Analysis of Maternal Mortality Determinants in Bondowoso District, East Java

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ABSTRACT

Background: Data from Population Inter-Census Survey (Survei Penduduk Antar Sensus, SUPAS) 2015 showed that maternal mortality ratio was 305 per 100,000 live-births in Indonesia. Sustainable Development Goals (SDGs) set 70 per 100,000 live-births as the target for maternal mortality ratio to be achived by 2030. This study aimed to analyze the determinants of maternal mortality in Bondowoso district, East Java.

Subjects and Method: This was an analytic observational study with cross-sectional design. This study was carried out at 17 Community Health Centers, in Bondowoso, East Java from February to March 2017. A sample of 117 study subjects, consisting of 39 cases of maternal death and 78 control, was selected for this study by fixed disease sampling. The dependent variable was incidence of maternal death. The independent variables were maternal education, maternal employment status, antenatal care visit, complication, late model, and other pregnancy risk factors. The data were collected from the obstetric and medical record, as well as a set of questionnaire. The data were analyzed by path analysis

Results: Determinants of maternal death included late decision making (b=2.37; 95% CI=0.81 to3.93; p=0.003), late transfer to the hospital (b=2.35; 95% CI =-0.21 to 4.91; to p=0.072), late handling at the hospital(b=2.36; 95% CI=-0.19 to 4.91; p=0.069), and complication(b= 2.5; 95% CI= 1.41 to 3.62; p<0.001). Complication was determined by completeness of antenatal visits (b=-1.01; 95% CI= -1.94 to -0.09; p= 0.032), and existence of pregnancy risk factor (b=1.90; 95% CI= 1.01 to 2.78; p<0.001). Pregnancy risk factors was determined by completeness of antenatal visit (b= -1.09; 95% CI =-1.99 to -0.19; p=0.018), maternal education (b= -0.47; 95% CI= -0.85 to 0.07; p= 0.020), and maternal employment status (b= 0.14; 95% CI= -0.17 to 0.45; p= 0.369). Antenatal visit was determined by maternal education (b= 0.54; 95%CI=0.098 to 0.99; p=0.017) and maternal employment status (b=0.08; 95% CI=-0.29 to 0.45; p= 0.683).

Conclusion: The direct determinants of maternal death include late decision making, late transfer to the hospital, late handling at the hospital, and complication. The indirect determinants of maternal death include completeness of antenatal visits, existence of pregnancy risk factor, maternal education, and maternal employment status.

Keywords: determinant, delay, complication, antenatal care, maternal death

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BACKGROUND

Public welfare of a country can be illustrated by using maternal mortality ratio indicator (Kemenkes RI, 2014). Maternal Mortality Ratio (MMR) refers to the number of maternal deaths during pregnancy, labor, and the puerperium, which is calculated per 100,000 live births (Nieburg, 2012). Countries in the world have committed to reduce maternal death up to below 70 per 100,000 live births by the year of 2030 in accordance with the target of goal 3 poin 3.1 of *Sustainable Development Goals* (SDGs) (WHO, 2016).

Indonesia as one of developing countries still has high maternal mortality ratio. The last data from the result of Population Inter-Census Survey (Survey Penduduk Antar Sensus, SUPAS) 2015 showed that Indonesia maternal mortality ratio was 305 per 100,000 live births (Atmarita, 2016). East Java Province as one of the provinces with the highest maternal mortality rate in Indonesia, in 2015 had 515 maternal death cases with ratio 89.60 per 100,000 live births (Dinkes Provinsi Jatim, 2016).

Bondowoso Regency is a Regency with the highest Maternal Mortality Rate in East Java in 2015 with ratio 188 per 100,000 live births with 19 maternal death. The number of maternal death in 2016 increased into 20 cases with ratio 195.82 per 100,000 live births (Dinkes Kabupaten Bondowoso, 2017).

High maternal mortality rate in a region is basically caused by various factors that are not only from individual level but also from society level since in this level policies are implemented. Maternal death leads to various impacts. It can imply to the loss for a productive family member thus will implicate to the economy of the family. Losing mother in a family will also affect children' social development since a mother is in charge to educate and take care of the children in a family (Hernandez, 2010).

