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# Nutritional and Socioeconomic Status toward the Low-Birth-Weight Neonates (LBW) Case

**Hasriyani[1], Suharyo Hadisaputro[1], Karmila Budhi[2], Mexitalia Setiawati[2], Henry Setyawan[1]**

*[1]Department of Epidemiology, Postgraduate Program, Diponegoro University, Indonesia*

*[2]Dr. Kariadi General Hospital, Semarang, Indonesia*

***Abstract***

*LBWN is a public health problem and is still a major cause of perinatal morbidity and mortality. In Indonesia, in the year of 2013, the case rate of LBWN is 10.2%. This study aims to prove the factor of nutritional status, socioeconomic status toward the case of LBWN. This research used case control study design. The total sample was 138 infants, consisting of 69 cases and 69 controls that meet the inclusion and exclusion criteria. Case collecting sample was conducted through consecutive sampling and simple random sampling control, by matching the sex of the baby and their area. Data analysis used logistic regression. The result of the analysis showed that the low of nutritional status (OR = 3.159; 95% CI = 1.390-7.178), low socioeconomic status (OR = 2.175; 95% CI = 1.066-4.439) were risk factors for LBWN case. Low nutritional status and low socioeconomic status are risk factors for LBWN case. It is needed to provide CIE (Counseling, Information, and Education) intensively to pregnant women and expectant pregnant women related to good nutrition.*

***Keywords****: LBWN, risk factor, nutritional status, socioeconomic status.*

## 1.0 INTRODUCTION

Low-birth-weight Neonates (LBWN) is defined as a newborn which is born with a birth weight of <2500 grams.[1,2] LBWN is still a health problem in many countries because it is considered to be one of the factors causing infant mortality.[3] LBWN case according to WHO is 15.5% of 20 million live births per year, 96.5% is in developing countries and contributes 60%-80% of all neonatal deaths. [2,4,5] Early neonatal mortality (age 0-6 days) in Indonesia in 2007 was 78.5% with the cause of death was LBWN (32.4%). Infant Mortality Rate (IMR) of 32 deaths per 1000 live births. Neonatal Mortality Rate (NMR) of 19 per 1000 live births (the same number as in 2007). The attention of efforts to decrease the NMR (0-28 days) becomes important because neonatal mortality contributes to 56% of infant mortality.[6] LBWN case in 2013 is 10.2%. This number decreased if it's compared to the 2010 of 11.1%.[7]

Nationally, South Sulawesi Province is one of the provinces with the 7th highest percentage of LBWN (12.4%).[8] In 2014, Makassar is one of the highest LBW case among 24 regencies/cities in South Sulawesi (2.48% ).[9] The proportion of LBWN cases in Makassar City in 2014 was 2.80% with 2.46% mortality, 2.62% in 2015 with 1.96% mortality and 3.29% of LBWN cases in 2016.

From 46 Public Health Center (PHC) in Makassar City, there were 6 health centers with highest percentage of LBWN is 12.19% of Antang Public Health Center, Tamangapa Public Health Center is 10,47%, Kaluku Bodoa Public Health Center 9.46%, Minasa Upa Public Health Center 8.64%, Rappokalling Public Health Center 7.44%, Pattingalloang Public Health Center 7.24%[10]LBWN is the result of the interaction of various risk factors such as maternal factors (maternal age, pregnancy range, extent, pregnancy diseases, maternal education, socioeconomic status, nutritional status, antenatal care status, nutritional intake), placental factors, fetal factors, and environmental factors. [11–15] Based on the high rate of LBWN in Makassar, it is necessary to see the risk factors that can cause the occurrence of LBWN. The purpose of this study is to prove the factor of nutritional status and socioeconomic status toward the LBWN case.

## 2.0 METHOD

The type of research was observational analytic research with case control design. Population of group case study in this research is all babies born with <2500 gram birth weight at Antang Public Health Center, Tamangapa Public Health Center, Kaluku Bodoa Public Health Center, Minasa Upa Public Health Center, Rappokaling Public Health Center and Pattingalloang Public Health Center of Makassar City registered in register book of cohort mother and/or register book of postpartum in year 2016/2017. While the control group study population were all babies born with birth weight ≥2500 gram at Antang Public Health Center, Tamangapa Public Health Center, Kaluku Bodoa Public Health Center, Minasa Upa Public Health Center, Rappokaling Public Health Center, Pattingalloang Public Health Center of Makassar City registered in register book of cohort mother and / or register book of postpartum in year 2016/2017. Collecting sample of cases was done by of consecutive sampling and was controlled by simple random sampling by matching the sex of the baby and the area. Dependent variable in this research is LBWN. The independent variables were maternal age, nutritional status, pregnancy range, Antenatal Care (ANC) and socioeconomic status. Confounding variables were maternal education levels and parity. Data analysis conducted in

this research was univariate, bivariate and multivariate analysis at significance level p = <0.05. This research has got the research ethic approval from Health Research Ethics Commission (KEPK) Faculty of Medicine, Diponegoro University and dr. Kariadi Hospital Semarang with No. 361 / EC / FK-RSDK / VI / 2017.

