

Factors Associated with Labor Complications at Plaosan Community Health Center

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ABSTRACT

Labor complications are conditions that hinder the normal progress of childbirth and increase the risk of morbidity and mortality for both mothers and infants. At Plaosan Community Health Center, the most common labor complications identified were premature rupture of membranes (PROM), preeclampsia, and prolonged first stage of labor. This study aimed to identify labor complications and determine the most influential factors associated with labor complications at Plaosan Community Health Center during 2023–2025. This study employed a quantitative analytic observational design with a cross-sectional approach. The sample consisted of all mothers with labor complications recorded in the medical records of Plaosan Community Health Center from 2023 to 2025, totaling 97 respondents, selected using total sampling. The dependent variable was labor complications, while the independent variables included maternal age, parity, and occupation. Data were analyzed using multinomial logistic regression with a significance level of $\alpha = 0.05$. The results showed that most mothers experiencing labor complications were within the healthy reproductive age group, had primiparous parity, and were unemployed. Labor complications were predominantly found in the first stage of labor. Multinomial logistic regression analysis revealed p-values > 0.05 , indicating that maternal age, parity, and occupation had no significant effect on the type of labor complications experienced. However, parity was identified as the dominant variable, although it did not show a statistically significant association. It can be concluded that maternal age, parity, and occupation did not significantly influence labor complications at Plaosan Community Health Center.

Keywords: labor complications; maternal age; parity; employment status mothers in labor; community health center

INTRODUCTION

Childbirth is a fundamental physiological process marking the culmination of pregnancy and representing one of the most critical transitions in a woman's reproductive life [1]. As a natural biological event, childbirth involves a series of intricate neuroendocrine, anatomical, and physiological adaptations that prepare both the mother and fetus for extra-uterine survival [2]. Under optimal conditions, these processes progress harmoniously, allowing labor and delivery to occur spontaneously without the need for substantial medical intervention. Normal childbirth is therefore characterized by coordinated uterine contractions, progressive cervical dilation, and the descent of the fetus through the birth canal. Nevertheless, in real-world clinical practice, childbirth does not always unfold in a purely physiological manner. A wide range of maternal, fetal, and environmental factors may disrupt the normal course of labor, resulting in complications that significantly elevate the risk of morbidity and mortality for both mother and newborn [3].

Ideally, childbirth proceeds without major disturbances, yet global and national data consistently demonstrate that maternal complications remain a pressing public health concern. Complications during pregnancy and childbirth continue to occur at substantial rates across countries with varying levels of healthcare resources. Preeclampsia, a hypertensive disorder of pregnancy characterized by multisystem involvement, affects approximately 4–5% of pregnant women worldwide. Premature rupture of membranes (PROM), defined as the rupture of fetal membranes before the onset of labor, is reported in about 10–15% of pregnancies. Both conditions pose significant clinical challenges. Preeclampsia may progress to severe preeclampsia or eclampsia, leading to seizures, organ dysfunction, and increased maternal and fetal mortality. PROM, on the other hand, increases the risk of ascending infection, chorioamnionitis, fetal distress, and prolonged labor. If not promptly and appropriately managed, these complications may result in adverse outcomes such as postpartum hemorrhage, neonatal sepsis, or emergency operative delivery [4].

In Indonesia, the burden of childbirth complications remains considerable and continues to demand attention from healthcare providers and policymakers. Data from the Indonesian Demographic and Health Survey (SDKI) indicate that approximately 21.4% of mothers experience complications during childbirth. Among the most frequently reported complications are premature rupture of membranes (around 4.3%), prolonged labor (around 3.3%), hypertension in pregnancy including preeclampsia (around 3–5%), and breech presentation (around 3%). These figures highlight that a substantial proportion of Indonesian mothers encounter difficulties during labor that may compromise maternal and neonatal well-being. Furthermore, regional data from the East Java Provincial Health Office reinforce the seriousness of this issue. Childbirth complications remain one of the leading contributors to maternal morbidity and mortality in the province. Hypertensive disorders of pregnancy, particularly preeclampsia, account for approximately 25–30% of maternal deaths, underscoring the need for improved antenatal surveillance, timely diagnosis, and evidence-based management strategies [5,6].

