The Correlation of Sociodemographic Status, Knowledge and Attitudes with Pregnant Women's Practice Regarding COVID-19 Vaccination

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ABSTRACT

***Background**: Pregnant women become a high-risk group that could get infected with COVID-19 during the pandemic. Maternal mortality also has increased during the COVID-19 pandemic. Based on this, vaccination for COVID-19 becomes one of the ways to prevent the transmission of COVID-19 to pregnant women. However, there are still high doubts about the vaccine for COVID-19, especially among pregnant women. As such the authors are interested in seeing the correlation between sociodemographic status, knowledge, and attitudes with pregnant women's practice regarding COVID-19 vaccination. **Objective**: This study focused on evaluating the correlation of sociodemographic status, knowledge and attitudes with pregnant women's practice regarding COVID-19 vaccination. **Methods**: This cross-sectional study was performed on 136 pregnant mothers determined through purposive sampling method and implemented from February-March 2023 at Kassi-Kassi Public Health Center using a questionnaire consisting of respondent characteristics, knowledge related to COVID-19 vaccination, and attitudes toward the COVID-19 vaccination. The analysis of the data was done univariately, then bivariate using a comparative Chi-square test. **Results**: The correlation between variables was analyzed using the Chi-Square comparison test and significant correlation was obtained for parity (p-value; 0.000 < 0.05, OR; 1.91, CI; 1.55-2.34), age (p-value; 0.000 < 0.05, OR; 33.67, CI; 11.04-102.63), work status (p-value; 0.045 < 0.05, OR; 3.40, CI; 1.10-10.47), educational level (p-value; 0.040 < 0.05, OR; 2.77, CI; 1.14-6.72), knowledge (p-value; 0.000 < 0.05, OR; 8.45, CI; 3.64-19.61), and attitude (p-value; 0.000 < 0.05, OR; 9.20, CI; 3.88-21.78). However there is a non-significant correlation for the monthly income category (p-value: 0.269 > 0.05, OR; 2.18, CI; 0.69-6.86). **Conclusion**: There is a significant correlation between sociodemographic status (parity, age, work status, and educational level), knowledge, and attitude with pregnant women practices regarding COVID-19 vaccination.*

***Keywords**: Attitudes, Covid-19 Vaccination, Knowledge, Practice, Pregnant Women*

INTRODUCTION

The World Health Organization (WHO) announced the emergence of Coronavirus Disease 2019 (COVID-19) in February 2020. As for Indonesia, the first case of COVID-19 was announced in March 2020. In this first case, two cases were found and since then it has continued to increase until finally in July 2021 the number of daily cases reached 51,000 new cases with a death rate of 2,000 cases per day (Burhan et al., 2022).

Pregnant women become a high-risk group that could get infected by COVID-19 (Dashraath et al., 2020). Based on research conducted by Antoun et al. (2020), from 23 patients with positive results for COVID-19, 70% of the patients were Asian. The severity of symptoms ranged from mild in 65.2% of patients, moderate in 8.7%, and severe in 34.8%. Approximately 17.4% (four cases) had severe respiratory distress syndrome which required ICU support, and 4.3% (one case) resulted in maternal death (Antoun et al., 2020).

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The mortality of pregnant women in Indonesia has also increased during the COVID-19 pandemic. According to the data from POGI until April, about 16 people died among 536 pregnant patients that were exposed to COVID-19 or it is estimated that for every 1000 pregnant women, 32 of them died. That is more than 10 times than in non-pandemic conditions with the average maternal mortality rate being three deaths for every 1000 pregnant women (Perkumpulan Obstetri dan Ginekologi Indonesia, 2020).

The spread of COVID-19 has also raised concerns about intrauterine transmission from mother to fetus in pregnant women. Complications that can occur in a fetus with a mother infected with COVID-19 are miscarriage (2%), Intra Uterine Growth Restriction (IUGR; 10%), and premature birth (39%) (Sass et al., 2017).

