Original Article

Infant Low Birth Weight and Its Related Factors in Banyumas Regency

Setiyowati Rahardjo[*1], Erna Kusumawati [2], Ibnu Zaki [2]

[1]S.K.M.,M.K.M., Public Health Department, Health Sciences Faculty, Jenderal Soedirman University, 53123, Indonesia

[2]S.K.M., M.Si., Public Health Department, Health Sciences Faculty, Jenderal Soedirman University, 53123, Indonesia

Corresponding author: Setiyowati Rahardjo, email: setiyowati_hanan@yahoo.com, Phone: +6282227640400

ABSTRACT

Low Birth Weight (LBW) is a major factor in increasing mortality and morbidity. The number of LBW cases at term delivery at the Health Center II Sumbang contributed was 21 (41%). The number of LBW cases at term delivery at the Kedungbanteng Health Center was 37 (71%). This study aims to analyze the risk factors that cause the incidence of LBW in term labor. This type of research is a case control study. Cases are mothers who have a history of giving birth to LBW at term delivery. Controls were mothers who were the closest neighbors of LBW babies who had almost the same birth time but did not have a history of LBW. The number of samples is 50 cases and 50 controls. The dependent variable was low birth weight and the independent variables included maternal age, maternal upper arm circumference, complications, parity, maternal knowledge, access to antenatal care, smoking exposure and maternal psychological factors. Collecting data using structured interviews and observation. Data analysis included univariate, bivariate with chi-square test and multivariate with multiple logistic regression. The results showed that the maternal upper arm circumference (OR = 4,186), disease complications (OR = 4,290) and access to antenatal care (OR = 2,918) were factors that influenced the occurrence of low birth weight in term delivery. It is necessary to increase the delivery of information about LBW through mass counseling or individual consultation with media modules and leaflets.

Keywords: Low birth weight, Upper arm circumference, disease complications

INTRODUCTION

Infant Mortality Rate (IMR) in Banyumas Regency in 2014 amounted to 9.04 per 1000 live births, decreasing from 12.16 per 1,000 live births in 2013. IMR in 2014 compared to the 2015 Millennium Development Goals (MGDS) target of 17/1000 live births then the IMR in Banyumas regency is good but still has to be minimized. One of the causes of infant mortality is low birth weight (LBW)[1]. Infants with LBW are among the contributors to high infant mortality, especially during perinatal periods. Neonatal with LBW at risk of death 6,5x bigger than baby with normal weight [2].

Banyumas regency is one that faced the health and nutrition problems of the community one of them LBW. Likewise, the percentage of LBW in Banyumas Regency is 5.1%, compared to the year of 2013 which is 5.53%. Although LBW has decreased but it is still above the target of 3% [3]. Birth weight less than 2500 grams can increase the risk that is good in the life of the child after birth. Research has shown that less birth weight can lead to an increased risk of heart disease and stroke and a 13% higher risk of death compared with birth weight over 2500 grams.

Maternal factors which include obesity, height, nutrition, gestational age; fetal factors which include genetic, hormonal, multiple pregnancy; placental factors include

pathophysiology, placental shape, umbilical cord insertion; access to antenatal services; and the environment which includes a place to live, the potential for exposure to cigarettes, and psychological[4,5,6] . Still there are problems of LBW in Banyumas Regency hinted to know the cause factor to make prediction model as effort of nutrient repair 1000 first day of life. The results of Kusumawati and Rahardjo studies show that there are still low birth weight babies and still need to improve the nutritional improvement of the first 1000 days of life. The purpose of this study is to identify and analyze risk factors that cause the birth weight of low birth weight babies at birth in Banyumas regency[7].

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METHODS
This research uses analytical method with case control approach to identify the factors that cause LBW occurrence. The study was conducted in two Public Health Center (PHC) areas that have percentage of LBW incidence above the average of district, Kedungbanteng PHC (7.11%) and Sumbang II (8.23%). Case population is LBW infants in the last 12 months. The control population is a normal birth weight infant who is the nearest neighbor of the case. Number of case samples were 50 LBW infants and control samples were 50 Normal Birth Weight (NBW) infants. Case sampling technique is purposive sampling which is taken case data of LBW from July 2016, then June and so on until obtained 50 cases. The control sample is the nearest neighbors of the case with normal birth weight, if the number is more than one then chosen by random.

