

Original Article

The Relationship of Sociodemographic Factors with Near-miss and Missed Cases in Educational and Affiliated Hospitals in Makassar from 2019 to 2020

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ABSTRACT

Introduction: Maternal mortality remains a critical issue in achieving optimal health status. Evaluation through near-miss cases provides valuable data about morbidity to monitor the quality of obstetric services, which can be used to estimate the incidence of life-threatening obstetric complications. A study reported that the incidence of near-miss in pregnant women had a significant relationship with various non-medical factors, included sociodemographic factors. Therefore, this study aims to examine the relationship of sociodemographic factors with near-miss and missed cases. **Methods:** This analytic retrospective study conducted in Educational and affiliated hospitals in Makassar. Data were retrieved from the obstetric referral registry from 2019 to 2020. Sociodemographic factors of interest include: diagnosis, gestational age, maternal age, referral status, maternal parity, and economics. **Results:** A total of 156 near-miss and missed cases were obtained from January 1, 2019, to December 31, 2020. There was no significant relationship between maternal age ($p=0.675$), gestational age ($p=0.38$), parity ($p=0.24$), economic status ($p=0.73$), educational background ($p=0.85$), and referral status ($p=0.16$) with maternal near-miss and missed cases. **Conclusions:** There was no significant

relationship between sociodemographic characteristics and maternal near-miss and missed cases in Educational and affiliated hospitals in Makassar from 2019 to 2020. More studies are needed to evaluate other factors associated with near-miss and missed cases.

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1. INTRODUCTION

Integrated health issues in the Sustainable Development Goals (SDGs) include health promotion for mothers by highlighting the prevention of maternal mortality. The goals focused on the national health system, health accessibility, and reproduction.¹ Maternal mortality is one of the critical issues in achieving optimal health status. The maternal mortality rate in the world is 810 per 100,000 births and in 2017 there were 295,000 maternal deaths.² A national survey reported the national Maternal Mortality Rate (MMR) to be 305 per 100,000 live births. Report of family health programs conducted by the Ministry of Health in 2020 mentioned 4,627 maternal deaths in Indonesia. This has increased from 4,221 deaths in 2019.³ As for South Sulawesi, the maternal mortality rate in 2019 was 94 per 100,000 live births.⁴

Maternal Mortality Rate (MMR) is one of the indicators used to measure maternal health status in an area. MMR is also used as an indicator of the quality of public health services and the success of development in a country.⁵ Over the past few years, reviews of severe and near-missed obstetric cases known as near-missed cases were mostly conducted in developed countries due to the low maternal mortality rate. It is conducted to assess the quality of midwifery services. Review results are valuable in developing countries with high maternal mortality.⁶ In this study, near-miss refers to pregnant or postpartum women (up to 6 weeks after termination of pregnancy) whose lives are threatened and managed to survive (passing life-threatening) because of good services/care. While missed cases refer to maternal death during pregnancy, delivery up to 6 weeks after termination of pregnancy

Near-miss cases are an option to be evaluated in addition to maternal mortality audits because these cases occur more often than maternal deaths and near-missed cases also lead to maternal death. In addition, this case can be used as a comparison against cases of maternal death. Information from patients who survive can be obtained through interviews to determine the risk associated with services that are not up to standard.⁷

It should be noted that from each case of maternal death, several cases may be found with life-threatening or near-miss conditions.⁸ The high near-miss rate before entering the hospital illustrates the poor quality of service in the referral chain. Several other factors also affect access to health services, including infrastructure, socio-economic and cultural factors, and the presence of health care workers in the facilities and their skills. A study reported that near-miss incidence in 341 pregnant women had a significant relationship with various non-medical factors, namely sociodemographic factors. Not only biological factors that are actually able to give complications to pregnant women, social factors such as economic status and education also affect the number of antenatal care visits, so that they have an impact on outcomes and are at risk of causing near miss cases.⁹

Given the background mentioned above, this study aimed to investigate the relationship of sociodemographic characteristics of near-miss and missed maternal cases in Educational and affiliated hospitals in Makassar City from 2019 to 2020.

2. METHODS

This was a retrospective cross-sectional study within a two-year observational period in Educational and affiliated hospitals in Makassar. Samples were women who referred to Education Hospital and Affiliated Hospitals in Makassar City. This study was approved by the Health Research Ethical Committee, Faculty of Medicine, Hasanuddin University. The data were retrieved from the obstetric referral registry from 2019 to 2020. Analysis of the relationship between sociodemographic factors with near-miss and missed cases was conducted using the *Chi-square test*.

