ORIGINAL RESEARCH

Maternal, socioeconomic and healthcare factors associated with postpartum maternal mortality in Papua Province, Indonesia, based on secondary data analysis of IDHS 2020

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ABSTRACT

Objective: This study utilized data from the Indonesia Demographic Health Survey (IDHS) 2020 to examine the relationship between postpartum maternal mortality and several determinants, including maternal, socioeconomic, and healthcare-related factors in Papua Province.

Materials and Methods: A cross-sectional design with a quantitative analytical framework was applied, drawing on secondary data from IDHS 2020. The sample comprised 14,802 women aged 15–49 years. Data were analyzed through a simple logistic regression test for bivariate analysis with a 95% confidence level (α = 0.05). Subsequently, multivariate multiple logistic regression analysis was conducted on variables with a p-value of less than 0.25.

Results: Findings demonstrated that all variables (parity p<0.001 AOR=0.533 95% CI 0.375–0.758; place of residence p=0.001 AOR=2.526 95% CI 1.438–4.436; proficiency in Indonesian language p<0.001 AOR=0.039 95% CI 0.031–0.050; delivery attendant and place of birth p<0.001 AOR=0.118 95% CI 0.142–0.249, whereas wealth index status p=0.972 AOR=1.010 95% CI 0.565–1.806) showed a significant negative association with postpartum maternal mortality (p<0.05), except for the wealth index. The strongest association, with an odds ratio (OR) of 0.039, was identified in Indonesian language proficiency, indicating a 25.64-fold increase.

Conclusion: The findings provide a crucial evidence base for the development of policies and interventions aimed at lowering postpartum maternal mortality in Papua Province. Proficiency in the Indonesian language emerged as the most influential factor, underscoring the potential for targeted interventions and improved healthcare outcomes.

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Highlights:

1. Postpartum maternal mortality demonstrates associations with determinants including parity, place of residence, proficiency in the Indonesian language, socioeconomic status or wealth index, type of delivery attendant, and place of childbirth.
2. Proficiency in the Indonesian language constitutes the most dominant factor, plausibly indicating inequalities in healthcare access, levels of health literacy, and conditions of geographic or social marginalization.

INTRODUCTION

Strategic initiatives to strengthen health systems constitute an essential component of the 2030 development agenda within the Sustainable Development Goals (SDGs).[1] To reduce the global maternal mortality ratio (MMR), the World Health Organization (WHO) recommends intensifying strategies to improve health outcomes. Maternal mortality is defined as death during pregnancy or within 42 days of pregnancy termination, excluding accidental or incidental causes, but attributable to pregnancy or its management. According to the Indonesia Demographic Health Survey (IDHS), the maternal mortality rate in 2020 was 189 per 100,000 live births. By 2030, the SDGs target 70 per 100,000 live births. In Papua Province, the MMR was 289 per 100,000 live births in 2017 and increased to 565 per 100,000 live births in 2020, reflecting a substantial rise within three years.[2] This increase underscores persistent disparities in healthcare provision, regional infrastructure, and access to skilled health professionals, which remain major challenges in achieving national and global maternal health targets.

Maternal mortality is classified into direct and indirect causes. Direct maternal deaths primarily result from complications of pregnancy, delivery, and the postpartum period. Approximately 75% of maternal deaths are attributed to hemorrhage, infection, hyper-tensive disorders of pregnancy, obstructed labor, and unsafe abortion. Indirect maternal mortality arises from pre-existing conditions or comorbid illnesses aggravated during pregnancy.[3] In Indonesia, the prevalence of Four High and Three Delays represents the leading indirect contributors to maternal mortality. The Four High cases encompass conditions that, when not adequately identified and managed, may result in fatal outcomes, with risk factors including maternal age and parity.[3] The Three Delays involve slow decision-making regarding referral to appropriate health facilities, delayed recognition of pregnancy danger signs, and delayed access to suitable care once at medical centers. Family-level decision-making often contributes to referral delays, highlighting the necessity to strengthen determinants influencing health-seeking behavior and recognition of puerperal complications. Expanding transportation infrastructure is critical to reduce referral delays and facilitate prompt access to healthcare. Furthermore, prolonged administrative processes, inadequate referral centers, insufficient medical personnel, lack of pre-facility readiness, and limited blood supply contribute to treatment delays, necessitating Regional Government reforms to support maternal mortality reduction in Papua Province.[4]

