Prevalence and risk factors of low birth weight in East Nusa Tenggara, Indonesia

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WORD COUNT	3844	TIME SUBMITTED	29-APR-2022 05:08PM
		PAPER ID	85374513

MINH MALAHAYATI INTERNATIONAL JOURNAL OF NURSING AND HEALTH SCIENCE
ISSN 2620-9152 (Print)
ISSN 2621-4083 (Online)

Nomor: 85/M/KPT/2020

ARTICLE INFORMATION
Received: June, 24, 2021
Revised: April, 28, 2022
Available online: April, 29, 2022
at : http://ejurnalmalahayati.ac.id/index.php/nursing/index

Prevalence and risk factors of low birth weight in East Nusa Tenggara, Indonesia

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Abstract

Background: Low birth weight (LBW) is a public health problem and is one of the causes of neonatal death in Indonesia. The Indonesian Demographic Health Survey (IDHS) in 2012 showed that the neonatal mortality rate in East Nusa Tenggara was 26/1000 live births with the most common cause of death being LBW at 10/1000 live birth rates. The profile of the Ende District Health Office in 2014 showed that the neonatal mortality rate was 12/1000 live birth rates, of which 15% were caused by low birth weight.
Purpose: To determine Prevalence and risk factors of low birth weight in East Nusa Tenggara, Indonesia
Method: The study was conducted in six public health centers in Ende Regency, NTT Province. The research design was a case-control with 156 respondents. In the case group the infants who birth weighing <2500 grams as many as 78 while the control group was 78 who gave birth to babies with a normal birth weight of 2500 grams and selected randomly from the birth register in 2015. Data were collected from the examination card of pregnant women, the MCH handbook, and by interviews with each respondent. Data were analyzed bivariate (chi-square) and multivariate using logistic regression.
Results: Showed that the risk factors that significantly increased the incidence of low birth weight babies were maternal age with *adjusted* OR(AOR) = 6.8 (95% CI:1.87-25.0), birth spacing with AOR = 6, 5(95%CI: 1,78-24.2), working mother status with AOR=4,6(95%CI:1,44-14,9), , malaria co-morbidities with AOR=3.9(95 %CI: 1,21-12,7) and the quality of ANC is less with AOR= 3,5 (95% CI: 1,11-11,3).
Conclusion: Age < 20 or 35 years, birth spacing, maternal occupation, malaria comorbidities and poor quality of antenatal care are risk factors for the occurrence of low birth weight in Ende Regency.

Keywords: Antenatal care; Comorbidities; Pregnancy; Low birth weight ; Infants

INTRODUCTION

Low birth weight (LBW) is one of the global and national problems that can affect the health status of a country. The United Nations International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO) use LBW as an indicator of public health and the incidence of LBW is increasing every year, both in developing and developed countries (World Health Organization & United Nations Children's Fund (UNICEF), 2004).

The Indonesian Demographic Health Survey (IDHS) in 2012 showed that the infant mortality rate (IMR) in Indonesia was 34/1000 live births and the IMR in Province was 45/1000 live births. The neonatal mortality rate in NTT based on the 2012 IDHS is 26/1000 live births. The most common cause of neonatal death is low birth weight, which is 10/1000 live births (Central Bureau of Statistics, 2012).

DOI: https://doi.org/10.33024/minh.v5i1.4575

Nationally, the prevalence of LBW has decreased but in some areas the prevalence of LBW is still very high, including in the Province of East Nusa Tenggara where the prevalence of LBW is found at 15% of live births (Ministry of Health of the Republic of Indonesia, 2013). The number of LBW cases reported in Ende Regency in 2013 was 267 cases or 5.97% of the total 4472 live births. In 2014 it was reported to increase to 729 cases or 15% of the total 4862 live births, while in the January-June 2015 period it was reported as many as 160 cases or 23.7% of the 673 live births (Ende District Health Office, 2013). The number of reported neonatal deaths was 15 people and mostly due to low birth weight, namely 7 people or 46.6% (Weldearegawi, Melaku, Abera, Ashebir, Haile, Mulugeta, & Spigt, 2015).