## 3.0 RESULT

Distribution of maternal age in case group was mostly with age of 24-27 years old, the youngest age was 15 years old to the oldest 43 years old with average age of 26 years. While the control group was mostly in the age group of 24-27 years old, the youngest age of 16 years old to the oldest 45 years old with an average age of 27 years.

**Table 1.** Distribution of Respondent Characteristics based on Maternal Age, Educational Background, Occupation, Pregnancy Age and Newborn's Sex

| | Respondent Characteristics | LBWN status | | | |
|---|---|---|---|---|---|
| | | Case | | Control | |
| | | n | (%) | n | (%) |
| 1. | Maternal age when gave birth | | | | |
| | 12-15 years old | 1 | 1.4 | 0 | 0 |
| | 16-19 years old | 9 | 13.1 | 9 | 13.1 |
| | 20-23 years old | 13 | 18.8 | 12 | 17.4 |
| | 24-27 years old | 21 | 30.4 | 16 | 23.1 |
| | 28-31 years old | 15 | 21.7 | 9 | 13.1 |
| | 32-35 years old | 4 | 5.8 | 9 | 13.1 |
| | 36-39 years old | 3 | 4.4 | 8 | 11.6 |
| | 40-43 years old | 3 | 4.4 | 5 | 7.2 |
| | 44-47 years old | 0 | 0 | 1 | 1.4 |
| | Total | 69 | 100.0 | 69 | 100.0 |
| | Mean | 26.07 | | 27.9 | |
| | Median | 26.0 | | 27.0 | |
| | Modus | 27 | | 21 | |
| | Minimum | 15 | | 16 | |
| | Maximum | 43 | | 445 | |
| 2. | Educational Background | | | | |
| | None | 0 | 0.0 | 1 | 1.4 |
| | Elementary | 20 | 29.0 | 24 | 34.8 |
| | Junior High Scool | 17 | 24.6 | 20 | 29.1 |
| | Senior High School | 24 | 34.8 | 18 | 26.1 |
| | Diploma | 1 | 1.4 | 3 | 4.3 |
| | Bachelor | 7 | 10.1 | 3 | 4.3 |
| | Total | 69 | 100.0 | 69 | 100.0 |
| 3. | Occupation | | | | |
| | Housewife | 57 | 82.6 | 64 | 92.8 |
| | Employee | 0 | 0.0 | 0 | 0.0 |
| | Farmer | 0 | 0.0 | 0 | 0.0 |
| | Fisherman | 0 | 0.0 | 0 | 0.0 |
| | Civil Employee | 0 | 0.0 | 0 | 0.0 |
| | Private Employee | 6 | 8.7 | 2 | 2.9 |
| | Entrepreneur | 1 | 1.4 | 3 | 4.3 |
| | Other | 5 | 7.2 | 0 | 0.0 |
| | Total | 69 | 100.0 | 69 | 100.0 |
| 4. | Pregnancy Age | | | | |
| | Premature (<37 weeks) | 14 | 20.3 | 2 | 2.9 |
| | Exact month (37-41 weeks) | 55 | 79.7 | 67 | 97.1 |
| | Total | 69 | 100.0 | 69 | 100.0 |
| 5. | Newborn Sex | | | | |
| | Male | 35 | 50.7 | 35 | 50.7 |
| | Female | 34 | 49.3 | 34 | 49.3 |
| | Total | 69 | 100.0 | 69 | 100.0 |

**Table 2** shows the independent variables or the main variables that have significant relationship with the LBWN case (p <0.05) that was nutritional status (p = 0.004; OR = 3.188; 95% CI = 1.421-7.151); and socioeconomic status (p = 0.025; OR = 2.199; 95% CI = 1.101-4394.