Parity, defined as the number of children a woman has delivered alive or deceased, is closely related to maternal mortality during the postpartum period. Parity serves as an indirect marker of maternal well-being during pregnancy and neonatal outcomes at birth.[3] Social determinants associated with residential settings, particularly rural versus urban environments, reflect health disparities in specific populations. Variations in population density, demographic structure, lifestyle patterns, employment, health perceptions, living standards, and sanitation contribute to differences in morbidity and mortality across rural and urban areas.[5] Another social determinant is proficiency in the Indonesian language. Limited fluency often reflects social isolation, especially among populations in remote areas lacking access to education and technology, such as rural communities in Papua. In this context, linguistic capacity functions not only as a communication skill but also as a critical determinant of health literacy, shaping how women understand medical instructions, navigate health systems, and utilize preventive services.

In Indonesia, many individuals are bilingual, speaking local languages as their mother tongue while using Indonesian as a second language.[6] Economic determinants, including the status/wealth index, affect household financial resources and consequently influence healthcare utilization. Households with lower socioeconomic status must expend greater effort to access healthcare services compared to wealthier households.[5] Healthcare-related factors also include delivery attendants, professionals committed to maternal health, whose skills and expertise are acquired through formal training and regulated licensure, which is essential to ensure safe healthcare practices.[7] Additionally, the place of delivery remains a critical factor, distinguishing between healthcare-based and non-healthcare-based settings. Non-healthcare delivery sites include the mother's home, residences of untrained personnel, or other locations without access to adequate health infrastructure.[8]

MATERIALS AND METHODS

This research was quantitative analytical, using secondary data from SDKI 2020. This research was conducted in Surabaya with data from October 2023 to March 2024. The study consisted of 20,482 women aged 15 to 49. There were originally 439,562 data for this study, but only 14,802 data remained after cleaning. This study was a total sample with inclusion criteria using data on postpartum maternal deaths that occurred within two years. Exclusion criteria in this study included incomplete data and different RUTA IDs. SPSS software version 26 for Windows was used to

classify and organize the study findings. This study received ethical approval from the Health Research Ethics Committee of the Faculty of Medicine Universitas Airlangga Surabaya, numbered 41/EC/KEPK/FKUA/2024. This ethics declaration applies from February 6, 2024 until February 6, 2025. Variables independent in this study are parity, living place, Indonesian language ability, status/wealth index, delivery attendant, and place of delivery. Variable Independent in this study is postpartum maternal mortality.

RESULTS AND DISCUSSION

The 2020 SDKI data classify the dependent variable into four distinct categories of maternal mortality: pregnancy, abortion, delivery process, and postpartum period. Results from the Central Bureau of Statistics indicate that maternal mortality in Papua Province is substantially higher than in other provinces. Table 1 presents the distribution of maternal mortality in Papua Province in 2020.

The study evaluated several independent variables, namely parity, place of residence, Indonesian language proficiency, socioeconomic status or wealth index, delivery attendant, and place of delivery. Table 2 illustrates the distribution of parity, living place, Indonesian language ability, status/wealth index, delivery attendant, and place of delivery.

A logistic regression analysis was performed to determine the association between parity and maternal mortality in Papua Province in 2020. The regression results demonstrated a p-value of less than 0.05, indicating a statistically significant relationship between parity and maternal mortality at the 0.05 level. The association between parity and postpartum maternal mortality revealed a negative Odds Ratio. Mothers with more than three children were at greater risk of maternal death compared with mothers having fewer than three children.[9] Logistic regression was further applied to evaluate the association between place of residence and maternal mortality in Papua Province in 2020. The test yielded a p-value of less than 0.05, establishing a significant association between place of residence and maternal mortality at the 0.05 significance level.