Many studies on risk factors for LBW have been carried out, but there are still some risk factors that are found to be inconsistent, including: parity, education, occupation and family income. This study was conducted to determine the risk factors for chronic energy deficiency, anemia and food abstinence culture on the incidence of LBW in Ende Regency.

RESEARCH METHOD

The study design was a case control. The case-control study is an analytical epidemiological study observational study that examines the relationship between certain effects (diseases or health conditions) and other factors certain risks (Sudigdo Sastroasmoro, 2014). The population reached by the case group were mothers who gave birth to low birth weight babies with a gestational age of 37-42 weeks in six areas of the Public Health Center in Ende Regency, while the population reached by the control group were mothers who gave birth to babies with normal birth weight (LBW) with a gestational age of 37-42 weeks in the control group. and the same time.

The number of case samples was 78 mothers with LBW and the control sample was 78 mothers with LBW (1:1). Cases and controls were selected from cohort pregnancy infant delivery cohort and cohort at the puskesmas. Data collection was carried out from February to April *2016* with interviews at each respondent's home and matched with the data in the MCH book kept by the respondents. The sample selection was carried out in stages (*multistage random sampling)* , namely by selecting 6 sub-districts from 21 sub-districts in Ende Regency. From 6 sub-districts 15 villages were then selected, and then LBW and normal birth weight cases were selected from the registers in 15 villages. Data were analyzed by univariate, bivariate and multivariate using Stata 12.0. This research has received ethical approval from the Ethics Commission of the Faculty of Medicine, Udayana University/Sanglah Central General Hospital.

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RESULTS

Table 1. Distribution of Demographic Characteristics (N=156)

Variable	Case (n=78)	Control (n=78)	p-value
Age (Years) (n/%)			
<20 atau ≥35	30/38.46	10/12.82	0.001
20-34	48/61.64	68/87.08	
Level education (n/%)			
Junior high school or under	48/61.54	29/37.18	0.003
Senior high school or above	30/38.46	49/62.82	
Occupation status (n/%)			
Employment	58/74.36	18/23.08	0.001
Unemployment	20/25.64	60/76.92	
Monthly income (n/%)			
Low (< Rp1.300.000)	52/66.67	18/23.08	0.001
High (≥ Rp1.300.000)	26/33.33	60/76.92	

In Table 1, the characteristics of mothers in the case group and control group are presented based on the variables of age, occupation, education, and family income. It was found that there was a significant difference (p value 0.001) between respondents in the case group and controls in the age variable, namely 38.46% aged <20 or 35 years in the case group while only 12.82% in the control group. It was also found that there was a significant difference in the education variable, namely 61.54% in the case group with low education while in the control group it was only 37.18% (p = 0.003). It was also found that there was a significant difference in the work variable, namely 74.36% in the case work group while in the control group it was only 23.08% (p value 0.001). In the income variable, it was found that there was a significant difference (p value 0.001) between respondents in the case group, namely 66.67% of low income while in the control group only 23.08%.

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Table 2. Crude Odds Ratios (95% Confidence Intervals) of Low Birth Weight and Risk Factors

Variable	Case (n=78)	Control (n=78)	Crude OR	95%CI	p-value
Age (Years) (n/%)					
<20 or ≥ 35	30/38,46	10/12,82	4,2	1,89-9,51	0.001
20-34	48/61,54	68/87,18			
Number of children (n/%)					
<2 or >4	44/56,41	16/20,51	5,0	2,46-10.18	0.001
2-4	34/43.59	62/79,49			
Birth Spacing (years) (n/%)					
< 2	47/60.26	16/20,51	5,8	2,88-11,97	0.001
≥ 2	31/39.74	62/79,49			
Comorbidities (n/%)					
Yes	44/56,41	14/17,95	5,9	2,84-12,29	0.001
None	34/43,59	64/82,05			
Quality of ANC (n/%)					
Poor	46/58,97	13/16,67	7,1	3,40 -15,17	0,001
Good	32/41,3	65/83,33			
Education level (n/%)					
Low (Junior high school or under)	48/61,54	29/37,18	2,7	1,41-5,16	0.003
High (Senior high school or above)	30/38,46	49/62,82			
Monthly income (n/%)					
Low (< Rp1.300.000)	52/66,67	18/23,08	6,6	3,28-13,5	0,001
High (≥ Rp1.300.000)	26/33,33	60/76,92			
Occupation status (n/%)					
Employment	58/74,36	18/23,08	9,6	4,64-20,0	0.001
Unemployment	20/25,64	60/76,92			