The theory of determinant of maternal mortality by McCarthy and Maine (1992) presents 3 determinants that affect the occurrence process of maternal mortality. The closest process to maternal mortality incidence is called close determinants that are the pregnancy itself and the complications occur during the pregnancy, labor, and puerperium (obstetric complication). Close determinants are directly affected by intermediate determinants namely maternal health status, reproducetive status, access to healthcare service, healthcare behavior/ the usage of healthcare service and other factors that are not known nor expected, whereas far-reaching determinants are the ones that will affect maternal mortality incidence through their effect toward intermediate determinants that consist of socio-economic and cultural factors.

The causes of maternal mortality in Indonesia are heavily related with the 3T factors (*terlambat mengambil keputusan* or late decision making, *terlambat mendapatkan transportasi* or late transportation providing, and *terlambat penanganan di sarana pelayanan kesehatan* or late handling in medical service) and the 4T factors (*terlalu tua* or too old, *terlalu muda* or too young, *terlalu sering* or too often, and *terlalu dekat jarak dekat kehamilan* or too short pregnancy interval) (Hemawati, 2011). These factors should be given attention because they may put pregnant mothers in high risk. The identification of pregnant mothers with high risk in the Province of East Java is performed by using the Poedji Rochjati Score card (KSPR, *Kartu Skor Poedji Rochjati*). The score in this card can be categorized into low risk, moderate risk, and high risk and later on the score will direct the medical officers' caution regarding the complication that might appear and the parturition site planning (Rochjati, 2011).

Every pregnant woman at least should perform four visits during her pregnancy. In each visit the pregnant mother will be given information related to her pregnancy, especially about the signs of pregnancy danger in each trimester that might threaten the safety of both the mother and the infant (Damayanti and Nur, 2010). If the pregnant mother does not regularly perform antenatal care (ANC) then the medical officer cannot perform screening since the beginning of the high risk preg-

nancy that might cause complication during the pregnancy or the parturition. Such situation might lead to the death of the mother and the infant.

The regular antenatal care visit is related to the mother's characteristics. This statement is in accordance to the results of a study by Pangemanan et al., (2014) which show that there has been relationship between the educational status and the mother's employment with the pregnant mother's first contact to the medical office in the first trimester of pregnancy (K1) and the pregnant mother's fourth contact on the third trimester of pregnancy (K4) in the public health center.

Mothers who have high educational level will display better knowledge; as a result, these mothers will examine their pregnancy regularly in order to maintain the development of both the mothers and their infants. Similarly, in terms of employment, the employed mothers tend to have better knowledge as well because these mothers have many opportunities to interact with other people and to accept more information; as a result, the awareness to consult their pregnancy is higher (Pangemanan et al., 2014).

This study aimed at analyzing the influence of lateness model that included the late decision making, the late transportation providing, the late handling in medical service, the complication, the high risk pregnancy, the antenatal care visit, and the mother's educational level and employment in Bondowoso District

SUBJECTS AND METHODS

1. Study Design
This study was a quantitative research and employed the analytic observational design using the case control. The study was conducted in 17 public health centers in Bondowoso District, the Province of East Java, from February to March 2017.

2. Population and Sample
The case population in this study was all mothers who used to experience pregnancy, parturition, and childbed in 2015-2016 with maternal mortality case in the area of Bondowoso District. The control population then was all mothers who used to experience pregnancy, parturition, and children but did not suffer from maternal mortality in 2015-2016 around the area of Bondowoso District, the Province of East Java.

The subjects in the case group were the medical officers or the relatives of the mothers who experienced maternal mortality case and the people who knew about the mother's history from the parturition until the maternal mortality. On the other hand, the subjects in the control group were the mothers who had never experienced pregnancy, parturition, childbed, and maternal mortality.

The subjects were selected by means of fixed disease sampling, namely a selection of sample based on the status of various expositions according to the "fixed" status disease (Murti, 2016). From the case group, the researchers selected 39 subjects based on the number of maternal mortality incident from 2015 to 2016. On the contrary, from the control group the researchers selected 78 subjects who had never experienced maternal mortality from 2015 to 2016.