The odds ratio demonstrated a negative correlation between place of residence and postpartum maternal mortality. Mothers residing in urban areas were found to be at greater risk of maternal death compared with those in rural areas.[9] Logistic regression was also employed to examine the relationship between Indonesian language proficiency and maternal mortality in Papua Province in 2020. The analysis revealed a p-value of less than 0.05, indicating a significant association between Indonesian language ability and maternal mortality at the 0.05 level. The Odds Ratio further indicated a negative association, whereby mothers proficient in Indonesian were at higher risk of maternal death compared with mothers without proficiency.[9]

Table 1. Distribution of maternal mortality in Papua Province 2020

Maternal mortality	Death n (%)	Life n (%)
Pregnancy	121 (26.30)	
Abortion	66 (14.35)	
Delivery process	204 (44.35)	
Postpartum period	69 (15)	
Total	460 (3.10)	14.342 (96.90)

Table 2. Distribution of parity, living place, Indonesian language ability, status/wealth index, delivery attendant, place of delivery

Factors	Categories	n (%)
Parity	> 3 children	2421 (16.36)
	≤ 3 children	12.381 (83.64)
Living place	Urban	4.136 (27.94)
	Rural	10.666 (72.06)
Indonesian language ability	Able	14.316 (96.72)
	Not capable	486 (3.28)
Status/wealth index	Middle to upper	3.693 (24.95)
	Middle to lower	11.109 (75.05)
Delivery attendant	Healthcare professional	10.562 (71.36)
	Non-healthcare professional	4.240 (28.64)
Place of delivery	Healthcare facility	10.562 (71.36)
	Non-healthcare facility	4.240 (28.64)

Table 3. Results from simple logistic regression parity, living place, Indonesian language ability, status/wealth index, delivery attendant, place of delivery with postpartum maternal mortality

Postpartum maternal mortality factors	Categories	p-values	Odds Ratio (95%CI)
Parity	> 3 children ≤ 3 children	0.000	0.478 (0.345-0.664)
Living place	Urban Rural	0.000	0.542 (0.425-0.691)
Indonesian language ability	Able Not capable	0.000	0.026 (0.021-0.033)
Status/wealth index	Middle to upper Middle to lower	0.000	0.513 (0.395-0.665)
Delivery attendant	Healthcare professional Non-healthcare professional	0.000	0.159 (0.130-0.195)
Place of delivery	Healthcare facility Non-healthcare facility	0.000	0.159 (0.130-0.195)

A logistic regression analysis assessed the relationship between the status/wealth index and maternal mortality in Papua Province in 2020. The regression produced a p-value of less than 0.05, confirming a significant association between the status/wealth index and maternal mortality. This association was statistically significant at the 0.05 level. The Odds Ratio indicated a negative relationship between the status/wealth index and postpartum maternal mortality. Mothers from middle-to-upper socioeconomic groups were found to be at greater risk of maternal death compared with mothers from middle-to-lower groups.[9]

A logistic regression test was conducted to analyze the correlation between delivery attendants and maternal mortality in Papua Province in 2020. The regression yielded a p-value of less than 0.05, indicating a statistically significant association between delivery attendants and maternal mortality at the 0.05 level. The Odds Ratio demonstrated a negative correlation between delivery attendants and postpartum maternal mortality. Mothers attended by healthcare professionals during delivery were more likely to experience maternal death compared with those attended by non-healthcare providers.[9] Logistic regression was further applied to assess the association between place of delivery and maternal mortality in Papua Province in 2020. The regression test produced a p-value of less than 0.05, confirming a significant association between place of delivery and maternal mortality at the 0.05 level. The Odds Ratio demonstrated a negative association between place of delivery and postpartum maternal mortality. Mothers who delivered in healthcare facilities were at higher risk of maternal death compared with mothers delivering in non-healthcare settings.[9] Referral delays were identified as a contributing factor to deaths occurring in healthcare facilities. These referral delays in Papua are attributed to difficult geographic accessibility, which results in prolonged processing times. Table 3 presents the regression outcomes.

Hazairin et al. (2021) reported that the weakening and decline in reproductive organ function increase the likelihood of complications, low birth weight, and other health problems that threaten maternal safety. Furthermore, high parity is generally associated with advanced maternal age and shortened birth intervals, both of which heighten maternal risk. Based on the findings of this study, it is recommended that the government strengthen family planning programs within communities to enhance awareness of the risks during pregnancy, childbirth, and the postpartum period that may arise when parity is high or non-ideal, defined as more than three children.[3] Rosales et al. (2019) emphasized that postpartum hemorrhage represents a critical danger sign, requiring the decision to seek medical help to be made as quickly as possible. Within Papuan communities, however, decision-making is predominantly influenced by the husband.

