



The Correlation Among Knowledge, Nutritional Status and Income with Incidence of Infant Mortality Rate in Grobogan Regency

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Abstract

In 2018 Infant Mortality Rate (IMR) in Grobogan increased into the third-highest death rate. It was 14.27 per 1,000 live births, and in 2019 Infant Mortality Rate in Grobogan was 14.61 per 1,000 live births, namely 284 deaths from 19,427 births. The purpose of this study was to determine the risk factors associated with IMR in Grobogan Regency from 2019 to 2020. The type of research used a case-control study with 60 cases and 60 controls as the sample. The instrument used a structured questionnaire sheet. Data analysis was performed by univariate and bivariate using the chi-square test. The results showed that the risk factors associated with the incidence of IMR include knowledge (P-Value = 0.000), maternal nutritional status during pregnancy (p-value = 0.000), and income (P-value 0.058). The conclusion of this study stated that there is a correlation between knowledge and nutritional status during pregnancy, but the income variable is not related to the incidence of IMR in Grobogan Regency.

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INTRODUCTION

Infant Mortality Rate (IMR) is the number of people who die before reaching one year, which is expressed in 1,000 live births in the same year. The high infant mortality rate (IMR) can lead to low health status in a region (Ministry of Health, 2018). The infant mortality rate is a sensitive indicator to determine the health status and even to measure the level of the nation's progress. If a country has a high degree of health, it can be said that the country is a developed country because health is used as a parameter for people's welfare.

The research from Singh and Stella (2019) stated that the cause of infant mortality in the United States is related to parents, namely education level, maternal addiction, maternal age at pregnancy, prematurity, low birth weight, race. According to the Washington State Department of Health in 2013, the causes of infant mortality in Washington State are low quality of antenatal care (ANC), preventive services, and low socio-economic conditions (Morgan et al., 2018).

The prevalence of infant mortality in several countries is still quite high. Based on the United Nations Children's Fund (UNICEF) 2018, Indonesia is one of the ten countries that are the focus of the Every Child Alive 2018 campaign among nine other countries, namely Bangladesh, Ethiopia, Guinea - Bissau, India, Malawi, Mali, Nigeria, Pakistan, and Tanzania. Indonesia's infant mortality rate is relatively high compared to ASEAN countries, namely 4.6 times higher than Malaysia, 1.3 times higher than the Philippines, and 1.8 times higher than Thailand.

Indonesia's Health Profile in 2018, the Infant Mortality Rate in Indonesia is 25 deaths per 1,000 live births. It is hoped that in 2030, the next target can reach 12 per 1,000 live births. Many factors influence this figure, including disease and development of maternal and fetal health, and all matters related to health services, either directly or indirectly (Indonesia Health Profile, 2018). The Infant Mortality Rate in Central Java Province in 2016 was 9.99 per 1,000

live births, then decreased in 2017 to 8.9 per 1,000 live births. In 2018, it decreased slightly to 8.37 per 1,000 live births.

In 2016, the highest Infant Mortality Rate in Central Java was in Grobogan Regency at 17.08 per 1,000 live births. In 2017, Grobogan Regency was ranked as the fourth highest infant mortality in Central Java at 13.5 per 1,000 live births. In 2018 the Infant Mortality Rate in Grobogan increased into the third-highest ranking of deaths. Which is 14.27 per 1,000 live births, and in 2019 the Infant Mortality Rate in Grobogan was 14.61 per 1,000 live births, namely 284 deaths from 19,427 births where the Infant Mortality Rate achievement is still far from the national target of 102 per 1000 live births.

According to Kusumaningtyas and Jatmiko (2019), the triggers for the high mortality rate for mothers and newborns in Indonesia are the quality of health services, the health referral system, and the National Health implementation Insurance, and local government policies related to health. Apart from these factors, there are also cultural factors where gender inequality is a problem when women want to give birth. Several regions in Indonesia even adhere to the principle that women do not have the right to determine their childbirth process.

Infant Mortality can result from a lack of awareness of maternal health. Many factors influence it, including mothers rarely have their womb checked by midwives, pregnant at a young age, the distance is too narrow, pregnant at old age, lack of nutrition for mothers and their babies, food consumed by mothers is not clean, sanitation and hygiene facilities are inadequate. Besides, the mother's condition during pregnancy is not good and healthy. It can also result in her womb, such as physical factors, psychological factors, environmental, social, and cultural factors (Wandira and Indawati, 2012).