3. Variables
The dependent variable of this study was the maternal mortality. Then, the independent variable of this study was the lateness model which included the late decision making, the late transportation providing, the late handling in medical service, the complication, the high risk pregnancy, the antenatal care visit, and the mother's employment.

4. Operational Definition

The operational definition of this lateness model was the lateness in transporting the mothers with pregnancy, parturition, and childbed/puerperium into the medical facilities which included the lateness in making decision to find assistance, the lateness in arriving to the location of assistance, and the lateness to get treatment

Complication was the presence of obstacles, diseases of complications that appeared in the mother both during the pregnancy and prior to the pregnancy. This complication might be a burden to the pregnancy, the parturition, or the childbed.

High risk pregnancy was a situation in which a pregnant mother had one of several risk factors that might influence the optimization of both the mother and the infant during the pregnancy; these risk factors include the absence or the presence of obstetric emergency potentials, obstetric danger, or obstetric emergency. The score that would be considered was the score of mother's last-time ANC visit.

The antenatal care was the pregnant mother's visit to the medical facility for consulting her pregnancy according to the minimum standards. The standards were 1 time in first trimester, 1 time in the second trimester, and two times in the third trimester. Education referred to the pregnant mother's formal education until the last parturition and the certificate issuance. Then, employment referred to the activities that had been performed other than those of housewives, both inside and outside the house, in order to improve income from the pregnancy period until the period prior to parturition.

5. Research Instrument

The research instrument for the variables of the lateness model which included the late decision making, the late transportation providing, and the late handling in medical facilities was measured using the questionnaire which validity and reliability had been tested. The results of the validity and reliability test were that r count ≤ 0.20 and the Cronbach's Alpha ≥ 0.70; as a result, all of the question items were considered reliable. The test results might be viewed in Table 1.

The complication was measured using checklist. The high risk pregnancy was measured using the Poedji Rochjati Score card. The antenatal care visit was measured using the Book of Mother and Infant Health (KIA, *Kesehatan Ibu dan Anak*) that the mothers possessed since their pregnancy period. Last but not the least, the mother's educational and employment level was measured using questionnaire.

Table 1. Results of reliability test

Variables	Total Item Correlation (r)	Alpha Cronbach
Lateness Model		
Late decision making	≥0.35	0.94
Late transportation providing	≥0.30	0.77
Late handling in medical facilities	≥0.35	0.78

For the sake of data analysis, the researchers performed categorization. Educational level variable, 0 would be given to the educational level which had been lower than senior high school (<Senior High School) while 1 would be given to the educational level which had been equal to or higher than senior high school (≥Senior High School). Employment variable, 0= unemployed mothers and 1= employed mothers. Antenatal care (ANC) visit, 0= if ANC visit <4 times and 1= ANC visit ≥4 times.

High pregnancy risk, 0= mothers without high pregnancy risk and 1= mothers with high pregnancy risk. For the complication variable, 0= without any complications and 1= there had been any complications. For the lateness model, 0= without any lateness and 1 with any lateness. Maternal mortality, code 0= there had not been any maternal mortality and code 1= there had been any maternal mortality.

6. Data Analysis

In analyzing the data, the researchers employed the bivariate analysis using the SPSS Version 22. Multivariate analysis using STATA 13 path analysis.

A. Univariate Analysis

The characteristics of the subjects in this study were viewed in terms of age, educational level, employment status, and parturition; the summary of these characteristics was displayed in Table 2. The highest proportion of mother's age was found in 20-35 years old group namely 74.40%. Then, the highest proportion of employment status was found in the unemployment mothers or the housewives group namely 76.90%. Next, the highest proportion of parity was found in the multipara group namely 60.60%.

RESULTS

Table 2. The characteristics of the subjects in this study

Characteristics	Classifications	N	%
Age	<20 years old	12	10.2
	20-35 years old	87	74.4
	≥35 years old	18	5.4
Educational Level	Dropped out	2	1.7
	Elementary School	49	41.9
	Junior High School	25	21.4
	Senior High School	31	26.5
	Diploma	2	1.8
	Undergraduate	6	5.1
Employment status	Employed mother	27	23.1
	Unemployed mother	90	76.9
Paritas	Primipara	32	27.4
	Multipara	71	60.6
	Grandemulti	14	12

B. Bivariate Analysis

The results that had been displayed in Table 3 showed the influence of education, employment status, antenatal care visit, high risk pregnancy, complication, and lateness model on the maternal mortality.