Childbirth complications such as PROM, preeclampsia, prolonged labor, and malpresentation exert profound impacts on maternal and infant health. PROM increases the likelihood of infection, umbilical cord prolapse, and dysfunctional labor patterns. Preeclampsia is associated with severe maternal outcomes including eclampsia, HELLP syndrome, acute kidney injury, pulmonary edema, and cerebrovascular events. For the fetus, preeclampsia increases the risk of intrauterine growth restriction, preterm birth, and perinatal mortality. Prolonged labor, often resulting from cephalopelvic disproportion or ineffective uterine contractions, heightens the risk of maternal exhaustion, postpartum hemorrhage, and operative delivery. Malpresentation; such as breech, transverse, or oblique lie complicates the mechanics of labor and is strongly associated with adverse neonatal outcomes [7-9].

Obstetric complications, particularly preeclampsia, significantly elevate the risk of severe maternal and neonatal events [10]. Women with preeclampsia face higher probabilities of developing eclampsia, acute organ injury, preterm delivery, and maternal or neonatal mortality compared to those without complications [11-13]. Additionally, studies from hospitals in East Java reveal that malpresentation during labor is linked to increased rates of neonatal asphyxia, intrauterine fetal demise (IUFD), and perinatal mortality. These findings emphasize the importance of early detection, comprehensive intrapartum monitoring, and timely intervention to mitigate risks associated with abnormal fetal positions [14-16].

Collectively, these data illustrate that childbirth, although inherently physiological, is highly vulnerable to complications that may jeopardize maternal and neonatal outcomes. Strengthening antenatal care, enhancing the capacity of healthcare facilities, and ensuring timely,

evidence-based intrapartum management are essential strategies to reduce the burden of childbirth complications and improve maternal and newborn survival. This study aimed to identify labor complications and determine the most influential factors associated with labor complications at Plaosan Community Health Center during 2023–2025.

METHODS

Study location and period

This research was carried out at the Plaosan Community Health Center, located in Magetan Regency, East Java Province, Indonesia. The health center serves a diverse maternal population from both rural and semi-urban areas, making it a representative setting for examining childbirth-related complications. The study utilized delivery data documented in the official medical records and delivery registers maintained by the health center. The research period covered three consecutive years, from January 2023 to December 2025, allowing for a comprehensive assessment of maternal characteristics and labor complications across multiple cohorts of childbirth cases. The extended timeframe also ensured adequate sample size and variability in maternal profiles, thereby strengthening the reliability of the findings.

Type and design of the study

A quantitative approach was employed using a cross-sectional design. This design was selected to enable the researchers to examine the relationship between maternal characteristics and the occurrence of labor complications at a single point in time for each respondent. The cross-sectional nature of the study allowed for simultaneous measurement of exposure variables (maternal age, parity, occupation) and outcome variables (labor complications) without manipulating the study environment. As an observational design, it is appropriate for identifying statistical associations and patterns within routinely collected clinical data, particularly in settings where prospective follow-up is not feasible [17-19].

Study subjects and sampling procedures

The study population consisted of all mothers who experienced labor complications and were recorded in the Plaosan Community Health Center delivery registers during the 2023–2025 period. From this population, a total sample of 97 respondents was obtained. The sample was determined based on predefined inclusion criteria to ensure data completeness and analytical accuracy. Eligible respondents were mothers whose medical records contained complete information on labor complications, demographic characteristics, and relevant obstetric history. Cases with incomplete documentation or missing key variables were excluded to maintain data integrity.

