



Research Article

The Relationship Between Maternal Age and Duration of Labor Among Women in Labor at Kotamobagu City General Hospital

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Abstract. Duration of labor is an important indicator in assessing labor progress and is associated with the safety of both the mother and the baby. One factor suspected to influence the duration of labor is maternal age; however, research findings regarding the relationship between the two remain inconsistent. This study aims to analyze the relationship between maternal age and duration of labor among parturients at Kotamobagu City General Hospital. The study employed a quantitative analytical design with a cross-sectional approach. The sample consisted of 50 parturient women selected using total sampling. Data were obtained from medical records using an observation form and were then analyzed univariately and bivariate using the Spearman's Rho test after conducting a normality test. The results showed that the mean maternal age was 26.06 ± 7.05 years, with a mean duration of labor of 8.75 ± 5.69 hours. Bivariate analysis indicated that there was no significant association between maternal age and duration of labor ($p = 0.328$; $r = 0.141$). These findings indicate that the duration of labor is a multifactorial condition influenced not only by maternal age but also by other factors such as parity, fetal condition, the strength of uterine contractions, and labor management. Therefore, comprehensive monitoring of labor progress is necessary through the use of partographs and early detection of obstetric risk factors to support the safety of both mother and baby.

Keywords: Duration of Labor; Labor; Laboring Mothers; Maternal Age; Regional General Hospital.

1. Background

Labor is a physiological process characterized by regular uterine contractions that cause cervical dilation, descent of the fetus, and expulsion of the products of conception through the birth canal. The duration of labor is an important indicator in evaluating labor progress and the safety of both the mother and the baby. According to World Health Organization (WHO) guidelines, labor lasting longer than the normal range is at risk of progressing to prolonged labor—a condition in which labor progress does not align with the physiological curve, thereby increasing the risk of maternal and neonatal complications (World Health Organization [WHO], 2023). The duration of labor is influenced by various factors, including the strength of contractions (power), the condition of the birth canal (passage), the fetus (passenger), the mother's position, psychological factors, and maternal characteristics, including the mother's age (American College of Obstetricians and Gynecologists [ACOG], 2024).

Prolonged labor remains a maternal health issue in many countries. The WHO estimates that approximately 8–10% of births worldwide involve prolonged or obstructed labor, particularly in low- and middle-income countries with limited access to emergency obstetric care (WHO, 2023). This condition contributes to high rates of maternal and neonatal morbidity and mortality by increasing the risk of postpartum hemorrhage, infection, uterine rupture, neonatal asphyxia, and perinatal death (Gedefaw et al., 2021; Say et al., 2019). Furthermore, a WHO report indicates that intrapartum complications, including prolonged labor, remain one of the leading causes of maternal mortality globally, accounting for approximately 287,000 maternal deaths in 2020, with nearly 95% occurring in developing countries (WHO, 2023).

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In Indonesia, prolonged labor remains one of the most common obstetric complications encountered in referral healthcare facilities. The Indonesia Health Profile indicates that labor complications continue to contribute to the high maternal mortality rate, which stood at 189 deaths per 100,000 live births in 2023. Although hemorrhage and hypertension during pregnancy are the primary causes, prolonged labor acts as a predisposing factor that increases the incidence of postpartum hemorrhage, infection, surgical interventions, and neonatal complications (Indonesian Ministry of Health, 2024). Therefore, identifying risk factors for prolonged labor is a crucial component of efforts to improve the quality of obstetric care.

Maternal age is one of the known maternal factors that influence the labor process. Pregnancy at an age younger than 20 years is associated with immature reproductive organs, an underdeveloped pelvis, and low physiological readiness, which may increase the risk of cephalopelvic disproportion and prolonged labor. Conversely, pregnancy at age 35 or older is associated with decreased tissue elasticity, reduced myometrial contractility, an increased prevalence of comorbidities, and obstetric complications that can prolong the labor process (Lean et al., 2017; ACOG, 2024). Thus, both very young and very old reproductive ages constitute high-risk groups for labor complications.

Various studies have shown a relationship between maternal age and the duration of labor. A study by Lean et al. (2017) found that maternal age ≥ 35 years is associated with increased duration of the first and second stages of labor, as well as a higher rate of cesarean section compared to the healthy reproductive age group. A study by Kenny et al. (2019) also reported that older maternal age increases the risk of uterine contraction dysfunction and prolonged labor. In Indonesia, several studies published in accredited national journals have shown that mothers in high-risk age groups (<20 years or >35 years) are more likely to experience prolonged labor compared to mothers of healthy reproductive age (20–35 years), although the magnitude of the risk is also influenced by parity, fetal weight, and the quality of intrapartum care.