The mothers who had high educational level (at least senior high school graduate) had 0.58 lower possibility to suffer from maternal mortality. The results of the analysis showed that there had been statistically insignificant relationship between the mother's educational level and the maternal mortality (OR= 0.58; CI 95%= 0.25 to 1.37; p= 0.212). The employed mothers had 0.19 lower possibility to experience maternal mortality. The results of the analysis showed that there had been statistically significant relationship between the mother's employment status and the maternal mortality (OR= 0.005; 95% CI = 0.05 to 0.67; p= 0.009). The mothers who had performed ANC visit according to the minimum standard had 0.25 lower possibility to suffer from maternal mortality. The results of the analysis showed that there

had been statistically significant relationship between the ANC visit and the maternal mortality (OR = 0.25; CI 95% = 0.11 to 0.58; p = 0.001).

The mothers with high pregnancy risk had 7.75 higher possibility to suffer from maternal mortality. The results of the analysis showed that there had been statistically significant relationship between the high pregnancy risk and the maternal mortality (OR= 7.75; 95% CI= 3.12 to 19.23; p <0.001).

The mother who suffered from complication had 11.24 higher possibility to suffer from maternal mortality. The results of the analysis showed that there had been statistically significant relationship between the complication and the maternal morta-

lity (OR = 11.24; CI 95% = 4.55 to 27.77; p < 0.001).

The mothers who experienced the late decision making had 17.39 higher possibility to suffer from maternal mortality. The results of the analysis showed that there had been statistically significant relationship between the late decision making and the maternal mortality (OR= 17.39; 95% CI= 4.65 to 65.01; p <0.001).

The mothers who had late transporttation providing had 14 .00 higher possibility to suffer from maternal mortality. The results of the analysis showed that there had been statistically significant relationship between the late transportation providing and the maternal mortality (OR= 14.00; 95% CI= 1.62 to 120.90; p= 0.002).

Table 3. Results of bivariate analysis toward the effect of educational level, employment status, ANC visit, high pregnancy risk, complication, and lateness model on maternal mortality in Bondowoso District

Variables	Category	Maternal Mortality				OR	95% CI	p
		No		Yes				
		n	%	n	%			
Educational Level	Low	49	62.8	29	37.2	0.58	0.25 to 1.37	0.212
	High	29	74.4	10	25.6			
Employment Status	Unemployed	54	60.0	36	40.0	0.19	0.05 to 0.67	0.005
	Employed	24	88.9	3	11.1			
ANC Visit	<4 times	15	44.1	19	55.9	0.25	0.11 to 0.58	0.001
	≥4 times	63	75.9	20	24.1			
High Risk Pregnancy	Low Risk	52	86.7	8	13.3	7.75	3.12 to 19.23	<0.001
	High Risk	26	45.6	31	54.4			
Complication	Absent	62	86.11	10	13.9	11.24	4.55 to 27.77	<0.001
	Present	16	35.6	29	64.4			
Late decision making	Absent	75	76.5	23	23.5	17.39	4.65 to 65.01	<0.001
	Present	3	15.8	16	84.2			
Late transportation providing	Absent	77	70.0	33	30.0	14.00	1.62 to 120.90	0.002
	Present	1	14.3	6	85.7			
Late handling in medical facilities	Absent	77	70.6	32	29.4	16.84	1.99 to 142.51	0.001
	Present	1	12.5	7	87.5			

The mothers who experienced late handling in medical facilities had 16.84 higher possibility to suffer from maternal mortality. The results of the analysis showed that there had been statistically significant relationtionship between the late handling in medical facilities and the maternal morta-

lity (OR = 16.84; CI 95% = 1.99 to 142.51; p = 0.001).

C. Multivariate Analysis
Figure 1 displayed the structural model after estimation using STATA 13 software had been performed. As a result, the

researchers attained the scores that had been displayed in the figure.

