

Beyond the Three Delays: A Policy and Health System Perspective on Maternal Mortality Determinants in Jayapura, Indonesia

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Abstract:

Maternal mortality during childbirth remains a critical public health concern in Indonesia, particularly in Eastern regions such as Jayapura, where structural inequalities, geographical barriers, and health system limitations intersect. While the Three Delays Model has been widely used to explain maternal mortality, existing studies often emphasize individual or household-level factors without sufficiently examining broader policy and health system dynamics. This study aims to analyze the determinants of maternal mortality in Jayapura by extending the Three Delays framework through a policy and health system perspective. Using a qualitative descriptive design, data were collected through in-depth interviews, observations of health facilities, and case documentation involving health workers, policymakers, community leaders, and families of patients. Thematic analysis reveals that Delay I is strongly influenced by limited maternal health literacy, cultural decision-making patterns, and financial considerations; Delay II is dominated by transportation constraints, geographical distance, and referral access barriers; while Delay III reflects systemic issues, including shortages of medical personnel, facility readiness, and bureaucratic referral procedures. The findings suggest that maternal mortality is not merely the result of delayed individual decisions but emerges from structural interactions between social context and institutional capacity. This study contributes by repositioning the Three Delays Model beyond behavioral explanations toward a governance-oriented framework, highlighting the need for integrated interventions encompassing community education, transport infrastructure, and health system strengthening.

Keywords: maternal mortality, three delays model, health system governance, policy implementation, jayapura

1. Introduction

Maternal mortality remains one of the most critical indicators of health system performance and social development, reflecting not only biomedical risk but also governance capacity, institutional responsiveness, and structural inequalities in access to care. Despite substantial global progress over the past decades, maternal deaths continue to occur disproportionately in regions characterized by geographical complexity, socio-cultural diversity, and uneven health infrastructure (Amponsah-Tabi et al., 2022). Recent global assessments emphasize that most maternal deaths are preventable when timely and adequate obstetric care is available, yet systemic barriers related to delayed decision-making, limited accessibility, and gaps in service quality persist across many low- and middle-income settings (Cresswell et al., 2025; WHO, 2020). These realities suggest that maternal mortality should be understood not solely as a clinical outcome but as a multidimensional phenomenon shaped by the interaction between social structures and health system capacity.

The Three Delays Model proposed by Thaddeus & Maine (1994) has long served as a foundational framework for examining maternal mortality by categorizing delays into three stages: the decision to seek care, the ability to reach healthcare facilities, and the provision of adequate treatment upon arrival. While the model has been widely applied in maternal health research, contemporary scholarship increasingly argues that delays cannot be treated merely as sequential operational failures. Instead, they should be interpreted as reflections of broader governance challenges, including inequitable resource distribution, infrastructural disparities, and institutional coordination gaps within health systems (Kruk et al., 2018; Symon et al., 2025). From this perspective, maternal mortality emerges from systemic interactions rather than isolated events, highlighting the need for analytical approaches that integrate socio-cultural, spatial, and organizational dimensions.

In Indonesia, maternal mortality continues to present a significant public health challenge despite national commitments aligned with the Sustainable Development Goals. Studies indicate that disparities in maternal outcomes are closely associated with variations in health service readiness, socio-economic conditions, and cultural perceptions of childbirth risk (Ahmed & Fullerton, 2019). These challenges become particularly pronounced in eastern Indonesian regions such as Papua, where geographic fragmentation, transportation limitations, and uneven workforce distribution shape access to maternal health services. Jayapura City represents a complex urban-peripheral context in which formal healthcare facilities coexist with strong cultural norms and spatial inequality. Although categorized as an urban area, peripheral communities within the city often experience barriers similar to rural settings, suggesting that conventional urban-rural distinctions may obscure localized patterns of vulnerability.

