Original Article

Knowledge and stress level in pregnant women: A cross-sectional study during the COVID-19 pandemic

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ABSTRACT

Introduction: Pregnant women are vulnerable to COVID-19 due to weakened immunity, leading to heightened stress amidst uncertainties about its impact. Research indicates increased levels of depression, stress, and anxiety in pregnant women since the pandemic declaration. This study explores the link between COVID-19 knowledge and stress levels among pregnant women.

Methods: Data collection involved the administration of a questionnaire addressing COVID-19 knowledge and stress levels. A total of 255 respondents voluntarily participated in the study. Quantitative methods were utilized, employing a descriptive correlation design within a cross-sectional approach. The accidental sampling technique was used to select participants.

Results: Univariate analysis results obtained 78.4% have a good knowledge, and 40.4% experienced moderate stress levels. Bivariate analysis using the Spearman rank indicated a relationship between knowledge and stress levels (*P*-value <0.001, r 0.732).

Conclusions: The study proposes that hospitals implement an educational approach using online seminars, audiovisual materials, and free telemedicine services to facilitate training and counseling on stress management and adaptive coping strategies.

Keywords: knowledge; pregnant women; stress level

INTRODUCTION

The World Health Organization officially declared COVID-19 as a global pandemic on March 11, 2020 (Djalante et al., 2020). This novel coronavirus disease, caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has become a significant public health concern worldwide (Li et al., 2020; Lu, Stratton, & Tang, 2020). Like many other countries, Indonesia has been affected by the COVID-19 pandemic, experiencing fluctuations in the number of new cases (Purnamasari & Raharyani, 2020).

As of December 16, 2020, global data indicated that COVID-19 had affected 220 countries, with a confirmed population of 72,196,732 and 1,630,521 reported deaths (Sohrabi et al., 2020). Specifically in Indonesia, the recorded data as of the same date showed 636,154 confirmed cases of COVID-19, resulting in 19,248 deaths. Data in West Java were recorded as of December 16, 2020, which was 69,500 (10.9%), and the number of pregnant women who were positively confirmed was 8.2 % of the 2,391 available data (Satgas, 2020). The number of visits from pregnant women

positively confirmed by COVID-19 in this private hospital during 2020 was recorded as many as 11 people. Pregnant women are particularly vulnerable to COVID-19 infection due to physiological changes that occur during pregnancy, resulting in a partial decrease in immunity. This heightened susceptibility can significantly impact pregnant women's health and well-being (Liang & Acharya, 2020).

Knowledge of the COVID-19 effects during pregnancy continues to grow, and there is little guarantee about the risk of viruses or their impact on the fetus and pregnancy. This makes pregnant women face various stressors during the pandemic. Other stressors related to pandemics are social isolation, declining economic conditions, risks related to the shelter, and rude attitudes in couples (Campbell, 2020). Psychological stress experienced by the mother during pregnancy is stress caused by the events of daily life they experience, known as psychosocial stress. Psychosocial stress is caused by various psychosocial stressors such as family internal problems, life changes, the environment of residence, concerns about economic difficulties, present pregnancy, and workload (Woods, Melville, Guo, Fan, & Gavin, 2010).

The psychological impacts due to the mother's emotional pressure during pregnancy affect the endocrine balance system and adjustment after labor. The psychosocial well-being of pregnant women plays a critical role in maternal health throughout childbirth, postpartum, and the early stages of motherhood (Pieter, 2018). Amid the COVID-19 pandemic, pregnant women are facing heightened psychological stress levels, ranging from moderate to severe (Saccone et al., 2020). Research conducted by Saccone et al. (2020) revealed that a significant proportion of pregnant women expressed

heightened concerns regarding the potential vertical transmission of COVID-19 to their unborn babies.

As elucidated, safeguarding pregnant women and their fetuses from COVID-19 infections is imperative (Purwaningsih, 2020). This necessitates equipping women with virus prevention and transmission mitigation strategies (Anikwe, Ogah, Anikwe, Okorochukwu, & Ikeoha, 2020. The important platform in action and decision-making is knowledge. A well-informed person will apply their knowledge daily (Aritonang, Nugraeny, & Siregar, 2020). Perwitasari's (2016) research suggested that individuals with higher levels of education tend to acquire more knowledge, enabling them to better cope with stressors they encounter (Perwitasari, 2016).

