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Relationship Between Knowledge and Attitude of Pregnant Mothers About Covid-19 Vaccination with Covid-19 Vaccine Status in Pregnant Mothers

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ABSTRACT

Background *: Covid-19* infection during pregnancy can increase the risk of disease severity and death of pregnant mothers. The highest maternal mortality rate in Indonesia in 2021 was caused by *Covid-19 at* 40.35%, while the coverage of booster vaccination for pregnant mothers at Bali Mandara Hospital was recorded at only 10%. This study aims to determine the relationship between knowledge and attitudes of *pregnant mothers about Covid-19 vaccination with Covid-19* vaccine status *in* pregnant mothers at Bali Mandara Hospital in 2023. **Method**: Type of observational analytical research with *cross sectional study.* Amount of 44 pregnant mother who were antenatal care in Polyclinic of Bali Mandara Hospital between 1st to 30th April 2023. Data collected by questionnaires, technique of sampling using *purposive sampling* techniques. Normality test using *Saphiro Wilk* and bivariate analysis was performed. **Result:** *The Kendalls Tau-b* bivariate test obtained an asymp value. sig = 0.043 which means that there is a fairly strong relationship between knowledge and *Covid-19* vaccine status in pregnant mothers. Then in the *Chi Square* test, a p value = *0.03 was obtained with an OR value = 7.714, which means that there is a significant relationship between attitude and* Covid-19 vaccine status in pregnant mothers. **Conclusion:** The higher the level of knowledge and positive attitudes of pregnant mothers about vaccination, the more potential to do *a* booster vaccine, so it is hoped that education about *booster vaccination for* pregnant mothers can be promoted at Bali Mandara Hospital through various media to support the realization of *herd immunity*.

Keywords: Knowledge, Attitudes, Vaccine Status, Pregnant Mother

INTRODUCTION

Corona virus is a type of virus that is able to cause diseases that have a significant impact on animals and humans. This virus infects humans, especially in the respiratory tract which can cause diseases ranging from flu to more severe diseases such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). In December 2019 this virus caused an extraordinary event found in Wuhan, China, with the discovery of a new type of Coronavirus variant which was later named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV2) and caused a disease known as Coronavirus Disease-2019 (Covid-19) (Ministry of Health, 2020).

Immunity changes in pregnancy have detrimental effects on the overall health of pregnant mothers infected with COVID-19 (Hanna et al., 2020). During pregnancy, the immune system and the body it self are highly dynamic and subject to several changes. The mother's immune system must be resistant to the father's antigens in the fetus while maintaining the ability to protect against potential pathogens. The uterus expands by increasing pressure in the abdominal cavity, lifting the diaphragm. In addition, the residual functional capacity (RFC) is reduced, leading to compensatory respiratory alkalemia, shifting the oxygen balance toward the fetus. This respiratory state, following a viral infection, could easily decompensate, leading to further lung complications (Alesci et al., 2022)

Pregnant mothers infected with the *Corona virus have the* potential to experience worsening conditions even though the mother does not have comorbidities at all. Pregnant mothers who test positive for *Covid-19* may experience respiratory distress or experience heart rhythm disturbances or acid-base disorders that are not balanced in the body. In addition, the risk of postpartum bleeding and premature birth is also quite common, therefore the option of cesarean section is widely applied (Noble, 2022).

Covid-19 *infection* during pregnancy can result in an increased risk of aggravating the mother's illness or condition, the mother can enter the intensive care unit, get mechanical ventilation, and worst of all death. There is a known increased risk of complications from *Covid-19* in pregnant patients with underlying health conditions (e.g., diabetes, obesity, increasing age, and cardiovascular disease). The *American College of Obstetricians and Gynecologists (ACOG)* recommends that pregnant mothers and mothers who are newly pregnant up to 6 weeks postpartum receive a *booster dose of bivalent Covid-19 mRNA* vaccine after completing the last primary Covid-19 vaccine dose or monovalent *booster*. The Covid-19 vaccine *reduces the risk of* severe Covid-19 disease . Even if patients get sick after being vaccinated, the chances of them becoming seriously ill are very low. The majority of hospitalized patients are individuals who did not receive the *Covid-19 vaccine* (*ACOG,* 2022).