Socio-economic factors such as education, knowledge of health, nutrition and environmental health, beliefs, values, and poverty are individual and family factors affecting mortality in society. Maternal education is a strong influence factor on infant mortality.

Education is essentially a conscious effort to develop personalities and abilities inside and outside the school for life, so it is more mature in facing and solving various problems. It includes health problems to reduce the risk of death (Aisyah et al., 2013).

Therefore this study aims to determine the correlation between knowledge, nutritional status, and income with the incidence of infant mortality rate.

METHODS

The research design used an analytic survey method with a case-control design. This research was conducted in Grobogan Regency from January 2019 to July 2020. In this study, the case population were all babies who died at the age of 0 to 12 months who were registered in the Grobogan Regency Health Office in 2020. This study's control population was infants who still alive for more than one year, recorded in the work area of Grobogan Regency Health Office in 2020.

The determination of minimum sample size for the case group and control group is based on previous research conducted by Sari (2016) with the result $OR = 3.3$, $P1 = 0.51$, $P2 = 0.24$ with the level of confidence ($Z\alpha = 95\%$), namely 1,960. Based on the calculation, the minimum sample size is 43 people. For anticipating subject disobeying the rules, the sample is exaggerated by 20%, so that the sample of this study becomes 60 people. This study used a 1:1 comparison of cases and controls, so the sample of this study was 120 respondents consisting of 60 cases and

60 controls. The sampling technique was purposive cluster sampling. It takes research samples in all districts in Grobogan Regency. In each cluster, the population number was calculated as the sample-based inclusion criteria.

This study's instruments were a knowledge questionnaire, nutritional status, and income also documentation sheet from Grobogan Regency health office. The questionnaire aims to find out information about the condition of the respondent. The data that has been collected will be tested for its validity and reliability. It is found that the knowledge questionnaire with 17 items is all valid, and the questionnaire is reliable. This is also in line with the nutritional status questionnaire with 14 items. After that, the results of the questionnaire were processed by giving. The statistical analysis that will be carried out in this study is univariate and bivariate analysis assisted by SPSS 16 program. Before that, the researchers received Ethical Clearance from Semarang State University with number 097 / KEPK / EC / 2020.

RESULTS AND DISCUSSIONS

The study results took 120 respondents whose criteria were mothers who had given birth to the dead and alive baby were recorded at the Grobogan Regency Health Office, Central Java.

The data was collected by distributing questionnaires and conducting interviews. Based on the research, it is found that the characteristics of the respondents are presented in Table 1 below.

Table 1. Characteristics of the respondents

No	characteristics		Total	(%)
1	Age	<21	16	13
		21 – 30	65	52.8
		31 – 40	33	26.8
		> 40	5	4.9
2	Education	ES	7	5.8
		JHS	32	26
		SHS	52	43.3
		Bachelor	29	24.2
3	Income	> 5.000.000	2	1.6
		2.500.000 - 5.000.000	101	82.1
		1.500.000 - 2.490.000	14	11.4
		< 1.500.000	3	2.4
4	work status	Work	75	62.5
		Not work	45	37.5

Table 1 shows that the characteristics of respondents based on age show that most age groups are 21-30 years old, namely 65 respondents or 52.8% of the total respondents. Based on the results, most are aged 21-30 because that age is a good time to conceive. At that age, the respondents are still good at filling out the questionnaire.

Based on education characteristics, it was found that the highest level of education was at the high school level, namely 52 respondents. This is because the Grobogan area is not one of the big cities, so the community, especially

Bivariate Analysis

The bivariate test results for the Correlation between knowledge and incidence of

women, still do not need to go to school too high.

Based on income characteristics, the majority income from 101 respondents or 82.2% of the total respondents is between Rp.2,500,000 to Rp.5,000,000. This is because the Grobogan Regency minimum wage (UMK) is Rp.2,400,000. Apart from that, the respondents also get other income.

For characteristics based on work status, it was found that 75 or 62% of respondents were working. This is because, in Grobogan, there are many industrial places and also fields to earn money as an additional family income.

