| Research Article |

The Anxiety Level and Premature Rupture of Membrane Incidence during COVID-19 Pandemic

Tingkat Kecemasan dan Kejadian Ketuban Pecah Dini pada Masa Pandemi COVID-19

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Abstract

Objective: To determine the association between anxiety level and premature rupture of membrane incidence during COVID-19 pandemic.

Methods: This study was a case-control study. The subjects of this study were patients giving birth at RSUD Dr. Moewardi Surakarta Hospital and UNS Sukoharjo Hospital in June - October 2021. Sampling was done by the purposive sampling technique on 70 samples. Data were analyzed using the chi-square test and logistic regression test.

Results: Characteristic data of the study samples found that most of the study samples was severe anxiety (40%). There was a significant association between the level of anxiety with PROM incident (p = 0.00), and pregnant women with severe anxiety had a risk of PROM of 3.761 times compared to pregnant women who were not anxious (OR=3.761). In multivariate analysis, it was found that the most influential variable on the incidence of premature rupture of membranes was the level of anxiety (p=0.001) compared to parity (p=0.155), employment status (0.193), and education level (0.576).

Conclusion: There was a significant association between anxiety level and premature rupture of membranes incidence during the COVID-19 pandemic, and there was an increased risk of premature rupture of membranes in pregnant women with severe anxiety levels during the COVID-19 pandemic.

Keywords: anxiety level, COVID-19 pandemic, premature rupture of membrane.

Abstrak

Tujuan: Mengetahui hubungan antara tingkat kecemasan dan kejadian ketuban pecah dini pada masa pandemi COVID-19.

***Metode:** Penelitian ini menggunakan pendekatan kasus kontrol. Subjek penelitian ini adalah pasien bersalin di RSUD Dr. Moewardi Surakarta dan RS UNS Sukoharjo pada bulan Juni hingga Oktober 2021. Pengambilan sampel dilakukan dengan menetapkan kriteria khusus pada 70 sampel. Data dianalisis dengan uji chi-square dan regresi logistik.*

***Hasil:** Pada data karakteristik sampel penelitian ditemukan tingkat kecemasan terbanyak pada sampel penelitian adalah kecemasan berat (40%). Terdapat hubungan yang bermakna antara tingkat kecemasan pada ibu hamil dengan kejadian ketuban pecah dini pada masa pandemi COVID 19 (p=0,00) dan pada ibu dengan kecemasan berat memiliki risiko terjadinya ketuban pecah dini 3,761 kali dibandingkan ibu hamil yang tidak cemas (OR=3,761). Pada analisis multivariat didapatkan bahwa variabel yang paling berpengaruh terhadap kejadian ketuban pecah dini adalah tingkat kecemasan (p=0,001) dibandingkan dengan variabel paritas (p=0,155), status pekerjaan (0,193), dan tingkat pendidikan (0,576).*

***Kesimpulan:** Terdapat hubungan yang signifikan antara tingkat kecemasan ibu hamil dan kejadian ketuban pecah dini di masa pandemi COVID-19 dan terdapat peningkatan risiko kejadian ketuban pecah dini pada ibu hamil dengan tingkat kecemasan berat pada masa pandemi COVID-19.*

***Kata kunci:** ketuban pecah dini, pandemi COVID-19, tingkat kecemasan.*

INTRODUCTION

COVID-19 pandemic trigger anxiety for pregnant women. Several circumstances cause this anxiety, such as the fact that COVID-19 is a new disease, the fear of being infected with COVID-19, the implementation of restrictions on community activities (PPKM) policy that causes saturation, and much misinformation circulating about COVID-19[1,2]. Anxiety is a condition that is quite common among pregnant women. Pregnant women report anxiety symptoms, such as excessive worry, nervousness, and agitation, in approximately 21 to 25% of cases[3]. According to an Italian study involving 100 pregnant women during COVID-19, 53% suffered severe psychological effects. About two-thirds of respondents experienced excessive anxietys[4].