Based on this, in addition, to the modification of health services for pregnant women, COVID-19 vaccination became one of the solutions to reduce or even prevent transmission of COVID-19 to pregnant women (Burhan et al., 2022). However, there are still high doubts about the COVID-19 vaccination, especially among pregnant women. Based on research conducted by Simanjorang et al. (2022) in a rural area on the Indonesia-Philippines border island, among 557 participants, the prevalence of vaccine hesitancy was high, namely 63.9% of the total respondents (Simanjorang et al., 2022).

To reduce the spread of the disease, the vaccine uptake should be approximately 67%-80% in the general population, but the acceptance of the COVID-19 vaccine especially among pregnant women, is different in every country around the world (Skjefte et al., 2021). The hesitancy toward vaccines has become a global health threat, which was pointed out by WHO in 2019 (Goncu Ayhan et al., 2021).

According to the data from Makassar City Health Office at 2022, in Kassi-Kassi Public Health Center, among 1800 pregnant women that have been registered there, only 50% already got COVID-19 vaccination. However, this percentage was two times higher than the other Public Health Centers in the same work area. This could happen due to the health promotion performed by the health workers in that Public Health Center.

Due to the high doubts and to increase awareness toward the benefits of taking COVID-19, especially among pregnant women, there are some factors that should be analyzed so there could be an intervention to increase the uptake of the COVID-19 vaccination. That leads the authors to evaluate the correlation of sociodemographic status, knowledge and attitudes with pregnant women's practice regarding COVID-19 vaccination.

METHODS

This research was from February-March 2023. The research design is quantitative analytic with a cross-sectional study approach. The study was conducted on 136 pregnant women in the working area of the Kassi-Kassi Public Health Center. The sampling method used in this study was purposive sampling. Data collection in this study was carried out through questionnaires that were distributed directly to the respondents.

The criteria for the respondents in this study were women with a gestational age of more than 12 weeks to 33 weeks and who were willing to be respondents. The exclusion criteria were mothers who could not read and write, mothers with unwanted pregnancies, mothers with psychiatric disorders, and mothers who previously had COVID-19 vaccination contraindications.

The instruments in this study consisted of respondent characteristics (parity, age, work status, education level, monthly income, COVID-19 vaccination status), a knowledge questionnaire modified from research by Mohamed et al. (2021), and a modified attitude questionnaire from the study of Galanis et al. (2021). The knowledge and attitude questionnaires were both translated into Indonesian and validated among 20 pregnant women (with each item has values <0.05) with Cronbach's alpha values of 0.741 and 0.864, respectively.

The data were analyzed using univariate and then Chi-square comparative tests for the bivariate analysis to see the correlation between sociodemographic status, knowledge, and attitudes toward pregnant women's practice regarding COVID-19 vaccination. This study used ethics from the Health

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RESULTS AND DISCUSSION

Table 1. Distribution of Sample Characteristics

Characteristics of Respondents	N	%
Parity		
Primiparous	56	41.2
Multiparous	80	58.8
Age		
Risked (<20 and >35 years)	35	25.7
Unrisked (20-35 years)	101	74.3
Work Status		
Employed	32	23.5
Unemployed	104	76.5
Education Level		
<12 years	26	19.1
≥12 years	110	80.9
Monthly income		
≤IDR 3,000,000,-	112	82.4
>IDR. 3,000,000,-	24	17.6
Knowledge		
Lack of Knowledge	46	33.8
Good Knowledge	90	66.2
Attitude		
Negative Attitude	37	27.2
Positive Attitude	99	72.8
COVID-19 Vaccination Status		
Not vaccinated	38	27.9
Vaccinated	98	72.1

Table 1 shows the distribution of the characteristics of the respondents from 136 samples consisting of parity, age, work status, education, and monthly income. In maternal parity, there were more mothers with multiparity (58.8%) than mothers with primiparity (41.2%). The age of the respondents mostly is in the range of unrisked age (20-35 years) (74.3%), and there are some with risk age (<25 and >35 years) (25.7%). The biggest distribution of work status is unemployed (76.5%) followed by a small percentage of employed respondent (23.5%). The education level mostly taken by pregnant women was ≥12 years (80.9%) and there are some with <12 years education level (19.1%). The monthly income earned by the mother's family was mostly ≤IDR 3,000,000,- (82.4%) followed by a small group with total income >IDR 3,000,000,- (17.6%).