The results of the path analysis in Table 4 showed that the maternal mortality in Bondowoso District had been influenced by the late decision making, the late transportation providing, the late handling in medical facilities, and the complication.

There had been statistically significant influence of maternal mortality. The mothers who experienced late decision making had maternal mortality logodd 2.37 point higher than the mothers who did not experience late decision making (b= 2.37; 95% CI= 0.81 to 3.93; p = 0.003).
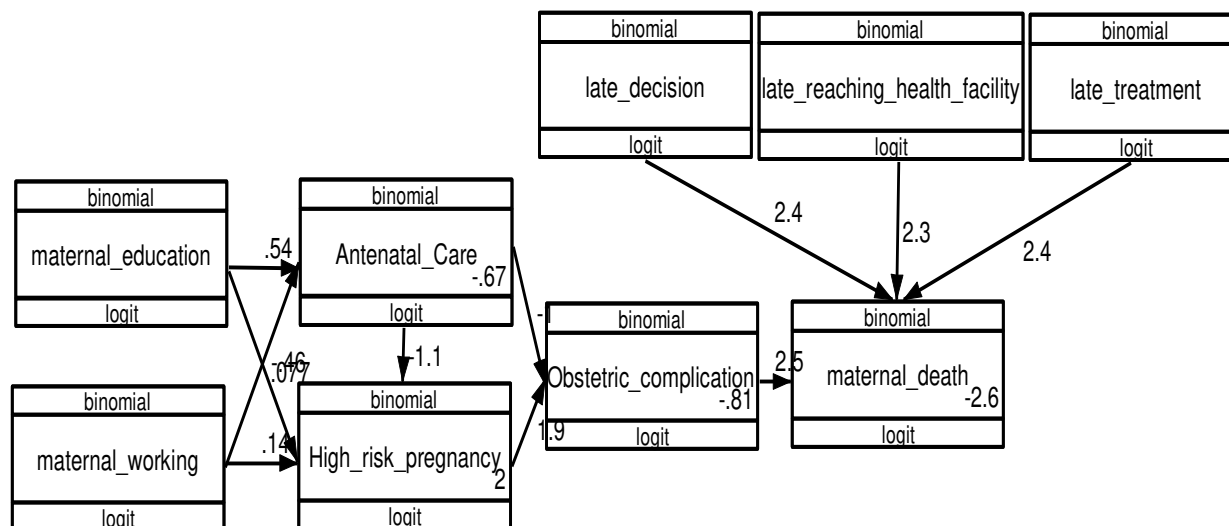
Picture 1. The Structural Model of Path Analysis

Table 4. Results of Path Analysis Test on the Determinant of Maternal Mortality in Bondowoso District, the Province of East Java

Dependent and Independent Variable			b	95% CI		p
				Upper Limit	Lower Limit	
Direct Effect						
Maternal	←	Late decision making	2.37	0.81	3.39	0.003
Mortality	←	Late transportation providing	2.35	-0.21	4.91	0.072
	←	Late handling in medical facilities	2.36	-0.19	4.91	0.069
	←	Complication	2.51	1.21	3.62	<0.001
Indirect Effect						
Complication	←	Standard ANC visit	-1.01	-1.94	-0.09	0.032
	←	High risk pregnancy	1.90	1.01	2.78	<0.001
High risk	←	Standard ANC visit	-1.09	-1.99	-0.19	0.018
pregnancy	←	High educational level	-0.46	-0.85	-0.07	0.020
	←	Employed	0.14	-0.17	0.45	0.369
Standard ANC	←	High educational level	0.54	0.10	0.99	0.017
Visit	←	Employed	0.08	-0.29	0.45	0.683

There had been almost statistically significant relationship between the late transportation providing and the maternal mortality. The mothers who experienced late transportation providing had maternal mortality logodd 2.35 point higher than the

mothers who did not experience the late transportation providing (b= 2.35; 95% CI= -021 to 4.91; p = 0.072).