The COVID-19 pandemic has led to widespread restrictions on routine services, affecting access and quality across various sectors, including maternal health services. These restrictions have resulted in reduced frequency of prenatal examinations and delays in care for pregnant women. Consequently, pregnant women may experience heightened psychological distress. Research indicates that depressive symptoms and stress levels among pregnant women have increased post-COVID-19 declaration compared to pre-declaration levels, with some individuals exhibiting a propensity toward self-harm (Wu et al., 2020). Indeed, the challenges and disruptions caused by the COVID-19 pandemic can potentially lead to dangerous conditions during pregnancy, ultimately impacting both the mother and fetus (Durankuş & Aksu, 2022). Given this phenomenon, researchers have shown interest in exploring the relationship between pregnant women's knowledge about COVID-19 and their stress levels during this challenging period.

METHODS

Design

This research adopts a quantitative methodology, employing a descriptive design study with a cross-sectional approach. In the cross-sectional approach, observations are conducted to assess multiple variables simultaneously. The study focuses on two main variables: knowledge about COVID-19 and stress levels among pregnant women.

Sample and Setting

The population for this study comprises all expectant pregnant women attending prenatal clinics at a specific private hospital in Bandung. Utilizing the Yamane calculation method, a minimum sample size of 255 individuals was determined. The inclusion criteria encompassed pregnant women in all trimesters (I, II, and III), while those with a history of depression or mental disorders, as well as those with disease complications, were excluded. Incidental sampling was employed, whereby expectant pregnant women present at the research site and meeting the inclusion criteria were included as participants in the study.

Variables

In this study, stress levels among pregnant women are the dependent variable, meaning they are the outcome or response that is being measured. On the other hand, knowledge about COVID-19 is the independent variable, meaning it is the factor that researchers manipulate or control in the study.

Instruments

A self-administered questionnaire included demographic information, knowledge levels, and stress levels. The demographic information included in this part of the questionnaire is age, gestational age, and level of education. The first questionnaire assessed knowledge of COVID-19, including understanding causes, symptoms, methods of contagion, COVID-19 prevention, and the effect of COVID-19 on pregnant women. The questionnaire was adopted from a previous study in 2020 consisting of 12 statement items, with the researcher obtaining permission to add 20 statement items (Dewi, Widowati, & Indrayani, 2020).

This questionnaire uses the Guttman scale for positive statements to be given a one if yes and 0 if not, instead of 1 if not and 0 if yes. Then, validity tests obtained three invalid items, so that a total of 17 statement items were used in research. The reliability test indicated overall consistency, with a reliability score of 0.859, suggesting that the questionnaire is reliable. Regarding the scoring for knowledge, it was categorized as follows: good (76-100%), moderate (56-75%), and poor (<56%).

The stress level was assessed using the Pandemic-Related Pregnancy Stress Scale (PREPS), a questionnaire with established validity and reliability. During validity testing, two out of the 17 statements were found to have a significance level of > 0.05, indicating that both items were omitted from the instrument. The reliability test showed overall consistency and reliability test of instrument answer scores for knowledge level instruments of 0.859 and stress level instruments of 0.908. It can be concluded that both instruments studied are reliable.

Data Analysis

The data analysis comprised frequency distributions for univariate analysis and bivariate analysis using Spearman's rho with a confidence level of 95% (α=0.05). A p-value < 0.05 indicates a significant relationship between the variables.

Ethical Considerations

This research has received ethical approval from Sub-committee of Research Ethics in Santo Borromeus Hospital's Health Research with letter No. 042/KEPK/XII/2020. The researcher provided an explanation about the study's purpose and then asked participants a yes-no question to confirm their voluntary willingness to participate. Pregnant women who agreed to take part in the study were requested to sign a consent form.

RESULTS

Table 1 shows the results of 92.16% of respondents aged 20-35 years, 86.7% of respondents have a recent college education, 41.6% are in the third trimester, with a mortality status of 51.4%, and 98.8% have no history of being diagnosed with COVID-19. Moreover, the result shows 78.4% of respondents' knowledge in the good category, while the stress level in the medium category is 40.4%.

