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Descriptive Study of Maternal Mortality Based On Maternal Characteristic in Semarang City

Indah Doanita Hasibuan[1*]
[1]Public Health, North Sumatra State Islamic University, Medan, Indonesia
*Coresponding author: doanitaindah@uinsu.ac.id
Phone: +62 81370139729

Abstract: Maternal mortality in Semarang District was in the 2th ranking (highest) of 35 districts/cities in Central Java Province by 2015. The purpose of this study was to analyze maternal mortality based on maternal characteristics in Semarang City. This research used descriptive analysis, derived from secondary data that taken from Maternal Verbal Autopsy data on maternal death at Semarang City Health Office. The sampling of this study were all death maternal cases whose died during pregnancy, delivery and postpartum in District Semarang as many as 35 people in 2015. From the analysis showed that maternal mortality in Semarang City based on mothers were aged 20-35 years (68.6%), level education in senior high school (54.3%), in working mothers (51.4%), at risk spacing births (52.4%), risk parity (51.4%), place of delivery were 89.2% in hospital, delivery by cesarian section (67.9%). Beside that, most of mortality cases occurred in postpartum period (80%), with the highest caused preeclampsia/ eclampsia (37%) and 71.4% of mothers also do Antenatal Care more than 4 times during pregnancy. There are Most of mothers have a history of heart disease (22.8%), 39.3% preeclampsia/ eclampsia as a delivery complication and 74% mothers with postpartum complication. This study recommends the need for early recognition of mothers about antenatal care and danger during pregnancy, childbirth and postpartum period and increased alertness of health workers to complications of pregnancy, complication of delivery and complication of postpartum especially in mothers with a history of illness.

Keywords : Characteristic, Descriptive Analysis, Maternal Mortality, Semarang

1. Introduction

Maternal mortality rate (MMR) is one indicator in determining the degree of public health status. The MMR describes the number of women who died from a cause of death related to pregnancy disorders or their treatment (excluding accidents or incidental cases) during pregnancy, childbirth and in the postpartum (42 days after delivery) without taking into account the length of pregnancy per 100,000 live births.

The results of the IDHS in 2012 showed that MMR in Indonesia was 359 per 100,000 KH. MMR in Central Java province in 2014 showed a rate of 126.50 per 100,000 KH. One of the cities in Central Java that still has a high AKM is Semarang City with an MMR in 2014 of 122.25 per 100,000 KH, an increase compared to 2013 which was 109.2 per 100,000 KH. Maternal deaths in Semarang City continue to increase from 2011. MMR data in Central Java Province, from 2012 to 2014 has increased. In 2012 MMR in Central Java was 116.34 per 100,000 live births, in 2013 MMR was 118.62 per 100,000 KH and in 2014 MMR was 126.50 per 100,000 live births, while the Infant Mortality Rate (AKB) of Central Java Province in 2014 was 10.08 per 1,000 live births.

Of the maternal deaths, about 20% occurred during pregnancy, 55.5% maternity and 24.5% occurred during the puerperium.

Semarang City is one of the cities that has a high maternal mortality rate in Central Java Province and has a tendency to increase every year. Based on the profile data of the Semarang City Health Office, the number of maternal death cases in 2014 was 33 cases from 26,992 live births (KH) or around 122.25 per 100,000 KH, an increase compared to 2013, which was 29 cases from 26,547 live births (109.2 per 100,000 KH) and in 2012 as many as 22 cases from 27,448 live births (77.5 per 100,000 KH). Meanwhile, the number of maternal deaths in Semarang City until December 2015 recorded 35 cases spread across 17 puskesmas and Semarang City was ranked 2nd Regency / city with the highest Maternal Mortality in Central Java Province.

In the scope of the Sustainable Development Goals (SDG), countries have united behind the target to accelerate the decline of maternal mortality by 2030. SDG 3 includes an ambitious goal: “reducing the global MMR to less than 70 per 100 000 births, with no country having a maternal mortality rate of more than twice the global average”.