Pregnancy and postpartum care are often still conducted at home by non-healthcare providers when immediate intervention is required. In most cases, care is sought outside the household but not at established health facilities, as mothers and families frequently fail to recognize danger signs of pregnancy through the postpartum period. Decisions to seek emergency care in formal health facilities are generally made only after non-healthcare personnel are unable to manage the condition. Maternal mortality is strongly associated with delays in seeking professional assistance, which result from both limitations in recognizing obstetric danger signs and delays in receiving definitive treatment at the health facility level.[10]

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To date, no studies have explicitly reported that mothers fluent in Indonesian face an elevated risk of maternal death; however, Fiharsono (2021) emphasized that the socio-cultural heterogeneity of Papua can be characterized through distinctions between urban, rural, and remote communities. This investigation further identified that populations proficient in Indonesian are more commonly concentrated in rural areas.[11] Khayati et al. (2018) additionally observed that families within the middle-to-upper socioeconomic strata were often associated with maternal employment. Their study demonstrated a significant correlation between maternal occupational status, heightened stress levels during pregnancy, and the occurrence of preeclampsia. Persistent stress sustains a physiologically activated state marked by excessive secretion of adrenaline and cortisol, stress hormones that compromise the maternal immune system. As a result, pregnant women become more vulnerable to multiple disorders, with pre-eclampsia representing a major concern. Complications arising from preeclampsia commonly persist throughout labor and frequently extend into the postpartum period.[12]

Afrida et al. (2022) reported that the crisis in healthcare professional availability across Indonesia has markedly influenced the effectiveness of national health development efforts. Papua Province remains among the regions experiencing uneven distribution of healthcare personnel, undermining the quality of maternal health services and directly contributing to maternal mortality. Fatalities frequently occur due to referral delays and treatment initiation, even after mothers have reached the presence of healthcare providers.[13] Munro et al. (2022) observed that Papuans place strong cultural emphasis on vaginal delivery while generally avoiding cesarean section. In practice, women and their families often confront or negotiate with physicians, decline recommended cesarean procedures, or insist upon clear justification before granting consent. Some avoid hospitals altogether to avert surgical intervention. These practices constitute an important contributor to maternal mortality, as they lead to substantial delays in decision-making and the initiation of treatment within health facilities.[14]

The initial study hypothesis proposed that parity was the most dominant determinant of maternal mortality in Papua Province in 2020. Nevertheless, results from multiple logistic regression analysis revealed that proficiency in Indonesian demonstrated the strongest association with postpartum maternal mortality, with negative test outcomes. The Indonesian language variable yielded a correlation coefficient of 0.039, corresponding to a 25.64-fold greater risk of postpartum maternal death. Mothers fluent in Indonesian were determined to be at higher risk of mortality compared to mothers lacking such proficiency.[15] The analysis results are displayed in Table 4. This outcome is likely attributable to the predominance of Indonesian-speaking populations in rural villages (OR=0.063), where referral delays are substantially more common. Therefore, in addition to implementing health promotion strategies, it is essential to encourage pregnant and postpartum women to reside closer to healthcare facilities. Furthermore, government efforts should prioritize expanding the establishment of healthcare centers in rural settings, particularly in areas where difficult terrain and limited accessibility hinder timely referral to the nearest facility.[16]

The development of rural healthcare facilities is fundamental in reducing maternal mortality by guaranteeing the provision of critical services, such as antenatal care, skilled attendance at delivery, and emergency obstetric management. These centers are equally vital in enhancing community awareness of safe maternal health behaviors and potential risks associated with pregnancy.[17] The presence of trained healthcare personnel, including midwives and physicians, during childbirth ensures the early detection and treatment of life-threatening complications such as obstructed labor and postpartum hemorrhage.[18] Regular antenatal visits at these centers enable timely detection of pregnancy-related complications and strengthen postnatal care, thereby reducing the risk of maternal and neonatal morbidity and mortality.[19] In emergency situations, village-based healthcare facilities serve as critical stabilization points, providing immediate care and organizing referral to higher-level institutions—an indispensable role in areas with limited transport networks. Furthermore, these centers function as focal points for health education, equipping mothers and families with essential knowledge on birth preparedness, danger sign recognition, and utilization of available maternal health services.[20]

Table 4. Results from multiple logistic regression factor with postpartum maternal mortality

Maternal mortality	Factors	p-values	Odds Ratio (95% CI)
Postpartum maternal mortality	Parity	0.000	0.533
	Living place	0.001	2.526
	Indonesian language ability	0.000	0.039
	Status/wealth index	0.972	1.010
	Delivery attendant	0.000	0.188
	Place of delivery	0.000	0.188

