

# The Relationship between Age, Parity, Early Detection, K1-K4 Visits, Integrated ANC, Three Times Obgyn's Ultrasound Examination, and Maternal Mortality

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DOI: <https://doi.org/10.52403/ijrr.20220138>

## ABSTRACT

Maternal mortality is one of the indicators of health-care quality and effectiveness. Maternal mortality increases and decreases due to several factors. This article aims to analyze the factors that cause the increase and decrease in the maternal mortality rate. The research method is a cohort prospective, using a systematic sampling technique with the principle of proportionality. The number of samples is 150 data taken from the Tapin District Health Office, South Kalimantan, Indonesia. Statistical data analysis was performed using statistical descriptions and statistical inferential. The results of hypothesis testing indicate that age, early detection, K1 – K4 visits, integrated ANC and 3x SpOG ultrasound have a significant effect on maternal mortality. The parity does not have a significant effect on maternal mortality. Therefore, the pregnancy program must pay attention to age. During pregnancy, pregnant women must go through the process of early detection, K1 – K4 visits, integrated ANC. Parity must be considered so that babies can be born with conditions without deficiencies.

**Keywords:** Age; Parity; Early Detection; K1 – K4 Visits; ANC, Ultrasound; Maternal Mortality

## INTRODUCTION

Maternal mortality is one of the indicators of health-care quality and effectiveness (MacDorman et al., 2018; Setiawan & Nurcahyanto, 2020). Maternal Mortality Rate is currently still significantly below the Sustainable Development Goals (SDGs) target of 70 per 100,000 live births by 2030 (Callister & Edwards, 2017). In developed and developing countries, 15-20 percent of pregnant women are at high risk (Suarayasa, 2020).

In Indonesia, there is a positive trend of decreasing maternal mortality from 1991 to 2020, which is 390 to 230 per 100,000 with an average decrease of 1.8% per year. Despite the decline, the maternal mortality rate has not yet reached the MDGs target for 2015 and the upcoming SDGs for 2030 (Kemenkes, 2019). This is completely illustrated in Figure 1 below (Prabhakara, 2010).

There are increases and decreases in maternal mortality due to several factors. In SGDs there is a decrease but still not beyond the target number. Therefore, this article aims to analyze the factors that cause the increase and decrease in the maternal mortality rate.

Age is one of the factors that need to be considered to maintain the stability of the

mother's pregnancy process (Nove et al., 2014). Apart from age, parity also has an impact on maternal mortality (Huayanay-Espinoza et al., 2017). Early detection with a clear protocol is needed to prevent maternal mortality and can be a good prenatal (Ghulmiyyah & Sibai, 2012). Good antenatal care can reduce antepartum

mortality rates (Merdad & Ali, 2018), in Indonesia carried out with K1 – K4 visits. Visits 4 times for pregnant women is one of the public health efforts to meet the SDGs target (Ghosh & Ghosh, 2020). Diagnostic ultrasound also has an important role in pregnancy management to prevent maternal death (Thurber & Fleischer, 2019).



Figure 1. The development of maternal mortality in MDGs and SDGs

## MATERIAL AND METHODS

The research method is a cohort prospective, using a systematic sampling technique with the principle of proportionality, then correlation test. Data taken from the Tapin District Health Office, South Kalimantan, Indonesia. The data sample is data for a period of 12 months (January – December 2016) at the Data Sanggul Hospital, South Kalimantan, Indonesia.

The number of samples is 150 data with a sample selection technique by systematic sampling. The independent variables were age, parity, early detection, K1 – K4 visits, integrated ANC and 3x SpOG Ultrasound. The dependent variable is the maternal mortality rate.

Statistical data analysis was performed using statistical descriptions and normality tests. The Pearson correlation test is used if the distribution is normal, while the Spearman correlation test is used if it is not.