Table 2. Bivariate Analysis of Independent and Confounding Variables

| No | Variable | Case | | Control | | OR | 95% CI | *p* |
|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | | | |
| 1. | Maternal age | | | | | | | |
| | - Risky | 16 | 23.2 | 23 | 33.3 | 0.604 | 0.285-1.279 | 0.186 |
| | - Not risky | 53 | 76.8 | 46 | 66.7 | | | |
| 2. | Nutritional status | | | | | | | |
| | - Low | 58 | 84.1 | 43 | 62.3 | 3.188 | 1.421-7.151 | 0.004 |
| | - High | 11 | 15.9 | 26 | 37.7 | | | |
| 3. | Pregnancy Range | | | | | | | |
| | - Risky | 5 | 7.2 | 9 | 13.0 | 0.521 | 0.165-1.643 | 0.259 |
| | - Not risky | 64 | 92.8 | 60 | 87.0 | | | |
| 4. | ANC status | | | | | | | |
| | - Incomplete | 38 | 55.1 | 38 | 55.1 | 1.000 | 0.511-1.956 | 1.000 |
| | - Complete | 31 | 44.9 | 31 | 44.9 | | | |
| 5. | Socioeconomic status | | | | | | | |
| | - Low | 47 | 68.1 | 34 | 49.3 | 2.199 | 1.101-4.394 | 0.025 |
| | - High | 22 | 31.9 | 35 | 50.7 | | | |
| 6. | Mother's education | | | | | | | |
| | - Low | 37 | 53.6 | 45 | 65.2 | 0.617 | 0.311-1.223 | 0.165 |
| | - High | 32 | 46.4 | 24 | 34.8 | | | |
| 7. | Parity | | | | | | | |
| | - Risky | 38 | 55.1 | 38 | 55.1 | 1.000 | 0.511-1.956 | 1.000 |
| | - Not risky | 31 | 44.9 | 31 | 44.9 | | | |

**Table 3** shows the independent factors that were risk factors for LBWN case in the multivariate model was low nutritional status and low socioeconomic status.

Table 3. Result of Logistic Regression Analysis

| No | Risk factors | B value | OR | 95%CI | *P* |
|---|---|---|---|---|---|
| 1. | Low nutritional status | 1.150 | 3.159 | 1.390-7.178 | 0.006 |
| 2. | Low socioeconomic status | 0.777 | 2.175 | 1.066-4.438 | 0.033 |
| | Constanta | -1.311 | | | |

## 4.0 DISCUSSION

### *4.1 Nutritional Status*

The nutritional status of pregnant women as measured by weight gain during pregnancy and Measuring Upper Arm Circle (MUAC) is positively related to the energy consumption level of pregnant women. Low of nutrition will cause bad consequences for the mother and her fetal and can cause fetal growth inhibited and LBWN. [16,17] Based on interviews with mothers, it was found that 52.2% of bad MUAC and weight gain were 79.7%. Multivariate analysis showed that low nutritional status was a risk factor for LBWN case with OR = 3.159 (95% CI = 1,390-7,178), meaning that low nutritional status was 3.159 times higher for LBWN delivery compared with good nutritional status. This result is consistent with the research of Tazkiah et al (2013) indicated that mother's nutritional status is a risk factor to the case of LBWN (OR = 2.583: 95% CI = 1.269-2.257).[16] Research from Reza (2014) showed that MUAC <23.5 cm have risk to the LBWN case (OR=3.678; CI95%=1.125-12.027).[18] Mumbare et al (2012) study showed that body weight during pregnancy was a risk factor for the case of LBW (OR = 4.82; CI95% = 2.54-9.15 ).[19]

The determinants of LBWN are not only during pregnancy, but also before pregnancy, therefore the nutritional status of the mother before pregnancy should be in good condition. During pregnancy, the need for food substances increases so that when pregnancy nutritional intake must be adequate so as not to disturb the growth of the fetal. Some of the factors causing fetal growth disturbance related to the mechanism are maternal nutritional intake, nutritional supply to the uterus and placenta, transport of nutrition through the placenta, and regulation of fetal nutrition. [18]

### *4.2 Socioeconomic Status*

Income has an indirect effect on the case of LBWN. Families with high income will be able to meet the nutritional needs, otherwise families with low income will have difficulties in meeting the nutritional needs.[3] Low economic level is one of the factors that cause the decline in affordability of food to meet the needs that affect the quality and quantity of food consumed by the whole family. If it continues, the nutritional status of the family, especially pregnant women, will be worse. [20]

Multivariate analysis showed that low socioeconomic status was a risk factor for LBWN case with OR = 2,175 (95% CI = 1,066-4,438), meaning low socioeconomic status had 2,213 times greater risk for delivering LBWN than high socioeconomic status. In line with a research by Jayant et al, (2011) shows that socioeconomic status is a risk factor for LBWN case. (OR = 1.68; 95% CI = 1.04-2.71)[21]

## 5.0 CONCLUSION

Based on the results of the study, it can be concluded that the low of nutritional status and low socioeconomic status are risk factors of the LBWN case.

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