Physiologically, prolonged labor leads to increased maternal fatigue, dehydration, electrolyte imbalances, and reduced effectiveness of uterine contractions. These conditions increase the risk of uterine atony, which can result in postpartum hemorrhage, puerperal infection, uterine rupture, and even obstetric shock. In the fetus, prolonged labor causes hypoxia due to prolonged uteroplacental perfusion impairment, thereby increasing the risk of neonatal asphyxia, birth trauma, meconium aspiration, neonatal intensive care, and even perinatal death (WHO, 2023; ACOG, 2024). Therefore, early detection of risk factors associated with prolonged labor is crucial to prevent more severe complications.

Efforts to reduce the incidence of prolonged labor require a comprehensive approach through high-quality antenatal care, screening for maternal risk factors, monitoring labor progress using a partogram, optimizing evidence-based midwifery care, and an effective obstetric referral system. One important aspect of screening is identifying maternal age as a risk factor that can be used to determine the level of vigilance during labor. This information enables healthcare providers to provide more intensive monitoring and make timely clinical decisions to prevent both maternal and neonatal complications (WHO, 2023; FIGO, 2021).

Kotamobagu City General Hospital, as the referral hospital in the Bolaang Mongondow Raya region, receives a wide range of labor cases involving mothers with diverse characteristics, including high-risk reproductive-age women. However, scientific evidence regarding the relationship between maternal age and the duration of labor at this hospital remains limited. Yet, this information is essential as a basis for developing strategies for early detection and risk-factor-based labor management to improve the quality of obstetric care.

Based on the above, this study aims to analyze the relationship between maternal age and duration of labor among women giving birth at the Kotamobagu City General Hospital. The study results are expected to provide a scientific basis for the development of obstetric risk screening, improve the quality of clinical decision-making by healthcare professionals, and support efforts to reduce maternal and neonatal morbidity and mortality through the prevention of prolonged labor.

2. Theoretical Review

The safe reproductive age range for women is 20–35 years. Pregnancy at ages younger than 20 or older than 35 is categorized as high-risk because it is associated with suboptimal reproductive function or a decline in physiological capacity, which can increase the risk of complications during pregnancy and labor. However, the labor process is influenced not only by age but also by the condition of the mother, the fetus, and the quality of obstetric care (ACOG, 2024; Ganchimeg et al., 2014; WHO, 2023).

The duration of labor is an indicator of labor progress influenced by the interaction of uterine contraction strength (power), the condition of the birth canal (passage), the condition of the fetus (passenger), and the mother's psychological state (psyche). Labor lasting longer than the normal limit can increase the risk of postpartum hemorrhage, infection, surgical interventions, and neonatal complications, thus requiring optimal monitoring using a partogram (FIGO, 2021; WHO, 2023; WHO 2025).

Several studies indicate that older mothers are at greater risk of prolonged labor compared to women of healthy reproductive age. However, the duration of labor is multifactorial and is not always influenced by the mother's age. Factors such as parity, fetal size, fetal position, the effectiveness of uterine contractions, and intrapartum management can have a greater impact on the duration of labor. Therefore, this study was conducted to analyze the relationship between maternal age and the duration of labor among women giving birth at the Kotamobagu City General Hospital (Bayrampour & Heaman 2010).

3. Research Methods

This study used a quantitative analytical design with a cross-sectional approach to analyze the relationship between maternal age and the duration of labor in the Delivery Room at Kotamobagu City General Hospital. The study was conducted in 2026 using data from laboring mothers who met the inclusion criteria. Total sampling was used, meaning all data meeting the criteria were analyzed, with a sample size of 50 laboring mothers.

The independent variable was maternal age, categorized into high-risk age groups (<20 years or >35 years) and low-risk age groups (20–35 years). The dependent variable was duration of labor, calculated based on the time interval from the onset of regular contractions until the baby's birth, and then categorized as normal labor or prolonged labor according to obstetric standards. Data were collected using an observation form based on medical records, including respondent characteristics (age, education, occupation), the time of onset of regular contractions, full dilation, time of birth, total duration of labor, and type of delivery.

Univariate analysis was performed to describe the frequency distribution of respondent characteristics, maternal age categories, and duration of labor. Bivariate analysis was then conducted using *Spearman's Rho* test to determine the relationship between maternal age and duration of labor. If any cell had an expected count <5, Fisher's Exact Test was used as an alternative. All analyses used a 95% confidence level with a significance threshold of $p < 0.05$. The study was conducted in accordance with the ethical principles of health research through the implementation of informed consent, confidentiality of respondent identities, and the principles of beneficence, non-maleficence, and justice.