Based on the results of several studies related to maternal mortality risk factors in Indonesia and in other countries, it shows that maternal mortality is influenced by factors related to maternal factors, reproductive status factors, factors related to obstetric complications, factors related to health services, socioeconomic factors and socio-cultural factors. The potential risk factors of maternal deaths include nutritional status, state of anemia, history of illness, age, antenatal care examination, method of delivery, late referral, occupational status, and pregnancy complications, which is specifically the most dominant factor(Diana et al., 2020) .Increased risk of maternal mortality occurred in women who deliver in hospitals, those who have deliveries attended by physicians and those who deliver by Caesarean section. The women who seek care by a physician or in a hospital are at higher risk for pregnancy complications or have experienced gestation complications that have required a higher level of medical care and these associations are confounded by indication(Bauserman et al., 2020).

This study aims to analyze maternal mortality based on characteristics mothers in maternal age, education, occupation, parity, spacing pregnancy, history of illness, pregnancy examination, place of pregnancy examination, pregnancy complications, delivery methods, place of delivery, delivery complications, postpartum complications, cause of death, period of death and place of death. This data related to maternal mortality that needed to plan and devise intervention programs to reduce mortality ratios. This study was conducted to describe the maternal mortality rate in Semarang City, to assess characteristics and causes of maternal mortality. Studies like these are important to contribute to the implementation of measures and expected to be used as information related to maternal deaths in Semarang City in taking policies to reduce the risk of an increase in maternal deaths, to improve the care, prevention and control of diseases during pregnancy and postpartum in pregnant women and mostly in women who are more vulnerable to the risk of maternal death.

2. Materials and Methods

This study used descriptive analysis, derived from secondary data in Semarang City Health Office. Sampling data was taken from Maternal Verbal Autopsy (OVM) data of maternal death cases who died during pregnancy, delivery and postpartum in Semarang City. In 2015 there were 35 cases of maternal deaths cases (totally sampling). The data were analyzed descriptively to obtain a describe of maternal mortality based on maternal characteristics in Semarang City.

3. Results and Discussion

Characteristics of mothers to be analyzed include maternal age, education, occupation, parity, pregnancy spacing, maternal of history illness, pregnancy examination, place of pregnancy inspection, pregnancy complications, mode of delivery, place of delivery, childbirth complications, puerperal complications, cause of death, period of death and place of death. The researche results can be described as follows :

3.1 Characteristic Based On Mother's age

The results of data collection on the characteristics of mothers based on age are presented in Table 1.

Tabel 1 Distribution of Maternal Mortality Based on Age

Age (year)	n	%
< 20 tahun	2	5,7
20-35 tahun	24	68,6
> 35 tahun	9	25,7
Total	**35**	**100**

According table 1, it can be interpreted that some of the cases in this research were in age group that is not at risk between 20-35 years (68.6%). In this case of maternal death, there were 2 mothers under 20 years, namely 17 years and 18 years and over 35 years there were 9 mothers between 36-48 years, the average age is in 29 years and cases of maternal death are in the age range 17-48 years.

Maternal age play an important role in the risk of maternal death. The group of women aged 40 years or older had a coarse risk on the order of 3 to 5 times higher than that observed for women in other age groups in Spain during the study period. The risk of adverse perinatal events and complications during pregnancy is signifcantly increased maternal ages greater than 40 years (García-Tizón Larroca et al., 2022). Maternal age group of 45 years or older were those who had a greater risk of caesarean delivery, preeclampsia, postpartum haemorrhage, gestational diabetes, puerperal thrombosis and hysterectomy as severe complications of pregnancy (Sheen et al., 2018).

3.2 Characteristic of mothers base on Education Level

From the cases of maternal death as many as 35 cases, the distribution of maternal deaths based on maternal education level can be seen in the table of below

Tabel 2 Distribution of Maternal Mortality Base on Education

Education Level	n	%
Elementary School	4	11,4
Junior High School	6	17,1
Senior High School	19	54,3
College	6	17,1
Total	**35**	**100**

Based on table 2 above, it can be interpreted that most of maternal mortality cases occurred on mothers with education level in senior high school (54.3%). This study is in accordance with other studies, which also state that the risk of death is higher among women with low education. Mothers with low education have 5.426 times greater experience maternal mortality (Sesunan, 2021).

