SOCIO ECONOMIC DETERIMINANT OF INFANT MORTALITY RATE IN WEST NUSA TENGGARA PROVINCE

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ABSTRACT

This study aims to assess the infant mortality rate in West Nusa Tenggara using the Mosley and Chen framework. This research uses econdary data obtained from 2013 Basic Healt Research (Riskesdas). In order to examine the factors predicting IMR, Logit regression analysis was applied. The finding show that Infant Mortality rate in West Nusa Tenggara is 42, this number is lower than data from Indonesian Demographic and Health Survey 2012. Infant mortality rate in West Nusa Tenggara Province is higher in rural area. Infant mortality have been associated with breastfeeding, household's economic level, the number of antenatal visits and the health of household environment. Overall, the independent variable accounted for effect reach 20,8%. The primary factors that have the most impact on infant mortality in West Nusa Tenggara Province is household's economic level

Keywords : Infant Mortality, Social Economic's Determinant, Household's economic level

INTRODUCTION

The infant mortality rate (IMR) is still becoming one of critical issues in developing countries like Indonesia. This paper examines the condition of infant mortality from the of socio-economic factor. The infant mortality and child mortality rate reflects the level of health development of a country's and quality of life in a society. The IMR can be used to monitor and evaluate programs and policies in the field of population and health. Moreover, mortality data are needed to make the projection in development planning and evaluation of population programs as well as policies.

Based on the Millennium Development Goals (MDGs), the target of health development achievements is to reduce infant mortality and child to two-thirds of the numbers contained in 2000. The infant mortality rate in Indonesia has been decreased significantly in the last 20 years. The greatest decrease occurred in the years 1991 to 2002/2003 and periodically decrease to 32 per 1,000 live births in 2012. This happens due to advance in technology and innovation in the health sector as an effort to reduce maternal, infant, and child into national development goals. United Nations Development Programme (UNDP) has set a target that was agreed in the MDGs requires Indonesia to be able to reduce the infant mortality rate amounted to 23 per 1,000 live births in 2015.

Many provinces in Indonesia have IMR above the average Indonesian IMR, one of them is West Nusa Tenggara Province. Table 1 show MDGs data achievement on West Nusa Tenggara Province in 2012. Regional Action Plan for the Acceleration Decrease of MDGs explained that reducing IMR from 57 to 32 is not easy task tod do even IMR has decreased periodically. IMR 2015 estimated by BPS show the numbers are still above the MDG targets, therefore it's definitely difficult to achieve.

Table 1.
Target and realization MDGs on West Nusa Tenggara Province in 2012

Goal	Indicator/ Sub Indikator	2012	2015	Status	Data source
Reduce Child Mortality	The under-five mortality rate	75	68	difficult to achieve	Realization by: Data Pre IDHS 2012
	Infant mortality rate	57	32	difficult to achieve	Realization by: Data Pre IDHS2012

Source: RAD PP MDGs West Nusa Tenggara Province 2011-2015

The high rate of infant mortality still become a problem that must be addressed to meet the targets set by the MDGs that cornerstones of the national development. Reducing mortality obviously need access to good health and well supported environmental health. Many factors can influence the high rates of infant and child mortality. Economic, social, and demographic. In addition to the non-technical aspects of mortality, further studies also need to be considered. Although the targets set by MDGs UNDP will most likely be difficult to be achieved, but the effort to reduce mortality has to be done. Thus, this research aim to (1) assess the infant mortality rate in West Nusa Tenggara Province and (2) Analyze the influence of socio-economic factors on infant mortality in NTB.