There had been almost statistically significant relationship between the late handling in medical facilities and the maternal mortality. The mothers who experienced late handling in medical facilities had maternal mortality logodd 2.36 point higher than the mothers who did not experience late handling in medical facilities (b= 2.36; 95% CI= -0.19 to 4.91; p = 0.006).

There had been almost statistically significant relationship between the complication and the maternal mortality. The mothers who had obstetric complication had maternal mortality logodd 2.51 point higher than the mothers did not experience the obstetric complication (b= 2.51; 95% CI= 1.41 to 3.62; p <0.001).

The complication was influenced by the ANC visit and the high risk pregnancy. There had been statsitically significant relationship between the ANV visit and the complication. The mothers who performed the standard ANC visit had maternal mortality logodd 1.01 point lower than the mothers who did not perform the standard ANC visit (b= -1.01; 95% CI= -1.94 to -0.09; p= 0.032). Similarly, there had also been statistically significant relationship between the high pregnancy risk and the maternal mortality. The mothers with high pregnancy risk had maternal mortality logodd 1.90 point higher than than the mothers without high pregnancy risk (b= 1.90; 95% CI= -01.7 to 0.45; p= 0.369).

The high pregnancy risk was influenced by ANV visit, the educational level, and the employment status. The mothers who performed standard ANC visit had high risk pregnancy logodd 1.09 lower than the mothers who did not performed standard ANC visit (b= -1.09; 95% CI= 1.99 to -0.19; p= 0.018). Then, there had been statisti-

cally significant relationship between the educational level and the high risk pregnancy. The mothers who had high educational level had high risk pregnancy logodd 0.47 point lower than the mothers who had low educational level (b= -0.47; 95% CI= -0.85 to -0.07; p= 0.020). Next, there had been statistically insignificant relationship between the employment and the high risk pregnancy. The mothers who had been employed had high risk pregnancy logodd 0.14 point lower than the mothers who had been unemployed (b= 0.14; 95% CI= -0.17 to 0.45; p= 0.369).

The ANC visit was influenced by the educational level and the employment status. There had been statistically significant relationship between the educational level and the ANC visit. The mothers who had high educational level had ANC visit logodd 0.54 point higher than the mothers who had low educational level (b= 0.54; 95% CI= 0.09 to 0.99; p= 0.017). Then, there had been statistically insignificant relationship between the employment status and the ANC visit. The mothers who had been employed had ANC visit logodd 0.08 point higher than the mothers who had been unemployed (b= 0.08; 95% CI= -0.29 to 0.45; p= 0.683).

DISCUSSIONS

1. The influence of late decision making on the maternal mortality

The results of this study show that there has been direct influence from the late decision making to the maternal mortality. Gelany et al., (2015) mentioned that most of the complications that cause the maternal mortality are possible to prevent by minimizing any lateness. The frequency of lateness or delay is associated to 78% maternal mortality incidents and the first type of lateness is the late decision making, which has frequently occured (57%) (Okusanya et al., 2007).

The late decision making in looking for the sufficient help for the pregnant mothers oftens occur in the family. The most common reason is the lact of awareness toward the disease severity, the financial problems, and the concern of being discriminated in the medical facilities.

The cultural factors also influence the late decision making. The low status that pregnant mothers have in their family has rendered them unable to make decisions regarding their own health condition (Nieburg, 2012). The presence of patriarchal culture also strengthens the men's position as a decision maker in the family and the women may not take any actions without the approval of the men. In such culture, the pregnant mothers do not have any autonomy to make their own decisions independently (Rajab, 2009).

2. The influence of late transportation providing on the maternal mortality

The results of this study show that there has been direct influence of late transportation providing on the maternal mortality.

The geographical factors play very vital role in determining the public access to the medical facilities. These geographical factors might ease or complicate the public to benefit the medical facilities. These factors are related to distance, the time, and the cost. The closer distance, the faster time, and the cheaper cost will improve the public access to the medical service and facilities as well as to the deliverance of preventive service, which will be higher than the curative service, and light complaint handling in relation to the public health.