Table 5. Relationship between Indonesian language ability and living place

Factors	p-values	Odds Ratio (95% CI)
Indonesian language ability	0.000	0.063
Living place	0.000	0.063

The strong association between the ability to speak Indonesian and postpartum maternal mortality, as revealed in this study, may initially appear unexpected—especially given that language proficiency is generally assumed to facilitate access to healthcare (Table 5). However, in the sociocultural and geographic context of Papua, this finding can be meaningfully interpreted through a broader understanding of structural health determinants. In this case, Indonesian language ability appears not as a protective factor but rather as a proxy for other underlying risks. The study found that women who speak Indonesian are more likely to reside in rural areas of Papua with limited access to health facilities, skilled birth attendants, and emergency obstetric care.

Thus, contrary to typical assumptions, proficiency in the national language does not necessarily translate to better health outcomes in this setting. Instead, it may reflect exposure to circumstances that increase vulnerability—such as poor infrastructure, social exclusion, or the absence of culturally appropriate services. The limited availability of quality maternal healthcare in these rural communities likely contributes more significantly to maternal mortality than language proficiency alone. Furthermore, the extraordinarily high adjusted odds ratio (AOR = 0.039) suggests a complex interplay of risk factors. Indonesian language ability, in this context, may signal a subset of the population that, despite linguistic fluency, remains marginalized in terms of access to timely and adequate maternal care.

In summary, Indonesian language ability in Papua should not be interpreted as a straightforward advantage in maternal health. Instead, it reflects deeper systemic vulnerabilities—geographic isolation, healthcare inequity, and limited service reach—which must be addressed through inclusive, community-based, and regionally tailored health interventions.

Strength and limitation

The advantage of secondary data lies in the rapid and straightforward data collection method. The Secondary Data Analysis of IDHS offers a range of intriguing data that yield comprehensive insights into Indonesian society's demographic and health aspects. The constraints of secondary data research arise from the outcomes of interviews. Completing questionnaires necessitates that respondents depend solely on recollection, potentially leading to recall bias and insufficient clarity of the essential information. The data employed is solely from the datasheet, limiting the factors analyzed. Secondary data necessitates a process of elimination to obtain the requisite information for researchers, along with a coding procedure due to inconsistencies in specific codes relative to the research.

CONCLUSION

The results indicated that all factors—parity, living place, Indonesian language ability, delivery attendant, and place of delivery—were significantly associated with postpartum maternal mortality, except for the status/wealth index. The strongest association was observed in Indonesian language ability. This finding likely reflects broader disparities in healthcare access, health literacy, and geographic or social marginalization. The research provides a strong foundation for future policies and interventions to reduce postpartum maternal mortality in Papua Province, with Indonesian language ability emerging as the most dominant factor,

highlighting the need for targeted, inclusive, and linguistically accessible healthcare strategies.

DISCLOSURES

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Conflict of interest

This study presents no potential physical or psychological risks, as it utilizes secondary data derived from IDHS 2020. The author declares no conflict of interest associated with this research.

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Author contribution

All authors contributed equally to every stage of the research process, including study design, data acquisition and analysis, manuscript drafting, and final approval of the version submitted for publication.