Research Framework

This research was conducted based on a theory by Mosley and Chen (1984), the theory mortality among children with intermediate variable approach. However, the research framework impure using Moesley theory and Chen. Some variables obtained from a variety of empirical reviews, such as household's economic level. Household's economic level may be indirect causes infant mortality. Households economic's level with low incomes will have meet daily nutritional requirements difficulty, and also associate with low education thus has no knowledge regarding health during pregnancy, such as knowledge of pregnant women nutritional needs and ante natal care. This research aims to determine how the socio-economic's determinant of the infant mortality rate. Independent variables in this research are maternal factors, environmental health, infant health, home economics and accessibility to health care. The research framework shown in Figure 2.
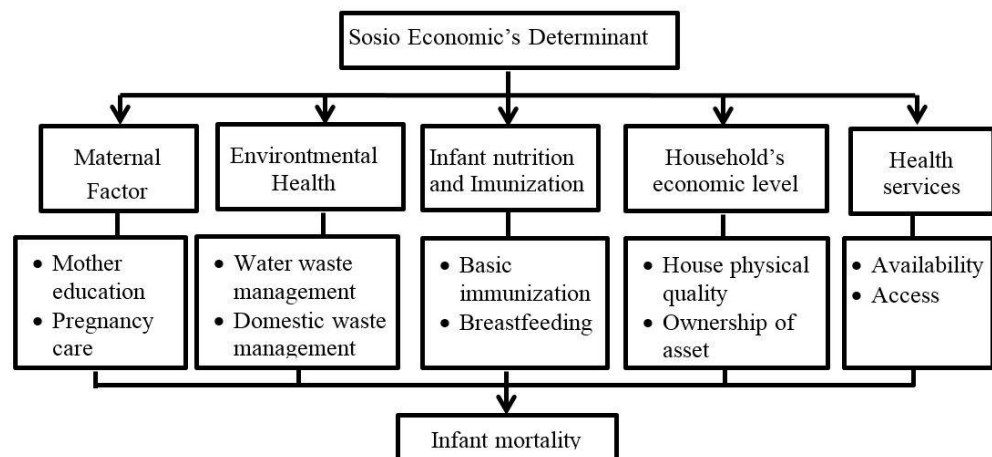
Figure 2. Research Framework

Research Methods
Research location

This research took place in West Nusa Tenggara Province. Locations were selected with consideration, that (1) IMR in West Nusa Tenggara Province in Indonesia is still high, amounting to 57 per 1000 live births. (2) of the ten provinces with the highest IMR, NTB is one of the provinces that were able to reduce IMR in the 2007-2012 significantly.

Population and Sample

This research used the survey method and equipped with secondary data Basic Health Research (Riskesdas) 2013. Number of household sample to West Nusa Tenggara Province amounted to 6,339 RT. The sample frame for this study are determined by the author based on criteria infant mortality according to Mosley, which is set the number of infant mortality during the period of last three years. Thus it obtained sample of 1,158 households for research in West Nusa Tenggara Province.

Measurement

This research examines the infant health problems by analyzing secondary data from Basic Health Research in 2013. Independent variables in this research are maternal factors, environmental health, infant health, home economics and accessibility to health care that contained in Riskesdas Household and Individuals Questionnaire. The dependent variable used in this penelititan is infant deaths in the last three years. Thus the independent variables selected must be able to represent the state in the last three years. So independent variables consist of data that does not change or undergo significant changes over the next three years.

Processing and Data Analysis

This research used quantitative descriptive analysis and inferential analysis. Descriptive analysis was used for describe distribution of infant mortality in West Nusa Tenggara Province. Measurements of correlation made using Chi square because of dichotomous dependent variable. The next inferential analysis is logistic regression.

THE RESULT AND DISCUSSION

Infant mortality is an important issue in health development. The infant mortality rate can be used as a benchmark of health, which is used to measure the life quality. Therefore, variations in infant mortality also showed a success rate of health development in each region distribution of infant deaths by county can be seen in Table 2.