Based on data from the Ministry of Health, it was noted that *Covid-19* contributed greatly as the first cause of maternal mortality in Indonesia, which was 40.35% (Ministry of Health, 2021)[4]. This indicates that preventing *Covid-19* in pregnant mothers is very important to do.

Keeping at least one meter distance from others, wearing a well-fitting mask, washing hands frequently and getting vaccinated immediately can protect mothers and babies from various infections including *Covid-19*. The vaccination program for pregnant mothers is not only to provide protection or prevention to mothers but also to prevent congenital infections and neonatal infections (*WHO,* 2022)[5]. The *American College of Obstetricians and Gynecologists (ACOG)* recommends that pregnant mothers and mothers who are newly pregnant up to six weeks postpartum receive a *booster dose of bivalent Covid-19 mRNA* vaccine after completing the *last primary Covid-19* vaccine dose or monovalent booster. The Covid-19 vaccine *reduces the risk of* severe Covid-19 disease . Even if patients get sick after being vaccinated, the chances of them becoming seriously ill are very low. The majority of hospitalized patients are individuals who did not receive the *Covid-19 vaccine* (*ACOG,* 2022)[6]. The government also supports pregnant mothers to get a *booster* vaccine after completing the primary dose of vaccination to prevent spread, reduce the risk of disease severity and death from *Covid-19* (UPK Kemenkes RI, 2021)[7].

Bali Mandara Regional General Hospital as one of the government hospitals in Bali province has provided vaccination services for pregnant mothers including *booster vaccines*. On the other hand, the incidence of *Covid-19* cases at Bali Mandara Hospital itself cannot be underestimated. Even the results of a preliminary study in February 2022 showed that the number of Covid-19 cases *in pregnant mothers at Bali Mandara Hospital was recorded at 55% of the number of visits and caused one maternal death confirmed with* Covid-19. However, it turns out that the vaccination coverage of pregnant mothers at Bali Mandara Hospital has not been maximized. Although 60% of pregnant mothers at Bali Mandara Hospital claimed to have been vaccinated twice, they also did not do a *booster* for fear that it would have a bad effect on their pregnancy. A person's belief in something is closely related to his knowledge of new situations (Darsini, 2019)[8]. Wawan and Dewi (2018) also said that the reaction displayed by a person is a manifestation of his attitude that synergizes with one's motivation in making decisions.

Knowledge of pregnant mother about Covid-19 can be increased through education which can be done by direct counseling or by using various virtual media (virtual education). Offline, media that can be used to educate pregnant mother about the Covid-19 vaccine can include leaflets and posters. In this digital era, information and education about the Cocid-19 vaccine can also be delivered through *virtual education* in the form of virtual leaflets or videos that can be shared via social media such as whatsapp, facebook, twitter, instagram, and so on. In addition, the role of mass media is no less important. Official information from the government regarding the safety of the Covid-19 booster vaccine, especially for pregnant mother, can be accessed through newspapers, radio, and television.