As for the knowledge and attitudes, it can be seen that the majority of respondents have good knowledge (66.2%) and a positive attitude (72.8%) about the COVID-19 vaccination. As for the status of the COVID-19 vaccination, it can be seen that the majority of respondents already had the COVID-19 vaccination (72.1%).

Table 2. Analysis of Correlation between Sociodemographic Status toward Pregnant Women's Practice for COVID-19 Vaccination

Sociodemographic Characteristics	Practice Regarding COVID-19 Vaccination						*p-value*	*OR*	*95% CI*	
	Vaccinated		Unvaccinated		Total				Lower	Upper
	N	%	N	%	N	%				
Parity										
Primiparous	56	100.0	0	0.0	56	41.2	0.000	1.91	1.55	2.34
Multiparous	42	52.5	38	47.5	80	58.8				

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Age										
Risked (<20 and >35 years old)	0	0.0	35	100.0	35	25.7	0.000	33.67	11.04	102.63
Unrisked (20-35 years old)	98	97.0	3	3.0	101	74.3				
Work										
Working	28	87.5	4	12.5	32	23.5	0.045	3.40	1.10	10.47
Unemployed	70	67.3	34	32.7	104	76.5				
Education Level										
<12 Years	14	53.8	12	46.2	26	19.1	0.040	2.77	1.14	6.72
≥ 12 Years	84	76.4	26	23.6	110	90.9				
Monthly Income										
≤IDR 3.000.000	78	69.6	34	40.4	112	82.3	0.269	2.18	0.69	6.86
>IDR 3.000.000	20	83.3	4	16.7	24	17.7				

Table 2 shows the bivariate analysis using the Chi-square test for the correlation of sociodemographic status regarding the respondent's practice for COVID-19 vaccination.

For maternal parity and practice toward COVID-19 vaccination, the number of primiparous women that have been vaccinated is higher (100%) than the multiparous women that have been vaccinated (52.5%) with the *p-value* for the parity 0.000 (OR: 1.91, CI: 1.55-2.34).

This also applies to age, where pregnant women with unrisking age are more willing to be vaccinated (97%) than pregnant women with risking age (0%) with the *p-value* for the age 0.000 (OR: 33.67, CI: 11.04-102.63).

As for the work status, both of the pregnant women that having a job and unemployed, mostly have been taking the vaccine (87.5% and 67.3%). But there are a small amount from both category that are not vaccinated (12.5% and 32.7). For the *p-value* of work status is 0.045 (OR: 3.40, CI: 1.10-10.47).

In the other category, which is educational level, pregnant women with ≥12 years of education are more willing to take vaccination (76.4%) than the pregnant women with <12 years of education (53.8%) with the *p-value* for the educational level 0.040 (OR: 2.77 CI: 1.14-6.72).

Meanwhile for the monthly income, whether pregnant with a monthly income of ≤IDR 3,000,000 or >IDR 3,000,000, more choose to vaccinate (69.6% and 83.3%) but in terms of number, more of the respondents who vaccinate are pregnant women with a monthly income of ≤IDR 3,000,000 with the *p-value* for the monthly income 0.269 (OR: 2.18, CI: 0.69-6.86).

This study show that most of the sociodemographic status (the parity, age, work status, and educational level) as having a significant correlation toward pregnant women practice regarding COVID-19 vaccination with the *p-value*<0.05 respectively and only one aspect (monthly income) with no significant correlation toward pregnant women practice regarding COVID-19 vaccination with the *p-value*>0.05.