4. Results and Discussion

Table 1. Demographic Data.

	Var	n	F (%)
Method of Delivery	Vaginal	39	78.0
	Cesarean section	11	22.0
Education	Uneducated	0	0
	Elementary school	0	0
	Junior high school	2	4.0
	High school	44	88.0
	College	4	8.0
Employment	Housewife	46	92.0
	Private-sector employee	2	4.0
	Civil servant	1	2.0
Total		50	100

(Source: primary data, 2026)

The demographic profile, which includes delivery method, educational level, and employment status of the 50 respondents who gave birth at the Kotamobagu City General Hospital, is presented in detail in Table 1. Based on Table 1, the vast majority of respondents gave birth vaginally—39 mothers (78.0%)—although the rate of deliveries via cesarean section (C-section) was also significant at 22.0%. Educational background was overwhelmingly dominated by high school graduates (SMA/SMK) at 88.0%. In terms of daily activities, the largest portion of the sample was not formally employed or was classified as a homemaker, totaling 46 mothers (92.0%).

Table 2. Numerical Data.

Var	N	min	max	Mean	SD
Mothers' Age	50	16.00	43.00	26.06	7.05
Duration of labor (hours)	50	0.2	25.50	8.75	5.69

(Source: primary data, 2026)

The distribution of numerical data illustrating the minimum, maximum, mean, and standard deviation (SD) of the variables maternal age and duration of labor is presented in Table 2.

Table 2 shows that the age range of mothers giving birth at the Kotamobagu City General Hospital is very wide, ranging from the youngest at 16 years (high risk of early childbearing) to the oldest at 43 years (high risk of late childbearing), with the mean falling within the healthy reproductive age range at 26.06 years. Meanwhile, the duration of labor indicator recorded a very short minimum value of 0.20 hours (precipitous labor) and an extreme maximum value of 25.50 hours (prolonged labor), with the average duration of labor at 8.75 hours.

Table 3. Statistical Analysis (Numerical Data).

Independent variable	n	P-Value
Mother's Age	50	0.08
Duration of labor (hours)	50	0.000

Kolmogorov-Smirnov

Independent variable	N	P-Value	r	Dependent Var
Mother's Age	50	0.328	0.141	Duration of labor (hours)

Spearman's Rho

*significant

(Source: primary data, 2025)

Before conducting the association test, a normality test was performed using the Kolmogorov-Smirnov method. The results of the normality test and bivariate analysis using Spearman's Rho are presented in Table 3. Since the data on duration of labor exhibited a non-normal distribution ($p=0.000$), the use of the non-parametric Spearman's Rho test was the appropriate methodological approach. Based on the statistical test results in Table 3, a p-value of 0.328 was obtained. Since the p-value is greater than 0.05, the null hypothesis (H_0) cannot be rejected statistically, meaning there is no significant association between maternal age and duration of labor in the Delivery Room at Kotamobagu City General Hospital. The correlation coefficient ($r = 0.141$) confirms that the strength of the relationship between these variables is very weak and can be clinically disregarded.

Discussion

The main finding of this study challenges the conventional obstetric dogma that maternal age linearly determines the duration of labor. Based on the results of the bivariate analysis, it was empirically proven that there is no significant association between maternal age and the duration of labor at the Kotamobagu City General Hospital ($p = 0.328$).

The very weak correlation ($r = 0.141$) indicates that a mother's increasing chronological age cannot be used as an absolute single predictor to forecast whether the labor process will be fast or slow. This clinical phenomenon confirms that the duration of labor is governed by multifactorial interactions that are far more complex than the maternal age variable alone (Indriyani et al., 2022).

In modern midwifery, the duration of labor depends heavily on the harmonization of the “4 Ps” components: Power (strength of uterine contractions), Passenger (size, presentation, and position of the fetus), Passage (shape and size of the mother’s pelvis), and Psyche (the mother’s psychological state) (Martínez & Silva, 2025). The lack of significance of the age variable in this study is due to the respondents’ average age of 26.06 years, at which—biologically—the uterine myometrial muscles are at their peak performance for efficient contractions, unaffected by differences of a few years in age (Kurniawan & Saputra, 2025). Although there were extreme cases of very young (16 years) and very old (43 years) participants, uterine function can remain adequate as long as the mother’s nutritional intake, hydration, and physical condition are well maintained throughout the latent phase up to the active phase of the first stage of labor (Martínez & Silva, 2025).