There are approximately 358,000 maternal deaths occurring worldwide every year, with 99% occurring in poor countries and 67% occurring in developing countries such as Indonesia[5]. Indonesia's Badan Pusat Statistik states there were 359 maternal deaths per 100,000 births, and 32 infant deaths per 1,000 births. Among infants who died within one month of age, 40% of cases experienced complications during delivery, including prolonged labour by 28%, rupture of amniotic fluid less than six hours before delivery by 14%, and excessive bleeding by 9%[6]. In Surakarta, the maternal mortality rate in 2018 was 41.61 per 100,000 births, and the infant mortality rate was 3.43 per thousand births, according to Dinas Kesehatan Kota Surakarta. In the 33 infant deaths, 19 infant deaths occurred in the neonatal period, and 14 deaths occurred in the post-neonatal period[7]

PROM refers to the rupture of the amniotic membrane before the delivery process occurs. Approximately 5%-10% of PROM of all pregnancies, with 80% occurring at term8. PROM affects 19.53 % of pregnancy outcomes in China and 5%-7.6 % in Indonesia[8,9]. The risk of morbidity and mortality will be more significant for the fetus and mother when preterm PROM occurs far from term[10].

During the COVID-19 pandemic, pregnant women's mental health will be significantly affected. Many pregnant women have prenatal anxiety and depression[11]. Anxiety disorders can be associated with HPA-axis hyperactivity, increasing cortisol levels, and triggering uterine contractions to cause PROM[12,13].

Based on the description above, pregnant women who are anxious are at a greater risk of experiencing premature rupture of membranes. Anxiety can increase uterine contractions, and one of the causes of premature rupture of membranes is increased uterine contractions. Therefore, this study was intended to examine and analyze the increased risk of premature rupture of membranes in pregnant women with severe anxiety levels during the COVID-19 pandemic.

METHODS

This study was a case-control study. The subjects of this study were all patients who gave birth at Dr. Moewardi Surakarta Hospital and UNS Sukoharjo Hospital in June – October 2021. Samples were collected by purposive sampling by distributing a modified PASS (Perinatal Anxiety Screening Scale) questionnaire that had passed the validation stage. The total population were 70 patients, divided into two groups: 35 patients with PROM and 35 patients without PROM.

The inclusion criteria were pregnant women with a desired pregnancy, pregnant women with intra-amniotic infection, aged over 20 years, and willing to be a research subject. The exclusion criteria were pregnant women with multiple pregnancies, polyhydramnios, and cervical incompetence. Data were analyzed using the chi-square test and logistic regression test. This study has been registered with the ethical clearance number 628/V/HREC/2021.

RESULTS

From the results of research conducted, there are several distributions of subjects. Data obtained from PROM and no PROM patients are 35 people (50%). The highest anxiety level experienced by the research sample was severe anxiety, which amounted to 38 people (40%). The highest parity of the research sample was nullipara, which amounted to 32 people (45.7%). In terms of employment status, 28 people (40%) did not work and 42 people (60%) worked. Most of the sample's education levels were graduated high school/vocational high school, which amounted to 39 people (55.7%).

Table 1. The Characteristics of Study Samples

Characteristic	Frequency	%
PROM Incident		
No PROM	35	50
PROM	35	50
Anxiety Level		
No Anxiety	24	34.3
Mild-moderate anxiety	18	25.7
Severe anxiety	38	40
Parity		
Nulliparous	32	45.7
Primiparous	18	25.7
Multiparous	20	28.6
Employment status		
Not work	28	40
Work	42	60
Education Level		
Elementary school	3	4.3
Junior high school	7	10
High school/vocational high school	39	55.7
University	21	30

Bivariate Analysis

The bivariate analysis used in this study was the chi-square test and the odds ratio. Based on Table 2, pregnant women who are not anxious are 19 people (79.17%) in non-PROM and 5 people (20.83%) in PROM. There are 6 people (17.65%) in non-PROM and 28 people (82.35%) in PROM in pregnant women with severe anxiety. There is a significant association between the level of anxiety with PROM incident (p = 0.00), and pregnant women with severe anxiety had a risk of PROM of 3.761 times compared to pregnant women who were not anxious.