The sampling technique followed a total sampling approach within the defined inclusion criteria, meaning all eligible cases recorded during the study period were included. This method was appropriate given the relatively limited number of complication cases and the retrospective nature of the data source. Using all available eligible records increased statistical power and minimized selection bias [20,21].

Variables and data collection procedures

Data collection was conducted through a documentary review of medical records and delivery registers. This method allowed researchers to extract standardized clinical information recorded by healthcare professionals during routine service delivery. Maternal age at delivery, categorized into: 1) risky age: <20 years or >35 years; and 2) non-risky age: 20–35 years. This categorization aligns with national and international maternal health guidelines that identify extreme reproductive ages as risk factors for obstetric complications. Parity, categorized into: 1) primipara (first delivery); 2) multipara (2–4 deliveries); and 3) grandmultipara (≥ 5 deliveries). Parity classification was based on standard obstetric definitions due to its known association with labor outcomes. Maternal occupation, categorized into: 1) working; and 2) not working. This variable was included to explore socioeconomic dimensions that may influence maternal health status and access to care. All variables were extracted using a structured data extraction sheet to ensure consistency and reduce the risk of transcription errors. The documentary method was chosen because it provides objective, clinically verified data and avoids recall bias commonly found in interview-based studies.

Data analysis procedures

Data analysis was performed using a combination of descriptive and inferential statistical techniques. Descriptive statistics were used to summarize the distribution of maternal characteristics and types of labor complications, presented in frequencies and percentages [22-25]. Inferential analysis included: 1) Chi-Square tests, used to examine bivariate associations between categorical maternal characteristics and the occurrence of labor complications; and 2) multinomial logistic regression, applied to assess the strength and direction of associations while controlling for potential confounding variables [26]. This method allowed the researchers to model multiple categories of labor complications simultaneously and identify significant predictors. All analyses were conducted at a significance level of $\alpha = 0.05$, meaning p-values below this threshold were considered statistically significant. The analytical approach ensured both preliminary and adjusted assessments of relationships between variables.

Ethical considerations

This study adhered to established ethical principles for research involving human participants, particularly in the use of secondary clinical data. Ethical procedures included obtaining formal approval from the relevant institutional ethics committee prior to data collection. The use of medical records was conducted with strict confidentiality safeguards; no personal identifiers were recorded, and all data were anonymized during extraction and analysis. The research complied with principles of respect for persons, beneficence, and justice, ensuring that the use of patient data posed no risk to individuals and contributed to improving maternal health services.

RESULTS

A total of 97 mothers with labor complications participated in this study. The research results show that most mothers with childbirth complications were in the non-risky age group of 20-35 years, totaling 79 people (81.4%). Based on parity, most mothers were primipara or first-time mothers, totaling 68 people (70.1%). Meanwhile, based on occupation, most mothers were not working, totaling 62 people (63.9%). Table 1 presents the frequency distribution of characteristics of mothers with childbirth complications.

Table 2 shows that out of a total of 97 mothers with childbirth complications, most experienced complications in Stage I, totaling 65 people (67.0%). Meanwhile, mothers who experienced complications in Stage II totaled 32 people (33.0%). Table 2 presents the distribution of mothers with childbirth complications based on the stage of labor.

Table 3 presents show that maternal age has a p-value of 0.525, parity of 0.111, and occupation of 0.178. All p-values are greater than 0.05, so it can be concluded that there is no significant relationship between maternal age, parity, or occupation with childbirth complications.

The results of Binary Logistic Regression analysis showed that the age variable has a p-value of 0.238, parity 0.059, and occupation 0.113. Although not statistically significant, parity was identified as the variable with the greatest tendency to influence the incidence of childbirth complications compared to age and occupation (Table 4).

