Exploring the factors leading to tiered referrals of pregnant women until tertiary healthcare facilities: An in-depth analysis

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ABSTRACT

Introduction: Maternal mortality in Indonesia remains a significant health issue, with a mortality rate of 305 per 100,000 live births, the highest in Southeast Asia. Prolonged referral processes and delays in receiving medical assistance are major factors contributing to the high maternal mortality rate.

Objective: This study aims to explore the factors influencing tiered referrals of pregnant women to tertiary healthcare facilities.

Materials and Methods: This descriptive analytical study uses secondary data from medical records of patients admitted to the Obstetrics and Gynecology Maternity Room at Dr. Soetomo Hospital, Surabaya, from July to September 2023, with ethical clearance number 2813/104/4/III/2024. Sampling was done using the total sampling method, with the dependent variable being the referral source (hospital and non-hospital) and independent variables including the number of Antenatal Care (ANC) visits, BMI, gravidity, residence, occupation, and education. Data analysis was performed using multiple logistic regression with SPSS Software.

Results: Among the 280 patients studied, the majority were referred from hospitals (196 patients), and most had abnormal BMI (193 patients). Logistic regression analysis showed that women from rural areas had significantly higher delays in referrals compared to urban residents (p=0.004), while other variables such as age, number of ANC visits, BMI, gravidity, occupation, and education did not show significant influence.

Conclusion: Place of origin is a critical factor influencing referral outcomes, highlighting the significant role of geographical and socio-economic determinants in the accessibility and quality of maternal healthcare services. This study underscores the necessity of an effective and timely referral system to mitigate maternal mortality rates in Indonesia, particularly emphasizing the need for enhanced referral infrastructure in rural areas to ensure prompt access to maternal care and ultimately reduce maternal mortality.

Summary: Indonesia's maternal mortality rate remains high (305 per 100,000 live births), influenced by prolonged referral processes. Secondary data from 280 medical records at Dr. Soetomo General Hospital, Surabaya (July–September 2023), revealed that most patients were referred from hospitals (196), predominantly exhibiting abnormal BMI (193). Logistic regression analysis identified residential location (rural vs. urban) as significantly impacting referral outcomes (p=0.004), whereas other factors (age, ANC visits, BMI, gravidity, occupation, education) showed no significant influence. These findings highlight the critical role of geographic and socioeconomic conditions in maternal healthcare accessibility and emphasise the importance of an efficient and timely referral system to reduce maternal mortality in Indonesia.

KEYWORDS:
Tertiary Care Centers, Maternal Mortality, Antenatal Care, Socioeconomic Factors, Maternal Health Services

INTRODUCTION

Maternal mortality remains a critical issue both in Indonesia and globally. Despite the World Health Organization's 2017 estimate of 177 maternal deaths per 100,000 live births[1], Indonesia's national data reports a significantly higher maternal mortality rate of 305 deaths per 100,000 live births in 2023. Furthermore, the country has the second highest neonatal mortality rate in Southeast Asia, with approximately 32 neonatal deaths per 1,000 live births.[2] The target is to reduce this number to 74 per 100,000 live births by 2025.[3] There is a significant disparity in maternal mortality rates between developed and developing countries. In developed countries, the rate is much lower, at 12 per 100,000 live births, but in Sub-Saharan Africa, it can reach 546 per 100,000 live births.[4]

Various factors contribute to maternal mortality, such as prolonged referral processes, delays in decision-making, delays in arrival at healthcare facilities, and delays in receiving medical assistance.[5,6] Research has shown that delayed referrals can lead to poor outcomes for both mothers and newborns, highlighting the importance of a timely and efficient referral system in preventing maternal deaths.[7] Addressing delays in the referral process, such as triage

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delays and inadequate access to healthcare facilities, it is crucial in reducing maternal mortality and improving maternal healthcare outcomes.[8] Therefore, an assessment of the factors related to referrals is necessary.

MATERIALS AND METHODS

This study is a descriptive analytical research using secondary data from medical records of patients admitted to the Obstetrics and Gynecology Maternity Room at Dr. Soetomo Hospital, Surabaya. The data collection period was from July to September 2023 with ethical clearance number 2813/104/4/III/2024 after thorough considerations by specialists, residents, and other healthcare professionals. Patients with incomplete medical records or patients transferred from tertiary hospitals were excluded. The sampling method used was total sampling.

The dependent variable in this study is the source of patient referral, categorized into hospital and non-hospital group. Non-hospitals includes Self-Administered Patients, Independent Practicing Midwives, Clinic, and Community Health Centers. Hospital referral is from secondary hospital. The independent variables are as follows: the number of ANC visits (based on the Ministry of Health of the Republic of Indonesia, 2020 [9], categorized as normal if ≥ 6 times and abnormal if < 6 times), BMI (based on the Ministry of Health's P2PTM, 2018 (10), categorized as normal if 18.5 – 25 and abnormal if <18.5 or >25), gravidity (categorized as normal if ≤ 4 and abnormal if >4), residence (categorized into rural and urban), occupation (categorized into unemployed and employed), and education (categorized into out-of-school and in school).

