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Research Article

Effectiveness factors analysis of near-miss incidence referral in obstetric complications at Waras Wiris Andong General Hospital on Boyolali District

Edy Mustofa[1*], Widyasih Pritasari[2], Arif Rahman Nurdianto[3], Sunarjo[4]

1,2,4) Study Program of Social Gynecology Obstetrics Sub-Center Malang, Jl.Jaksa Agung Suprapto No. 2 Malang
3) Lecture in Magister Immunology Program, Postgraduate School of Universitas Airlangga Surabaya, Jawa Timur, Indonesia

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Correspondence:
edy.mustofa.obgynsos@gmail.com

ABSTRACT

Maternal mortality in Indonesia is still very high, and the biggest problem is obstetric complications. It is possible that the mother who has obstetric complications is safe and recovered (near miss) or died. This research was an observational analytic epidemiological study conducted to determine the effectiveness of near-miss incidence referral in obstetric complications using a cross-sectional approach. The sampling technique used was a random sampling system with 85 respondents. The effectiveness of referral affects near-miss incidence, meaning that mothers who get referral according to procedure only have a 0.107 times greater chance of not occurring near miss. Pregnant women who had a history of the disease had a risk of 0.157 times greater for the absence of near-miss than mothers who did not have a history. Pregnant women with high risk have 0.157 times no near-miss than those with low risk. Maternal antenatal examination affects the incidence of a near miss. It was found that the mother's history of illness, the risk of pregnancy owned by the mother and the effectiveness of referrals could affect the incidence of near miss in obstetric complications. In conclusion, there is an influence between the effectiveness of the referral and the near-miss incident at the Waras Wiris Andong Regional Hospital, Boyolali Regency

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INTRODUCTION

In its life cycle, women experience several important life stages and need special attention, as in pregnant women. Every year around 160 million women around the world experience pregnancy. However, around 15% suffer severe complications, and a third are life-threatening complications (Adisasmita, 2007).

Reducing maternal mortality is one of the fifth MDGs (Millennium Development Goals) programs that has not yet been achieved. Based on World Health Organization (WHO) data in 2015 an estimated 830 pregnant women die every day, and 99% of cases occur in developing countries. Maternal Mortality Rate (MMR) is one of the main indicators used to measure the success of the *safe motherhood* program. In some areas in Indonesia, such as in Boyolali, MMR tend to increase. Based on Boyolali health service reports, the maternal mortality rate in Boyolali in 2011 (116 / 100,000) with 18 cases, 2012 (97.97 / 100,000) with 15 cases (Biro Pusat Statistik, 2015).

Mothers who experience life-threatening complications have the possibility of surviving and recovering (*near miss*) or not being saved and experiencing maternal death (Souza, 2007). One of the events closest to maternal mortality is *near*-miss (Mantel, 1998). A Maternal *near miss* is a woman who almost died, but survived complications during pregnancy, during delivery, or within 42 days after the termination of pregnancy (WHO, 2005; 2011). The incidence of *a near-miss* in Indonesia varies from 0.7 per 1000 births to 12 per 1000 births, depending on the criteria used, with the main causes of *near misses* being bleeding and hypertension. *Near miss* due to abortion is also quite commonly found in the amount of 13.0% (Adisasmita 2008).

Based on data obtained from the Waras Wiris Andong Regional Hospital in Boyolali District, the incidence of *a near-miss* in obstetric complications in 2017 was 100 cases. As for the maternal mortality rate in Boyolali Regency during 2017, there were 12 maternal deaths due to obstetric complications.

Care services for pregnant women or commonly called *Antenatal Care* (ANC) are fundamental things that pregnant women must obtain to prepare for the pregnancy to run well (Colti et al, 2014). The leading causes of death in pregnant women can be classified into direct and indirect causes. Overall, 80% of deaths among pregnant women are caused directly, and 20% are not directly. The direct cause of death can be caused by obstetric complications such as bleeding (25%), infection (15%), eclampsia (12%), unsafe abortion (12%), prolonged labor or without a tear of the birth canal (8%), and other direct causes (Brinkmann, S. and Kvale 2005; Nurdianto et al, 2019a, 2019b, Nurdianto et al., 2020a;2020b).

The cause of the delay in obtaining services at health facilities is inseparable from the current referral system in Indonesia (Rochyati, 2005; Anggondowati, 2018) In the era of the National Health Insurance (JKN), the government is expected to reduce the MMR. The method is when there is an ANC, the village midwife must always screen pregnant women. Is the pregnant woman included in high risk or not. If pregnant women are included in the high-risk criteria, it is recommended to be referred to a higher health facility for further examination or treatment. But in the field of implementation, many JKN participants who come to check themselves only bring a referral letter from the midwife or village midwife, with their status as public patients.

