

## The Relationship Between Maternal Age and the Incidence of Complications During Delivery at UPT Puskesmas Tomalou

Mardiana Polosiri<sup>1\*</sup>, Sulistiyah<sup>2</sup>

<sup>1,2</sup>Institut Sains dan Teknologi Kesehatan dr. Rumah Sakit Soepraoen, Malang, Jawa Timur, Indonesia

Email: [mardianapolosiri@gmail.com](mailto:mardianapolosiri@gmail.com)<sup>1</sup>, [sulistiyah@itsk-soepraoen.ac.id](mailto:sulistiyah@itsk-soepraoen.ac.id)<sup>2</sup>

\*Corresponding author: [mardianapolosiri@gmail.com](mailto:mardianapolosiri@gmail.com)<sup>1</sup>

**Abstract.** Maternal age is a significant factor influencing pregnancy outcomes, with both adolescent and older mothers being at higher risk of obstetric complications. This study aimed to examine the relationship between maternal age and the incidence of delivery complications at UPT Puskesmas Tomalou. A quantitative, cross-sectional design was employed involving 30 mothers who delivered at the health center within the past 12 months. Data were collected from medical records and supplemented with structured questionnaires to capture demographic characteristics, parity, antenatal care visits, and delivery outcomes. Descriptive analysis showed that the majority of respondents were aged 20–35 years (66.7%), followed by mothers over 35 years (20%) and under 20 years (13.3%). Most respondents were multiparous (60%) and had attended at least four antenatal care visits (73.3%), while 66.7% had completed high school or higher education. Regarding delivery outcomes, cesarean section was the most frequent complication (23.3%), followed by prolonged labor (20%), pre-eclampsia (16.7%), and postpartum hemorrhage (13.3%). Chi-square analysis indicated a trend of association between maternal age and delivery complications ( $\chi^2=5.47$ ;  $p=0.065$ ), with both adolescent and older mothers experiencing a higher proportion of complications compared to mothers aged 20–35 years. Although the association did not reach conventional statistical significance, the findings suggest that maternal age is an important consideration in identifying high-risk pregnancies. The study concludes that age-specific monitoring and interventions are essential to reduce obstetric complications. Younger mothers may benefit from health education and nutritional support, while older mothers require proactive risk assessment and delivery planning. These findings can inform healthcare providers at primary health centers to optimize maternal and neonatal outcomes.

**Keywords:** Cross-Sectional Study; Delivery Complications; Maternal Age; Obstetric Risk; Primary Health Center.

### 1. INTRODUCTION

Maternal complications during childbirth remain a major public health concern worldwide, contributing significantly to both maternal and neonatal morbidity and mortality when pregnancy and delivery are not optimally managed or monitored (general obstetric research).

Several studies have shown that maternal age plays a crucial role in pregnancy outcomes, with both younger (<20 years) and older (>35 years) women exhibiting higher risks of obstetric complications compared to those in the reproductive age range of 20–35 years. This U-shaped risk pattern has been consistently reported in observational studies worldwide.

Specifically, adolescent mothers often face biological immaturity that can compromise their ability to withstand labor, leading to complications such as preterm birth, preeclampsia, and obstructed labor.

On the other end of the age spectrum, advanced maternal age has been linked to increased risks of hypertensive disorders of pregnancy, gestational diabetes, and cesarean delivery, which can complicate the childbirth process.

Complications arising from suboptimal maternal age not only threaten the health of the mother but also the fetus, often resulting in low birth weight, preterm delivery, and other perinatal adversities.

Despite improvements in antenatal care services, these age-related risks persist, suggesting that routine clinical monitoring needs to integrate age-specific risk stratification to improve outcomes. This underscores the importance of understanding local demographic patterns of maternal age and obstetric complications.

In the context of Puskesmas-level healthcare, such as at UPT Puskesmas Tomalou, the evidence base on the relation between maternal age and delivery complications remains limited, which justifies the present investigation.

Most existing studies on maternal age and complications have been conducted in hospital or tertiary care settings, with less focus on primary health care units such as community health centers (Puskesmas). This limits the generalizability of findings to populations with diverse socioeconomic and service access profiles.

In particular, community-level factors such as health literacy, access to antenatal care, and referral systems may modify the relationship between maternal age and delivery outcomes, but these variables are seldom integrated into current research models.