The conditions that also inhibit the public access and influence the distance, the time, and the cost are transportation facilities, damaged roads, and minimum transportation mode to the medical facilities. The uneven distribution of health facilities, especially because of the tendency that most health facilities are centered in cities, has caused the community who lives far away from the city to have difficulties in accessing the health facilities (Cham et al., 2005); whereas, the affordable distance and the sufficiently available health facilities will provide easiness for the patients whenever they would like to consult their health. With such easiness, any emergency situations can be immediately handled (Rukiyah et al., 2012).

3. The influence of late handling in medical facilities on the maternal mortality

The results of this study show that there has been direct influence of late handling in medical facilities on the maternal mortality. The late handling in medical facilities is associated to the ill-mannered handling procedures, late treatment, limited medicine stock, and limited medical tools and equipment (Depkes RI, 1998).

A study by Gelany et al., (2015) found that the causes of late handling in medical facilities that often appear are the poor communication between the hospital and the patients, the limited access to bloodbags (this is related to the unavailable donor), and the late decision making with regards to the surgery intervention due to the late diagnoses.

These results are in accordance to those of a study by Juharni et al. (2013) which show that hospital as the referral of health service is late in giving treatment due to their unpreparedness to encounter emergency situations, the lack of bloodbag supply, the absent medical staff, and other cases the medical treatment which takes more than 30 minutes since the arrival of the pregnant mothers to the hospital (Juharni et al., 2013). Therefore, the improvement of medical staff, the quality of coaching activities, and the availability of sufficient facilities are heavily demanded both the first-level health facilities and the advanced-level health facilities.

4. The influence of obstetric complication on the maternal mortality

The results of this study show that there has been direct influence of obstetric complication on the maternal mortality. If the complication is not appropriately handled, then it will lead to maternal mortality. Most of maternal mortality cases (75%) has been triggered by the direct cause namely the complication during the pregnancy, the parturition, and the childbed. Such complication can actually be prevented

using the sufficient handling (Weyesa et al., 2015).

Complication is a close determinant of maternal mortality. Complication is differentiated into two types namely direct obstetric complication and indirect obstetric complication. The direct obstetric complication refers to the complication that occurs during the pregnancy, the parturition, and the childbed while the indirect obstetric complication refers to conditions that have negative impacts on the pregnancy and the parturition (McCharty and Maine, 1992).

The results in this study are in accordance to a study by Aeni (2013), which show that the complication that occurs during the pregnancy and the parturition has significant relationship to the improvement on the risk of maternal mortality. Most complications occur during the parturition and the postpartum period, which lead to maternal mortality (Weyesa et al., 2015). Medical staff should have sufficient skills during the parturition process and there should be tight childbed period monitoring that goes in accordance to the national standard of childbed service. In minimum, the childbed service should be provided within 4 meetings in order to prevent, to detect, and to handle problems that might appear during the childbed period.

5. The influence of high pregnancy risk on the maternal mortality

The results of this study show that there has been indirect influence of high pregnancy risk on the maternal mortality with the presence of a moderating variable namely obstetric complication.

High pregnancy risk is assessed using the Poedji Roechjati Scorecard and the assessment is based on the risk factors that the pregnant mothers have during pregnancy, such as the history of previous pregnancy and parturition, the history of diseases, and the problems during pregnancy. These matters will influence the risk of suffering from complication during the pregnancy (Rochjati, 2011).

Previous studies have identified several factors that have been considered contributing to the improvement of several maternal morbidity risks, which might lead to the death of pregnant mothers. One of the factors is the late identification toward pregnant mothers with risk (Nair et al., 2015).

The maternal mortality in Indonesia is related to 4 *terlalu* factors namely *terlalu tua untuk hamil* (too old to get pregnant or pregnancy above 35 years old), *terlalu muda untuk hamil* (too young to get pregnant or pregnancy under 20 years old), *terlalu banyak* (having too many children or having 4 children and more), and *terlalu dekat* (too close pregnancy interval or the inter-pregnancy interval has been less than two years) (Hernawati, 2011). Such risk factors are several indicators within the assessment of high pregnancy risk status. Based on these points only, a mother might be regarded having high risk pregnancy.