REFERENCES

1. Maternal mortality [Internet]. [cited 2023 Nov 21]. Available from: https://www.who.int/news-room/fact-sheets/detail/maternal-mortality
2. Preventing Pregnancy-Related Deaths | CDC [Internet]. 2023 [cited 2023 Nov 21]. Available from: https://www.cdc.gov/reproductivehealth/maternal-mortality/preventing-pregnancy-related-deaths.html
3. Kurniawan R, Melaniani S. Hubungan paritas, penolong persalinan dan jarak kehamilan dengan angka kematian bayi di Jawa Timur [Relationship between parity, birth attendant and pregnancy spacing with infant mortality rate in East Java]. Jurnal Biometrika dan Kependudukan. 2018;7(2): 113–121. doi: 10.20473/jbk.v7i2.2018.113-121.
4. Ulfah M. Analisis kematian ibu ditinjau dari Tiga Terlambat pada rujukan maternal desa siaga dengan P4K di Kabupaten Bojonegoro tahun 2016-2018 [Analysis of maternal mortality given Three Delays in maternal referral of alert village with P4K in Bojonegoro Regency in 2016-2018] [Repository]. Surabaya: Universitas Airlangga; 2019.
5. Lengkong GT, Langi FL, Posangi J. Factors associated with infant mortality in Indonesia. Journal of KESMAS. 2020;9(4).
6. Language Center of Papua Province. Indonesian language development in Papua province in 2020. [Internet]. Available from https://www.pusatbahasa provinsipapua
7. Ulfa DN. Analisis determinan antara pada kasus kematian ibu di kota Tasikmalaya tahun 2018 [Analysis of intermediate determinants in maternal mortality cases in Tasikmalaya City in 2018]. [Repository]. Tasikmalaya: Universitas Silliwangi; 2019.
8. Ray JG, Fu L, Austin PC, et al. Teen pregnancy and risk of premature mortality. JAMA Netw Open. 2024;7(3):e241833. doi: 10.1001/jamanetworkopen.2024.1833. PMID: 38483391; PMCID: PMC 10940968.
9. Hosmer DW, Lemeshow S, Sturdivant RX. Applied Logistic Regression. New York: John Wiley & Sons; 2013.
10. Rosales A, Sulistyo S, Miko O, et al. Recognition of and care-seeking for maternal and newborn complications in Jayawijaya district, Papua province, Indonesia: a qualitative study. J Health Popul Nutr. 2017;36(Suppl 1):44. doi: 10.1186/s41043-017-0122-0. PMID: 29297380; PMCID: PMC5764 054.
11. Fiharsono A, Carey M, Hyde M. et al. Culturally based learning needs of Korowai students in a lowland-remote area of Indonesian Papua:school physical environment and building design. Aust Educ Res. 2024:51;611–29. doi: 10.1007/s13384-023-00615-x.
12. Khayati YN, Veftisia V. Hubungan stress dan pekerjaan dengan preeklamsia di wilayah Kabupaten Semarang [Relationship between stress and work with preeclampsia in Semarang Regency Area]. Indonesian Journal of Midwifery. 2018;1:35-40. doi: 10.35473/ijm.v1i1.38.
13. Afrida ND, Wulandari SP. Pemetaan fasilitas tenaga kesehatan berdasarkan kabupaten/kota di Provinsi Papua [Health care facility mapping based on districts/towns in Papua Province]. Jurnal Sains dan Seni ITS. 2022;11(1):D57–63. doi: 10.12962/j23373520.v11i1.62871.
14. Munro J, Katmo ETR, Wetipo M. Hospital births and frontier obstetrics in urban West Papua. The Asia Pacific Journal of Anthropology. 2022;23(4–5):388–406. doi: 10.1080/14442213.2022.2115121.
15. Bursac Z, Gauss CH, Williams DK, et al. Purposeful selection of variables in logistic regression. Source Code Biol Med. 2008;3:17. doi:

10.1186/1751-0473-3-17. PMID: 19087314; PMCID: PMC2633005.
16. Laksono AD, Wulandari RD. Urban–rural disparities of facility-based childbirth in Indonesia. In: Proceedings of the 4th International Symposium on Health Research (ISHR 2019). Advances in Health Sciences Research. 2020;22. Atlantis Press, pp. 33-9. ISBN 10.2991/ahsr.k.200215.007
17. Mathar I, Klevina MD, Sebtalesy CY. A literature review of maternal mortality in the countryside. What are the policies and prevention? Asian Journal of Healthy and Science. 2024;3(8):197-209. doi: 10.58631/ajhs.v3i8.110.
18. Regif SY, Nasution FA, Pattipeilohy A, et al. Revitalizing rural healthcare: a case study of village maternity cottages in Indonesia. International Journal of Sustainable Development and Planning. 2023;18(10):3309-16. doi: 10.18280/ijsdp.181030.
19. Chhabra S, Kanade M. Need of going beyond creating rural health facilities and community based care for prevention of maternal deaths. J Clin Exp Reprod Med. 2024;1(1):12-25. doi: 10.46439/reproductivemed.1.003.
20. Damayanti NA, Wulandari RD, Ridlo IA. Maternal health care utilization behavior, local wisdom, and associated factors among women in urban and rural areas, Indonesia. Int J Womens Health. 2023;15: 665-77. doi: 10.2147/IJWH.S379749. PMID: 37163 191; PMCID: PMC10164391.