Empirical research increasingly highlights the role of household decision-making dynamics, gender relations, and community norms (Utarestantix, Purwanto, & Lukito-Budi, 2022) in shaping maternal health outcomes. Women's access to care is frequently mediated by family authority structures and cultural expectations surrounding childbirth, influencing the timing of health-seeking behavior (Souza et al., 2024; Sujana, Barnes, Rowe, & Reed, 2017). At the same time, institutional factors such as referral efficiency, facility readiness, and workforce capacity determine whether life-saving interventions can be delivered effectively once women reach healthcare facilities (Abanga, Ziblim, & Boah, 2025; Ayehu et al., 2025). These interconnected determinants indicate that maternal mortality cannot be fully explained by behavioral or geographic factors alone; rather, it reflects the interaction between individual agency and structural health system conditions (Anumudu, Uhegwu, & Anumudu, 2025).

Despite extensive application of the Three Delays Model, much of the existing literature remains largely descriptive, focusing on categorizing delays without sufficiently theorizing how institutional arrangements and governance dynamics produce them. Previous studies often isolate clinical risks, geographic barriers, or socio-cultural influences without integrating these elements into a unified analytical framework capable of explaining maternal mortality as a socio-institutional phenomenon. This gap is particularly evident in Indonesian contexts, where local cultural dynamics intersect with fragmented referral systems and uneven health infrastructure, limiting theoretical advancement beyond epidemiological description.

Addressing this gap, the present study reconceptualizes maternal mortality through a socio-structural governance lens by examining how individual decisions, geographic accessibility, and institutional readiness interact within the childbirth process in Jayapura City. Rather than treating delays as isolated stages, this research interprets them as interconnected outcomes shaped by social negotiation processes, spatial inequality, and health system organization. By situating the Three Delays Model within a contextualized health system framework, the study contributes to ongoing debates in maternal health

scholarship by offering a theoretically grounded analysis that bridges public health, gender studies, and governance perspectives. This approach enables a deeper understanding of how structural and cultural factors collectively shape maternal vulnerability in geographically complex regions.

2. Method

This study employed a qualitative descriptive design to explore the determinants of maternal mortality during childbirth in Jayapura City through the analytical lens of the Three Delays Model. The methodological choice was grounded in the need to capture complex interactions between individual behavior, socio-cultural contexts, geographic accessibility, and institutional health system dynamics that cannot be adequately explained through quantitative indicators alone (Creswell & Poth, 2018; Green & Thorogood, 2018). Qualitative inquiry has been widely recommended in maternal health research to understand lived experiences, decision-making processes, and structural barriers shaping care pathways (Sujana et al., 2017). By focusing on lived experiences and institutional practices, the study aimed to generate a contextualized understanding of how delays emerge across decision-making, access, and service delivery stages within maternal health systems (Thaddeus & Maine, 1994).

The research was conducted in Jayapura City, Papua Province, Indonesia, an urban area characterized by diverse socio-cultural backgrounds and varying levels of access to maternal health services. Informants were selected using purposive sampling to ensure representation of key actors involved in maternal health pathways, a strategy commonly applied in qualitative health system research to capture information-rich perspectives (Palinkas et al., 2015). Participants included midwives, obstetricians, heads of primary healthcare centers, district health office staff, community health volunteers, community leaders, and family members of deceased mothers. This multi-perspective sampling strategy enabled triangulation across clinical, institutional, and socio-cultural viewpoints, strengthening analytical depth and contextual validity (Patton, 2015).

Data collection was carried out through in-depth interviews, field observations, and document analysis. Semi-structured interview guides were developed based on the Three Delays Model framework, allowing exploration of decision-making processes, transportation barriers, referral systems, and facility readiness during obstetric emergencies. Observational methods were applied in selected healthcare facilities to assess structural readiness, referral procedures, and workflow dynamics related to emergency maternal care, consistent with qualitative approaches in health service evaluation (Green & Thorogood, 2018). Documentary sources included maternal mortality audit reports, referral records, and local health policy documents, enabling methodological triangulation across narrative, institutional, and policy-level data (Bowen, 2009). Data collection took place throughout 2024, ensuring contextual relevance to recent maternal health conditions in Jayapura.

