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The Association Between Maternal Age and Parity and the Incidence of Prolonged Labor

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Abstract

Background: Prolonged labor is one of the most common complications experienced by women during childbirth and remains a significant contributor to maternal and neonatal morbidity. Globally, prolonged labor is estimated to occur in approximately 17% of all deliveries, with nearly 70% of these cases requiring medical interventions such as cesarean section. In Indonesia, the incidence of prolonged labor is estimated at around 9% of all deliveries. Maternal factors such as age and parity are considered important determinants influencing labor outcomes. Therefore, identifying the relationship between these factors and prolonged labor is essential to improve maternal health services. This study aimed to determine the association between maternal age and parity and the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024. **Methods:** This study employed an analytic approach using a cross-sectional design. The population consisted of mothers who delivered at the Kassi-Kassi Community Health Center in 2024. A total of 23 mothers were selected as the study sample using probability (random) sampling techniques. Data were analyzed using the chi-square test to examine the relationship between maternal age and parity with the incidence of prolonged labor. A significance level of $p < 0.05$ was applied. **Results:** The analysis showed a significant association between maternal age and the incidence of prolonged labor ($p = 0.001$; $p < 0.05$). Additionally, maternal parity was significantly associated with prolonged labor ($p = 0.002$; $p < 0.05$). These findings indicate that both maternal age and parity are important factors related to the occurrence of prolonged labor at the Kassi-Kassi Community Health Center. **Conclusion:** Maternal age and parity are significantly associated with the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024. Strengthening maternal care services, particularly through closer monitoring of high-risk pregnant women, is recommended to reduce the occurrence of prolonged labor and improve maternal health outcomes.

Keywords: Maternal age; Parity; Prolonged labor; Obstetric complications; Maternal health.

1. Introduction

Childbirth is a physiological process marking the completion of pregnancy; however, it may be accompanied by complications that increase the risk of maternal and neonatal morbidity. One of the most common complications is prolonged labor, also known as dystocia, which is characterized by delayed or ineffective labor progression. Prolonged labor may result from inadequate uterine contractions, cephalopelvic disproportion, fetal malposition, or other maternal and fetal factors that interfere with the normal process of delivery. If not properly managed, prolonged labor can lead to adverse outcomes, including maternal exhaustion, postpartum hemorrhage, infection, fetal distress, and increased likelihood of operative delivery.

According to the World Health Organization (WHO, 2019), approximately 17% of deliveries worldwide experience prolonged labor, and nearly 70% of these cases require medical interventions such as cesarean section. In Indonesia, the incidence of prolonged labor is estimated at around 9% of all deliveries (Ministry of Health Republic of Indonesia, 2021). These figures indicate that prolonged labor remains a significant public health concern, particularly in developing countries where access to comprehensive obstetric care may be limited.

Several maternal factors have been identified as determinants of prolonged labor, including maternal age and parity. Women younger than 20 years or older than 35 years are considered at higher risk due to biological immaturity or age-related reproductive changes that may affect uterine efficiency and pelvic adequacy. Similarly, parity influences labor progression; primiparous women may experience longer labor due to untested birth canals, whereas high parity may be associated with uterine muscle fatigue or other complications (Prawirohardjo, 2018). Understanding the contribution of these maternal characteristics is essential for early risk identification and prevention strategies.

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Data from the Kassi-Kassi Community Health Center in 2022 reported 123 deliveries, with 10 cases of prolonged labor recorded. Previous research by Lubis and Sugiarti (2019) also demonstrated significant associations between maternal age, parity, and the incidence of prolonged labor. Given these findings, further investigation is needed to assess whether similar patterns are observed in recent local data.

Therefore, this study aims to analyze the association between maternal age and parity and the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024. The results are expected to provide evidence to support risk-based maternal care and contribute to efforts to reduce labor complications and improve maternal health outcomes.

2. Materials and Methods

Study Design

This study employed an analytic cross-sectional design to examine the association between maternal age and parity and the incidence of prolonged labor. In a cross-sectional study, both independent variables (maternal age and parity) and the dependent variable (prolonged labor) are measured simultaneously at a single point in time, allowing for assessment of relationships between variables without follow-up observation.

Population and Sample

The study population comprised all mothers who delivered at the Kassi-Kassi Community Health Center and were recorded in the delivery register between 2023 and 2024. The study sample consisted of mothers who met the inclusion criteria and delivered at the health center during the study period. Sample selection was conducted using probability sampling with a simple random sampling technique. In this method, each eligible subject in the population had an equal probability of being selected. The sampling process was carried out through random selection to avoid selection bias and ensure representativeness. The minimum sample size was calculated using the Slovin formula to determine the required number of respondents based on the total population and acceptable margin of error. Mothers who met the inclusion criteria and had complete medical record data were included in the final analysis..