The bivariate analysis results revealed a *P*-value of <0.05, indicating a statistically significant relationship between knowledge and the stress levels of pregnant women during the COVID-19 pandemic at the prenatal clinic of a private hospital in Bandung (Table 2).

Table 1. Distribution of Demographic Data, Independent, and Dependent Variables (n=110)

Characteristics	n	%
Age		
<20 years old	1	0.4
20-35 years old	235	92.2
>35 years old	19	7.4
Education		
Elementary school	0	0
Junior high school	1	0.4
Senior high school	3	12.9
Higher education	221	86.7
Gestational age		
1st trimester	63	24.7
2nd trimester	86	33.7
3rd trimester	106	41.6
Parity status		
Primipara	131	51.4
Multipara	124	48.6
COVID diagnosed		
Yes	3	1.2
No	252	98.8
Knowledge		
Good	200	78.4
Moderate	39	15.3
Poor	16	6.3
Stress levels		
High	100	39.2
Moderate	103	40.4
Low	52	20.4

Table 2. Relationship between Knowledge and Level of Stress in Pregnant Women regarding COVID-19

Spearman's rho	Stress level
Knowlede	
Correlation Coefficient	0.732
P-value	<0.001

DISCUSSION

This study revealed that most respondents (78.4%) possessed good knowledge about COVID-19. Education, environment, and experience are key factors influencing knowledge acquisition. Education level, in particular, significantly impacts individuals' responsiveness and understanding of new information. Research suggests that individuals with higher education levels tend to have higher acceptance rates and better understanding of new concepts than those with lower education levels (Corneles & Losu, 2015). In this study, most respondents (86.7%) had higher education levels, which correlates with a higher degree of knowledge and precision in attitude and behavior.

Education profoundly influences various aspects, including thought processes, willpower, attitudes, and behaviors (Maramis, Ismanto, & Babakal, 2013). Additionally, higher education levels equip individuals with better coping mechanisms to manage stress than those with lower education levels (Fitriani, 2019). Thus, education is crucial in enhancing knowledge acquisition and shaping individuals' actions and problem-solving abilities. Consequently, educated individuals tend to be more open to new ideas and information.

Another factor is aging, which is an internal factor affecting knowledge. This study found that almost all respondents, or 92.2%, were aged 20-35 (Table 1). Previous research obtained that the age of 20-35, called the productive age, which counts into the early adult stage, is the peak of prime physical condition. Thus, age affects memory and mindset (Apriani, Putri, & Widiasari, 2022). The older the degree of maturity and strength a person is in thinking and working in terms of trust in a mature society, the more likely to trust a person who is not yet mature enough (Sulastri, 2016).

Research conducted at the Casa Medika Clinic in Bandung found that 75% of pregnant women had good knowledge about preventing COVID-19 (Dewi et al., 2020). Conversely, a quick survey from another study indicated that 60% of mothers lacked knowledge about preventing COVID-19 transmission during pregnancy (Mulyani, Sulastri, Hidayati, & Mujahidah, 2020). However, Aritonang's (2020) study showed that respondents had good knowledge regarding COVID-19 transmission and prevention during pregnancy, as well as the proper use of masks. Furthermore, there was a 50% increase in knowledge following health education interventions (Aritonang et al., 2020). These varying results underscore the importance of tailored health education interventions to improve knowledge levels among pregnant women regarding COVID-19 prevention and transmission during pregnancy.

A total of 40.4% of respondents had a stress level in the moderate category. Stress is a more specific response than anxiety. Prenatal exposure to unpredictable or chronic stressors, such as adverse life events, natural disasters, or social pressures, has been shown to impact pregnant women's stress response. During the COVID-19 pandemic, pregnant women experience stress due to factors like limited access to healthcare services, economic challenges, and anxiety related to the pandemic (Taubman–Ben-Ari, Chasson, Abu Sharkia, & Weiss, 2020; Wulandari, Melina, Kuswanti, Rosyad, & Rias, 2020). Depending on the timing of stress exposure during life stages, exposure to highly stressful or traumatic events can significantly affect limbic structures, including the amygdala, and result in alterations in social and affective behaviors (Mañas-Ojeda, Ros-Bernal, Olucha-Bordonau, & Castillo-Gómez, 2020). An individual's ability to cope with stress is influenced by several intrinsic factors, including age, as well as characteristics of the stressor, such as its duration, intensity, and unpredictability (Bale & Epperson, 2015).