According to these patients, they cannot get a referral from the Public Health Service (Puskesmas) to go to the hospital, arguing that

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it can still be handled at the puskesmas level. Finally, patients cannot use their facilities as JKN participants. When in the hospital if the pregnant woman still receives polyclinic services and is done outpatient, it may not be too burdensome for the patient. However, if the visit had to be taken at the time of the visit, most of the patients refused and went home because of the cost.

Most near miss and maternal deaths can be prevented if they receive adequate treatment in a health facility (Akbarani, 2013). Many influential factors such as time actors, transportation, costs, the responsiveness of health workers, and referral flow are crucial in referring cases of obstetric complications to get the right help (Anggondowati, 2008; Khosla et al., 2000). Therefore, on this occasion, the author aimed to analyze the factors that affect the effectiveness of near-miss referral in obstetric complications in the Waras Wiris Andong Regional Hospital Boyolali Regency.

METHODS

This research was an observational analytic epidemiological study that was conducted to determine the extent to which the effectiveness of referral events *near-miss* in the case of obstetric complications. The design in this study uses a *cross-sectional* approach in which the researcher collects data at one time simultaneously by making observations based on a questionnaire that describes the situation for a moment through primary data analysis at the time of the research. This design was chosen with the consideration that it can be used to look at the effectiveness of near-miss incidence referral in obstetric complications in the Waras Wiris Andong Regional Hospital Boyolali. (Lemeshow et al., 1990; Notoatmojo, 2010)

The sample in this study were all women who had obstetric complications at the Waras Wiris Andong Regional Hospital in Boyolali Regency from January 2018 to February 2018 period. Determination of the sample size of an unpaired categorical analytic study in a population determined using a formula and the results obtained were 85 respondents (Murti, 2010). The result of the study will be carried out with statistical analysis with the Chi-square test and multivariat analysis using SPSS 21 application. This study has obtained ethical clearance from the Health Research Ethics Moment of Rumah Sakit Umum Daerah (RSUD) Saiful Anwar Malang with number 305/209/K.1/289/2017.

RESULTS

The results of this study show the cross-tabulation between the characteristics of women who experience complications, including age, parity, a distance of pregnancy, education, and examination of the pregnancy carried out by the mother during pregnancy with a near-miss at the time of delivery.

Based on the age of mothers <20 years or> 35 years who experienced near-miss as many as 1 mother (5.3%) and in the age category 20-35 years most did not experience near miss as many as 53 mothers (82.8%). Based on the analysis of the Chi-square test, the *p*-value was 0.756> α (0.05), which means that there was no relationship between maternal age and near-miss.

In parity, mothers with children ≤ 4 experienced near-miss as many as 13 mothers (16.7%) and in parity > 4 mothers who experienced near-miss, namely as many as 1 (14.3%). Based on the results of the Chi-square test analysis, the *p*-value was 0.871 > α (0.05) which means that parity has no relationship with near-miss events.

Based on the distance of pregnancy, it can be seen that the majority of mothers who have a pregnancy distance of 0 years or 2 - 9 years experience near miss as many as 13 mothers

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(16.5%) and mothers who have a distance of <2 years or> 9 years who experience near miss 1 events mothers (16.7%). Based on the analysis of Chi-square test results, obtained *p*-value of 0.989> α (0.05), which means there is no relationship between the distance of pregnancy with near-miss events.

Based on maternal education, most of those who experienced near-miss was educated > junior high school (SMP) by 13 mothers (16.1%), and maternity education in the category of ≤ SMP mostly experienced near-miss by 4 mothers (57.2%). The analysis results obtained *p*-value = 0.641 > α (0.05) which means that a mother's education is not related to near-miss events.

Pregnancy checks can be known that most of the mothers with a good pregnancy examination did not experience near miss as many as 62 mothers (87.3%) and mothers who did fewer pregnancy checks mostly experienced near-miss as many as 5 mothers (35.8%). Chi-square test analysis results obtained a p-value of 0.043 <α (0.05), which means that antenatal care has a relationship with near-miss events.

Based on a height that was cross-tabulated with near-miss events, mothers who had a height of ≤ 145 cm and experienced near-miss events of 1 mother (100%) and mothers who had height> 145 cm mostly did not experience near miss 71 mothers (84.5%). The results of the analysis with Chi-square obtained *a* p-value of 1,000> α (0.05) which means it can be concluded that there is no relationship between height and near-miss events.