Table 2

IMR Distribution Based on Region

District	Mortality	%	Live	%	Total	%
West Lombok Regency	8	6,0	126	94,0	134	100
Central Lombok Regency	8	6,1	123	93,9	131	100
East Lombok Regency	6	3,5	164	96,5	170	100
Sumbawa Regency	2	2,0	96	98,0	98	100
Dompu Regency	8	6,9	108	93,1	116	100
Bima Regency	6	4,0	145	96,0	151	100
West Sumbawa Regency	3	3,3	89	96,7	92	100
North Lombok Regency	2	2,2	87	97,8	89	100
Mataram City	6	4,7	121	95,3	127	100
Bima City	0	0,0	50	100,0	50	100
Total	**49**	**4,2**	**1.109**	**95,8**	**1.158**	**1006**

Source: primary data processing by Riskesdas 2013

Table 2 shows that in West Nusa Tenggara Province, infant mortality in the district of West Lombok Regency, Central Lombok Regency and Dompu Regency are higher than other districts. As for districts that don't have the incidence of infant mortality is Bima City. IMR obtained from analysis data (Riskesdas) in 2013 amounted to 42 deaths per 1.000 population aged 0 years. This value is below the value of infant deaths issued by IDHS 2012. But the problem lies not in percentage of infant mortality due to the expected incidence of infant mortality had zero occurred. The correlation between infant mortality and socio-economic determinant in West Nusa Tenggara Province were analyzed using Chi square. Chi squared measurement results can be seen in Table 3.

Table 3

Chi Square Summary of Infant Mortality with Socio-economic's Determinant

No	Independent Variabel		sig	Information
1	Mother's Education Level		.465	Not Correlate
2	Household's economic Level		.030	Correlate
3	Number of ANC visit		.000	Correlate
4	Immunization		.283	Not Correlate
5	Breastfeeding		.000	Correlate
6	Environmental Health		.042	Correlate
7	Accessibility of health service(s)	• Hospital	.432	Not Correlate
		• Private Hospital	.508	Not Correlate
		• Community Health Centre (Puskesmas)	.557	Not Correlate
		• Clinic	.532	Not Correlate
		• Midwives	.416	Not Correlate
		• Integrated service post (Posyandu)	.382	Not Correlate
		• Village Health Post (Poskesdes)	0.01	Correlate

Table 3 shows correlation between dependent and each independent variables. Not all independent variables have a correlation with the dependent variable. Explanation of the correlation between the dependent variable and independent variables are as follows:

a. Measurement of correlation between the variables of infant mortality and mother's education level indicates that there is no correlation between those two variables. However, mother's education level was correlate with other independent variables such as Household's economic level, the number of ANC visits, breastfeeding, provision of basic immunization and environmental health (data attached to L1).

b. Measurement of correlation between the variables of infant mortality and the number of ANC visits indicates that there is a correlation between those two variables. Variable number of ANC visits also have correlation to the other independent variables such as mother's education level, breastfeeding, and the accessibility to health services (data attached to L1).

c. Measurement of correlation between the variables of infant mortality to environmental health shows that there is a correlation between those two variables. Environmental health variables also have correlation to the mother's education level and household's economic level (data attached to L1). So it can be said that mothers with higher education level and a high economic will maintain environmental conditions in order to remain healthy. This is in line with the results of research Davanzo (1984) which states that the presence of water and sanitation has been associate in infants mortality.

d. Measurement of correlation between the variables of infant mortality with the provision of basic immunization in infants showed that there is no correlation between those two variables. However, primary immunization in infants has correlation to breast-feeding infants (data attached to L1). This can be due to population will give breastfeeding and immunizing infants, but for immunization is not carried out correctly and completely.

e. Measurement of correlation between the variables of infant mortality by breastfeeding infants showed that there is a correlation between those two variables. Variable breast-feeding also have a correlation with the mother's education level, the number of ANC visits and the provision of basic immunization (data attached to L1).

f. Measurement of correlation between the variables of infant mortality to accessibility to health care facilities showed that there is a correlation between those two variables. Besides having a correlation with infant mortality, variable access to health services also have correlation to the number of visits pregnancy (data attached to L1).

g. Measurement of correlation between the variables of infant mortality to household's economic level shows that there is a correlation between those two variables. Moesley and Chen (1984) states that at the household scale, economic factors have an important role, such as income, asset ownership, and the selection of treatment and care for the baby. Besides having a correlation with infant mortality and mother's education level, household's economic level also have correlation to the health of the environment (data attached to L1). So it can be said that people with a high economic level have the physical condition of the house was good and healthy environmental conditions.