Mechanical factors related to the “Passenger” and “Passage” components are believed to have a far more dominant influence on controlling the duration of labor than age (Brown et al., 2021). Complications such as cephalopelvic disproportion (CPD), fetal malpresentation (such as persistent occipital posterior position), or fetal macrosomia can affect pregnant women in any age group, whether young primigravidas or older multigravidas (Nguyen & Taylor, 2024). It is this mechanical barrier—the mismatch between the size of the fetal head and the mother’s pelvis—that triggers labor dystocia and prolongs the duration of both the first and second stages of labor, extending beyond the influence of the mother’s own biological maturity (Brown et al., 2021). This aligns with the high rate of cesarean section (CS) deliveries in this study’s sample—reaching 22.0%—which indicates that immediate delivery was performed due to the emergence of mechanical obstetric complications or fetal distress before prolonged labor could occur (Kurniawan & Saputra, 2025).

The sociodemographic aspect of the respondents’ employment status—where 92.0% were homemakers—also provides an interesting complementary analysis from the perspective of physical activity. A mother’s daily physical activity during the third trimester of pregnancy influences the flexibility of her pelvic floor muscles (Widati & Utami, 2022). Stay-at-home mothers often have unmeasured physical activity patterns; some may engage in active domestic mobility that aids the descent of the fetal head toward the pelvic inlet, while others may tend toward a sedentary lifestyle due to a lack of structured exercise programs such as prenatal exercise (Widati & Utami, 2022). These variations in lifestyle and domestic physical activity among housewives eliminate the influence of maternal age as a factor in determining the efficiency of fetal head descent during the labor process (Widati & Utami, 2022).

Furthermore, the “Psyche” component—or the mother’s psychological state—during labor in the Delivery Room at Kotamobagu City General Hospital exerts a massive hormonal influence (Pratama & Lestari, 2024). Fear, anxiety, and high stress levels when facing labor stimulate the release of catecholamine hormones (epinephrine and norepinephrine) into the bloodstream (Pratama & Lestari, 2024). This increase in catecholamine levels directly inhibits the effectiveness of oxytocin at myometrial receptors, thereby reducing the quality of uterine contractility and causing the active phase of labor to stall or prolong (Pratama & Lestari, 2024). Susceptibility to intrapartum anxiety is universal and is influenced by an individual’s mental preparedness and the quality of support from the birth companion, rather than being determined by the mother’s chronological age (Sari & Wahyuni, 2023).

In terms of educational level, the majority of respondents were high school or vocational school graduates (88.0%). This upper-secondary education level reflects a sufficient level of health literacy for mothers to understand medical team instructions, perform proper pushing techniques, and apply the taught coping mechanisms for labor pain (Rahmawati et al., 2023). The cognitive ability to cooperate with midwives or doctors during the second stage of labor helps accelerate the process of fetal expulsion, thereby minimizing the risk of prolonged labor, regardless of whether the mother is young or old (Rahmawati et al., 2023).

Methodologically, a cross-sectional survey design has inherent limitations in isolating pure relationships among the main variables (Sari & Wahyuni, 2023). The very low Spearman correlation coefficient ($r = 0.141$) indicates the presence of bias caused by uncontrolled confounding variables in the analysis, such as parity history (the contrasting differences in labor duration between primiparous and multiparous women), the use of medical augmentation (oxytocin induction), and maternal nutritional status (Sari & Wahyuni, 2023).

The implication for maternity and midwifery nursing care in the Delivery Room at Kotamobagu City General Hospital is the need for a paradigm shift in labor management. Healthcare providers must not make generalizations or lower their vigilance in monitoring labor progress simply because a mother is within the healthy reproductive age range (20–35 years) (Kurniawan & Saputra, 2025). The use of partogram monitoring forms by attending midwives must be strictly, consistently, and continuously applied regardless of the patient's age (Smith & Jones, 2023).

In addition, non-pharmacological interventions to support the Psyche and Power components—such as the use of hypnobirthing techniques, the use of upright birthing positions to utilize the force of gravity, and the provision of patient-centered pain management—must be optimized to reduce the incidence of labor dystocia and lower the prevalence of induced labor at Kotamobagu City General Hospital (Indriyani et al., 2022).

5. Conclusions and Recommendations

This study shows that there is no significant association between maternal age and duration of labor among women giving birth at the Kotamobagu City General Hospital ($p=0.328$; $r=0.141$). These results indicate that the duration of labor is influenced not only by maternal age but also by other factors such as parity, fetal condition, contraction strength, and labor management. This study was limited by its cross-sectional design, relatively small sample size, and failure to control for all confounding factors. Future research is recommended to use a stronger study design with a larger sample size and to consider other obstetric factors. Healthcare providers should continue to conduct comprehensive labor monitoring without relying solely on age as the basis for risk assessment.

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