Based on the nutritional status by a cross-tabulation with near-miss events, 69 mothers (88.4%) did not experience near-miss events, and 88 mothers with 88 nutritional status did not experience near-miss events (100%). The results of the analysis with Chi-square obtained *a* p-value of 0.999 > α (0.05) which means it can be concluded that there is no relationship between nutritional status and near-miss events.

Based on the Hb level cross-tabulated with near-miss events in women with obstetric complications, it can be seen that most of the mothers with Hb levels> 11 g% or no anemia did not experience near-miss events of 36 mothers (83.7%) and in mothers with Hb levels <11 g%, 7 mothers (16.7%) experienced near-miss events. The results of the analysis with Chi-square obtained *a* p-value of 0.962 > α (0.05), which means that it can be concluded that there is no relationship between Hb levels with near-miss events.

Based on the history of maternal diseases that were cross-tabulated with near-miss events in women with obstetric complications, it can be seen that most mothers who did not have a history of illness did not experience near miss as many as 60 mothers (92.3%), and those who had a history of the disease the majority also did not experience near miss as many as 11 mothers (55%). The results of the analysis with Chi-square obtained *a* p-value of 0.000 < α (0.05), which means that it can be concluded that there is a relationship between the history of the illness suffered by the mother with the near-miss.

10 mothers had a high risk of experiencing near miss (30.4%). Whereas most mothers who had low-risk did not experience near miss as many as 43 mothers (92.3%). The results of the analysis using Chi-square obtained *a* p-value of 0.010 <α (0.05), which means that the risk during pregnancy has a relationship with the incidence of near-miss.

Based on the results of the cross-tabulation between the use of KIA Handbooks with near-miss events it is known that most respondents whose KIA Handbooks were filled incorrectly did not experience near-miss events as many as 61 mothers (87.1%), while mothers whose KIA Handbooks were not properly filled

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inexperienced near-miss events as many as 5 mothers (33.3%). Based on the analysis of Chi-square test results obtained *p*-value of 0.062> α (0.05), which means there is no relationship between the use of the KIA Handbook and the near-miss event.

The results of multivariate analysis to examine the effect of maternal characteristics, maternal health status, the effectiveness of referrals to near-miss events are shown in table below. The results of the analysis show the significant value in the last step of the logistic regression using the *Backward Wald* method which is seen as a whole; three categories have a significant value smaller than the confidence level of 0.05 (5%), ie for the history of the disease suffered by the mother has a valuable significance of 0.012 ($p = 0.012 < \alpha = 0.05$), the risk of pregnancy has a significance value of 0.043 ($p = 0.043 < \alpha = 0.05$), and the effectiveness of referral has a significance value of 0.005 ($p = 0.005 < \alpha = 0.05$).

The variable history of the illness suffered by the mother has a significance value of $0.012 < \alpha = 0.05$, which means that there is an influence of the history of the disease suffered by the mother with near-miss events. Mothers who have a history of the disease are 0.157 times more likely to develop near-miss compared to women who have no history of illness.

The pregnancy risk variable has a significance value of $0.043 < \alpha = 0.05$, which means that there is an influence on the risk of pregnancy with near-miss events. Mothers who have a high risk are likely 0.213 times more likely to have a near-miss than a mother who has a low risk.

The referral effectiveness variable has a significance value of $0.005 < \alpha = 0.05$, which means that there is an influence of the effectiveness of the referral with near-miss events. Mothers who are referred incorrectly or not according to procedures have a 0.107 times greater chance of developing near misses when compared to mothers who are referred correctly.

Table 1. Logistic Regression Test Results for Mother Characteristics, Maternal Health Status, Utilization of KIA Handbook, Effectiveness of References to Near Miss Events

Variable	P-value	*Exp (B)*
Disease History	0.012	.157
Risk of Pregnancy	0.043	0.213
Effectiveness of Referrals	0.005	.107

DISCUSSION

Maternal characteristics by level of education mostly have more than junior high school level of education (SMP). The level of education is not directly related to the near-miss incident because the level of education of the mother only affects the access and utilization of health services. mothers who have high levels of education will tend to pay more attention to self and family health and seek antenatal care (Adisasmita, 2017). If you are pregnant, you will choose childbirth help with a professional health worker. They are easier to get and receive information given related to their health and pregnancy.