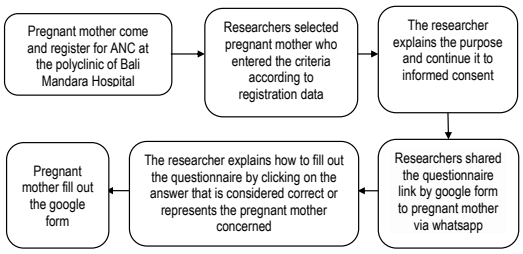
This study aims to analyze the relationship between knowledge and attitudes of pregnant mothers about Covid-19 vaccination with *Covid-19* vaccine status in pregnant mothers. Through this research, it is hoped that all parties, both hospitals,

educational institutions and the community, will support and facilitate the education of pregnant mothers about the importance of Covid-19 vaccination and *contribute to better health services, especially for pregnant mothers so that mothers' understanding and attitudes towards* Covid-19 vaccination become more optimal. Therefore, it is hoped that there will be counseling and education programs, especially related *to the importance of Covid-19 vaccination and its safety, so as to encourage pregnant mothers to take part in* the booster vaccine program so that *the protection of mothers and babies against* Covid-19 is more optimal so that *health immunity* is realized and prevents the occurrence of maternal and infant morbidity and mortality due to *Covid-19* .

METHOD

This research is a type of quantitative research with observational studies using *a cross sectional study* approach and using questionnaire instruments that have been tested for validity and reliability. The questionnaire used was in the form of *a google form* sent via *the whatsapp* application to *the smartphone* of each respondent.

The implementation of this research is during April 2023 in the obstetrics polyclinic room of Bali Mandara Hospital with ethical approval issued by the Health Research Ethics Committee of Bali Mandara Hospital, Bali Province, with number 017 / EA / KEPK. RSBM. DISKES/2023. In addition to the data normality test with *Saphiro Wilk*, the data analysis method in this study used univariate analysis in the form of frequency distribution and bivariate analysis with *the Kendalls Tau-b* test to analyze knowledge variables with vaccine status of pregnant mothers and Chi Square *test to analyze* attitudes with vaccine status in pregnant mothers. The sampling technique in this study used *purposive sampling* with a sample of 44 respondents according to inclusion criteria.



Picture 1. Data collection techniques

Respondents filled out a knowledge and attitude questionnaire through *a google form* and then an assessment was carried out. Knowledge instruments can be assessed by counting the number of answers that are correct. The correct answer will be given a value of one, the wrong answer will get a value of zero, then presented by the number of correct answers divided by the number of questions multiplied by one hundred and then categorized according to the percentage value of the knowledge category (good, enough, less).

Assessment on attitude instruments uses a Likert scale with score values of one to five for each item. The scoring of an item should take into account the nature of its statement. For *favourable* statements, the answer "strongly agree" should be given the most weight. On the other hand, "strongly agree" answers to *unfavourable statements* should be given the least weight. The respondents' scores are calculated by the total score divided by the ideal score multiplied by one hundred. Then determine the positive or negative attitude by looking at the results of the data normality test.

If the data is normally *distributed, the cut off point uses the mean, but if the data is not normally distributed,* the cut off point uses the median. It can also use a reference if the mean value is equal to the median and mode then the cut off point uses the *mean, otherwise* the cut off point uses the median so that it can be determined if the attitude score > median is said to be a positive attitude, and a negative attitude if the attitude score value is < the median. (Ariani, 2014).

The data is then processed by editing*, coding, scoring,* and *tabulating* so that the master table is obtained. After that, the data was entered into the SPSS program for *Kendalls Tau-b analysis test and Chi Square test* then interpretation of the research results was carried out.

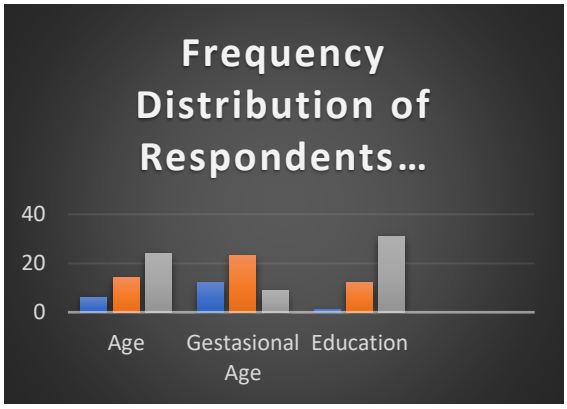
RESULTS

Characteristics of Respondents

The characteristics of the respondents studied can be described based on age, gestational age, and education presented in the form of a table as follows.