Secondary or higher education significantly reduced the odds of maternal mortality by 47%. According having a secondary or higher education reduced the odds of maternal death by 23% (reference: no education). Secondary/ higher education was protective against maternal death in the North compared to having no education. This is consistent with other studies. In one study, non users of maternal health services were more likely to be less educated. The risk of maternal death may be higher in women with less education because of factors such as early marriage and other cultural practices that confine their access and participation in the labor force (Meh et al., 2019). Meh also stated that education level is fundamental in explaining the behavior of individuals in a society. Accordingly, low educational level among women leads to low or no use of modern healthcare.

The majority of deaths occurred among those with a low educational status by 46.2% and higher than mothers with higher educational status. Mothers with low education experience maternal mortality by 5.426 times greater (Bomela, 2020). The level of education of a mother affects the level of knowledge about the dangers of pregnancy risks. High knowledge implies that respondents can provide sufficient information about the causes and risk factors for maternal death. Meanwhile, low knowledge implies that respondents can provide little or no information about maternal death's causes and risk factors (Amoo & Ajayi, 2019).

WHO Global Survey on Maternal and Perinatal Health, which was conducted in 24 countries, found that, compared to women with more than 12 years of education, women with no education were at a 2.7-times higher risk and women with 1–6 years of education had twice the risk of maternal death. In the secondary data analysis of a demographic health

survey in Brazil, women with no or fundamental education had 2.18 times the odds of Maternal Near Miss (Rajbanshi et al., 2021).

3.3 Characteristic of mothers based on Occupation

The results of data collection on the characteristics of mothers based on occupation are presented in Table 3

Tabel 3 Distribution of Maternal Mortality Based on Occupation

Employment Satus	n	%
Working	18	51,4
Not Working (housewives)	17	48,6
Total	**35**	**100**

Based on table 3, it was found that maternal death cases mostly occurred in the group of working mothers, which amounted to 51.4%. In working mothers, most of them work as private employees 31.4%, then those who have self-employed jobs 14.3%, midwives 2.9% and teachers 2.9%. This is in line with research that working mothers 4,592 times more risk with maternal death (Respati et al., 2019). Maternal working status was associated with 25% higher risk compared with mothers that stay at home of under-five mortality in 26 countries from South Asia, Africa, and the Middle East. The strength of the association, however, difered across countries (Amir-ud-Din et al., 2022).

3.4 Characteristic of Mothers based on Parity

In the parity variable, the group of mothers with risk parity is categorized < 2 or > 4 and the group of mothers with parity is not at risk for maternal death (parity 2-4). The result of data collection on the characteristic of mothers based on parity are presented in table 4.

Table 4 Distribution of Maternal Mortality Based on Parity

Parity	n	%
< 2	15	42,9
2-4	17	48,6
>4	3	8,5
Total	**35**	**100**

Based on table 4, the results showed that most maternal deaths occurred in mothers with risk parity (< 2 or > 4) as many as 18 people (51.4%). This study in line with the results showed that parity and gravidity have high effect on maternal mortality and significantly correlate to maternal death in Ekiti state. Hence, more awareness should be created on the frequency of pregnancy and birth by the government, NGOs and other health regulated agencies, hence reducing this menace of maternal death. It is also recommended

that women should have an interval of at least 24 months from a live birth to the next pregnancy in order to reduce maternal mortality (Moses et al., 2020).

In this study there were still grande mothers multiparous or gave birth more than 4 times and primiparous or gave birth for the first time. This is in accordance with the theory that high parity will have an impact on the emergence of various health problems for both mother and newborn. In primipara, the first time there is pregnancy and childbirth that may not have experience in dealing with pregnancy and childbirth so that it can cause malnutrition, less ANC visits and to detect early high risk of difficult pregnancy. While in multiparous or mothers who gave birth 2-4 times were the majority in this study. This is due to past maternity experiences, thus making mothers to regularly visit ANC.