DISCUSSION

The results of this study demonstrated that the majority of mothers experiencing labor complications were within the non-risky reproductive age group (81.4%). At first glance, this finding appears to diverge from classical obstetric theory, which posits that women at risky ages; those younger than 20 years or older than 35 years are more susceptible to adverse labor outcomes due to biological immaturity or age-related physiological decline. However, epidemiological principles provide an important contextual explanation. According to the concept of population distribution bias, an event may appear more frequent in a group that numerically dominates the study population, even if the relative risk is theoretically higher in another group [27]. In this study setting, women aged 20–35 years constituted the majority of pregnant mothers seeking care, thereby increasing the absolute number of complications observed in this age group.

Furthermore, the types of complications identified; particularly premature rupture of membranes and prolonged labor are not exclusively determined by maternal age. PROM, for instance, is influenced by membrane integrity, infection, and obstetric history, while prolonged labor may arise from uterine dysfunction or fetal factors, irrespective of maternal age [28]. Thus, the predominance of complications among non-risky age mothers reflects population structure and the multifactorial nature of labor disorders rather than a contradiction of established theory.

With respect to parity, the findings revealed that most mothers experiencing complications were primiparous (70.1%). This pattern aligns strongly with physiological and clinical expectations. In primiparous women, the cervix and birth canal have not previously undergone the stretching and remodeling associated with childbirth. As a result, cervical effacement and dilation tend to progress more slowly, and the descent of the fetal head may be less efficient compared to multiparous women [29]. These physiological characteristics predispose primiparous mothers to labor progression disorders, including prolonged first stage of labor, dysfunctional uterine contractions, and increased likelihood of requiring augmentation or operative delivery. The high proportion of primiparous women experiencing complications in this study therefore reflects well-established obstetric mechanisms and underscores the need for vigilant monitoring during the first labor experience.

Regarding occupation, the majority of mothers with complications were non-working (63.9%). Although non-working mothers; typically housewives may have more flexible schedules and opportunities for rest, they often engage in substantial domestic responsibilities such as childcare, household chores, and physical tasks that require repetitive exertion. These activities can contribute to physical fatigue, musculoskeletal strain, and reduced physiological readiness for labor [30]. Additionally, non-working mothers may have limited access to health information or fewer opportunities for structured antenatal education, potentially influencing their preparedness for childbirth. Thus, the predominance of complications among non-working mothers may reflect a combination of physical workload, socioeconomic factors, and health literacy.

The concentration of complications in the first and second stages of labor (100%) highlights the critical importance of intensive intrapartum monitoring during these phases. The first stage of labor, characterized by cervical dilation, is particularly vulnerable to disturbances such as prolonged latent phase, protracted active phase, or arrest disorders. These conditions often arise from uterine dysfunction, cephalopelvic disproportion, or malpresentation [31]. The second stage, involving fetal descent and expulsion, may also be complicated by ineffective maternal pushing, fetal distress, or obstructed labor. The absence of complications in the third and fourth stages suggests that early-stage complications

Table 1. Distribution of characteristics of mothers with childbirth complications

Characteristic	Category	f (%)
Maternal age	High-risk (<20 or >35 years)	18 (18.6%)
	Low-risk (20–35 years)	79 (81.4%)
Parity	Primiparous (first birth)	68 (70.1%)
	Multiparous (2–4 births)	29 (29.9%)
	Grand multiparous (≥5 births)	0 (0.0%)
Occupation	Employed	35 (36.1%)
	Unemployed	62 (63.9%)

Table 2. Frequency distribution of mothers with childbirth complications

Stage of labor	Type of labor complication	f (%)
First stage	Premature rupture of membranes (PROM)	26 (26.8%)
	Prolonged first stage of labor	25 (25.8%)
	Preeclampsia	12 (12.4%)
	Fetal distress	2 (2.1%)
	Subtotal (First Stage)	65 (67.0%)
Second stage	Prolonged second stage of labor	27 (27.8%)
	Nuchal cord	4 (4.1%)
	Maternal exhaustion	1 (1.0%)
	Subtotal (Second Stage)	32 (33.0%)
Third & fourth Stages	No complications identified	0 (0.0%)

Table 3. Relationship between maternal age, parity, and occupation with childbirth complications