Table 3. Analysis of Correlation between Knowledge and Attitudes toward Pregnant Women's Practice for COVID-19 Vaccination

Variable	Practice Regarding COVID-19 Vaccination						*p-value*	*OR*	*95% CI*	
	Not Vaccinate		Vaccinate		Total					
	N	%	N	%	N	%			Lower	Upper
Knowledge										
Less Knowledge	26	56.5	20	43.5	46	33.8	0.000	8.45	3.64	19.61
Good Knowledge	12	13.3	78	86.7	90	66.2				
Attitude										
Negative Attitude	23	62.2	14	37.8	37	27.3	0.000	9.20	3.88	21.78

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Positive Attitude	15	15.2	84	84.8	99	72.8

Table 3 shows the bivariate analysis using the Chi-square test for the correlation of knowledge and attitude with the respondent's practice for COVID-19 vaccination. For knowledge and practice toward COVID-19 vaccination, most of the pregnant women that possess good knowledge about COVID-19 vaccination have been vaccinated (86.7%), and only a small number of pregnant women had good knowledge but didn't vaccinate (13.3%). Meanwhile, pregnant women with less knowledge about the COVID-19 vaccination mostly didn't do the COVID-19 vaccination (56.5%). However, some pregnant women have less knowledge but vaccinate (43.5%). The results in this study obtained a *p-value* between knowledge of pregnant women and COVID-19 vaccination precautions of 0.000, <0.05.

As for attitudes and practice toward COVID-19 vaccination, most pregnant women with a positive attitude chose to vaccinate against COVID-19 (85%) and there were a small number who chose not to vaccinate against COVID-19 (15%). Meanwhile, pregnant women who have a negative attitude regarding COVID-19 and vaccination prefer not to vaccinate (62.2%), but there are still some pregnant women who still choose to vaccinate against COVID-19 (37.8%). This study found that the *p-value* between attitude and practice toward COVID-19 vaccination was 0.000, <0.05.

Discussion

The study about the side effect of the COVID-19 Vaccination for pregnant women was still limited. This happened because the trial of the COVID-19 vaccine from all companies excluded pregnant women as their trial sample (Leik et al., 2021). However, there are only a few cases that result in severe side effects. Most of the side effects that occur were local side effects, such as injection site pain, and the main systemic side effect was fever (Alinaghi et al., 2022).

Other local and systemic side effects were as follows: rash, fever, severe fatigue, arthralgia, myalgia, headache, sore arm or pain, fatigue, chills, nausea, vomiting, sweating, feelings of joy, joint pain, swelling, flushing, reduced mental clarity, itching, decreased appetite, decreased sleep quality, palpitations or increased heart rate, heat or cold intolerance, anxiety, heartburn, muscle spasm, nasal congestion, increase in sleep, swollen lymph node and sore throat, dizziness, stomachache, clogged ears, general weakness, non-specified pain, and eye burning or blurred vision (Alinaghi et al., 2022).

Although clinical trial data are not yet available to verify the safe use of the COVID-19 vaccine in pregnancy, a precedent of the effort of past immunizations and the current pandemic provide strong support for vaccination. SARS-CoV-2 infection increases the likelihood of a poor outcome for mother and baby, which could be prevented by vaccination (Chavan et al., 2021).

1. Correlation between sociodemographic status and pregnant women's practice toward COVID-19 vaccination

In this study, it has been found that there is a significant correlation between some of sociodemographic aspects, namely parity, age, work status, and educational level. It is shown that primiparous women were more likely to take the COVID-19 vaccine than multiparous women. This result was in line with the study conducted by Bhattacharya et al. (2022) which found that multiparous women had a lower acceptance toward COVID-19 vaccine (41%) than primiparous women (59%). This could happen probably because multiparous women have a higher confidence in giving birth so they didn't concern for the effect of COVID-19.

As for the age, this study has shown that women within age of 20-35 (unrisked age) are taking the vaccine even more than the women with age <20 and >35 (risked age). This can be due to women aged 20-35 having a better and more mature mindset than women aged <20 years. Similarly, women >35 years old have difficulty digesting information and lack in literacy, causing hesitancy toward COVID-19 vaccination (Abedin et al., 2021).