3. RESULTS

The Incidence of Near-miss and Missed Cases

The incidence of maternal near-miss and missed cases at Makassar Hospital from 2019 to 2020 was 156 cases, consisting of 138 near-miss cases and 18 missed cases. There was an increase in near-miss cases from 2019 to 2020 by 10 cases (16%). In contrast, a 50% decrease was observed in missed cases. This significant decrease in missed cases needs to be interpreted with caution, considering that this data did not cover all hospitals in Makassar. The most common diagnosis for near-miss cases in 2019 and 2020 was eclampsia. However, there was a difference in the second-highest percentage in 2019 and 2020. In 2019, the most common diagnoses after eclampsia were post-partum hemorrhage followed by severe preeclampsia.

Meanwhile, in 2020 the most common diagnoses were HIV infection and placenta accreta. There was a significant decrease in post-partum bleeding cases, which was around 60% from 2019 to 2020. In addition, severe preeclampsia for near-miss cases from 2019 also decreased by 50% in the following year. Interestingly, in 2020 other cases such as HIV infection increased by twelve times folded, and placental accreta increased by twice compared to the previous year and cases of placenta accreta.

Other diagnoses with increased incidence in 2020 were placenta previa (by 100%), ectopic pregnancy, and abortions (three times folded). Cases with reduced incidence include Hemolysis, Elevated Liver Enzymes and Low Platelets (HELLP) syndrome and uterine rupture; both decreased by 25%. The number of retained placental diagnoses remained similar in the two years studied.

Interestingly, new diagnoses appeared in 2020, including two cases of gestational trophoblastic disease and severe anemia and three cases of placental abruption.

In addition to maternal near-miss cases, Table 1. also shows the distribution of diagnoses for maternal cases of missed cases. In 2019, pulmonary embolism was the most common maternal missed case, but the diagnosis was absent in the following year. The most common diagnosis in 2020 was eclampsia. The number of cases with this diagnosis did not change from the previous year, where the diagnosis of eclampsia was the second most common cause, followed by post- partum bleeding in 2019.

Overall, the most common diagnosis in maternal near-miss and missed cases eclampsia (54 cases, 34.62%), followed by post-partum hemorrhage (17 cases, 10.9%) and HIV infection (13 cases, 8.3%).

Table 1. Distribution of Near-miss and Missed Maternal Cases in Educational and Affiliated Hospitals by Diagnosis

Diagnosis	2019				2020				Total	
	Near miss		Missed		Near miss		Missed		n	%
	n	%	n	%	n	%	n	%		
Eclampsia	28	43.75	3	25.00	20	27.03	3	50	54	34.62
Severe Preeclampsia	6	9.38	1	8.33	3	4.05	0	0	10	6.41
Post Partum Haemorrhage	10	15.63	2	16.67	4	5.41	1	16.67	17	10.90
Placenta accreta	4	6.25	0	0	7	9.46	0	0	11	7.05
Placenta Previa	2	3.13	0	0	4	5.41	0	0	6	3.85
HELLP Syndrome	4	6.25	0	0	3	4.05	1	16.67	8	5.13
Uterine Rupture	4	6.25	0	0	3	4.05	0	0	7	4.49
Ruptured Ectopic Pregnancy	2	3.13	0	0	6	8.11	0	0	8	5.13
Retained Placenta	2	3.13	0	0	2	2.70	0	0	4	2.56
HIV Infection	1	1.56	0	0	12	16.22	0	0	13	8.33
Abortion	1	1.56	0	0	3	4.05	0	0	4	2.56
Gestational Trophoblastic Disease	0	0	0	0	2	2.7	0	0	2	1.28
Abruptio placenta	0	0	0	0	3	4.05	0	0	3	1.92
Severe Anemia	0	0	0	0	2	2.70	0	0	2	1.28
Pulmonary Embolism	0	0	0	33.33	0	0	1	16.67	5	3.21
Septic Shock	0	0	2	16.67	0	0	0	0	2	1.28
Total	64	100	12	100	74	100	6	100	156	100

Note : HELLP (Hemolysis, Elevated Liver Enzymes and Low Platelets) syndrome

Sociodemographic Characteristics

The sociodemographic factor is one aspect that may have a relationship with the incidence of near-miss and missed cases. This study showed that most maternal near-miss and missed patients were aged 20- 35 (79 cases, 50.64%). Fifty-three cases (33.98%) of mothers aged >34 years and 24 with a maternal age less than 20 years. In addition, on table 2 showed that there were no missed cases in mothers under 20 years of age. There was a shift in the most common age groups. In 2019, missed cases were predominated by mothers aged 20-35 years, while in the following year, missed cases were dominated by mothers aged 34 years. There were no maternal cases missed in mothers under 20 years of age. In 2019, missed cases were dominated by mothers aged 20-35 years, while in the following year, missed cases were dominated by mothers aged >34 years.