Tabel 1. Frequemcy Distribution of Respondent Characteristics at Bali Mandara Hospital in 2023

Characteristics	Frequency (f)	Percentages (%)
Age		
20-25 years old	6	13,6
26-30 years old	14	31,8
31-35 years old	24	54,5
Total	44	100
Gestational Age		
TM I	12	27,3
TM II	23	52,3
TM III	9	20,5
Total	44	100
Education		
Junior High School	1	2,3
Senior High School	12	27,3
College	31	70,5
Total	44	100



Picture 2. Fequency Distribution of Respondents Characteristic

The majority of respondents were in the age range of 31-34 years, namely 54.5% (24 respondents) with the most gestational age in the second trimester of 52.3% (23 responses) and it was found that most of the respondents' education level was tertiary which was 70.5% (31 respondents).

Normality Test

The number of samples studied was less than 50, namely 44 respondents so that the data normality test used was the *Saphiro Wilk test* which can be seen in the following table.

Tabel 2. Normality Data Test by *Saphiro Wilk*

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	Statistic	df	Sig.
Knowledge	0.732	44	0.001
Attitude	0.609	44	0.001
Vaccine status	0.573	44	0.001

Decision Criteria:

1. Probability or sig value. < 0.05 (not normally distributed),
2. Probability or sig value. > 0.05 (normally distributed),

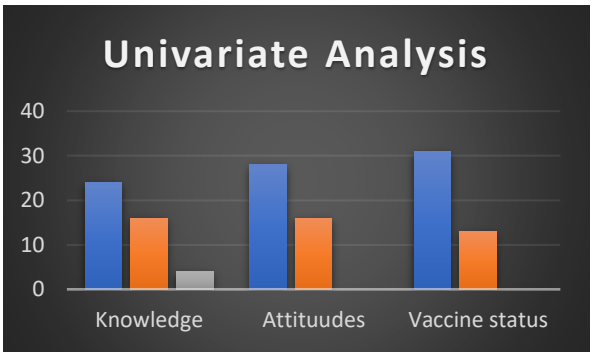
From the table, it is known that the value of p (Sig.) = 0.001 which means p < 0.005 so that the data is said to be not normally distributed, so that the reference for the cut off point of the attitude value will be the median.

Univariat analysis

The results of observations on pregnant mother's knowledge, attitudes and Covid-19 vaccinatbe seen in the following table.

Tabel 3. Frequemcy Distribution of Respondent Characteristics at Bali Mandara Hospital in 2023

Univariate Analysis	Amount	Percentages (%)
Knowledge		
Less good	4	9.1
Fairly good	16	36.4
Good	24	54.5
Total	44	100
Attitudes		
Negative attitude	16	36.4
Positive attitude	28	63.6
Total	44	100
Covid-19 Vaccine Status		
Not boostered	13	29.5
Boostered	31	70.5
Total	44	100



Picture 3. Univariate Analysis

Based on the data above, it is known that from 44 respondents in this study, it was found that there were still 9.1% (4 persons) of pregnant mothers who were less knowledgeable about *Covid-19* vaccination, while the majority of respondents were college graduates. It was found that 36.4% (16 persons) of pregnant mothers still have negative attitudes about *Covid-19 vaccination* even though 54.5% (24 persons) of pregnant mothers already have good knowledge. And, it is known that from 44 respondents in this study there are still 29.5% (13 persons) of pregnant mothers who are not vaccinated with a *booster*.

Bivariat analysis

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The results of the analysis of the relationship between knowledge and *Covid-19* vaccine status in pregnant mothers at Bali Mandara Hospital in 2023 are as follows.