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In other aspect, which is work status, this study has found that mostly women taking the COVID-19 vaccine are unemployed. But in terms of the percentage, women working are mostly taking the COVID-19 vaccination (87%) more than unemployed women (67%). This can be due to the influence or policies implemented by companies or workplaces that require their members to be vaccinated.

Furthermore in this study, for educational level, women with ≥12 years of education are more likely to be vaccinated than women with <12 years of education. This result was supported by the research from Abedin et al. (2021) that found pregnant women with at least 12 years of formal education are having a higher acceptance than the women that hadn't completed 12 years of education (Abedin et al., 2021).

However, it has been found that monthly income does not significantly affect pregnant women's practices toward COVID-19 vaccination. In this study, there are more pregnant women with ≤IDR 3,000,000 who are vaccinated than women with monthly income >IDR 3,000,000. This result was in line with the study from Sezerol and Davun, (2023) which found that the lower income of the pregnant women, the lower of hesitancy toward COVID-19 vaccination. This may be because people with higher incomes have easier access to more sources that may be effective in spreading misinformation on social media, and other misinformation.

2. Correlation between knowledge and pregnant women's practice toward COVID-19 vaccination

Knowledge is a collection of information that is produced through a sensing process and underlies the formation of a belief from an individual (Notoatmodjo, 2012). Related to the Lawrence-Green behavioral theory, knowledge is associated as a predisposing factor that will determine one's behavior related to health, such as decisions regarding taking COVID-19 vaccinations as a precaution against COVID-19 (Pakhpahan et al., 2020). In this study, knowledge was tested through the Chi-square comparison test and a relationship was found between pregnant women's knowledge and the practice toward COVID-19 vaccination.

The results obtained in this study are supported by research conducted by Tao et al. (2021) using the cross-sectional method with a sample size of 1392, which obtained a p-value of 0.01, <0.05 which showed that the higher the knowledge of pregnant women regarding COVID-19 vaccination, the higher they wanted to receive the vaccination (Tao et al., 2021). In another study conducted by Nurdin et al. (2021) using the cross-sectional method on 220 pregnant women, there was found a relationship between the behavior of pregnant women and the level of knowledge of respondents about the transmission of COVID-19 with a p-value *0.001<0.05 (Nurdin et al., 2022). The results obtained by Mose and Yeshaneh (2021) through a cross-sectional study found that among 396 pregnant women, those with a good level of knowledge regarding COVID-19 and how to prevent it are easier to take the COVID-19 vaccine compared to pregnant women with lesser knowledge (Mose & Yeshaneh, 2021).

In another study conducted by Aynalem et al. (2022), knowledge is one of the significant factors to encourage pregnant women to take the COVID-19 vaccine. Pregnant women with good information about COVID-19 are about two times more likely to receive a COVID-19 vaccine than their counterparts. That could be explained because pregnant women with good knowledge of the COVID-19 vaccine realize the risk of the COVID-19 virus for themselves and their fetuses so they need to take the COVID-19 vaccine to prevent the risk. In addition, pregnant women with good knowledge about the COVID-19 vaccine will understand more about the benefits of the COVID-19 vaccination program (Aynalem et al., 2022).

Metacognitive knowledge is a combination of all types of knowledge that is influenced by several factors, such as education (formal or non-formal) which is the intellectual foundation for acquiring and understanding knowledge (Irwan, 2017). Age is also a factor for an individual in capturing and processing knowledge growing (Hoff et al., 2018).

3. Correlation between attitudes and pregnant women's practice toward COVID-19 vaccination

Attitude is a closed reaction or response from someone to a stimulus or

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object, in other words attitude is a person's readiness to act. Attitude is not yet an action or activity, but is a predisposition to a behavior (Pakhpahan et al., 2020). In this study, attitudes were tested through the Chi-square comparison test of bivariate analysis and the results showed that there was a correlation between attitudes with pregnant women's practice for COVID-19 vaccination.