In Table 2, *crude* OR is presented for each independent variable which shows that the variable that is significantly related to LBW is the age of the mother with OR = 4.2 (95% CI: 1.89-9.51), the number of children <2, > 4 with OR= 5.0 (95% CI: 2.46-10.18), birth spacing < 2 years with OR=5.8 (95% CI: 2.88-11.97), comorbidities pregnancy with OR = 5.9 (95% CI: 2.84-12.29), poor ANC quality with OR = 7.1 (95% CI: 3.40-15.17), low education level with OR = 2.7 (95% CI: 1.41-5.16), earnings low family with OR= 6.6 (95% CI: 3.28-13.5) and working mother status with OR= 9.6 (95% CI: 4.64-20.0).

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Table 3. Adjusted Odds Ratios (and 95% Confidence Intervals) From Logistic Regression Analyses Identifying Associations Between Low Birth Weight and Risk Factors

Variable	Early Model			Final Model		
	AOR	95%CI	p-value	AOR	95% CI	p-value
Age <20 or ≥35 Years	6,2	1,63-23,6	0,007	6,8	1,87-25,0	0,004
Birth spacing < 2 Years	5,1	0,90-28,6	0,064	6,5	1,78-24,2	0,005
Malaria co-morbidities	4,5	1,13-18,4	0,032	5,3	1,38-21,0	0,015
Poor ANC quality	3,1	0,90-10,6	0,072	3,5	1,11-11,3	0,033
Employment	3,6	1,05-12,9	0,041	4,6	1,44-14,9	0,010
Low education	2,4	0,71-8,62	0,155	2,9	0,89-9,86	0,077
Low income	1,8	0,48-7,33	0,365	-	-	-
Number of children < 2 or > 4	1,3	0,26-7,13	0,699	-	-	-

Table 3 presents *adjusted* OR for the independent variables found to be related in the bivariate analysis. Variables that independently increased the incidence of LBW were maternal age <20 and 35 years, birth spacing <2 years, anemia, presence of chronic energy deficiency, malaria comorbidities, poor ANC quality, work status, and culture of abstinence during pregnancy. The risk of low birth weight was higher in mothers aged < 20 or 35 years with OR= 6.8 (95% CI: 1.87-25.0), abstinence from food during pregnancy with OR= 6.7 (95% CI: 1.71-26.8), birth spacing < 2 years with OR= 6.5 (95% CI: 1.78-24.2), the presence of CED with OR= 5.3 (95% CI: 1.38 -21,0), the status of mothers who work as farm laborers with OR = 4.6 (95% CI: 1.44-14.9), anemia during pregnancy with OR = 4.2 (95% CI:1, 37-13,1), malaria co-morbidities with OR= 3.9 (95% CI: 1.21-12.7), and poor ANC quality with OR=3.5 (95% CI: 1.11-11 ,3).

DISCUSSION

Maternal age at pregnancy < 20 or 35 years in this study was found to have the greatest increase in the risk of low birth weight (AOR = 6.8; 95% CI: 1.87-25.0). The results of another study in Iran also stated that babies born to mothers aged 15-19 years or <20 years had a risk of dying from birth with low body weight compared to mothers who gave birth at the age of 25-29 years (Weldearegawi, Melaku, Abera, Ashebir , Haile, Mulugeta, & Spigt, 2015). Young age pregnancy (< 20 years) and old age pregnancy (age > 35 years) are pregnancies with risk factors that can adversely affect both the mother and the fetus (Rochjati, 2011; Permatasari, 2012). Pregnancy at a young age affects the growth and development of the fetus in the womb because the reproductive organs, namely the endometrium, are not ready to receive the products of conception so that the food supply from the mother to the fetus is disrupted. Pregnancy in old age, the endometrium declines in function due to a degenerative process that causes health problems for the mother

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and interferes with the transport of nutrients from the mother to the fetus in the womb (Prawirohardjo, 2011; Puti Sari, Hapsari, 2011; Dharmayanti, & Kusumawardani, 2014; Ekasari, 2015).