Variable	χ^2	p-value
Maternal age	0.404	0.525
Parity	2.534	0.111
Occupation	1.812	0.178

Table 4. Results of binary logistic regression test

Variable	B	p-value	OR (95% CI)
Maternal age	-0.667	0.238	0.513 (0.170–1.552)
Parity	-0.944	0.059	0.389 (0.146–1.036)
Occupation	-0.720	0.113	0.487 (0.200–1.186)

were effectively managed, preventing progression to postpartum hemorrhage, retained placenta, or other late-stage morbidities [32]. This pattern underscores the effectiveness of clinical interventions at Plaosan Community Health Center and highlights the value of timely decision-making during early labor.

The absence of statistically significant relationships between demographic factors and labor complications reinforces the understanding that childbirth complications are inherently multifactorial. Demographic characteristics such as age, parity, and occupation may contribute to risk profiles, but they rarely act as isolated determinants. Instead, clinical and obstetric factors; including maternal nutritional status, comorbidities, quality of antenatal care, fetal size and position, membrane integrity, and uterine contractility often exert more substantial influence on labor outcomes [31]. These findings align with contemporary obstetric literature emphasizing the interplay of biological, environmental, and healthcare system factors in shaping maternal and neonatal outcomes.

Although parity did not reach statistical significance ($p = 0.059$), the observed odds ratio ($OR = 0.389$) suggests a potential protective effect with increasing parity. This trend is consistent with physiological expectations: multiparous women typically exhibit more efficient uterine action, faster cervical dilation, and smoother fetal descent due to prior remodeling of the birth canal [33]. The borderline significance indicates that with a larger sample size or more detailed parity stratification, this association might reach statistical significance. Thus, parity remains an important variable in understanding labor dynamics, even if its effect was not fully captured in this dataset.

Overall, these findings illustrate the complex interplay of demographic, physiological, and clinical factors in determining labor outcomes. They highlight the need for comprehensive intrapartum assessment, individualized care, and strengthened antenatal services to mitigate risks and improve maternal and neonatal health.

This study has several limitations that should be acknowledged. First, the use of secondary data from medical records may introduce documentation bias, as the accuracy of the findings depends on the completeness and consistency of clinical recording practices. Second, the cross-sectional design limits the ability to establish causal relationships between maternal characteristics and labor complications, allowing only the identification of statistical associations. Third, the study was conducted in a single community health center, which may restrict the generalizability of the findings to broader populations with different demographic or clinical profiles. Fourth, several potentially influential clinical variables; such as nutritional status, comorbidities, antenatal care quality, and fetal factors were not included due to limitations in available documentation. Finally, the relatively small sample size may reduce statistical power, particularly for detecting subtle associations in multivariate analyses.

CONCLUSION

There is no significant relationship between maternal age, parity, or occupation with childbirth complications at Plaosan Community Health Center ($p > 0.05$), indicating that labor complications are multifactorial and likely influenced more by clinical and obstetric conditions than by demographic characteristics alone. The majority of mothers with complications were in the non-risky age group, primiparous, and non-working. Complications were entirely concentrated in the first and second stages of labor.

It is recommended that Plaosan Community Health Center enhance early detection of risk factors during pregnancy and labor, especially in the first and second stages. Health workers should maintain high clinical vigilance regardless of demographic characteristics. Future researchers are advised to use a case-control or cohort design to strengthen causal inference and to include more comprehensive clinical variables such as nutritional status, hemoglobin levels, ANC adherence, and comorbidities. Further intervention studies are also needed to develop and evaluate strategies for the early detection and management of PROM, preeclampsia, and prolonged labor.

Ethical considerations, conflict of interest, and funding source

- This research was conducted using secondary data from medical records with permission from relevant authorities. The ethical clearance certificate is No.EA/4403 /KEPK-Poltekkes_Sby/V/2026.
- There is no conflict of interest related to this publication.
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