The results of this study are supported by research conducted by Anjelika and Indarjo (2022) as well as Anggrek, Asmin, and Saija (2023), which showed a significant correlation between attitude and participation in COVID-19 vaccination with p-values of 0.027 and 0.002, respectively ($p<0.05$) (Anggrek et al., 2023; Anjelika & Indarjo, 2022). In a study conducted by Pairat and Phaloprakarn (2022), the number of pregnant women who had been vaccinated against COVID-19 and had a positive attitude was 61.4% of the 171 pregnant women who were respondents. This shows that most pregnant women who vaccinate against COVID-19 have a positive attitude toward vaccination (Pairat & Phaloprakarn, 2022).

As for the research conducted by Taye et al. (2022), respondents who came from pregnant women and women who had given birth having a positive attitude toward vaccines were 8.54 times more likely to receive the COVID-19 vaccine than respondents who had negative attitudes (Taye et al., 2022). This is possible because respondents who have a positive attitude can trust information related to vaccines and comply with instructions given by different guidelines. Another reason is that respondents who have a positive attitude toward vaccines can receive vaccines because of their high desire and willingness to prevent the disease.

According to the theory of planned behavior, a person will comply with a certain behavior or not, in this case getting a COVID-19 vaccination, depending on three main factors. These factors are i) a person's attitude toward vaccination in general and COVID-19 vaccination in particular; ii) attitudes of 'important people' about vaccines; iii) Difficulties or obstacles that are felt in carrying out the behavior, in this case, the obstacles that arise when wanting to do the COVID-19 Vaccination (Cordina et al., 2021).

Good knowledge and a positive attitude toward COVID-19 vaccination will further boost self-confidence and a desire to vaccinate. Vice versa, lack of knowledge and negative attitudes toward COVID-19 vaccination will cause doubts and reluctance to vaccinate. Specifically in Indonesia, several factors that raise doubts about the COVID-19 vaccination include age, history of co-morbidities, low information about COVID-19, the halalness of the COVID-19 vaccine which is less known considering that Indonesia itself is a country with a majority Muslim population, and distrust of the effectiveness of the COVID-19 vaccine to prevent infection (Anggrek et al., 2023). Good health education and promotion related to COVID-19 vaccination is the key to increasing the acceptance of COVID-19 vaccination in the community, especially among pregnant women.

However, this study has some limitations. In terms of data collection; the distribution of questionnaires took a long time because questionnaires were distributed directly so that they could only be received and filled out by respondents who were present on the spot. This study also only focused on pregnant women and doesn't include the husband even though they have a big role in influencing their pregnant wife to take the COVID-19 vaccine. Also, this study only focused on the COVID-19 vaccine; as the pandemic has passed, the interest to take a review about COVID-19 vaccine will be lesser.

CONCLUSION

According to the result and discussion about this research, from 136 pregnant women, most of pregnant women that have been vaccinated (72%) are primaparous, 20-35 years old, working, have ≥12 years of education, but with monthly income ≤IDR 3,000,000. Also, most of them are having a good knowledge and positive attitude toward COVID-19 vaccination. Pregnant women with these characteristics have shown a higher acceptance toward COVID-19 vaccination. This can be a benchmark to focus more on educating and promoting about COVID-19 vaccination for pregnant women with multiparity, risk age (<20 and

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>35 years), not working, education <12 years, monthly opinion >IDR 3,000,000, have less knowledge and negative attitude related to COVID-19 vaccination so that they have more accurate and precise information related to COVID-19 vaccination and increase the uptake for COVID-19 vaccine among pregnant women.

Researchers hope that the data and information obtained from this research can be an additional reference for health service providers, governments, and institutions to improve health promotion efforts and encourage the uptake of COVID-19 vaccinations, especially for the Kassi-Kassi Public Health Center, which could provide more valid information for all the pregnant women to increase their knowledge and create a positive attitude, especially for those who still afraid to take the COVID-19 vaccine.

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