Data analysis followed a thematic analytical approach combining inductive and deductive coding strategies. Interview transcripts and field notes were coded to identify patterns aligned with Delay I (decision-making), Delay II (reaching healthcare facilities), and Delay III (receiving adequate care), reflecting best practices in applied qualitative health research (Braun & Clarke, 2022). Triangulation across data sources was applied to enhance credibility and reduce interpretive bias (Patton, 2015). In addition to qualitative interpretation, frequency mapping and weighted importance scoring were used to identify dominant contributing factors within each delay category, allowing the study to move beyond narrative description toward structured identification of systemic bottlenecks affecting maternal survival. Such integrative analytical approaches have been increasingly

encouraged in global health research to bridge qualitative depth with analytical rigor (Kruk et al., 2018).

Ethical considerations were addressed by ensuring informed consent from all participants, maintaining confidentiality of personal information, and anonymizing sensitive case narratives. The study adhered to ethical principles for qualitative health research, emphasizing respect for participants' experiences and minimizing potential harm when discussing maternal death cases (WHO, 2020).

Beyond describing maternal mortality cases, this methodological approach positions the Three Delays Model as an interpretive framework that links micro-level experiences with macro-level health system structures. Rather than treating delays as isolated events, this study conceptualizes maternal mortality as a dynamic process shaped by interacting layers of social norms, geographic realities, and institutional readiness. By combining thematic analysis with weighted importance mapping, the research extends previous applications of the Three Delays Model from descriptive epidemiology toward a policy-oriented analytical lens capable of identifying structural bottlenecks within urban peripheral contexts (Symon et al., 2025). This positioning enables the findings to contribute not only empirical insights from Jayapura but also a broader conceptual understanding of how localized health system constraints reproduce preventable maternal deaths in geographically complex regions.

3. Findings

The findings reveal that maternal mortality in Jayapura is not driven by a single dominant factor but emerges from a layered interaction between household decision-making, physical access constraints, and systemic readiness within health services. Rather than occurring as isolated clinical failures, maternal deaths appear as cumulative outcomes of delayed responses across multiple stages of childbirth care.

At the household level, the first delay manifests through uncertainty in recognizing obstetric danger signs and hesitation in seeking medical assistance. Families often interpret early symptoms as normal pregnancy conditions, leading to prolonged decision-making processes. Cultural considerations and financial concerns further complicate this stage, particularly when childbirth is initially perceived as a domestic event rather than a medical emergency. This hesitation indicates that knowledge gaps alone do not explain delayed decisions; instead, they reflect the embedded nature of childbirth within social expectations and familial authority structures.

The second delay becomes evident in the physical journey toward health facilities. Despite Jayapura's urban classification, geographic realities such as uneven infrastructure, transportation availability, and distance to referral hospitals significantly shape maternal outcomes. Several cases show that even when families decide to seek help, logistical barriers prolong travel time and intensify medical complications before arrival. These findings suggest that spatial inequality persists within urban settings, where peripheral communities experience access conditions similar to rural environments.

Within healthcare facilities, the third delay highlights systemic pressures rather than individual negligence. Health workers often face limited resources, high patient loads, and administrative complexities that slow emergency responses. Delays in referral coordination and limited availability of specialized obstetric services contribute to prolonged waiting periods after mothers reach care centers. The findings indicate that facility-based delays are less about clinical incompetence and more about structural constraints within the health system.

Across cases, maternal mortality appears as a cascading process in which earlier delays amplify the impact of later ones. Women who arrived late at facilities frequently encountered service limitations that reduced the effectiveness of medical interventions.

This interaction suggests that maternal deaths cannot be fully understood by examining any single stage of delay in isolation.