IMR in Grobogan Regency, which is calculated using the chi-square test, are presented in Table 2 below

Tabel 2. The Correlation Between Knowledge and Incidence of IMR

knowledge	IMR				Total	OR	P	
	Yes		No					
	N	(%)	N	(%)				
Good	8	7	35	29.1	43	36.1	0.11	0.000
Poor	52	43	25	20.9	77	63.9		
Total	60	50	60	50	120	100		

In Table 2, the correlation between knowledge and incidence of IMR shows that the Odds Ratio value is 0.11, which means that

respondents with poor knowledge have 0.11 times greater possibility of experiencing IMR than respondents with good knowledge. Poor

knowledge of respondents whose babies experienced death was high, namely 52 respondents. This is because respondents focus on work, so knowing the importance of maintaining pregnancy and nutrition during pregnancy is not well understood/ known.

The chi-square statistical test results to see the Correlation between knowledge and IMR in Grobogan Regency found that the P-Value is 0,000, which means less than the significance value applied in this study, which is 0.05. This means that there is a The Correlation between knowledge and IMR. So the first hypothesis, that there is a The Correlation between knowledge and IMR in Grobogan Regency is accepted.

The results of respondents' knowledge were extracted from 17 questions. It obtained an average score of 13.3 respondents. It is under the operational definition. If the respondent gets a lower score than the average, it is classified as poor knowledge. Therefore, in this study, the respondents' knowledge was low.

The low result of this knowledge is that the respondent does not know what nutrition the fetus needs during pregnancy, and also, the respondent does not know if anemia during pregnancy can cause the mother and the fetus at high risk. According to Notoadmojo (2003), limited knowledge will make it difficult for a person to understand the importance of advancing health information and changes someone's attitudes and behavior or in a favorable direction. The respondent's knowledge is good because the respondent knows the information from various media that is absorbed quite well, such as the internet, magazines, advertisements on television, and various other

sources. Also, information can be obtained from other people, such as friends, neighbors, medical personnel, and people.

Most of the respondents' education is in high school, and the respondents work in certain institutions daily, so the respondents do not have enough time to learn about parenting. Therefore, poor knowledge is related to the IMR incident in Grobogan Regency. The results showed a The Correlation between knowledge and incidence of IMR in line with the research of Garcia et al. (2019), which reported The Correlation between knowledge level and IMR. Increasing knowledge for mothers can be done through health promotion and counseling or classes for pregnant women about nutritional needs during pregnancy and effective ways to prevent, recognize the danger signs of pregnancy and babies.

Research from Franca et al. (2017) shows that neonatal mortality is four times higher than mothers with unwell-educated levels. It is consistent with Toscano and Hossain (2018) research, who reported that women's education, especially women with low knowledge, was considered significant in reducing IMR. Besides, Ely & Hoyert (2018) stated that education for pregnant women is very important because it can anticipate the risks she takes during pregnancy. Research by Gebregziabher et al. (2019) states that a knowledgeable mother may be more able to use health care information during pregnancy and after childbirth.

The chi-square calculation result of the correlation between nutritional status during pregnancy and the incidence of IMR are presented in Table 3 below.

Table 3. The Correlation results between nutritional status and IMR

Nutritional status	IMR				Total n	OR	P
	Yes		No				
	n	(%)	N	(%)			
Good	11	9.1	56	46.6	67	55.7	0.16 0.000
Poor	49	40.9	4	3.4	53	44.3	
Total	60	50	60	50	120	100	

The Correlation results between nutritional status and IMR, as seen in Table 3,

show that the Odds Ratio value is 0.16, which means that respondents with poor nutrition

during pregnancy have a 0.16 times higher risk of IMR in Grobogan Regency compared to good nutritional status. Nutritional status is inseparable from knowledge because good knowledge will lead to a good attitude towards pregnancy. So the results of not good majority knowledge make nutritional status during pregnancy is also not good.

The chi-square analysis on nutritional status during pregnancy obtained a 0.000 p-value, which means that the p-value is less than the significant value of 0.05, so it can be concluded that there is a The Correlation between nutritional status during pregnancy and IMR. Furthermore, the second hypothesis is that the Correlation between nutritional status and IMR in Grobogan Regency is accepted.

In Table 3, it is found that the incidence of IMR occurs a lot because there are still many whose nutrition is not good. From 14 questionnaires with a maximum score of 28, the average score was only 15.77. Therefore, the nutritional status of pregnant women in Grobogan Regency is still not good enough. This is because several factors, namely during pregnancy, rarely consume foods containing protein such as eggs, fish, and meat. Furthermore, they do not drink blood-booster every day, and during pregnancy, the mother does strenuous physical activity. Therefore, the analysis shows that there is a The Correlation between nutritional status during pregnancy and IMR.