More comprehensive analysis used by logistic regression to determine the influence of the independent variable on the dependent variable. Not all independent variables included in the equation because some variables have no significant correlation with the dependent variable. Independent variable and dependent variable regressed with, household's economic level, number of ANC visits, breastfeeding, environmental health and access to health services. Measurements of logistic regression was performed using a variety of models. Determination of the logistic regression model in this research conducted by making the whole possibility of the model there is then determined the best model. Logistic regression modeling of data can be seen in Table 4 (data attached to L2)

- Model I created by using one independent variable, household economic's level. In this model, the results given does not fit, so it is necessary to created other models.
- Model II created by using two independent variables, household economic's level and breastfeeding. In this model a given test results showed that the model is fit, but the influence of the independent variables only 7.3%, so that this model is not used.
- Model III created by putting three independent variables, household economic's level and breastfeeding, and number of ANC visits. In this model a given test results showed that the model is fit. The influence of independent variables increased to 18.20%, so it can be said that a number of ANC visits provide considerable influence when combined with other independent variables.
- Model IV created by using four independent variables, household economic's level and breastfeeding, number of ANC visits and environmental health. The influence of independent variables increased to 20,8% so that it can be said that the health variables provide improved overall effect when combined with other independent variables.
- Model V created by using five independent variables, household economic's level and breastfeeding, number of ANC visits and environmental health and health services. The influence of the independent variables do not change, which remained 19.50%. This is because the variable health services do not have a significant influence. Health services play an important role in reducing infant mortality, however, still many people who have not been able to access it. (Caldwell, 1984)

Logistic regression model chosen is the model IV, which uses four independent variables, household economic's level and breastfeeding, number of ANC visits and environmental health. Variable accessibility of basic services are not used in the regression because it does not have a significant influence. The summary of measurement results of logistic regression can be seen in Table 4

Table 4
Summary of logistic regression model IV

Omnibus Tests of Model Coefficients			
	Chi-square	df	Sig.
Step	73.377	4	.000
Block	73.377	4	.000
Model	73.377	4	.000
Model Summary			
-2 Log likelihood	Cox & Snell R	Nagelkerke R Square	

332.457a	.061				.208

Hosmer and Lemeshow Test

Chi-square	df	Sig.
4.307	7	.744

Variable in the equation

							95% C.I.for	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Household	-.897	.33	7.25	1	.00	.40	.21	.78
Breastfeed	-1.529	.419	13.332	1	.000	.217	.095	.493
ANC Visits	-2.578	.602	18.360	1	.000	.076	.023	.247
Environmental	-.975	.318	9.378	1	.002	.377	.202	.704
Constant	6.865	.706	93.961	1	.000	958.037		

The measurement results using logistic regression showed the influence of all independent variables on the dependent variable. Omnibus Test shows the significant value of 0.000. Thus it can be interpreted that the overall independent variables that used give a significant influence on the dependent variable. Coefficient significance Goodness of Fit (GoF) obtained through Hosmer and Lemeshow. GoF measurement results in regression models give a significant value of 0.744. This value is greater than 0.05 so it can be said that the model is fit for use.

Measurement of the influence of socio-economic variables on infant mortality can be partially seen in B. coefficient B shows that the overall value of independent variable coefficient is negative. Thus we can say that:

- Households with high economic level have smaller probability of infant mortality.
- Households with healthy environmental conditions have smaller probability of infant mortality.
- Breastfed babies have smaller probability of infant mortality.
- Mothers who checkups as recommended by KIA hve smaller probability of infant mortality.

Measurement Nagelkerke R Square showed the value of 0.208 so it can be said that the influence of the independent variables on the dependent variable is 20.8%. There are 79.2% of other factors that influence the incidence of infant mortality in NTB. The small effect of independent variables can be caused by many things. Technically, this can be due to value of the infant mortality rate is 42 per 1,000 population. Theoretically, indeed that number is a number that is high in the realm of infant mortality, but these figures are statistically small numbers.