Another notable pattern concerns the role of socio-cultural expectations surrounding childbirth. Decisions are rarely made by the mother alone; extended family members, community norms, and perceived social judgments influence when and where help is sought. Such dynamics create a tension between biomedical recommendations and culturally embedded practices, particularly when traditional perceptions of resilience during childbirth discourage early medical intervention.

The findings also reveal disparities in risk profiles among mothers. Women with limited antenatal monitoring, existing health conditions, or high parity show greater vulnerability when delays occur. However, the presence of risk factors alone does not inevitably lead to mortality; rather, it is the interaction between risk and delayed response that escalates danger during labor.

Overall, maternal mortality in Jayapura emerges as a systemic phenomenon shaped by interconnected delays rather than isolated incidents. The findings illustrate how structural health system challenges, socio-cultural norms, and geographic barriers collectively produce conditions in which preventable deaths remain possible even within an urban healthcare environment.

4. Discussion

The findings of this study demonstrate that maternal mortality during childbirth in Jayapura cannot be understood solely as a clinical failure but must be interpreted as a multidimensional governance issue shaped by social norms, geographical inequality, and systemic health service constraints. While the Three Delays Model has long provided a useful framework for examining maternal mortality, this research shows that the delays are not isolated stages; rather, they form a cumulative pathway of risk in which early social decisions cascade into structural health system challenges.

The first delay, related to decision-making within families, reflects deeply embedded socio-cultural dynamics that influence perceptions of childbirth risk. Limited recognition of danger signs, economic considerations, and reliance on traditional beliefs contribute to delayed health-seeking behavior. Similar patterns have been observed in maternal health research across low- and middle-income settings, where gendered power relations and household decision structures shape access to care (Cresswell et al., 2025; Thaddeus & Maine, 1994). In Jayapura, these dynamics appear intensified by local cultural contexts and uneven health literacy, suggesting that maternal mortality is partly rooted in social negotiation processes rather than purely medical factors.

The second delay highlights how spatial inequality continues to define maternal health outcomes, even within urbanizing regions. Transportation barriers, long travel times, and geographical fragmentation remain significant obstacles to timely referral. This finding resonates with broader discussions on health system accessibility in archipelagic and remote regions, where physical infrastructure and emergency referral networks often lag behind population needs (De Jonge et al., 2015). Rather than representing isolated logistical issues, these barriers illustrate how maternal mortality is embedded within broader patterns of regional development disparities and infrastructural governance.

The third delay reveals structural vulnerabilities within health service delivery itself. Shortages of trained personnel, limited facility readiness, and slow referral procedures indicate that institutional capacity remains a critical determinant of maternal survival. From a systems perspective, this delay reflects organizational bottlenecks rather than individual clinical errors. Contemporary maternal health scholarship increasingly emphasizes that improving survival outcomes requires strengthening institutional coordination, professional training, and resource allocation within obstetric care systems

(Kruk et al., 2018). The Jayapura case reinforces this argument by demonstrating that even when mothers reach health facilities, systemic readiness determines whether life-saving interventions can be delivered in time.

Importantly, the interaction among the three delays suggests that maternal mortality emerges from overlapping vulnerabilities rather than discrete events. Cultural norms influencing early decision-making intersect with geographical barriers and institutional capacity constraints, producing compounded risks throughout the childbirth pathway. This integrated perspective challenges approaches that treat maternal mortality as a singular medical outcome and instead positions it as a socio-technical phenomenon shaped by governance structures, gender relations, and health system resilience.

From a broader perspective, these findings contribute to ongoing debates on maternal health within the Sustainable Development Goals framework, particularly in relation to reducing preventable deaths and strengthening equitable health systems. The Jayapura context illustrates how local realities reshape global models, indicating that policy responses must move beyond standardized interventions toward context-sensitive strategies that address cultural, spatial, and institutional dimensions simultaneously.