3.5 Characteristic mothers by Spacing Pregnancy

The pregnancy spacing variable could only be analyzed in 21 samples out of 35 samples, because 14 samples were first-time pregnancies (no pregnancy spacing). In the variable pregnancy spacing

Table 5 Distribution Maternal Mortality Based on Spacing Pregnancy

Spacing Pregnancy	n	%
<2 tahun	3	14,3
2-4 tahun	10	47,6
> 4 tahun	8	38,1
Total	**21**	**100**

Based on table 5, it can be seen that most cases of maternal death are found in mothers with a pregnancy spacing of < 2 years and > 4 years (which is the spacing of pregnancy at risk for maternal death), which is 52.4%. At the distance of pregnancy < 2 years there are 3 people (14.3%) namely 1 year 6 months, 5 months and the closest or shortest pregnancy distance is 2 months after abortion or miscarriage in the previous pregnancy, while the distance of the longest pregnancy is 20 years, so the range of pregnancy in the case of maternal death is ranging from 2 months to 20 years. Adoption of policies of a law fertility rate, the control of timing and interval of pregnancies and greater access to family planning can help to reduce the maternal mortality rate by reducing the number of pregnancies (Najimudeen et al., 2018).

The shorter birth-to-pregnancy interval, the higher risk to women and their children. Pregnancies that are too closely spaced occur among adolescents younger than 18 also carry with them a higher risk of preterm birth and low birth weight for infants, as well as maternal pregnancy and birth related complications, such as anemia and obstetric fistula. Three evidence based global recommendations for healthy timing and interval of pregnancy can lead to significantly improved maternal and child health outcomes : Women should delay their first pregnancy until at least age 18, after a live birth, women should wait at least 24

months before attempting the next pregnancy to reduce health risks for the mother and the baby then after a miscarriage or induced abortion, women should wait at least 6 months before attempting the next pregnancy to reduce health risks for the mother and baby (Starbird & Crawford, 2019).

3.6 Characteristic Based on History of Illness

The results of data collection on the characteristics of mothers based on history of illness are showed in Table 6

Tabel 6 Distribution of Maternal Mortality Based on History of Illness

History Of Illness	n	%
There is a history of illness	15	42,9
There is no history of illness	20	57,1
Total	**35**	**100**

The results of the study on maternal history illness variables showed that most maternal deaths occurred in the group of mothers who did not have a history of disease, which was 57.1%. Diseases suffered by the mother are diseases that have been suffered since before pregnancy / childbirth or diseases that arise during pregnancy, which will affect pregnancy or will be aggravated by the pregnancy. The type of disease suffered by the mother is mostly heart disease (22.8%) then tumors in the head (2.9%) and phlegmon (2.9%). In mothers who have a history of the disease, it is recommended to check their pregnancy more often. Cardiac disease in pregnant patients is an important risk factor for maternal as well as neonatal morbidity and mortality. A comprehensive management approach is needed for evaluation and management of these patients (Kumar et al., 2021).

3.7 Caharacteristic Based on Pregnancy Examination

The results of data collection on the characteristics of mothers based on pregnancy examination are presented in Table 7.

Table 7 Distribution of Maternal Mortality Base on Pregnancy Examination

Pregnancy Inspection	n	%
Good (≥4 time)	25	71,4
Not Good (<4 time)	10	28,6
Total	**35**	**100**

Based on table 7, it can be shows that in the pregnancy examination variable, the proportion of the group of mothers who met the criteria for good pregnancy screening (during pregnancy, mothers always checked their pregnancy / the frequency of examination more than 4 times on existing health workers) was 71.4% greater than the group of mothers

who met the criteria for bad antenatal examination (during pregnancy, mothers never checked their pregnancy / the frequency of examination was less than 4 times on existing health workers) namely by 28.6%.

The aim of antenatal care is to help women sustain normal pregnancies through early identifcation of preexisting conditions, identifying complications that arise during childbirth, and promotion of well-being. Currently, the WHO guidelines recommend at least eight contacts, with the frst one occurring within the first 12 weeks of gestation. The results of this study show that pregnancy checks in most mothers who experience maternal death are included in the good category in frequency, which is ≥ 4 times, but still need to be considered in quality, how the implementation of the pregnancy check, whether it has been carried out in accordance with the 10 T standard.