Partially, the independent variables have a significant effect. The order of the independent variable that has the most impact are among others household's economic level, environmental health, breastfeeding and number of ANC visits. Most influential variable is the household's economic level, while the smallest effect number of ANC visits. So the regression model generated in this research are:

$$Y = 6,722 - 0,823\,X_1 - 1,525\,X_2 - 2,590\,X_3 - 0,826\,X_4$$

Information

Y = Infant mortality
X_1 = Household's economic level
X_2 = Breastfeeding
X_3 = Number of ANC visits
X_4 = Environmental health

CONCLUSION

1. The infant mortality rate in West Nusa Tenggara Province is still relatively high at 42 deaths per 1,000 population aged 0 years.
2. Socio economic determinant that have the most significant effect on infant mortality is household's economic level. At the household level, economic factors have an important role of treatment and care for the baby. household's economic level is also correlated with mother's education level and environmental health.
3. Variable mother's education level that theoretically should have the highest impact with infant mortality, but in this research showed no correlation. Mother's education level does not have a direct correlation with infant mortality, but the mother's education level shows correlation between the socio-economic variables. High level of mother education associated with behavioral and knowledge in the care of the baby. Knowledge and mother attitude directly related to infant mortality.

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Table 3
Correlation among Socio Economic's Determinant

No	Variabel		Mother's education level	Household's economic level	Number of ANC visits	Breast-feeding	Immunization	Environmental health	Health services
1	Mother's education level	Value			57.293[a]	10.647[a]	7.354[a]	5.453[a]	31.411[a]	.634[a]
		Asymp. Sig. (2-sided)			0.000	0.001	0.004	0.012	0.0000	0.239
2	Household's economic level	Value				1.502[a]	2.641[a]	2.360[a]	39.398[a]	1.320[a]
		Asymp. Sig. (2-sided)				0.2200	0.0600	0.071	0.000	0.145
3	Number of ANC visits	Value					6.527[a]	.059[a]	1.001[a]	3.929[a]
		Asymp. Sig. (2-sided)					0.006	0.427	0.098	0.029
4	Breastfeeding	Value						6.920[a]	.778[a]	.039[a]
		Asymp. Sig. (2-sided)						0.005	0.207	0.454
5	Immunization	Value							1.603[a]	.505[a]
		Asymp. Sig. (2-sided)							0.114	0.264
6	Environmental health	Value								1.688[a]
		Asymp. Sig. (2-sided)								0.111

Tabel 4
Permodelan Regresi Logistik

Model	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-square	df	GoF	B	Sig.	Information	
Model 1	401.754a	0.004	**0.012**	0.000	0	0.000			• Model Fit	
Constan							3.309	.000	• Overall	
Household's economic level							-0.635	.037	influence	1.20%
Model 2	380.401a	0.022	**0.073**	.073	2	**.964**				
Constant							2.827	.000	• Model Fit	
Household's economic level							-.575	.062	• Overall	
Breastfeeding							-1.626	0.00	influence	7.30%
Model 3	341.746a	0.054	**0.182**	3.426	6	0.754				
Constant							6.431	.000	• Model Fit	
Household's economic level							-0.645	.041	• Overall	
Breastfeeding							-1.516	.000	influence	18.20%
Number of ANC visits							-2.622	.000		
Model 4	336.988a	0.058	**0.195**	5.066	7	**.652**				
Constant							6.722	.000	• Model Fit	
Household's economic level							-0.823	.013	• Overall	
Breastfeeding							-1.525	.000	influence	19.50%
Number of ANC visits							-2.590	.000		
Environmental health							-0.706	.027		
Model 5	336.981a	.058	**.195**	4.533	8	**.806**				
Constant							6.709	.000	• Model Fit	
Household's economic level							-0.820	.013	• Overall	
Breastfeeding							-1.525	.000	influence	19.50%
Number of ANC visits							-2.588	.000		
Environmental health							-0.826	.027		
Health services							0.025	.935		