5. Conclusions

This study demonstrates that maternal mortality during childbirth in Jayapura emerges not from a single clinical failure but from the interaction of social decision-making processes, geographical constraints, and institutional readiness within the health system. By applying the Three Delays Model through a qualitative policy lens, the findings reveal that delays are not independent stages but interconnected pathways that cumulatively shape maternal risk. Cultural perceptions of childbirth, family-level decision authority, and limited recognition of danger signs initiate the first layer of vulnerability, which is then intensified by transportation barriers and uneven infrastructure. Even when mothers reach health facilities, structural limitations in staffing, coordination, and service preparedness continue to influence outcomes, indicating that maternal mortality reflects broader systemic conditions rather than isolated medical events.

Conceptually, this research advances existing maternal health scholarship by reframing the Three Delays Model from a sequential clinical framework into a socio-structural governance perspective. Instead of viewing delays merely as operational obstacles, the study positions them as manifestations of gendered social relations, spatial inequality, and institutional capacity gaps that intersect throughout the childbirth process. This shift contributes to a deeper understanding of maternal mortality as a multidimensional phenomenon shaped by interactions between individual agency and structural context. By integrating cultural, geographical, and organizational dimensions into one analytical lens, the study extends current discussions on maternal health beyond biomedical explanations toward a more holistic interpretation of risk.

Theoretically, the paper highlights the importance of contextualizing maternal health models within local governance environments. While global frameworks often emphasize universal indicators, the Jayapura case illustrates that maternal mortality must be analyzed through localized configurations of culture, infrastructure, and policy implementation. This contextualized perspective aligns with emerging debates on health equity and emphasizes that effective maternal health strategies require adaptive governance rather than standardized interventions. The study therefore contributes to the growing body of literature that bridges public health, gender studies, and policy analysis by demonstrating how structural inequalities shape maternal outcomes in geographically diverse regions.

From a policy standpoint, the findings suggest that reducing maternal mortality requires integrated interventions across multiple levels. Strengthening community-based

health literacy and family decision-making capacity addresses the first delay, while improving transportation systems and referral coordination mitigates access barriers associated with the second delay. Equally important is the reinforcement of institutional readiness through workforce development, infrastructure investment, and streamlined clinical protocols to address the third delay. These interconnected strategies reflect the need for systemic transformation rather than fragmented programmatic responses.

Ultimately, this research argues that maternal mortality should be understood as a reflection of how societies organize care, allocate resources, and negotiate gendered power within health systems. By shifting analytical focus from isolated medical complications toward structural determinants, the study offers a more comprehensive framework for understanding and addressing maternal health disparities in complex regional contexts.

References

- Abanga, E. A., Ziblim, A. M., & Boah, M. (2025). Antenatal care quality and pregnancy outcomes in the northern region of Ghana: A mixed-methods analysis. *BMC Pregnancy and Childbirth*, 25(1), 810. <https://doi.org/10.1186/s12884-025-07915-3>
- Ahmed, S., & Fullerton, J. (2019). Challenges of reducing maternal and neonatal mortality in Indonesia: Ways forward. *International Journal of Gynecology & Obstetrics*, 144(S1), 1–3. <https://doi.org/10.1002/ijgo.12728>
- Amponsah-Tabi, S., Dassah, E. T., Asubonteng, G. O., Ankobea, F., Annan, J. J. K., Senu, E., ... Opare-Addo, H. S. (2022). An assessment of the quality of antenatal care and pregnancy outcomes in a tertiary hospital in Ghana. *PLOS ONE*, 17(10), e0275933. <https://doi.org/10.1371/journal.pone.0275933>
- Anumudu, S. I., Uhegwu, C. C., & Anumudu, C. K. (2025). A scoping review of maternal mortality, its health determinants, and factors that influence care utilization in women of child-bearing years in Nigeria. *Global Health Journal*, 9(3), 185–199. <https://doi.org/10.1016/j.glohj.2025.10.004>
- Ayehu, T., Tiruneh, G. T., Tesfaye, C., Belete, M., Fesseha, N., Semahegn, A., ... Emaway, D. (2025). Facility readiness and experience of women and health care providers in receiving and delivering obstetric care in comprehensive health posts in Ethiopia: A mixed method study. *BMC Health Services Research*, 25(1), 303. <https://doi.org/10.1186/s12913-025-12453-x>
- Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27–40. <https://doi.org/10.3316/QRJ0902027>
- Braun, V., & Clarke, V. (2022). *Thematic Analysis: A Practical Guide*. London: SAGE Publications, Inc.
- Cresswell, J. A., Alexander, M., Chong, M. Y. C., Link, H. M., Pejchinovska, M., Gazeley, U., ... Say, L. (2025). Global and regional causes of maternal deaths 2009–20: A WHO systematic analysis. *The Lancet Global Health*, 13(4), e626–e634. [https://doi.org/10.1016/S2214-109X\(24\)00560-6](https://doi.org/10.1016/S2214-109X(24)00560-6)
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry & Research Design Choosing Among Five Approaches* (4th ed.). London: SAGE Publications, Inc.