Tabel 4. The Results of Kendall's Tau Test About The Relationship of Pregnant Mother's Knowledge About Covid-19 *Vaccination* with Covid-19 *Vaccine Status* in Pregnant Mothers

Correlations

			Knowledge	Vaccine Status
Kendall's Tau_b	**Knowledge**	*Correlation Coefficient*	1.00	0.299*
		Sig. (2-tailed)	.	0.043
		N	44	44
	Vaccine Status	*Correlation Coefficient*	0.299*	1.00
		Sig. (2-tailed)	0.043	.
		N	44	44

*. Correlation is significant at the 0.05 level (2-tailed).

From the data analysis above, the asymp sig value was obtained. between the knowledge of pregnant mother about Covid-19 vaccination and Covid-19 vaccine status in pregnant mother is 0.043 where this value is < 0.05 with Kendall's Tau-b correlation analysis so the hypothesis is accepted, which means, there is a relationship between pregnant mother's knowledge about Covid-19 vaccination and Covid-19 vaccine status in pregnant mother at Bali Mandara General Hospital in 2023 with the direction of the relationship between positive because a correlation coefficient of 0.299 was obtained in Kendall's Tau-b test. With the correlation coefficient, it can also be determined the strength of the correlation (r) which interprets how strong the relationship is between the two variables in the study. The correlation coefficient in the test results of this study is in the range of a fairly strong correlation strength, namely in the range of values of 0.26-0.50.

The analysis results of the relationship between attitude and *Covid-19* vaccine status in pregnant mothers at Bali Mandara Hospital in 2023 are as follows.

Table 5. The Analysis Results of Relationship Between Attitudes and Covid-19 Vaccine Status In Pregnant Mothers at Bali Mandara Hospital in 2023

Attitudes	Covid-19 vaccine status in pregnant mothers				Total		*P value*	OR (95% C1)
	Not boostered		boostered					
Negative attitude	9	20.5	1	5.9	6	6.4	0 ,003	7.714 (1.81 4-32.814)
Positive attitude	4	.1	4	4.5	8	3.6		
Jumlah	13	0.6	3	9.4	44	00		

Based on the table above, it is known that pregnant mother who has positive attitudes *about Covid-19 vaccination,* 9.1% of the total 44 peoples still choose not to do *booster* vaccination, and most of those who are negative about *Covid-19* vaccination choose not to do *booster* vaccination, which is 20.5% so the total person who choose not to do booster vaccination is 29.6% from 44 peoples.

The results of statistical tests obtained that the p value < 0.05 (0.003 < 0.05), so it can be concluded that there is a significant relationship between the attitude of pregnant mother about Covid-19 vaccination *and the status* of the Covid-19 *vaccine in* pregnant mother at the Bali Mandara General Hospital in 2023.

DISCUSSION

Identification of Knowledge of Pregnant Mothers

Factors that affect knowledge according to Wawan and Dewi (2018)[9] include a person's age and education. Education is important in improving the quality of one's life because through education a person obtains information for example about things that support his health. With adulthood and a good level of education encourages someone to receive better information so that it will indirectly have an impact on their knowledge of something and how someone's attitude in responding to it.

Based on the observations of the researcher above, most respondents of pregnant mothers are in the age range of 31-34 years, which is as much as 54.5%. At this age a person already has maturity in thinking. In addition, the majority of respondents were college graduates at 70.5%. That is, the majority of respondents have a good education.

Based on data obtained by researchers regarding the knowledge of pregnant mothers about *Covid-19 vaccination* at the Bali Mandara Regional General Hospital, it was found that of the 44 respondents studied, there were still 9.1% of pregnant mothers with less knowledge, even though the majority of respondents were college graduates and were in the adult age range.

Identification of Pregnant Mother's Attitude

According to Heri Purwanto in (Wawan and Dewi, 2018) attitude determines a person's behavior in carrying out an action that is closely related to self-motivation so as to distinguish decision making between one person and another. Someone who has a tendency to support or expect something tends to have a positive attitude so that they will take positive action. While someone who has a negative attitude towards an object will tend to avoid the object so that it will move away or reject actions related to the object.