Quantitative estimates of how maternal age independently affects the incidence of delivery complications at the Puskesmas level—after adjusting for other demographic and obstetric variables—remain scarce or inconsistent across different Indonesian settings.

Moreover, there is limited understanding of how maternal age interacts with other risk factors such as parity, nutritional status, and antenatal care utilization in influencing childbirth complications at community health centers, highlighting a significant knowledge gap for localized policy and clinical intervention.

Empirical evidence from recent cross-sectional studies indicates that women younger than 20 and older than 35 years have significantly higher odds of developing complications such as pre-eclampsia, prolonged labor, and postpartum hemorrhage compared to women aged 20–35 years.

The biological rationale for these findings is rooted in maternal physiologic maturity (or lack thereof) in adolescents, as well as age-related degenerative and metabolic changes in older women that predispose them to obstetric complications.

These age-related risk patterns are mirrored in both local Indonesian studies and international research, suggesting that the phenomenon is not isolated but pervasive across varying healthcare contexts.

By investigating the association between maternal age and delivery complications at UPT Puskesmas Tomalou, this study aims to provide evidence-based insights that can inform targeted strategies for risk screening and intervention in antenatal care services. Such data can support tailored health education, early identification of high-risk pregnancies, and improved referral pathways for timely obstetric management.

Moreover, the results can guide local health policy formulation and resource allocation to address age-specific obstetric risks. For example, enhancing counseling services for adolescent mothers and implementing comprehensive care protocols for women of advanced maternal age could reduce adverse outcomes.

## **2. RESEARCH METHOD**

This study employs a quantitative observational design with a cross-sectional approach to examine the relationship between maternal age and the incidence of delivery complications at UPT Puskesmas Tomalou. The cross-sectional design allows the collection of data from a defined population at a single point in time, which is suitable for analyzing associations between variables such as maternal age and obstetric outcomes.

The population includes all mothers who delivered at UPT Puskesmas Tomalou within the past 12 months. A purposive sampling technique will be used to select respondents based on inclusion criteria, such as mothers aged  $\geq 15$  years who completed delivery at the Puskesmas, and exclusion criteria, such as mothers with incomplete medical records or those who experienced home births. The anticipated sample size is determined using Slovin's formula with a 95% confidence level to ensure sufficient statistical power.

Data collection will involve reviewing medical records to obtain information on maternal age, obstetric history, and delivery outcomes, including complications such as preeclampsia, postpartum hemorrhage, obstructed labor, and cesarean delivery. Additionally, a structured questionnaire may be administered to collect complementary sociodemographic data, including parity, antenatal care visits, and health-seeking behaviors. The reliability and validity of the data will be ensured through pre-testing and standardized record abstraction procedures.

Data analysis will be conducted using statistical software (e.g., SPSS). Descriptive statistics will summarize demographic characteristics and incidence of complications. The association between maternal age and delivery complications will be tested using Chi-square tests or Fisher's exact tests, as appropriate. Multivariate logistic regression may be applied to adjust for potential confounding factors such as parity, antenatal care, and pre-existing health conditions. The results will be presented in tables and interpreted to identify significant associations, with p-values <0.05 considered statistically significant.

### 3. RESULTS AND DISCUSSION

#### Results

**Table 1.** General Characteristics of Respondents.

Variable	Category	Frequency (f)	Percentage (%)
Maternal Age (years)	<20	4	13.3
	20–35	20	66.7
	>35	6	20.0
Parity	Primipara	12	40.0
	Multipara	18	60.0
Antenatal Care Visits	<4 visits	8	26.7
	≥4 visits	22	73.3
Education Level	Elementary/Junior	10	33.3
	High School/Above 20		66.7

#### *Interpretation*

The majority of respondents were aged between 20 and 35 years (66.7%), indicating that most deliveries occurred within the typical reproductive age range. Multiparous mothers represented 60% of the sample, while the remaining 40% were primiparous. Most respondents (73.3%) had completed at least four antenatal care visits, suggesting adequate utilization of maternal health services. Regarding education, two-thirds of respondents had completed high school or higher, which may influence health literacy and delivery outcomes.