- De Jonge, A., De Vries, R., Lagro-Janssen, A. L. M., Malata, A., Declercq, E., Downe, S., & Hutton, E. K. (2015). The Importance of Evaluating Primary Midwifery Care for Improving the Health of Women and Infants. *Frontiers in Medicine*, 2. <https://doi.org/10.3389/fmed.2015.00017>
- Green, J., & Thorogood, N. (2018). *Qualitative Methods for Health Research* (4th ed.). London: SAGE Publications, Inc.
- Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., ... Pate, M. (2018). High-quality health systems in the Sustainable Development Goals era: Time for a revolution. *The Lancet Global Health*, 6(11), e1196–e1252. [https://doi.org/10.1016/S2214-109X\(18\)30386-3](https://doi.org/10.1016/S2214-109X(18)30386-3)
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), 533–544. <https://doi.org/10.1007/s10488-013-0528-y>
- Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (Fourth edition). Thousand Oaks, California: SAGE Publications, Inc.
- Souza, J. P., Day, L. T., Rezende-Gomes, A. C., Zhang, J., Mori, R., Baguiya, A., ... Oladapo, O. T. (2024). A global analysis of the determinants of maternal health and transitions in maternal mortality. *The Lancet Global Health*, 12(2), e306–e316. [https://doi.org/10.1016/S2214-109X\(23\)00468-0](https://doi.org/10.1016/S2214-109X(23)00468-0)
- Sujana, T., Barnes, M., Rowe, J., & Reed, R. (2017). Decision Making towards Maternal Health Services in Central Java, Indonesia. *Nurse Media Journal of Nursing*, 6(2), 68. <https://doi.org/10.14710/nmjn.v6i2.12151>
- Symon, A., Mortensen, B., Pripp, A. H., Chhugani, M., Adjorlolo, S., Badzi, C., ... Cummins, A. (2025). Validating the Quality Maternal and Newborn Care Framework Index: A Global Tool for Quality-of-Care Evaluations. *Birth*, 52(2), 347–352. <https://doi.org/10.1111/birt.12895>
- Thaddeus, S., & Maine, D. (1994). Too far to walk: Maternal mortality in context. *Social Science & Medicine*, 38(8), 1091–1110. [https://doi.org/10.1016/0277-9536\(94\)90226-7](https://doi.org/10.1016/0277-9536(94)90226-7)
- Utirestantix, Purwanto, B. M., & Lukito-Budi, A. S. (2022). Role of Desire and Implementation of Intention in the Theory of Planned Behavior: A Bibliometric Analysis. *Binus Business Review*, 13(1), 97–107. <https://doi.org/10.21512/bbr.v13i1.7898>
- WHO. (2020). *Guidance for Research Ethics Committees for Rapid Review of Research During Public Health Emergencies* (1st ed). Geneva: World Health Organization.