for dangerous diseases such as TORCH.<sup>[18]</sup>

Furthermore, this study also identified factors that influence preconception care practices among pregnant women served at the Sangkrah Community Health Center in Surakarta, Indonesia. The findings of this study indicate that the factors that significantly influence preconception care practices are occupation and level of knowledge about preconception care, with multivariate p-values of  $p=0.024$  and  $p=0.017$ , respectively. This is in line with a study in Mizan-Aman, Ethiopia, in 2020, which stated that the employment status and type of occupation of the husband influence the behavior of WUS in utilizing preconception health services. Husbands who work as traders are 23% more likely to utilize preconception health services for themselves and their partners than husbands who work as farmers.<sup>[19]</sup>

Employment affects individual and family income levels. The higher an individual's income, the greater their chances of accessing quality health services. Furthermore, the Mizan-Aman Ethiopia study states that the husband's employment status enables the family to make joint decisions regarding the woman's health status and makes it easier to cover the costs of accessing health services for women, including transportation.<sup>[19]</sup> Another study in West

Guji, Ethiopia, found that women with good wealth status were 4.23 times more likely to use preconception services than mothers with poor wealth status.<sup>[20]</sup> The majority of respondents in this study were unemployed pregnant women, totaling 21 people (52.5%). However, when viewed based on final education level, the majority of respondents in this study had a high level of education, totaling 25 people (62.5%).

So even though statistically education did not have a significant influence in this study, it is suspected that the respondents' final education level influenced their thinking abilities. Therefore, even though the majority of respondents were unemployed, they had a good level of understanding of information. Education influences an individual's level of acceptance of information. A study shows that individuals who have received formal education have a greater opportunity to obtain health-related information, which will increase their knowledge, behavior in utilizing health services, and individual health practices.<sup>[10]</sup> Another study explains that low levels of education affect WUS awareness of the importance of preconception care, which in turn affects their preconception care behavior.<sup>[21]</sup> The results of this study indicate that employment has an OR value of 0.082 (0.009-0.720), meaning that the employment variable is a protective factor. Pregnant women who do not work are 12 times more likely ( $1/0.082$ ) to have poor preconception care practices than working women, or working pregnant women can reduce the risk of poor preconception care practices by 0.082 times. The analysis results in Table 5 also show that the majority of working pregnant women have good preconception care practices, namely 17 people (65.4%) compared to pregnant women who do not work.

This study also shows a significant relationship between knowledge level and preconception care practices with a p-value of 0.017. Pregnant women with low levels

of knowledge are 19 times more likely (1/0.052) to have poor preconception care practices than pregnant women with good levels of knowledge or pregnant women with good preconception care knowledge, which can reduce the risk of poor preconception care practices by 0.052 times. The results of this study are in line with studies in Manna, Ethiopia; Jordan, Arab; Guji, Ethiopia; Mizan, Ethiopia; and Sawunggaling, Surabaya.<sup>[10][17][18][19][20]</sup>

One possible reason for this study is that knowledge is one of the predictors of behavior. Good knowledge of an object will influence an individual's intentions and attitudes, which will ultimately improve that individual's behavior and practices. Knowledge directs a person to seek and obtain detailed information. Although knowledge does not always cause positive behavioral change, many studies have proven a positive relationship between the two. The Nagelkerke R<sup>2</sup> value of 66.1% means that if applied in the community, 66.1% of preconception care practices are influenced by occupational factors and knowledge levels, while the remaining 33.9% are influenced by other factors that were not studied.

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### CONCLUSION

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Occupation and level of knowledge are the most significant factors influencing preconception care practices among pregnant women served at the Sangkrah Community Health Center in Surakarta. Attention from the government and relevant health workers is needed to improve individual knowledge and provide greater opportunities for individuals to participate in the workforce.

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