Characteristics of maternity mothers based on parity in this study most mothers gave birth ≤ 4. The second to fourth births are the safest deliveries. The risk will increase in subsequent pregnancies. A risky first delivery can only be managed with better antenatal care. Mothers with high parity will be at greater risk of complications during labor that can cause near-miss. In women who often give birth, the uterine muscle is often stretched, resulting in thinning of the uterine wall, which eventually causes contraction of the uterus to be weak. Rupture of the uterus is a labor complication that often occurs in mothers who have previously given birth to several children (Waterstone, 2001; Manuaba, 2007; Prawiroharjo, 2014).

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The results of both bivariate and multivariate analysis showed no influence or relationship between the distance of pregnancy with near-miss events. The results of this study are consistent with the results of Arulita's research (2009), which states that pregnancy spacing is not a factor influencing obstetric complications that can cause maternal deaths. With a value of p = 0.222. The recommended pregnancy interval for a safe pregnancy to last for at least 2 years allows the mother's body to recover from the extra needs of pregnancy and lactation. The distance of pregnancy too close, causing mothers to have a higher risk for uterine bleeding early postpartum and maternal mortality (Manuaba, 2007; Prawiroharjo, 2014; Astari, 2014).

According to research conducted by Agudelo AC and Belizan JM and supported by previous studies, a pregnancy distance that is too long ≥ 10 years will increase the risk for preeclampsia/eclampsia, gestational diabetes, bleeding in the third trimester and also shows an increased risk for the occurrence maternal death, therefore, this woman with a gestational distance ≥ 10 years requires special attention during the antenatal examination (Agudelo and Belizan, 2020).

The bivariate analysis results showed that the antenatal examination affected the near-miss incidence with a value of p = 0.043. However, the results of multivariate analysis showed that antenatal examination is not a variable that affects the incidence of near-miss. The results of this study are consistent with WHO study which states that poor antenatal care is not a risk factor that influences the incidence of complications that cause maternal death (WHO, 2011).

The antenatal examination standards that have been set are regular at least 4 times during pregnancy to health workers with intervals of 1 time in the first trimester, 1 time in the second trimester, and 2 times in the third trimester with a minimum examination standard of 10 T, namely: weight measurement and measure height, measure blood pressure, measure nutritional status by measuring upper arm circumference, measure uterine fundal height, determine the fetal presentation and fetal heart rate (DJJ), screen for tetanus immunization status and provide tetanus toxoid immunization (TT) when needed, minimal iron tablets 90 tablets during pregnancy, laboratory tests (special and routine), case management, consultation (counseling) including planning for the prevention of complications (P4K) and postpartum birth control (Depkes, 2008; Nurdianto, 2020c).

Maternal health status with near-miss events indicates that height is not related to near-miss events. Height is an indicator used to determine the health status of a mother, especially at the time of delivery. There are three restrictions on mothers with a height of less than 145cm. This is the first pregnant woman who needs special attention. The area of the mother's pelvis and fetal head size may be disproportionate, in this case, two possibilities occur, the mother's pelvis as a birth canal is narrow with the fetus/head not large, normal size pelvis but the large child / large head, second pregnant women, with a pregnancy then the baby is born just months but dies in time (baby age) 7 days or less, Pregnant women before pregnancy had never delivered enough months, and low birth weight <2500 grams. The danger that can occur is that labor is not going well, the baby is difficult to be born, in danger. Medical assistance needs cesarean delivery (Rochyati 2011).

Another maternal health status is nutritional status by measuring the Upper Arm Circumference (Lingkar Lengan Atas / LILA) (Manuaba, 2007; Prawiroharjo, 2014). The results showed no relationship between the nutritional status of respondents to the

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incidence of a near miss. The results showed that most respondents had good nutritional status, meaning that good nutritional status was that respondents had upper arm circumference or Lila more than 23.5 cm. The study results are consistent with the research from the 2001 SKRT analysis which showed no significant relationship between nutritional status as measured by LILA with the incidence of labor complications (Manuaba, 2007; Prawiroharjo, 2014).

Mothers with poor nutritional status are at risk for bleeding and infection during the puerperium. Malnutrition before and during pregnancy, especially the condition of mothers with *stunting* in childhood that reflects severe malnutrition, will provide a risk of parturition due to cephalopelvic disproportion, which will increase the risk of malnutrition maternal death during labor (Say et al., 2014).

The study results for hemoglobin levels showed no relationship between the respondents' hemoglobin levels to the near-miss event. This is not following Arulita's research (2009) which concluded that mothers who suffer from anemia during pregnancy have a 4 times greater risk for labor complications than mothers who do not suffer from anemia (OR = 4.0; 95% CI: 1.7 - 9.6; p = 0.001).