Such high risk pregnancy should be identified accurately and should be handled appropriately in order to decrease the risk of suffering from complication that might lead to the maternal mortality. Most of obstetric complications cannot be prevented and be predicted previously; however, it does not mean that the complications cannot be handled. Recalling that every pregnant mother has the risk of suffering from obstetric complication, all pregnant mothers should have access to adequate obstetric emergency service (Simarmata et al., 2014).

6. The influence of ANC visit on the maternal mortality

The results of this study show that there has been indirect influence of ANC visit on the maternal mortality with the presence of two moderating variables namely high risk pregnancy and obstetric complication.

The results of this study are in accordance to those of a study by Nair et al. (2015), which explain that mothers with less sufficient antenatal visit have 15 times higher risk to suffer from maternal mortality than mothers who perform sufficient antenatal visit. Antenatal care plays a role in identifying mothers with high risk pregnancy (such as mothers with hypertension, anemia, and infection) so that the chance of decreasing maternal mortality rate might be widely accepted.

The results of a study by Yeoh et al., (2016) show that most women with high risk pregnancy has ANC visit that is below the standard. The ill-compliance in pregnancy examination may lead to the unknown multiple complications that can influence the pregnancy or even may lead to the pregnancy complication; as a result, medical staff might be late in handling the complication. Detection during the pregnancy examination is very helpful for preparing the risk control. If a pregnant mother does not perform pregnancy examination, then medical staff will not notify whether the pregnancy has been good or has been suffering from high risk situation. Not to mention, obstetric complication may endanger the life of both the mother and the infant. This situation is the cause behind the high morbidity and mortality (Damayanti and Nur, 2010).

7. The influence of educational level on the maternal mortality

The results of this study show that there has been indirect influence of educational level on the maternal mortality with three moderating variables namely ANC visit, high risk pregnancy, and complication.

The results of this study are in accordance to those of a study by Bauserman et al. (2015), which show that mothers who do not possess formal educational background have 3.2 times higher possibility to suffer from maternal mortality, mothers who possess elementary educational background have 3.4 times higher possibility to suffer from maternal mortality, and mother who possess high educational background have 2.5 times higher possibility to suffer from maternal mortality.

The mothers who have high educational level may process information better; as a result, if they find any signs of complications during the pregnancy, the parturition, or the childbed they will make decisions immediately by visiting the medical facilities in order to get immediate intervention (McCharty and Maine, 1992).

Mother's education is a strong predictor on the benefit of health care in relation to the antenatal care. If a mother has high educational and understanding level regarding the ANC visit

and the high risk pregnancy, then she will have better possibility to survive from the maternal mortality. As a result, she will have good awareness toward performing ANC visit according to the standard and she will be able to recognize the signs of danger in order to avoid the risks of suffering from complication that might occur during the pregnancy, the parturition, or the childbed. Prevention toward the risk of suffering from complication will decrease the maternal mortality.

8. The influence of employment status on the maternal mortality

The results of this study show that there has been indirect influence of employment status on the maternal mortality with three moderating variables namely ANC visit, high risk pregnancy, and complication.

The results of the study show that the mothers who have been employed improve the regularity of ANC visit. These results are in accordance to those of a study by Pangemanan et al., (2014), which explain that employed mothers tend to have better knowledge level because they have many opportunities to have interactions with other people and to receive more information than the unemployed mothers. As a result, their awareness consult the pregnancy also becomes higher.

Employment also influences the high risk pregnancy; the employment status certainly improves the pregnancy risk. However, such high risk pregnancy might be decreased if the employed mothers perform ANC visit according to the standard. By doing so, the employed mothers will be assisted by the medical staff in performing early detection toward the sign of dangers during the pregnancy. The factors of predisposition and the presence of inhibitors along should be identified since early period of the pregnancy in order to prevent heavy complications that might threaten the pregnancy and even the safety of both the mother and the infant (Astuti, 2012).

Based on the results of the study, the researchers may conclude that the maternal mortality has been caused by the late decision making, the late transportation providing, the late handling in medical facilities, and the

complication. The complication itself has been influenced by the high risk pregnancy and the ANC visit. The high pregnancy risk has been caused by the ANC visit, the educational level, and the employment status. Last but not the least, the ANC visit has been influence by the educational level and the employment status.

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