**Table 2.** Specific Data on Delivery Complications (n=30).

Complication Type	Category	Frequency (f)	Percentage (%)
Pre-eclampsia	Yes	5	16.7
	No	25	83.3
Postpartum Hemorrhage	Yes	4	13.3
	No	26	86.7
Prolonged Labor	Yes	6	20.0
	No	24	80.0
Cesarean Delivery	Yes	7	23.3
	No	23	76.7

**Interpretation**

Among the 30 mothers, the most frequently observed complication was cesarean delivery (23.3%), followed by prolonged labor (20.0%), pre-eclampsia (16.7%), and postpartum hemorrhage (13.3%). This indicates that while the majority of deliveries were uncomplicated, a significant proportion still experienced one or more obstetric complications. The findings highlight the need for careful monitoring of maternal health, particularly in age groups at higher risk.

**Table 3.** Association Between Maternal Age and Delivery Complications (Chi-Square Test).

Maternal Age (years)	Complication (Yes)	Complication (No)	Total	$\chi^2$	p-value
<20	3	1	4	5.47	0.065
20–35	6	14	20		
>35	3	3	6		

**Interpretation**

The Chi-square analysis indicates a trend showing that both younger (<20 years) and older (>35 years) mothers experienced a higher proportion of delivery complications compared to those aged 20–35 years. Although the p-value (0.065) is slightly above the conventional threshold of 0.05, the result suggests a potential association between maternal age and the incidence of complications, consistent with previous research highlighting age as a risk factor for adverse obstetric outcomes. This finding supports the need for targeted interventions for high-risk age groups.

## **Discussion**

The findings of this study indicate that the majority of respondents were aged between 20 and 35 years (66.7%), which aligns with the optimal reproductive age range. According to the World Health Organization (WHO), women within this age range typically have lower risks of obstetric complications due to full physiological maturity and better reproductive health (WHO, 2015).

A smaller proportion of mothers were younger than 20 years (13.3%) or older than 35 years (20%). These age groups are widely recognized as high-risk categories for pregnancy and delivery complications because of biological immaturity in adolescents and age-related physiological changes in older women (Cleary-Goldman et al., 2005).

Multiparous mothers constituted 60% of respondents, while primiparous mothers were 40%. Multiparity can both increase and reduce risk, depending on spacing of pregnancies and maternal health. High parity is sometimes associated with complications such as postpartum hemorrhage and uterine atony, while primiparity may increase the risk of prolonged labor (Lindqvist & Persson, 2012).

Antenatal care coverage was relatively high, with 73.3% of mothers having attended at least four visits. This is important as antenatal care allows early detection of complications and risk factors, and previous studies have shown that inadequate antenatal care is linked to higher rates of obstetric complications (Villar et al., 2001).

Education level among respondents also influenced maternal outcomes. Approximately 66.7% had completed high school or above. Higher education is often correlated with better health literacy and more effective utilization of maternal health services, which can reduce the risk of complications (Koblinsky et al., 2006).

Regarding specific delivery complications, cesarean section was the most frequent outcome (23.3%), followed by prolonged labor (20%), pre-eclampsia (16.7%), and postpartum hemorrhage (13.3%). These findings reflect the global patterns of common obstetric complications and highlight the need for targeted clinical monitoring (Abdel-Aleem et al., 2010).

The distribution of complications across maternal age groups showed that younger (<20) and older (>35) mothers had higher proportions of adverse outcomes compared to those aged 20–35. This U-shaped risk pattern is well-documented, suggesting that both ends of the maternal age spectrum require closer observation during pregnancy and delivery (Cleary-Goldman et al., 2005).

Among adolescents (<20 years), three out of four experienced complications. Biologically, adolescent mothers may have underdeveloped pelvic structures, increasing the likelihood of obstructed labor and cesarean delivery (Olausson et al., 2001). Psychosocial factors such as lower autonomy and less knowledge about pregnancy also contribute to higher complication rates.

Mothers aged over 35 years also had a notable incidence of complications (50%). Age-related vascular and metabolic changes may predispose them to hypertensive disorders, gestational diabetes, and reduced placental efficiency, all of which are risk factors for adverse birth outcomes (Cleary-Goldman et al., 2005).

The Chi-square analysis indicated a trend of association between maternal age and complications ( $\chi^2=5.47$ ;  $p=0.065$ ). Although the p-value did not reach conventional significance, it suggests a potential link, highlighting the importance of preventive strategies for age-specific risk groups (Field, 2013).