Good nutritional status is due to the provision of knowledge through education and health counseling by health workers to pregnant women and a diet according to the recommendations carried out by the mother during pregnancy. The nutritional status associated with the incidence of IMR is in line with Rofiah (2014), which states that mothers' nutritional status during pregnancy affects infant mortality rates. There is a The Correlation

between nutritional statuses because mothers who experience deficiencies of certain nutrients needed during pregnancy will cause the fetus to grow imperfectly. If the mother lacks calories, it causes malnutrition, or it is called Chronic Energy Deficiency (KEK), which is marked by the size of LILA <23.5 cm (Mahirawati, 2014).

Chronic energy deficiency causes pregnant women to not have adequate nutritional reserves to provide the physiological needs of pregnancy, namely hormonal changes and increased blood volume for fetal growth, so the fetus's supply of nutrients is reduced. As a result, fetal growth and development are hampered (Mariyatul, 2016).

Then nutritional imbalance or malnutrition often occurs, and most pregnant women experience malnutrition. Lack of nutrition/ calorie causes poor health conditions for pregnant women. The main factor affecting IMR with low nutritional status is the low regular consumption of fruits and vegetables. This is also in line with research from Sati et al. (2016), Pal et al. (2020), Alisjahbana et al. (2019), and Mardiaturrahmah and Anjarwati (2020), who state that unbalanced food during pregnancy results in malnutrition and causes IMR.

The Correlation between IMR and nutritional status is directly affected by nutrient/ calorie intake. The higher the nutritional or calorie intake, the lower the IMR. On the other hand, due to a pregnant woman's condition is not healthy—undernourished pregnant women. Lack of nutrition/ calorie intake causes poor health conditions for pregnant women. This is in line with research from McKinney *et al.* (2017), Anitasari & Tandiana (2019) also Sukoco and Wigunantiningasih (2020), which state that nutritional status plays a major role in infant survival.

The chi-square calculation of the Correlation between income and IMR is presented in Table 4 below.

Tabel 4. The Correlation Analysis Between Income and IMR

Income	IMR				Total	OR	P
	Yes		No				
	n	(%)	N	(%)			
Low	27	22.5	17	14.1	44	36.6	2.07 0.058
High	33	27.5	43	35.9	76	63.4	
Total	60	50.0	60	50.0	120	100	

The correlation analysis between income and IMR presented in Table 4 shows that the Odds Ratio value is 2.07, which means that respondents with low-income status have a probability of 2.07 times higher on IMR than those with high income. High income in this study is the majority, with the number of respondents 81. This is inseparable from the respondents whose families get additional income.

The Correlation results between respondents' income and IMR in chi-square analysis obtained a P-value of 0.058, which means more than a significant value of 0.05, so it can be concluded that there is no correlation between income and IMR. The third hypothesis is that there is the correlation between income and IMR in Grobogan Regency is rejected.

The statistical results of the correlation between income and IMR are not significant. The use of BPJS from the government to conduct audits allows people with low income to be examined without spending a lot of money. The income factor in Grobogan Regency is also high because many of the income is already above UMK. The high income in Grobogan Regency also led to the development of the CBS class to be better.

The average respondent has an income between Rp.2,500,000 - 5,000,000. This value is not necessarily high because the income is derived from three factors: the husband's income, the respondent's income, and other sources. Although operationally, it is classified as having a good income, in practice, it is not good enough because the expenses for each family are different, and the number of family members is heterogeneous.

The absence of a significant correlation between income and IMR in Grobogan Regency

is in line with research by Fell *et al.* (2017) and Siddiqui *et al.* (2013), which states that IMR is indirectly influenced by income through its impact on the level of consumption of goods which affects the health such as food, housing, sanitation, also health care and education. The high income of mothers also does not affect because a higher income level will create conditions that can affect the quality of life, such as fulfilling good quality goods and good family conditions (Utoyo and Camidah, 2018). According to previous research conducted by Wandira and Indawati (2012), income does not affect the incidence of infant mortality, which states that economic status is not a factor in infant mortality.

CONCLUSION

This study's conclusion shows that there is a correlation between knowledge and nutritional status during pregnancy with the incidence of IMR in Grobogan Regency. Furthermore, income has no correlation with the IMR incident in Grobogan Regency.

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