3.8 Characteristic based on Place of Pregnancy Inspection

The results of data collection on the characteristics of respondents based on Place of Pregnancy Inspection are presented in Table 8

Table 8 Distribution of Maternal Mortality Based on Place of Pregnancy Inspection

Pregnancy Checkpoint	n	%
Midwives Practice	5	14,3
Public Health Center	2	5,7
Maternity Hospital	2	5,7
Hospital	4	11,4
Private Practice Doctor	1	2,9
2nd place	15	42,9
3rd place	5	14,3
Don't Check	1	2,9
Total	**35**	**100**

Based on table 8 above, it was obtained that from 35 cases of maternal death, most mothers carried out pregnancy checks at 2 pregnancy checkpoints (ANC places) as many as 42.9%, consisting of pregnancy checks at midwives practice and at hospitals 14.3%, public health center and midwives practice 11.4%, public health center and hospitals 2.9%, public health center and maternity hospital 2.9%,, maternity hospital and hospital 2.9%, maternity hospital and midwives practice 2.9%, at public health center and clinic 2.9%, midwives practice and Pharmacy 2.9%. Then, mothers who checked pregnancy at 3 ANC places were 14.3%, namely public health center, midwives practice and hospital 8.6%, at public health center, maternity hospital and midwives practice 2.9% then at public health center, maternity hospital and hospital 2.9%. It can be concluded that independent midwives practice and the other place of pregnancy inspection have a very important role in improving the utilization of ideal ANC services in preparation for safe childbirth.

3.9 Characteristic Based on Pregnancy Complications

The distribution of maternal death cases based on pregnancy complications can be seen in the following table :

Table 9 Distribution of Maternal Mortality Based on Pregnancy Complication

Pregnancy Complication	n	%
There are Complication	9	25,7
No Complication	26	74,3
Total	**35**	**100**

Based on table 9 above, it is show that in cases of maternal death, there is still a small percentage of pregnancy complications, which is 25.7%. Types of pregnancy complications in this group were 90% with preeclampsia / eclampsia and bleeding 10% of 9 people who had pregnancy complications. Health education and mass enlightenment should be strengthen to create greater awareness on gestation complications and zero non institutional delivery tolerance. Maternal mortality rate (MMR) can be reduced by improving women access to productive resources and income also improving status of woman's nutrition (AP & JK, 2021).

The prevention of gestation complications is actually possible through early detection, conducted by regular and quality examinations, especially for high-risk gestations (Nyfløt & Sitras, 2018). This is one of the programs practiced in Community Health Center, although in a simple way, due to the fact that all gestations are basically risky, hence early intervention is important for everyone (Ozimek & Kilpatrick, 2018). The occurrence of high maternal mortality rate in Indonesia is suggestive of low quality health services, and this is assumed impossible to reduce without an effective referral system, especially in cases with complications (Geller et al., 2018; Howell, 2018).

3.10 Characteristic based on Mode of Delivery

The variable mode of delivery only can be analyzed for 28 samples from 35 existing samples, because 7 samples are cases of maternal death during pregnancy (not yet entering the labor process). The results of the characteristic based on mode of delivery are presented in table 10.

Table 10 Distribution of Maternal Mortality Based on Mode of Delivery

Cara Persalinan	n	%
Spontaneous	9	32,1

By Action	19	67,9
Total	**28**	**100**

The results on table 10 showed that in the variable mode of delivery, maternal mortality was mostly found in mothers who gave birth with action 67.9%. The mode of delivery by action in the case of maternal death is by cesarean section. The results of this study showed that from 28 cases of maternal death with cesarean section delivery, 19 cases of cesarean section delivery were obtained with indications of maternal factors including 11 cases with preeclampssia, 3 cases with age factors, 4 cases with indications because the mother has diseases that can affect energy and can worsen the mother's condition, namely heart disease and phlegmon while 1 other case with indications of the baby is breech location or latitude and history of labor cesarean section in previous deliveries.

3.11 Characteristic based on Place of Delivery

In the variable place of delivery, the analysis was only carried out on 28 samples, because 7 samples died during pregnancy (not yet entering the labor process). The distribution of maternal death cases based on the place of delivery can be seen in the table as follows:

Table 11 Distribution of Maternal Mortality Based on Place of Delivery

Place of Delivery	n	%
Midwives Practice	1	3,6
Clinic	1	3,6
Maternity Clinic	1	3,6
Hospital	25	89,2
Total	**28**	**100**

According to table 11, it can be interpreted that most of deliveries are in hospitals (89.2%). Several factors including gravidity, type of delivery, socio-economic status of mothers, place of delivery, death and maternity care venues were found in the original studies as the most important determinant of maternal mortalities in Iran (Zalvand et al., 2019). The largest proportion of maternal deaths occur in facilities where the higher risk patients are treated and where complicated patients are referred and while data are consistent with findings that hospital delivery is associated with higher maternal death, we do not have data on the quality of care that was delivered to these women or at what point in the mother’s illness she arrived at the hospital for care (Bauserman et al., 2020).