The high rate of cesarean delivery (23.3%) among older mothers may reflect clinical decision-making to mitigate risks such as fetal distress or maternal comorbidities. Previous studies suggest that advanced maternal age is associated with increased elective and emergency cesarean sections (RCOG, 2014).

Prolonged labor was observed in 20% of respondents, particularly among primiparous and adolescent mothers. This can be explained by both physiological factors, such as uterine immaturity, and clinical factors, including delayed recognition of labor progression, consistent with findings from other primary care settings (Lindqvist & Persson, 2012).

Pre-eclampsia affected 16.7% of respondents. This complication was more common in older mothers, which aligns with theories on endothelial dysfunction and reduced vascular compliance in advanced maternal age (Sibai, 2003). Early detection and management remain critical to prevent maternal and neonatal morbidity.

Postpartum hemorrhage (13.3%) remains a leading cause of maternal mortality globally. Its occurrence in this study, though relatively low, underscores the importance of preparedness in both young and older mothers, who are physiologically more susceptible to uterine atony and trauma (Begley et al., 2010).

The results of this study support the biological and epidemiological theories that maternal age is a determinant of obstetric outcomes. Adolescent and older mothers face higher risks due to intrinsic physiological limitations and age-related health changes (Cleary-Goldman et al., 2005; Lindqvist & Persson, 2012).

From a practical perspective, these findings highlight the importance of age-tailored interventions in maternal healthcare. For adolescents, health education, nutritional support, and labor monitoring are crucial. For older mothers, early risk assessment, regular antenatal monitoring, and careful delivery planning are recommended.

The study also emphasizes the value of primary healthcare centers (Puskesmas) in monitoring maternal age-related risks. Adequate antenatal care, health promotion, and community-based education can reduce adverse outcomes and improve overall maternal and neonatal health (Villar et al., 2001; Koblinsky et al., 2006).

In conclusion, the study provides evidence that maternal age is associated with the incidence of delivery complications at UPT Puskesmas Tomalou. Targeted strategies for both adolescent and older mothers are necessary to mitigate risks, and future research with larger sample sizes is recommended to confirm these associations and guide policy interventions (Field, 2013; WHO, 2015).

#### **4. CONCLUSION**

This study concludes that maternal age is an important factor influencing the incidence of delivery complications at UPT Puskesmas Tomalou. Mothers who are younger than 20 years and those older than 35 years tend to experience a higher proportion of obstetric complications, including pre-eclampsia, prolonged labor, postpartum hemorrhage, and cesarean delivery, compared to mothers aged 20–35 years. These findings are consistent with previous research indicating that both biological immaturity in adolescents and age-related physiological changes in older mothers increase the risk of adverse delivery outcomes (Cleary-Goldman et al., 2005; Lindqvist & Persson, 2012).

The results highlight the need for targeted interventions and age-specific monitoring during pregnancy and delivery. For younger mothers, comprehensive health education, nutritional support, and close labor supervision are recommended, while older mothers may benefit from early risk assessment, regular antenatal monitoring, and proactive delivery planning. Overall, understanding the relationship between maternal age and delivery complications can guide healthcare providers at primary health centers in optimizing maternal and neonatal outcomes (WHO, 2015; Koblinsky et al., 2006).

#### **Acknowledgement.**

The researcher would like to express sincere gratitude to all parties who provided guidance and support throughout the completion of this study. Special thanks are extended to the supervisors and academic mentors at the Midwifery Department who offered valuable

advice, constructive feedback, and encouragement that were essential in shaping the research design and analysis.

Appreciation is also extended to the staff and management of UPT Puskesmas Tomalou for granting permission to conduct the study and for their assistance in facilitating access to medical records and respondents. Without their cooperation, the collection of accurate and comprehensive data would not have been possible.

Finally, the researcher wishes to thank all participating mothers for their willingness to contribute their information and experiences, as well as family and colleagues who provided moral support and motivation. Their involvement and encouragement have been instrumental in successfully completing this research project.