Research data analyze in two method using SPSS software. First, the univariate level, the percentage distribution of the research sample is presented to show the distribution of respondents according to the characteristics mentioned above. Futher, Multiple logistic regression was performed to further test relationship between referral source and its independent variables. The results are presented as adjusted odds ratio (OR) estimates with 95% confidence intervals (CI).

RESULTS

The table shows the number of ANC (Antenatal Care) visits at various healthcare facilities in Indonesia, including Independent Practicing Midwives, Community Health Center, Clinic, Obstetrics and Gynecology Specialist Practices, and Hospital. The data indicate that the majority of ANC visits occur only once, primarily at community health center (189 visits), Hospitals (116 visits), and independent practicing midwives (76 visits). Clinics exhibit a more evenly distributed range of ANC visits. There are no cases where no ANC visits were reported. The highest total number of ANC visits was recorded at hospitals (284 visits), followed by Clinic (271 visits), and Community Health Center (255 visits).

The table also shows the number of patients based on their referral sources to healthcare facilities. Most patients were referred from hospitals (196 patients), followed by self-administered patients (75 patients). Referrals from community health center (4 patients), independent practicing midwives (3 patients), and clinic (2 patients) were relatively few. The total number of referred patients was 280.

The table describes patient characteristics across various categories. A total of 193 patients had an abnormal BMI, while 87 patients had a normal BMI. Regarding gravidity, 22 patients had an abnormal gravidity condition, and 258 patients had a normal gravidity condition. Based on the patients residence, 126 patients were from rural areas and 154 patients were from urban areas. In terms of occupation, the majority of patients, 225 in total, were unemployed, while 55 patients were employed. Regarding education, 85 patients had out-of-school, while 195 patients had in school. Overall, the majority of patients had an abnormal BMI, normal gravidity, were from urban areas, were unemployed, and had formal education.

The results of the logistic regression analysis show the influence of various variables on the observed outcomes. The variables included in the model are age category (age), ANC category (ANC), Body Mass Index category (BMI), gravidity category (gravidity), place of residence (residence), employment category (occupation), and education category (education).

The analysis results indicate that the age category (age), ANC category (ANC), Body Mass Index category (BMI), gravidity category (gravidity), employment category (occupation), and education category (education) are not significant predictors of the outcome. However, one variable stands out: place of residence, which has a significant influence on the outcome. Rural residents were 58% more likely to experience referral delays compared to urban residents (OR 0.42, 95% CI: 0.23-0.76, p=0.004).

Additionally, the constant variable also shows a significant influence on the outcomes, indicating geographical or socio-economic factors of the patient play an important role in maternal outcomes.

DISCUSSION

Based on the research findings, the variables of age category, number of antenatal care (ANC) visits, body mass index (BMI), gravidity, and employment were not significant. The lack of significance for age category may be attributable to the homogeneity of the study population or the presence of unmeasured confounding variables, such as healthcare provider availability and emergency transport accessibility, which could have influenced the outcomes. Similarly, the number of ANC visits might show no significant effect due to the inconsistent quality of services provided in different healthcare settings, creating limited variation in measurable outcomes. Furthermore, BMI, gravidity, and employment could be overshadowed by other unmeasured factors.

Nonetheless, place of residence demonstrated a significant influence, suggesting that socio-economic or geographical aspects of a patient's living environment may play a pivotal role. These findings suggest that residence-based disparities—such as differing accessibility to healthcare services, environmental conditions, and cultural practices—may contribute to variations in maternal health behaviors and outcomes.

Table I: Characteristics of antenatal visits

Number of ANC	Independent Practicing Midwives	Community Health Center	Clinic	Obstetrics and Gynecology Specialist Practices	Hospitals
0	0	0	0	0	0
1	76	189	30	104	116
2	18	26	16	8	26
3	18	12	30	12	33
4	20	4	36	16	16
5	5	5	45	10	25
6	-	12	36	-	24
7	7	7	21	7	35
8	-	-	16	-	-
9	-	-	18	-	9
10	10	-	10	-	-
13	-	-	13	-	-
Total	154	255	271	157	284

Table II: Distribution of Patients Based on Referral Sources

Referrer	Number of Patients
Independent Practicing Midwives	3
Self-Administered Patients	75
Clinic	2
Community Health Center	4
Hospital	196
Total	280