Based on the researchers' observations regarding the attitude of pregnant mothers about *Covid-19* vaccination, it can be seen that there are still 36.4% of mothers who have negative attitudes. From the frequency distribution, it was also obtained from 44 respondents, there were 29.5% *who were not vaccinated with a booster and most of the pregnant mothers who were not vaccinated with a* booster were pregnant mothers who were in the category of negative attitudes towards booster vaccination , which was 20.5%.

According to the journal from Egloff et al., (2022)10 in their journal, it is said that the main reason pregnant mothers do not agree to vaccination is related to fear of side effects of the SARS-CoV-2 vaccine on the fetus rather than Covid-19. This perception affects the acceptance of pregnant mothers to vaccination.

Covid-19 *Vaccine Status* in Pregnant Mothers at Bali Mandara Hospital

According to a study presented by the *Centers for Disease Control and Prevention*, receiving a booster dose with an mRNA *Covid-19* vaccine during pregnancy significantly increases levels of antibodies found in cord blood. This suggests that getting a Covid-19 booster *during pregnancy can help further protect the baby from* Covid-19 *(*CDC, *2022)*11. Therefore, the government recommends that pregnant mothers in Indonesia also receive the *Covid-19 booster* vaccine to protect mothers and their babies from exposure to the virus.

Based on the observations of researchers on the booster vaccine status *of*

pregnant mothers at the Bali Mandara Regional General Hospital, it was found that there were still 29.5% of pregnant mothers who did not *get a booster* vaccine. This certainly needs attention because according to scientific reports the immune system of pregnant mothers is more susceptible to *Covid-19 infection* because in this condition there is a decrease in lymphocytes, NGK2A inhibitory receptors, and an increase in ACE2, IL-9, IL-10, and IP-10 receptors and has the potential to increase the risk of premature labor and fetal distress.

Several studies reveal things that can affect people's willingness to vaccinate, including knowledge, age, work, education, and the presence or absence of comorbidities (Pertiwi and Ayubi, 2022)[12]. In addition, gender and the level of confidence in the use of vaccination also play a role in decision making to receive the *Covid-19 vaccination* (Wasi et al., 2022)[13].

The Relationship of Knowledge with *Covid-19 Vaccine Status of* Pregnant Mothers

According to Notoatmodjo in (Wawan and Dewi, 2018) knowledge influences a person in action. If a person is supported by good knowledge about health, then the person will be encouraged to maintain health and implement it into his life.

After statistical testing of the *Kendalls Tau-b* correlation, the results of the asymp value were obtained*. sig = 0.043 (asymp. sig* < 0.05), meaning that there is a significant relationship between the knowledge *of pregnant mothers about Covid-19 vaccination with the status of the Covid-19* vaccine in pregnant mothers and with the *correlation coefficient (r)* = 0.299 which means that the relationship is quite strong and has a positive value. This means that the higher the level of knowledge of pregnant mothers about *Covid-19 vaccination*, the greater the tendency of pregnant mothers to take booster vaccines.

The results of this study are in line with research conducted by Haya et al., (2022)[14] which states that the level of knowledge and education has a significant relationship with community compliance to be vaccinated. In line with the opinion of Fudyartanto, a psychology lecturer from Udayana University, in Darsini (2019) it is said that knowledge has a control function, which is to give a person the ability to control unwanted events. In this case, booster vaccines for pregnant mothers are given to prevent the incidence of *Covid-19 in pregnant mothers and support the government in controlling maternal morbidity and mortality due to* Covid-19*.*