3.12 Characteristic based on Delivery Complications

In the variable of childbirth complications, it is categorized as present and no complications during labor. The distribution of maternal death cases based on childbirth complications can be seen in the table 12.

Table 12 Distribution of Maternal Mortality Based on Delivery Complications

Delivery Complications	n	%
There are complication	18	64,3
No Complication	10	35,7
Total	**28**	**100**

Based on the table above, it was found that most cases of maternal death were found in the group of mothers who experienced delivery complications 64.3%. This variable of delivery complications only can analyzed in 28 samples out of 35 samples, because 7 samples died during pregnancy. The types of childbirth complications experienced in the case of maternal death were preeclampsia / eclampsia 39.3% and bleeding 25%. Mothers who experience childbirth complications have a risk of maternal death 14 times greater than mothers who do not experience complications in childbirth (Supardi et al., 2022).

3.13 Characteristic based on Post partum Complication

In the puerperal complication variable, it is categorized as present and no complication. The results showed that most cases of maternal death were found in mothers with puerperal complications, which was 74%, as in the table 13.

Table 13 Distribution of Maternal Mortality Based on Post Partum Complication

Post Partum Complication	n	%
There are Complication	20	74
No Complication	8	26
Total	**28**	**100**

This puerperal complication variable can only be analyzed in 28 samples from 35 existing samples, because 7 samples died during pregnancy (not yet entering labor). The types of puerperal complications experienced in the case of maternal death are preeclampsia / eclampsia as many as 10 people (37%), bleeding as many as 8 people (29.6%), then oedem pulmo 1 person (3.7%) and amniotic fluid embolism 1 person (3.7%). The mothers who experience complications during the puerperium have a risk of maternal death 50 times greater than mothers who do not experience complications during the puerperium. It is also in line with research conducted by Nabila that there is a significant relationship between childbirth and postpartum complications and maternal mortality (Respati et al., 2019).

3.14 Characteristic based on Cause of Death

Based on data from verbal autopsy results in maternal death cases are presented in table 14

Table 14 Distribution of Maternal Mortality Based on Cause of Death

Cause of Maternal Death	n	%

Death from direct obstetric complication (***direct obstetric death***)		
a. Bleeding	9	25,7
b. Preeclampsia / Eclampsia	13	37,1
c. Embolism of amniotic fluid	1	2,9
d. Oedem Pulmo	2	5,7
Death due to indirect complications/diseases that worsen the mother's condition (***indirect obstetric death***)		
a. Heart Disease	8	22,8
b. Tumors in the head	1	2,9
c. Phlegmon	1	2,9
Total	**35**	**100**

The pattern of maternal mortality in 35 cases of maternal death in Semarang City showed that the highest cause of maternal death was preeclampsia / eclampsia (37.1%), followed by bleeding (25.7%), diseases that worsened the condition of the mother (28.6%), Oedem pulmo (5.7%) and amniotic fluid embolism (2.9%). The pattern of maternal mortality is the same when compared to Brebes Regency which is the area / district with the highest number of maternal deaths in Central Java Province in 2015, namely the 3 largest causes of maternal death consisting of preeclampsia / eclampsia followed by bleeding and heart disease.

Eclampsia was the second largest cause of maternal mortality, causing nearly 1600 deaths in Bangladesh. Eclampsia remains an important cause of maternal mortality throughout the world, accounting for about 50000 deaths globally. The basics of eclampsia management include control of convulsions, control of severe hypertension, the initiation of steps to effect delivery, and general nursing care. The medicinal against eclampsia varies across different countries. Bangladesh participated in the recent Magpie trial, which showed that magnesium sulphate can reduce the risk of eclampsia among women. It is also indispensable to identify the high risk preeclampsia patients by providing appropriate antenatal care (ANC) with blood pressure and urine protein measurements. Ensuring quality ANC and appropriate prevention and treatment strategy could decrease the potential hazards of eclampsia (Hossain et al., 2023).