## Hypothesis

- H1: The age has a significant influence on the maternal mortality.
- H2: The parity has a significant influence on the maternal mortality.
- H3: The early detection has a significant influence on the maternal mortality.
- H4: The K1 – K4 visits has a significant influence on the maternal mortality.
- H5: The integrated ANC has a significant influence on the maternal mortality.
- H6: The 3x SpOG Ultrasound has a significant influence on the maternal mortality

## RESULTS

From the results of data processing, statistically descriptive obtained the classification of age, parity, early detection, K1 – K4 visits, integrated ANC, 3x SpOG Ultrasound and maternal mortality. Table 1 below is a descriptive statistic for each variable.

**Table 1. The frequency of each variable**

Variable	Frequency	Percentage
Age classification		
Less than 20 years old	16	10.70
20 – 29	66	44.00
30 - 39	61	40.70
40 years old and above	7	4.40
Parity classification		
Parity 1	38	25.30
Parity 2	65	43.30
Parity 3	31	20.70
Parity 4	15	10.00
Parity 5	1	0.70
Early detection		
No	12	8.00
Yes	138	92.00
K1 – K4 visits		
K1	12	8.00
K2	56	37.30
K3	58	38.70
K4	24	16.80
Integrated ANC		
No	17	11.30
Yes	133	88.70
3x SpOG Ultrasound		
No	33	22.00
Yes	117	78.00
Maternal mortality		
Died	2	1.30
Not Died	148	98.70

Statistically inferential, table 2 below is a test of data assumptions using the normality test.

**Table 2. Kolmogorov Smirnov Test**

Variable	Sig.	Result
Age classification	0.019	No
Parity classification	0.000	No
Early detection	0.000	No
K1 – K4 visits	0.000	No
Integrated ANC	0.000	No
3x SpOG Ultrasound	0.000	No
Maternal mortality	0.000	No

Based on the table above, all variables show the value of sig. less than 0.05, it means that all the variables show that the data is not normally distributed. Because, the distribution is not normal, the data is transformed, but the results are still not normal distribution, then Spearman test with SPSS is performed to test the hypothesis.

**Table 3. Hypothesis test**

Independent Variable	Dependent variable	P	H	Support
Age classification	Maternal mortality	0.018	1	Yes
Parity classification	Maternal mortality	0.296	2	No
Early detection	Maternal mortality	0.000	3	Yes
K1 – K4 visits	Maternal mortality	0.016	4	Yes
Integrated ANC	Maternal mortality	0.000	5	Yes
3x SpOG Ultrasound	Maternal mortality	0.007	6	Yes

## DISCUSSION

### Relation Between Age And Maternal Mortality

The results of hypothesis testing indicate that the age has a significant influence on the maternal mortality. Age is one of the factors that need to be considered to maintain the stability of the mother's pregnancy process (Nove et al., 2014). In addition, the age at birth is an important factor for the welfare of mothers and children after the birth process (Assari et al., 2019).

The mother's age at childbearing has changed dramatically in recent decades due to a variety of cultural and social determinants. Reproductive age is considered to be at risk for an adverse outcome (Londero et al., 2019).

High age has a risk of pregnancy (Morris et al., 2018). Maternal age when pregnant biologically has an emotional, mental and nutritional fulfillment during pregnancy (Rangkuti & Harahap, 2020).

### Relation Between Parity and Maternal Mortality

Parity was defined as the number of children ever born to a woman (Huayanay-Espinoza et al., 2017). The results of hypothesis testing indicate that parity does not have a significant effect on maternal mortality. Even though it has no significant effect, women with high parity should pay attention to the negative impact that arises. Based on the perception of high parity women, the problem that arises is the problem of their welfare and quality of life (Alzboon & Vural, 2021).

Few cases of death are caused by parity. However, parity can affect placental weight during pregnancy (Flatley et al., 2021). The placenta supplies nutrients and oxygen to the fetus. Therefore, parity must be considered so that babies can be born with conditions without deficiencies. Moreover, parity has a high risk of maternal cardiovascular disease and has the potential to cause type 2 diabetes mellitus (Klingberg et al., 2017).