The majority of maternal near-miss and missed cases in Educational and affiliated hospitals from 2019 to 2020 were at term gestational age (89 cases, 57%). There were 67 cases (42.95%) with gestational age under 37 weeks and no cases with gestational age more than 42 weeks. While based on parity, there were 72 (46.15%), 61 (39.1%), and 23 (14.75%) cases in primiparous, multiparous, and grand multiparous mothers, respectively. There were no multiparous mothers in the missed case group in 2020

Based on economic status, most near-miss and missed cases were from the upper- middle group (100 cases, 64.74%). The low economic status contributed to 55 cases (35.26%). There were no cases with low economic status in the missed cases in 2020. On the contrary, there were 7 cases (58.33%) with low economic status in the missed cases in 2019. Meanwhile, there were 5 cases (41.67%) of the upper middle

group in 2019. By educational background, there were 83 (53.32%) and 73 (46.79%) cases from middle-upper and lower educational backgrounds, respectively.

According to the referral status, most of the near-miss and missed cases came to the hospital on their own and were not a referral from a health facility (80 cases, 51.28%). The referral from hospitals and governmental primary health care services were 68 cases (43.59%) and 8 cases (5.13%), respectively. There were no cases referred from the governmental primary health care services in the missed case in 2020.

Table 2. Near-miss and Missed Maternal Cases by Sociodemographic Characteristics in Educational and Affiliated Hospitals from 2019 to 2020

Sociodemographic	2019				2020				Total	
	Near miss		Missed		Near miss		Missed		n	%
	n	%	n	%	n	%	n	%		
Maternal age (years)										
< 20	8	12.50	0	0	16	21.62	0	0	24	15.38
20 – 35	33	51.56	8	66.67	36	48.65	2	33.33	79	50.64
≥ 35	23	35.94	4	33.33	22	29.73	4	66.67	53	33.98
Gestational age										
<37 weeks	27	42.19	4	33.33	34	45.95	2	33.33	67	42.95
37-42 weeks	37	57.81	8	66.67	40	54.05	4	66.67	89	57.05
>42 weeks	0	0	0	0	0	0	0	0	0	0
Parity										
Primiparity	21	32.81	5	41.67	45	60.81	1	16.67	72	46.15
Multiparity	34	53.13	6	50	21	28.38	0	0	61	39.1
Grande Multiparity	9	14.06	1	8.33	8	10.81	5	83.33	23	14.75
Economy status										
≥ UMK	42	65.63	5	41.67	48	64.86	6	100	101	64.74
< UMK	22	34.37	7	58.33	26	35.14	0	0	55	35.26
Mother's Education										
Middle-upper	30	46.88	10	83.33	40	54.05	3	50	83	53.21
Lower	34	53.12	2	16.67	34	45.95	3	50	73	46.79
Referral status										
No referral	30	46.88	8	66.66	38	51.35	4	66.67	80	51.28
Hospital referral	30	46.88	2	16.67	34	45.95	2	33.33	68	43.59
PKM referral	4	6.24	2	16.67	2	2.70	0	0	8	5.13

Note: UMK (*Upah Minimum Kota*) is the lowest monthly wage consisting of basic wages and fixed allowances; PKM (Public health centers)

The relationship between the sociodemographic characteristics and maternal near-miss and missed cases in Educational and affiliated hospitals in Makassar City in 2019-2020 is described in Table 3.

Table 3. Relationship between Sociodemographic Characteristics and Maternal Near-miss and Missed Cases in Educational and Affiliated Hospitals from 2019 to 2020

Sociodemographic	<i>Near miss</i>		<i>Missed</i>		<i>p value</i>
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	
Maternal age (years)					
20-35	69	50	10	56	0.657*
<20 & ≥ 35	69	50	8	44	
Gestational age					
37-42 weeks	77	55.80	12	66.7	0.381*
<37 & >42 weeks	61	44.20	6	33.4	
Parity					
Primiparity	66	47.8	6	33.3	0.246*
Multiparity	72	52.2	12	66.7	
Economy status					
≥ UMK	90	65.2	11	61.1	0.732*
< UMK	48	34.8	7	38.9	
Mother's Education					
Middle-upper	70	50.7	13	72.2	0.086*
Lower	68	49.3	5	27.8	
Referral status					
With referral	70	50.7	6	33.3	0.165*
No referral	68	49.3	12	66.7	

*chi-square test

Note : UMK (*Upah Minimum Kota*) is the lowest monthly wage consisting of basic wages and fixed allowances

4. DISCUSSIONS

In this study, we only focus on whether there is an effect of age as a factor in maternal mortality. Therefore, in the analysis of this study, based on the age of the mother we only divided into two groups, the first group is the group with a risk age of <20 years and >35 years and the second group is a group that is not at risk based on the age of 20-35 years. The study results (Table 3) showed no significant relationship between maternal age and maternal near-miss and missed cases. The results of this study are not in line with the theory, which states that maternal age under 20 years and older than 35 years is an age with a high risk of pregnancy and childbirth. The Fifth Annual State of the World's Mothers Report, published by the International Charity Save The Children, reported that up to 13 million babies are born to women aged < 20 years, and 90% of these births occur in developing countries.