3.15 Characteristic based on Death Period

In the variable period of death in cases of maternal death occurs in the period of pregnancy and puerperium with the results as can be seen in the table 15

Table 15 Distribution of Maternal Mortality Based on Death Period

Death Period	n	%
Pregnant	7	20
Post Partum	28	80
Total	**35**	**100**

Based on table 15, it can be interpreted that maternal deaths in Semarang City mostly occur during post partum (80%). From the 7 cases of maternal death that occurred during pregnancy, there were 2.9% in the first trimester of pregnancy (0-14 weeks), 2.9% in the second trimester pregnancy (14-28 weeks), 11.4% in the third trimester pregnancy (28-36 weeks) and 2.9% at > 36 weeks gestation. While in the case of maternal death in the puerperium period mostly occurred within <48 hours postpartum (31.4%), then in the postpartum period then followed at 8-28 days postpartum (22.9%), at 3-7 days postpartum (17.1%) and at 29-42 days postpartum (8.6%). Underscore that the postpartum period is the deadliest time for pregnant women with 226 maternal deaths occurring per 100,000 postpartum hospitalizations (Mogos et al., 2020).

3.16 Characteristic based on Place of Death

The result study of maternal mortality based on place of death are presented in table 16

Table 16 Distribution of Maternal Mortality Based on Place of Death

Place of Death	n	%
Home	1	2,8
Hospital	31	88,6
On the way to healthcare facility	3	8,6
Total	**35**	**100**

Based on table 14, it can be interpreted that most of maternal deaths in Semarang City occurred in hospital (88.6%). The place where the most maternal deaths occur is at RSDK (Dr. Karyadi Hospital). RSDK, is the last referral place for most maternal death cases, who have previously received services or treatment in several other health service facilities, including mothers with referral status who have received services / treatment in 3 places and even 4 health service places (health facilities).

This shows that in cases of maternal death travel time to referral health services is mostly no obstacle, but the obstacle is when the mother has to move several times to get treatment, so it takes time and sometimes to arrive at the hospital the mother's condition is critical and worsening, so that before getting treatment, the mother dies.

Based on data obtained from the Semarang City Health Office, it can be seen that the number of mothers who come alone or escorted to the hospital by their families is 24 people (68.6%). While mothers who came to the hospital escorted by health workers were as many as 7 people (20%). There were 10 referrals from Midwives practice, 3 referrals

from public health center, 2 referrals from the Maternity Home and 1 referral from the clinic. Mothers with referrals who get health services (handling) with 2 service places as many as 8 people, then mothers with handling from 3 health service places as many as 6 people, while mothers who get treatment with 4 service places as many as 2 people.

To get an idea of referral health services in maternal death cases, it can be known / estimated from the length of treatment in the hospital before the mothers died. The length of treatment time to find out the picture of health services in hospitals is divided into 2 groups, namely < 48 hours or > 48 hours after entering the hospital. From 31 cases who died in hospital, there were 21 cases (67.7%) who died within < 48 hours after admission to the hospital and the remaining 10 cases (32.3%) died within > 48 hours after admission to the hospital. The proportion of cases who died in hospitals was mostly (67.7%) in less than 48 hours after hospital admission. This situation shows that it is possible that the mothers died already in poor health before being taken to the hospital or it could also be caused by late referral and late handling.

4 Conclusion

The most maternal deaths in Semarang City occurred in mothers aged 20-35 years, who had senior high school education. Then the most maternal deaths occur on postpartum period in hospitals, the most causes of death are caused by preeclampsia/ eclampsia, it is expected to monitor and evaluate the performance of midwives in carrying out maternal health services.

There are no sources in the current documentality can be reduced by identifying causes which are preventable and giving timely treatment. Many reasons of maternal mortality were found to be preventable. Early identification and stratification of risks with prompt initiation of necessary management measures are necessary to prevent these deaths.

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Conflict of Interest

Author has no conflict of interest.

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