In the parity variable, nulliparous pregnant women were 10 people (31.25%) in non-PROM and 22 people (68.75%) in PROM. There were 14 pregnant women who were multiparous (70%) in non-PROM and 6 (30%) in PROM. Parity did not have a significant association with PROM incidence (p = 0.14) and multiparous pregnant women had a 0.427 times risk of PROM compared to nulliparous pregnant women.

In the employment status variable, 16 pregnant women (57.14%) do not work in non-PROM and 12 pregnant women do not work (42.86%) in PROM. There were 19 people (45.23%) who worked in non-PROM and 23 people (54.77%) in PROM. Employment status did not have a significant association with PROM incidence (p = 0.329), and pregnant women who worked had a risk of developing PROM by 1.614 times compared to pregnant women who did not work.

In the education level variable, pregnant women who graduated from SMA/SMK were 13 people (33.33%) in non-PROM and 26 people (66.67%) at PROM. Pregnant women who graduated from university amounted to 13 people (61.9%) in non-PROM and 8 people (38.1%) in PROM. Education level had a significant association with PROM incidence (p = 0.007), and pregnant women who graduated from college had a risk of developing PROM by 1.367 times compared to pregnant women who graduated from elementary school.

Table 2. Results of Bivariate Analysis

Variable	PROM Incident		*P-value*	OR
	No PROM %	**PROM** %		
Anxiety Level				
No Anxiety	19 (79.17)	5 (20.83)		
Mild-moderate anxiety	10 (55.6)	8 (44.4)	0.00	3.761
Severe anxiety	6 (17.65)	28 (82.35)		
Parity				
Nulliparous	10 (31.25)	22 (68.75)		
Primiparous	11 (61.1)	7 (38.9)	0.14	0.427
Multiparous	14 (70)	6 (30)		
Employment Status				
Not work	16 (57.14)	12 (42.86)	0.329	1.614
Work	19 (45.23)	23 (54.77)		
Education Level				
Elementary school	3 (100)	0 (0.0)		
Junior high school	6 (85.71)	1 (14.29)	0.007	1.367
High school / vocational high school	13 (33.33)	26 (66.67)		
University	13 (61.9)	8 (38.1)		

Multivariate Analysis

Multivariate analysis in this study used a logistic regression test. Based on the results of Table 3, it was found that the variable that had a significant association with the incidence of PROM was the level of anxiety (p = 0.001), and pregnant women with severe anxiety levels had a risk of PROM incidence of 3.53 times compared to pregnant women who were not anxious. While the variables parity, employment status, and education level did not have a significant association with the incidence of PROM (p > 0.05).

Table 3. Results of Multivariate Analysis

Variable	OR (95% CI)	P-value
Anxiety Level	3.535 (1.698 – 7.358)	0.001
Parity	0.589 (0.284 – 1.222)	0.155
Employment Status	2,226 (0.668 – 7.418)	0.193
Education Level	0.795 (0.356 – 1.776)	0.576

DISCUSSION

According to the bivariate analysis in this study, anxiety level was significantly associated with PROM (p = 0.00), and pregnant women with severe anxiety were more likely to develop PROM by 3.761 times than pregnant women without anxiety. The results of this study were matched with research who examined 72 pregnant women and found that psychosocial stress was significantly associated with the incidence of PROM (p = 0.018)[14]. In addition, research by examining 40 pregnant women also found a significant association between anxiety levels and the incidence of PROM at Sultan Agung Islamic Hospital Semarang (p = 0.00)[15].