The prenatal period is one of those that ranges from stress exposure. Other research statements stated that in Indonesia, 64.4% of pregnant women experience severe stress and have a chance of delivery in less than a month (Fitriah, Saputri, & Marlin, 2022). Exposure to stress during pregnancy can have a profound impact on fetal brain development and increase the risk of offspring developing mental health disorders. Prenatal stress refers to the stress experienced by mothers during the gestational period, which can adversely affect the health and development of the offspring (Coussons-Read, 2013).

Furthermore, this study identified a correlation between the level of knowledge and stress among pregnant women during the pandemic. This finding aligns with existing literature suggesting a strong association between knowledge and stress levels. A previous study stated most respondents (78.4%) had good knowledge, and most (40.4%) had moderate stress levels. Another study highlighted that the high mortality rate of mothers and babies in Indonesia can be attributed to pregnant women's lack of knowledge about pregnancy-related issues, leading to difficulties in addressing discomforts. Low knowledge levels can predispose individuals to experience stress more easily, as ignorance about a topic can be perceived as a pressure that may lead to crises (Mubasyiroh, Tejayanti, & Senewe, 2016).

In the current study, analysis of the questionnaire revealed that 34.1% of respondents expressed concerns that a COVID-19 infection could negatively impact their baby's health. It is further explained that pregnant women are irritable and irritable, restless, unable to concentrate, have doubts, and even the possibility of wanting to run away from the realities of life (Rahmi, 2010).

Various factors can influence pregnant women's psychology, including their education level, employment status, income, number of children, parity, social isolation, and resilience factors such as social activity, social support, and spousal support. Research indicates that pregnant women in the third trimester tend to exhibit a positive attitude toward preventing COVID-19, often influenced by good knowledge about the virus. This knowledge empowers pregnant women to maintain a positive outlook and confidence in managing COVID-19 effectively (Dewi et al., 2020).

In this study, most mothers were multiparous, meaning they had previous childbirth experiences. For multiparous mothers, physical changes, hormonal fluctuations, childbirth events, and baby care are typically considered experiences they should be able to adapt to. However, for primiparous mothers experiencing these changes for the first time, it can be a source of significant stress (Setiawati & Purnamawati, 2020). The level of knowledge is closely linked to the pregnant women's stress level during pandemic. Educational background, gestational age, and parity are factors that influence the level of knowledge, subsequently affecting the stress levels in pregnant women. Additionally, external factors such as changes in family health conditions and economic status also play a role in influencing the stress levels of pregnant women during the COVID-19 pandemic.

Limitations of the study included that the assessment of stress levels was conducted only once rather than through repetitive measurements over time. Mood conditions can fluctuate and may influence individuals' responses to stress, potentially affecting the accuracy of their reported stress levels. Therefore, future research may benefit from longitudinal or repeated measures to better capture changes in stress levels over time and minimize the influence of mood fluctuations. Moreover, this study design was cross-sectional with an incidental sampling in one private hospital. The results cannot be generalized to the patients in other settings like the community. Despite these limitations, the results of this study do have implications for screening knowledge and the level of stress among pregnant women. Further research needs to assess the level of stress and associated factors with a longitudinal approach and develop interventions to improve knowledge and stress management in pregnant women.

CONCLUSION

This study's findings revealed that most pregnant women had good knowledge about COVID-19, and respondents reported experiencing moderate levels of stress related to the pandemic. Furthermore, a significant relationship was identified between knowledge levels and stress levels among pregnant women during the COVID-19 pandemic.

These results have important implications for healthcare providers and hospitals, suggesting the need for targeted educational interventions to enhance pregnant women's knowledge about preventing COVID-19 transmission and promoting overall health during pregnancy. Implementing educational methods such as online seminars, audiovisual presentations, and telemedicine consultations could effectively disseminate information and support pregnant women in managing stress and maintaining their health during this challenging time.

Declaration of Interest

The authors have disclosed that they have no conflicts of

interest.

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