3. Results

Respondent Characteristics

a. Characteristics of Respondents Based on Age

The distribution of respondents by age can be seen in the following table:

Table 1. Distribution of Respondents by Maternal Age at Kassi-Kassi Community Health Center

No	Age (Years)	n	%
1	< 20	6	26.1
2	20–35	8	34.8
3	> 35	9	39.1
Total		**23**	**100**

Source: Primary Data, 2024

Table 1 shows that out of 23 respondents, the largest proportion was in the >35 years age category, totaling 9 respondents (39.1%), while the smallest proportion was in the <20 years category, totaling 6 respondents (26.1%).

b. Characteristics of Respondents Based on Education

The distribution of respondents by education level can be seen in the following table:

Table 2. Distribution of Respondents by Educational Level of Mothers in Labor at Kassi-Kassi Community Health Center

No	Education Level	n	%
1	Elementary School	4	17.4
2	Junior High School	7	30.4
3	Senior High School	7	30.4
4	Bachelor's Degree	5	21.7
Total		**23**	**100**

Source: Primary Data, 2024

Table 5 shows that out of 23 respondents, the largest proportion had Senior High School and Junior High School education, each with 7 respondents (30.4%), while the smallest proportion had Elementary School education, totaling 4 respondents (17.4%).

Univariate Analysis

a. Prolonged Labor

The distribution of prolonged labor cases at the Kassi-Kassi Community Health Center can be seen in the following table:

Table 3. Distribution of Prolonged Labor at Kassi-Kassi Community Health Center

No	Prolonged Labor	n	%
1	Yes	14	60.9
2	No	9	39.1
Total		**23**	**100**

Source: Primary Data, 2024

Table 3 shows that out of 23 respondents, 14 respondents (60.9%) experienced prolonged labor, while 9 respondents (39.1%) did not experience prolonged labor.

b. Age

The distribution of maternal age in relation to the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024 can be seen in the following table:

Table 4. Distribution of Maternal Age and the Incidence of Prolonged Labor at Kassi-Kassi Community Health Center in 2024

No	Age Category	n	%
1	At Risk	15	65.2
2	Not at Risk	8	34.8
Total		**23**	**100**

Source: Primary Data, 2024

Table 4 shows that out of 23 respondents, 15 mothers (65.2%) were in the at-risk age category, while 8 mothers (34.8%) were in the not-at-risk category.

c. Parity

The distribution of maternal parity in relation to the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024 can be seen in the following table:

Table 5. Distribution of Maternal Parity and the Incidence of Prolonged Labor at Kassi-Kassi Community Health Center in 2024

No	Parity Category	n	%
1	At Risk	14	60.9
2	Not at Risk	9	39.1
Total		**23**	**100**

Source: Primary Data, 2024

Table 5shows that out of 23 respondents, 14 mothers (60.9%) had at-risk parity, while 9 mothers (39.1%) had non-risk parity.

Bivariate Analysis

a. The Relationship Between Maternal Age and the Incidence of Prolonged Labor at Kassi-Kassi Community Health Center

The distribution of the relationship between maternal age and the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024 is shown in the following table:

Table 6. Relationship Between Maternal Age and the Incidence of Prolonged Labor at Kassi-Kassi Community Health Center in 2024

AGE	Prolonged Labour				Total		ρvalue ϕ	α
	Yes		No					
	N	%	n		n	%		
At Risk	13	56,5	2	8,7	15	65,2	0,001	
Not At Risk	1	4,3	7	30,4	8	34,8	Φ =	0,05
Total	14	60,9	9	39,1	23	23	0,724	

Table 6 shows that out of 23 respondents, there were 15 mothers in the at-risk age group and 8 mothers in the non-risk age group. Among the at-risk group, 13 mothers (56.5%) experienced prolonged labor, while 2 mothers (8.7%) did not. Among the non-risk group, 1 mother (4.3%) experienced prolonged labor, while 7 mothers (30.4%) did not.

Based on the Chi-square statistical test, the obtained p-value = 0.001 ($p < 0.05$), indicating that H_o is rejected and H_a is accepted, meaning there is a significant relationship between maternal age and the incidence of prolonged labor at the Kassi-Kassi Community Health Center at a 95% confidence level ($\alpha = 0.05$). The phi coefficient ($\phi = 0.724$) indicates a strong correlation between maternal age and the incidence of prolonged labor.

b. The Relationship Between Parity and the Incidence of Prolonged Labor at Kassi-Kassi Community Health Center in 2024

The distribution of the relationship between parity and the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024 is shown in the following table:

Table 7. Relationship Between Parity and the Incidence of Prolonged Labor at Kassi-Kassi Community Health Center in 2024