According to WHO, maternal deaths in developing countries are related to anemia during pregnancy. Pregnant women with severe anemia will be more vulnerable to infections during pregnancy and labor, increasing the risk of bleeding that will continue with death. Several studies have shown that the risk of maternal death increases in mothers who suffer from anemia during pregnancy (WHO, 2016).

The results of both bivariate and multivariate analysis showed that the study showed that there was an influence on the history of the disease suffered by the mother with near-miss events. Mothers who have a history of the disease are 0.157 times more likely to develop near misses compared to women who have no history of the disease. History of diseases that can aggravate pregnancy and childbirth include hypertension, heart disease, asthma, diabetes mellitus, infectious diseases such as Toxoplasmosis, Tuberculosis, Malaria (Nurdianto 2020a; 2020b; WHO, 2007).

This is by Arulita's research (2009) which shows that the risk for maternal death in mothers who have the disease is 210.2 times greater than mothers without a history of the disease with a value of p = 0.002 (OR adjusted = 210.2; 95% CI: 13.4 - 5590.4).

A history of maternal illness is defined as a disease that the mother suffered before pregnancy or childbirth or disease that arises during pregnancy that is not related to the direct obstetric cause but is exacerbated by the physiological effects of pregnancy so that the mother's condition becomes worse. Maternal deaths due to illnesses suffered by the mother is a cause of indirect maternal death (*indirect obstetric death*).

The results of both bivariate and multivariate analysis showed that the study showed that there was an influence of maternal pregnancy risk factors with near-miss events. Pregnancy risk variables had a significance value of 0.043 <α = 0.05, which means there was an influence of pregnancy risk with near-miss events. Mothers who have high risk are 0.213 times more likely to develop near-miss than women with low risk. This is related with Akbarani (2013) states that mothers with high-risk categories will experience obstetric complications when labor is 19.14 times higher than mothers with low-risk categories (Akbarani, 2013).

The results showed there was no relationship between the use of KIA Handbooks with near-miss events. This is consistent with research

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by Colti, et al (2014) which states there is no relationship between the role of health workers in the use of the KIA Handbook to the incidence of childbirth complications (Colti, 2014).

Utilization of the KIA Handbook through complete recording of the health of pregnant women by midwives is expected to have a contribution in reducing maternal and infant mortality rates, namely by detecting early risks of pregnancy that can threaten the lives of mothers and babies (Nurdianto, 2020c; Nurdianto et al., 2021).

Obstetric complications can be detected if the pregnant woman performs an Ante Natal Care (ANC) checkup routinely or at least four times during pregnancy. Recording the results of examinations is a midwife's competency standard and part of a quality *Antenatal* service standard. Each time the examination, the midwife must record the results on the medical record, Mother's Card, and KIA Handbook. At present, the recording of the results of antenatal examinations is still very weak, so the data cannot be analyzed to improve the quality of *antenatal care*. The function of the KIA Handbook is as information and recording tools for analyzing the health condition of pregnant women. With the complete and accurate recording of the health of pregnant women in the KIA Handbook, if analyzed the data can be an early warning against high-risk threats of pregnant women, thus they will avoid 3 L (late detection, late referral, late handling). Midwives must recognize high-risk pregnancies/abnormalities, if found midwife abnormalities can take the necessary actions and refer to the next cell action (Mangun, 2008).

The results of both bivariate and multivariate analyses indicate that research shows an effect of maternal referral effectiveness with near-miss events. The referral effectiveness variable has a significance value of 0.005 $<\alpha = 0.05$, which means that there is an influence on the referral's effectiveness with near-miss events. According to the procedure, mothers who were referred incorrectly or not were 0.107 times more likely to have a near-miss than those who were referred correctly.

This is following Arulita's research (2009) which shows that ineffective referrals or late referrals during obstetric complications will cause mothers to have a risk of 50.8 times more likely to experience maternal death (near-miss) when compared to mothers who are referred by effective.

The results of this analysis indicate that late referrals or ineffective referrals to mothers who experience complications during pregnancy, childbirth, and the puerperium present a greater risk for near-miss. 3 delays influence this ineffective reference. The first delay is the delay in decision-making. The second is the delay in reaching the referral place and the third is the delay in handling the case at the referral place. The ineffectiveness of this referral will worsen the mother's condition due to the mother not getting adequate treatment following the existing complications. Thus, death can be life-threatening to the mother.

CONCLUSION

There is an influence of the history of the disease suffered by the mother, the risk of pregnancy, and the effectiveness of the referral with near-miss events in obstetric complications in the Waras Wiris Andong Regional Hospital Boyolali Regency.

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