In other words, according to researchers, a pregnant woman who understands about *Covid-19* vaccination will be motivated to do a *booster* vaccination to maintain and protect the health of herself and her baby. In a journal published by *the Centers for Disease Control and Prevention* (CDC *2021)*15, Dr. Rochelle Walensky, director of the CDC said the vaccine is safe and effective, and increased vaccination is needed as it faces the *highly contagious* Delta variant *and sees more severe outcomes of* Covid-19 *in unvaccinated pregnant mother..*

CDC analysis found no increased risk of miscarriage or safety concerns in vaccinated pregnant mothers. Armed with the knowledge that *the Covid-19 vaccine in pregnant mothers is safe and important to do, pregnant mothers will be moved to take a* booster vaccine *as a*

complete protection to prevent transmission of the Covid-19 virus.

The Relationship between Attitude and *Covid-19 Vaccine Status of* Pregnant Mothers

In this study, from the results of the *Chi Square* statistical test, the results of p value = 0.03 (p < 0.05) which means that the alternative hypothesis (Ha) is accepted which means that there is a significant relationship between the attitude of pregnant mothers about Covid-19 with the status *of* the *Covid-19 vaccine in pregnant mothers and* obtained the value of Odd Ratio *(OR) = 7.714 which means that pregnant mothers* who have a negative attitude about vaccination *Covid-19* is 7,714 times more likely to be less likely to have a booster vaccine than pregnant mothers who have a positive attitude about *Covid-19 vaccination*.

The results of this study are also in line with research conducted by Yuliyaningsih (2022)[16] on factors that influence pregnant mothers to follow vaccination, one of which is attitude. There was a relationship between attitudes and compliance *with Covid-19 vaccination in pregnant mothers , where it was said that pregnant mothers with negative attitudes had a 3.1 times risk of not complying with the* Covid-19 vaccination *compared to those who were positive*.

Thus, according to researchers, pregnant mothers who have a positive attitude and good acceptance about vaccination are more likely to do booster vaccines and vice versa pregnant mothers who have negative attitudes will delay or avoid *booster* vaccines.

CONCLUSION(S)

Pregnant mothers at Bali Mandara Regional General Hospital are on average well knowledgeable, but it turns out that pregnant mothers are found to be in the category of lack of knowledge about Covid-19 vaccination even though the majority of respondents are adults and college graduates. At Bali Mandara Regional General Hospital, the average pregnant mother is positive about the Covid-19 vaccination, but there are still those who do not want a booster vaccine and most of those who are negative choose not to do a booster vaccination. The status of Covid-19 vaccination for pregnant mothers at the Bali Mandara Regional General Hospital is partly a booster vaccine and some are not a booster vaccine. There is a fairly strong relationship between the knowledge of pregnant mothers and the status of Covid-19 vaccination at the Bali Mandara Regional General Hospital, evidenced by the Kendalls Tau-b statistical test which shows a positive relationship, namely the good the level of knowledge of pregnant mothers about Covid-19 vaccination, the greater the tendency to follow the booster vaccine. There is a significant relationship between the attitude of pregnant mothers and the status of the Covid-19 vaccine in pregnant mothers at the Bali Mandara Regional General Hospital as evidenced by the Chi Square statistical test which shows that pregnant mothers who have a positive attitude about Covid-19 vaccination are potentially more likely to take further vaccines (boosters) than pregnant mothers who have a negative attitude (unfavourable)).

Conflict of Interest

No potential conflicts of interest were reported by the authors.

Acknowledgment

Praise especially for the presence of God Almighty for the blessing of His mercy, the author was able to complete a thesis entitled "The Relationship Between Knowledge and Attitudes of Pregnant Mothers About Covid-19 Vaccination with *Covid-19* Vaccine Status in Pregnant Mothers" which was held at Bali Mandara Hospital on time. This thesis is prepared in order to meet one requirement in completing the thesis course in the Bachelor of Applied Midwifery study program.

The author realizes that this thesis still has shortcomings, for that the author really hopes for input so that this thesis becomes better. Hopefully this thesis can provide benefits to all parties.

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