### **Relation Between Early Detection and Maternal Mortality**

The results of hypothesis testing indicate that the early detection has a significant influence on the maternal mortality. One of the challenges in the effort to conduct early pregnancy detection is that several health facilities are not sufficient. The availability of essential facilities and medicines increases the risk of maternal morbidity and mortality (Ansari et al., 2019).

Through early detection, it is possible to anticipate the incidence of hypertension in pregnant women. Early detection is done by hemodynamic screening for circulatory disorders, to improve maternal-fetal outcomes, it can be done by selecting the right intervention (Phillips et al., 2020). In addition, early detection is very important for pregnant women who are at risk of preeclampsia in the first trimester (Mönckeberg et al., 2020).

### **Relation Between K1 – K4 visits and Maternal Mortality**

The results of hypothesis testing indicate that the K1 – K4 visits has a significant influence on the maternal mortality. To prevent maternal mortality, the government must pay attention to the procedures for antenatal care until delivery (Purhadi et al., 2021). In Indonesia, the k1-k4 examination is highly recommended by the government. The k1-k4 examination is that pregnant women carry out routine checks at least four times. At least once in the first trimester, at least once in the second trimester and at least 2 times in the third trimester. Continuing care for pregnant women can reduce maternal mortality (Merdad & Ali, 2018).

### **Relation Between Integrated ANC and Maternal Mortality**

An effective strategy to reduce the risk of maternal and neonatal mortality is the integration of ANC (Hirai et al., 2020; Palmer et al., 2021). The results of hypothesis testing indicate that the

integrated ANC has a significant influence on the maternal mortality. Therefore, the solution that can be done is to improve the quality of ANC services (Ejigu Tafere et al., 2018).

However, various difficulties were discovered and classified during the implementation of integrated ANC, including strategy, care process, administration and management support (Afrizal et al., 2020). Diseases in pregnant women can be detected and integrated early with Antenatal Care services that must be carried out in a comprehensive, integrated and quality manner. Pregnant women should also get more comprehensive and integrated services, missed opportunities can be avoided and services can be carried out more effectively and efficiently.

### **Relation Between 3x SpOG ultrasound and Maternal Mortality**

Routine ultrasound can help reduce perinatal mortality and prevent maternal mortality (Goldenberg et al., 2018). The results of hypothesis testing indicate that the 3x SpOG Ultrasound has a significant influence on the maternal mortality. In some countries, the use of ultrasound has proven that ultrasound can detect pregnancies that have a high risk of death. Therefore, it is necessary to train for quality ultrasound examinations and improve doctor services (Holmlund et al., 2018).

The inside of a pregnant woman's uterus can be seen using ultrasound. It can help doctors in analyzing a pregnancy. In addition, it can see the presence or absence of an embryo, ultrasound can also be used to determine estimated labor, gestational age, weight and length of the fetus.

## **CONCLUSIONS**

Age, early detection, K1 – K4 visits, integrated ANC and 3x SpOG Ultrasound have a significant effect on maternal mortality. The parity does not have a significant effect on maternal mortality. High age has a risk of pregnancy. Early detection is very important to control the

fetus and the risk of maternal mortality. Continuing K1-K4 visits can reduce maternal mortality. An effective strategy to reduce the risk of maternal and neonatal mortality is the integration of ANC. Routine ultrasound can help reduce perinatal mortality and prevent maternal mortality. Women with high parity should pay attention to the negative impact that arises. Parity can affect placental weight during pregnancy.

**Acknowledgement:** None

**Conflict of Interest:** None

**Source of Funding:** None

**Ethical Approval:** Approved

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How to cite this article: Milhan, Indang Trihandini, Shinta Prawitasari. The relationship between age, parity, early detection, K1-K4 visits, integrated ANC, three times Obgyn's ultrasound examination, and maternal mortality. *International Journal of Research and Review*. 2022; 9(1): 321-327. DOI: <https://doi.org/10.52403/ijrr.20220138>

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