Birth spacing < 2 years in this study was found to increase the risk of low birth weight (AOR = 6.5; 95% CI:1.78-24.2). This is consistent with the results of a study conducted at *the University of Medical Sciences* in Iran, which stated that mothers who gave birth at a distance that was too close (<2 years) had a 2.35 times risk of LBW (Chaman, Amiri, Raei, Ajami, Sadeghian, & Khosravi, 2013). The results of another study in Sidoarjo stated that pregnant women with delivery intervals < 2 years were 3.02 times at risk of giving birth to low birth weight compared to mothers who had delivery intervals > 2 years (Rahayu, 2011). Birth spacing that is too close results in the condition of the uterus not being fully recovered so that it can interfere with the process of growth and development of the fetus in the womb where physiologically a woman takes two to three years to recover the condition of her womb (Manuaba, 2012).

Pregnant women with working status in this study were found to be a risk factor for the occurrence of LBW (AOR = 4.6; 95% CI: 1.44-14.9). This is consistent with other studies; Based on working hours, it shows that a pregnant woman who works for more than 7 hours a day has a risk of giving birth to a baby with low birth weight by 6.11 times compared to a mother who only works less than 4 hours a day and a pregnant woman who works 4-7 hours a day has 1.7 times the risk compared to those who worked less than 4 hours (Kramer, Goulet, Lydon, Séguin, McNamara, Dassa, & Koren, 2011). The results of this study found that the most types of work were as farm laborers and non-farm workers with a frequency of working every day and requiring > 10 hours of work per day so that mothers did not have enough time to rest which had an impact on impaired fetal growth and development. The results of other studies show that working mothers are 3.1 times at risk of giving birth to low birth weight babies (ESU, 2012).

Malaria co-morbidities in this study were found to increase the risk of low birth weight (AOR=3.9; 95% CI:1.21-12.7) and this result is consistent with the results of other studies which showed that pregnant women with malaria infection were 2.9 times risk of giving birth to low birth weight babies (Tazkiah, Wahyuni, & Martini, 2013).

Quality *antenatal care* in this study was found to increase the risk of LBW events. This study shows results that are consistent with research which states that mothers who carry out pregnancy checks with poor quality are at risk of giving birth to babies weighing <2500 grams by 5.85 times (OR 5.85: 95% CI:1.91-17, 8) (Sistiarani, 2008). Another study stated that 59% of the factors that influence the occurrence of LBW is the quality of antenatal care when the mother visits ANC (Roudbari, Yaghmaei, & Soheili, 2007). Likewise, research in Wonosobo Regency stated that pregnant women who had *antenatal care* a 1.15 times greater risk of giving birth to low birth weight (OR 1.15: 95% CI: 0.71-1.90) and mothers who had antenatal care. Irregular care during pregnancy has a 2.33 times greater risk of giving birth to LBW (OR 2.33: 95% CI: 1.47-3.69) (Saeni, 2012).

In connection with this research, it is recommended that there is a need for policies to increase cross-program collaboration to deal with problems related to medical techniques and the role of cross-sectors in dealing with problems related to cultural factors in society to reduce the risk of neonatal morbidity and mortality due to low birth weight.

The limitation of this study is the data obtained by interviewing about past events so that respondents cannot remember or answer objectively.

CONCLUSION

Age < 20 or 35 years was found to have the greatest increase in the risk of LBW incidence, followed by birth spacing, mother's occupation,

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DOI: https://doi.org/10.33024/minh.v5i1.4575

presence of malaria co-morbidities, and poor quality of antenatal care.

ACKNOWLEDGMENTS

The researcher would like to thank the head of the Health Service, the Head of the Public Health Center in the working area of Ende Regency, colleagues of midwives and respondents who have participated in this study.

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DOI: https://doi.org/10.33024/minh.v5i1.4575

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