Table III: Demographic and Clinical Characteristics of Patients

Characteristics of Patients	Number of Patients
BMI Classification	
Abnormal	193
Normal	87
Gravidity	
Abnormal	22
Normal	258
Residence	
Rural	126
Urban	154
Occupation	
Unemployed	225
Employed	55
Education	
Out-of-School	85
In School	195

Table IV: Logistic Regression Analysis Results

Variable		p-value	OR	95% CI	
				Lower	Upper
Step 1a	Age	0,123	0,596	0,309	1,150
	Antenatal Care	0,242	0,696	0,380	1,276
	Body Mass Index	0,085	0,613	0,350	1,071
	Gravidity	0,537	1,394	0,487	3,993
	Residence	0,004	0,419	0,232	0,757
	Occupation	0,294	0,705	0,367	1,353
	Education	0,783	1,094	0,578	2,073
	Constant	0,002	5,529	-	-

a. Variable(s) entered on step 1: age, antenatal care, body mass index, gravidity, residence, occupation, education.

An effective referral system remains critical for maternal healthcare because it ensures timely access to specialized services, reduces maternal mortality rates, and supports the reduction of stillbirths and neonatal deaths.[8,11] Improved referral mechanisms also bolster maternal outcomes through adequate communication systems and standardized operational guidelines [12–14], along with the integration of emergency obstetric and neonatal care.[15–17] However, these benefits can be undermined by factors such as transportation limitations and broader socio-economic inequalities, which often impair referral efficiency.[13,18]

Similar access disparities have been observed in healthcare contexts such as kidney transplantation and genetic counseling, where socio-economic variables and physician referral patterns contribute to unequal service utilization.[19,20] Consequently, mitigating these disparities may include targeted educational interventions, quality improvements, and the adoption of electronic referral systems.[21–23]

Understanding how health access disparities affect maternal mortality at tertiary healthcare facilities requires consideration of multiple elements, including distance to care, availability of skilled midwives, and the comprehensiveness of maternal healthcare services.[24,25] Geographic barriers and shortages of trained providers can severely impede the management of obstetric emergencies.[26,27)]

In Indonesia, these obstacles can be categorized into modifiable and unmodifiable factors: the former encompasses inadequate healthcare infrastructures, limited access to skilled professionals, and insufficient emergency transportation systems, while the latter covers distinct cultural and socio-economic conditions that affect the uptake of modern healthcare services. Such factors may manifest in varying attitudes toward antenatal care (ANC), childbirth practices, and acceptance of medical interventions, further highlighting the role of culture and tradition in shaping maternal health-seeking behaviors.

To address both sets of barriers holistically, enhancing the quality and standardization of ANC services across facilities is an essential first step. Evidence-based strategies to reduce maternal mortality should include strengthening healthcare infrastructure—particularly through the implementation of mobile health (mHealth) referral tracking systems, which would improve the coordination of care and ensure timely referrals. Additionally, emergency transportation subsidies for rural women can mitigate the impact of geographical barriers and ensure more equitable access to essential obstetric care. The integration of private midwife clinics into existing referral networks would further enhance the reach of skilled providers and ensure continuity of care, particularly in underserved areas.

Moreover, continuous training and education for healthcare providers, particularly midwives, are vital for ensuring consistent service quality and fostering more efficient care pathways. To overcome social and cultural barriers, community-based education and culturally sensitive initiatives are necessary to encourage positive health-seeking behaviors and bolster the utilization of maternal health services. Implementing these measures comprehensively can help mitigate the combined effects of geographical, socio-economic, and cultural factors, ultimately reducing maternal mortality and improving pregnancy outcomes across diverse local contexts in Indonesia.

CONCLUSION

This study aimed to identify factors influencing the tiered referral of pregnant women to tertiary healthcare facilities. The findings indicated that place of residence was the only variable significantly associated with referral outcomes, highlighting the critical impact of geographic and socio-economic disparities on maternal healthcare accessibility. Conversely, other examined factors—including maternal age, frequency of antenatal care (ANC) visits, body mass index (BMI), gravidity, employment status, and educational background—were not significantly associated with referral outcomes, possibly due to variations in ANC quality or the influence of unmeasured confounding variables.

Given these findings, interventions should focus primarily on strengthening healthcare infrastructure, particularly through enhanced transportation systems, effective referral protocols, and standardized ANC service delivery. Additionally, culturally sensitive community-based educational programs are essential to address social and cultural barriers affecting maternal healthcare utilization. Further research is warranted to validate the proposed interventions, including intervention-based trials such as mHealth referral monitoring and community-based maternal transport systems, which have the potential to improve maternal health outcomes. Additionally, exploring additional context-specific determinants is critical for developing comprehensive strategies to optimize referral pathways and mitigate maternal mortality rates, particularly in rural Indonesia.

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