Parity	Prolonged Labour				Total		ρvalue ϕ	α
	Yes		No					
	N	%	n		n	%		
At Risk	12	52,2	2	8,7	14	60,9	0,001	
Not At Risk	2	8,7	7	30,4	9	39,1	Φ =	0,05
Total	14	60,9	9	39,1	23	100	0,635	

Source: Primary Data, 2024 – Chi-Square Test

Table 7 shows that out of 23 respondents, 14 mothers had at-risk parity, and 9 mothers had non-risk parity. Among the at-risk group, 12 mothers (52.2%) experienced prolonged labor, while 2 mothers (8.7%) did not. Among the non-risk group, 2 mothers (8.7%) experienced prolonged labor, while 7 mothers (30.4%) did not.

Based on the Chi-square statistical test, the obtained p-value = 0.002 ($p < 0.05$), meaning H_o is rejected and H_a is accepted, indicating a significant relationship between maternal parity and the incidence of prolonged labor at the Kassi-Kassi Community Health Center at a 95% confidence level ($\alpha = 0.05$). The phi coefficient ($\phi = 0.635$) shows a strong correlation between parity and the incidence of prolonged labor.

4. Discussion

Association Between Maternal Age and Prolonged Labor

The findings of this study demonstrate a statistically significant association between maternal age and the incidence of prolonged labor at the Kassi-Kassi Community Health Center ($\alpha = 0.05$; $\phi = 0.724$), indicating a strong relationship between these variables. A substantial proportion of respondents were classified within the high-risk age group (>35 years), and more than half of them experienced prolonged labor. This suggests that advanced maternal age remains an important determinant of labor complications.

Prolonged labor is commonly defined as labor lasting more than 24 hours in primigravida and more than 18 hours in multigravida (Manuaba, 2019). Biologically, increasing maternal age is associated with reduced uterine muscle elasticity, decreased myometrial contractility, and diminished tissue flexibility of the birth canal. These physiological changes may impair

effective uterine contractions and delay cervical dilation, thereby increasing the likelihood of prolonged labor. In addition, older mothers are more likely to present with comorbidities or obstetric complications that may further hinder labor progression.

The present findings are consistent with previous studies by Rochjati (2018), Damayanti (2018), and Murkoff (2007), which report that maternal age above 35 years significantly increases the risk of obstetric complications, including dystocia and prolonged labor. The strong correlation coefficient observed in this study further supports the hypothesis that maternal age is not merely a demographic characteristic but a clinically relevant risk factor in labor outcomes. Early identification and closer monitoring of pregnancies in advanced maternal age groups are therefore essential to prevent adverse delivery outcomes.

Association Between Parity and Prolonged Labor

This study also identified a significant association between maternal parity and prolonged labor ($\alpha = 0.05$; $\phi = 0.635$), indicating a strong correlation. More than half of mothers categorized within the high-risk parity group experienced prolonged labor. These findings highlight parity as another important maternal determinant influencing labor progression.

Parity refers to the number of previous deliveries a woman has had. According to Prawirohardjo (2017), parity of two to three births is considered optimal in terms of obstetric safety, whereas very low parity (primiparity) or high parity (>3) increases the risk of complications. In primiparous women, prolonged labor may occur due to an untested birth canal, higher anxiety levels, and less efficient uterine contractions. Conversely, high parity may contribute to uterine muscle fatigue or decreased contractile efficiency due to repeated stretching of uterine tissues (Murkoff, 2007).

The findings in this study suggest that prolonged labor tends to occur more frequently among mothers with high-risk parity. This is in line with Manuaba et al. (2019), who explain that prolonged labor in older primiparas or high-parity mothers may be associated with uncoordinated or insufficient uterine contractions that fail to overcome resistance within the birth canal. Thus, both extremes of parity may predispose women to delayed labor progression through different physiological mechanisms. The results underscore that maternal age and parity are interrelated reproductive factors that significantly influence labor dynamics. Identifying women at risk based on these characteristics allows healthcare providers to implement closer monitoring, early intervention strategies, and appropriate referral systems to reduce the incidence of prolonged labor and its associated complications.

5. Conclusions

This study demonstrates that maternal age and parity are significantly associated with the incidence of prolonged labor at the Kassi-Kassi Community Health Center in 2024. Mothers in the high-risk age group (>35 years) and those with high-risk parity were more likely to experience prolonged labor. The strong correlation identified in this study indicates that these maternal characteristics play an important role in influencing labor progression. These findings highlight the importance of early risk identification during antenatal care, particularly among pregnant women with advanced maternal age or high-risk parity. Strengthening monitoring, counseling, and timely referral systems is recommended to reduce the occurrence of prolonged labor and improve maternal and neonatal outcomes.

Conflict of Interest

The authors declare no conflicts of interest.

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