Young women have a two to five times higher risk of maternal death from pregnancy and childbirth than women >20 years of age.¹¹ However, the results of this study are in line with Jayanti's study, which reported the highest number of maternal deaths in the age group 20-35 years, while in the high-risk age group, the number of

maternal deaths that occurred was less than the non-risk age group. Likewise, in the near-miss group, the maternal age was more at the age of 20-35 years, while at the risky age, the number was less than the age not at risk. The results of the analysis showed that there was no relationship between age and maternal mortality.¹² The same applies to the study by Pratama, which reported the highest distribution of maternal deaths in the 20-35 year age group, both cases and controls. The age group of 20-35 years in the case group was 30 people (60%) and 42 people (84%) in the control group.¹³ However, studies with a larger sample are needed to find a more accurate correlation of the relationship between age and maternal mortality.

Similar to maternal age, in this study we analyzed the relationship between gestational age and maternal mortality, the analysis in this study only divided into two groups, the group with 37-42 weeks gestational age and the non-term age group including preterm (<37 weeks). and post-term (>42 weeks). The results of this study also showed that there was no significant relationship between gestational age and the incidence of maternal near-miss and missed. To date, no studies have reported the relationship between gestational age and the incidence of maternal near-miss. This is because gestational age is more influential on conditions that can occur in each phase of pregnancy and these conditions have the same risk of maternal death, such as abortion, preeclampsia, sepsis, eclampsia, uterine rupture, and others.

Parity status in total previous pregnancies also did not have a significant relationship with maternal near-miss and missed cases. The results of this study are similar to a study conducted in Sudan which reported that there was no relationship between parity and the incidence of maternal near-miss.¹⁴ Meanwhile, other studies report that parity status has a relationship with maternal near-miss cases where parity status with high risk has a greater chance of experiencing maternal near-miss cases.^{15,16} Birth defects are more common in nulliparous women (first pregnancy) and >35 years of age. Meanwhile, multiparous grand mothers (having children more than 4) are also a risk factor for complications during pregnancy and during childbirth.¹⁷ The minimal number of samples and the uneven distribution are factors that can cause insignificant results in evaluating these two relationships.

Educational and economic status also did not have a significant relationship with maternal near-miss and missed cases. This result is different from several previous studies. Titley et al., in 2010, conducted a study on 26,591 pregnant women and found that families with low economic levels had lower prenatal clinic visits. This is closely related to the mother's education level, wherewith a low economic level, awareness and knowledge of the services and benefits of prenatal visits is also lower.¹⁸ Joshi et al. in 2014 also got the same result where mothers with upper economic level had a ratio to perform prenatal visits 3 times higher than low economic level. A higher frequency of prenatal visits will certainly provide a better result for the health of mothers and children during pregnancy and after delivery.¹⁹ This inconsistent result could be influenced by several factors. One of them is the number of samples, which in this study only used 156 samples, while the previous two studies used thousands and tens of thousands of samples.

Referral status also did not have a significant relationship with maternal near-miss and missed cases. The results of this study are the first to report the relationship between referral status and maternal near-miss and missed cases. This can be

explained by the very varied referral causes, starting from the skills of health workers in the first health service and the distance from different referral hospitals, and will certainly affect the outcomes of this study.

It should be noted that this study found no association between sociodemographic factors and near-miss and missed cases. This is different from other studies. The cause of this difference is probably due to the small population studied. This study also did not describe the overall near-miss and missed cases that occurred in Makassar because the data were obtained from near-miss and missed cases that were referred to Educational and affiliated hospitals.

5. CONCLUSION

Women with eclampsia, gestational age 37 to 42 weeks, maternal age 20 to 35 years, no referral, multiparous, and the middle and upper economic level were the majority of cases of near-miss and missed.

There was no correlation between maternal near-miss and missed cases and sociodemographic factors. The population number that involved in this study may affect the statistical tests. Therefore, more studies with a larger population are warranted to evaluate this relationship.

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Conflict of Interest Statement:

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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