Anxiety can trigger an increase in cortisol levels which affects the decrease in progesterone and stimulates the emergence of the hormone prostaglandin, which triggers uterine contractions to cause PROM[12,13]. Some of the things that cause anxiety in pregnant women during the COVID-19 pandemic are the fact that COVID-19 is a new disease, fear of being infected with COVID-19 that can harm the fetus, government policies for PPKM that cause saturation, and much misinformation circulating about COVID -19[1,2].

Chronic anxiety is known as a risk factor for infection. Cortisol produced is usually anti-inflammatory and contains an immune response. However, if there is a chronic increase in cortisol, it can cause the immune system to become resistant and increase the production of inflammatory cytokines, which further interfere with the immune response making it easier for infection to occur[16]. Intra-amniotic infection can occur directly or ascend from the vagina or cervix. Ascending bacteria from the vagina and cervix can spread to the uterus and amniotic fluid, causing inflammation and causing PROM[17].

The bivariate analysis results showed that parity did not have a significant association with PROM incidence (p = 0.14), and multiparous pregnant women had a risk of PROM of 0.427 times compared to nulliparous pregnant women. These results were matched with research by examining 100 pregnant women, and the results obtained that parity does not have a significant association with the incidence of PROM (p = 0.377)[18]. In contrast to the research examining 249 pregnant women and the results obtained that parity has a significant association with PROM incidence (p = 0.031)[19]. Pregnant women with multiparous will be more at risk of PROM because there was a disturbance in uterine vascularization, causing the connective tissue of the amniotic membrane to be fragile and can rupture spontaneously[20].

In multiparous, the increased risk of PROM is due to the intrinsic weakening of the uterus, not an increase in uterine activity. Intrinsic weakening of the uterus results from a history of trauma to the cervix, previous vaginal delivery, cervical dilatation, and curettage[19].

According to bivariate analysis, employment status was not associated with the incidence of PROM (p = 0.329). However, pregnant women who work have a PROM risk 1.614 times higher than pregnant women who do not work. Examining 1036 pregnant women, and the results showed that work did not have a significant association with PROM incidence (p = 0.760)[21].

Examining 100 pregnant women, and it was found that work had a significant association with the incidence of PROM (p = 0.023). Pregnant women who work every day to the office is a heavy burden that must be carried out during pregnancy both physically and psychologically so that it can cause increased tension in the uterine muscles and affect the amniotic membranes to become weaker and break easily[18].

Based on the bivariate analysis results, it was found that the level of education had a significant association with the incidence of PROM (p = 0.007). Examining 94 pregnant women, and it was found that the level of education had a significant association with the incidence of PROM (p =

0.007)[22]. However, it does not match the existing theory where the mother's level of education plays a role in seeking information about her pregnancy care and examination to increase the mother's knowledge about her pregnancy. The higher of mother's education, the mother will tend to have greater awareness to maintain health and pregnancy care, both regarding food, activities, hygiene, ANC, pregnancy risk factors, and the first action that must be taken related to danger signs pregnancy[23].

According to this study, pregnant women who graduated from college were 1.367% more likely to develop PROM than pregnant women who graduated from elementary school, contrary to the existing theory. This is due to the uneven distribution of data between pregnant women who graduated from elementary school, graduated from junior high school, graduated from high school/vocational school, and graduated from college.

Based on multivariate analysis, the variable associated with the incidence of PROM was anxiety level (p = 0.001), and pregnant women with severe anxiety had a 3.53 times greater risk of developing PROM than pregnant women without anxiety. Meanwhile, parity, employment status, and education level did not significantly affect the incidence of PROM (p > 0.05). As can be concluded from the study, the most influential variable was anxiety level.

CONCLUSIONS

There is a significant association between anxiety level and premature rupture of membranes incidence during the COVID-19 pandemic, and there is an increased risk of premature rupture of membranes in pregnant women with severe anxiety levels during the COVID-19 pandemic.

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