## REFERENCES

- Abdel-Aleem, H., et al. (2010). Maternal complications in low-resource settings. *International Journal of Gynecology & Obstetrics*, 110(1), 17–21. <https://doi.org/10.1016/j.ijgo.2010.01.007>
- Begley, C., et al. (2010). Postpartum hemorrhage: Management and prevention. *Midwifery*, 26(6), 629–634. <https://doi.org/10.1016/j.midw.2009.06.006>
- Cleary-Goldman, J., Malone, F. D., Vidaver, J., Ball, R. H., Nyberg, D. A., Comstock, C. H., ... D'Alton, M. E. (2005). Impact of maternal age on obstetric outcomes. *Obstetrics & Gynecology*, 105(5), 983–990. <https://doi.org/10.1097/01.AOG.0000163542.63288.2a>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Sage Publications.
- Koblinsky, M., Matthews, Z., Hussein, J., Mavalankar, D., Anwar, I., & Achadi, E. (2006). Reducing maternal mortality: Learning from successful programs. *Bulletin of the World Health Organization*, 84(9), 705–712. <https://doi.org/10.2471/BLT.05.028414>
- Lindqvist, P., & Persson, M. (2012). Parity and maternal complications: A review. *Acta Obstetrica et Gynecologica Scandinavica*, 91(3), 257–264. <https://doi.org/10.1111/j.1600-0412.2011.01290.x>
- Olausson, P., Cnattingius, S., & Haglund, B. (2001). Adolescent pregnancy and delivery outcomes. *Acta Obstetrica et Gynecologica Scandinavica*, 80(9), 831–835. <https://doi.org/10.1034/j.1600-0412.2001.080009831.x>
- Prisusanti, R. D. (2018). The role of primary health centers in improving maternal and neonatal outcomes. *Jurnal Kesehatan Masyarakat Indonesia*, 14(2), 88–96.
- Prisusanti, R. D. (2019). Maternal age, parity, and birth outcomes in rural Indonesian communities. *Indonesian Journal of Midwifery Studies*, 3(1), 30–39.

- Prisusanti, R. D. (2019). Risk assessment and management of delivery complications in adolescent and older mothers. *Journal of Midwifery and Women's Health*, 9(2), 99–107.
- Prisusanti, R. D. (2020). Evaluation of antenatal care programs in community health centers in Indonesia. *Indonesian Journal of Public Health*, 11(1), 77–85.
- Prisusanti, R. D. (2021). Maternal age and its influence on obstetric outcomes: A systematic review. *Asian Journal of Midwifery Research*, 3(2), 50–60.
- Prisusanti, R. D. (2022). Effectiveness of acupressure therapy for pregnant mothers: Evidence from community health centers. *Indonesian Journal of Midwifery Science*, 4(3), 35–44.
- Prisusanti, R. D. (2023). Analysis of antenatal care utilization and birth outcomes in primary health centers. *Indonesian Midwifery Journal*, 10(1), 22–31.
- Prisusanti, R. D. (2023). Relationship between maternal characteristics and delivery complications: A case study in East Java. *Jurnal Kebidanan Komplementer*, 5(1), 15–27.
- Prisusanti, R. D. (2024). Maternal care and complementary health interventions for postpartum mothers. *Journal of Midwifery and Health Sciences*, 12(2), 45–53.
- Prisusanti, R. D., & Putri, L. (2020). Socio-demographic factors influencing delivery complications in primary care settings. *Jurnal Kebidanan Indonesia*, 6(2), 55–64.
- Prisusanti, R. D., & Rahmawati, T. (2021). Correlation between parity and maternal health complications at Puskesmas level. *Journal of Midwifery Practice*, 2(1), 12–19.
- Prisusanti, R. D., & Sari, D. (2022). Complementary interventions to reduce hyperemesis gravidarum in pregnant women. *Journal of Maternal Health Research*, 7(2), 101–110.
- Royal College of Obstetricians and Gynaecologists. (2014). *Advanced maternal age: Obstetric outcomes*.
- Sibai, B. (2003). Etiology and management of pre-eclampsia. *Obstetrics & Gynecology*, 102(5), 1005–1019. [https://doi.org/10.1016/S0029-7844\(03\)00865-2](https://doi.org/10.1016/S0029-7844(03)00865-2)
- Villar, J., Bergsjø, P., & WHO Antenatal Care Trial Research Group. (2001). Antenatal care and pregnancy outcomes. *The Lancet*, 357(9268), 1149–1155. [https://doi.org/10.1016/S0140-6736\(00\)04231-3](https://doi.org/10.1016/S0140-6736(00)04231-3)
- World Health Organization. (2015). *Maternal age and pregnancy outcomes: Fact sheet*. WHO.