 Data collection techniques used are structured interviews and observations into primary data sources in this study. The variables studied included the dependent variable was low birth weight, while the independent variables included maternal age, maternal upper arm circumference, complication disease, parity, maternal knowledge, access to antenatal care, smoking exposure and maternal psychological factors. Secondary data from the District Health Office and other available secondary data are also used in this study. Data analysis included univariate analysis, bivariate analysis with chi square test and multivariate analysis with multiple logistic regression test. This research has obtained an ethical approval letter from the Faculty of Medicine, Jenderal Soedirman University with KEPK registration number : 127/KEPK/III/2017

RESULTS
Table 1 shows that most mothers (71%) of their ages are at high risk for pregnancy (<20 and> 35 years), 82% of primary educated mothers, 88% of mothers are unemployed, 36% of their family members are 3, 77% are women with normal upper arm circumference (≥ 23.5 cm), 82% of mothers did not have complications, 65% of mothers had no psychological disturbance, 91% were not exposed to cigarette smoke, 94% had access to good antenatal care and 61% had no-risk parity (Table 1)

Furthermore, bivariate analysis was carried out to determine the relationship between each causal factor and the incidence of LBW and as a step in selecting variables that would participate in multivariate analysis. Bivariate analysis in this study using chi square test with complete results can be seen in Table 2.

Based on Table 2 it can be seen that the variables associated with the occurrence of LBW at aterm birth in the area of Kedungbanteng PHC and Sumbang II PHC are Upper arm circumference (p value 0.017), maternal risk / complication (p value 0,019), psychology (p value 0.035) antenatal (p value 0,025). The variables that entered as multivariate candidate were variables having p <0.25 value is Upper urm circumference, maternal risk / complication, access to antenatal care, and psychology.

Multivariate analysis in this study used multiple logistic regression with 95% confidence level (α = 0,05) to know the most influencing factor from factors influencing the occurrence of LBW at birth aterm in Sumbang II PHC and Kedungbanteng PHC. The variables that will be candidates in

this logistic regression test are the variables which in bivariate analysis have p value <0.25 that is mother age variable, Upper urm circumference, maternal risk / complication, access and quality of antenatal service, and psychology.

Based on Table 3, the factors affecting the occurrence of LBW at aterm birth in Sumbang II PHC and Kedungbanteng PHC are Upper urm circumference , accompanying diseases and access to health services because the p value obtained

<0.05. The most influential variable with the occurrence of LBW at aterm birth in Sumbang II PHC and Kedungbanteng PHC is accompanying diseases , because the larger OR value is 4.29, it means that pregnant women having coexistence have risk to give birth of baby LBW 4,29 times greater than mothers who do not have accompanying diseases.

Table 1. Respondent Characteristics of Work Area of Puskesmas II Sumbang and Puskesmas Kedungbanteng

No	Variable	Category	Amount	percentage
1.	Mother'age	At risk	71	71
		Not risk	29	29
2.	Mother's education	High (D3, S1/S2/S3)	4	4
		Moderate (equal to Senior high school)	13	13
		Basic (equal to elementaryschool – yunior high school)	82	82
		No school		
			1	1
3.	Mother's work	No work	88	88
		Goverment employment	2	2
		private	5	5
		labour	5	5
4.	Upper arm circumference	At risk	23	23
		No risk	77	77
5.	Maternal complication disease	Yes	18	18
		No	82	82
6.	Psychologys factor	At risk	35	35
		No risk	65	65
7.	Cigarette exposure	At risk	9	9
		No risk	91	91
8	Access to antenatal care	Not good	6	6
		good	94	94
9	Parity	At risk	39	39
		No risk	61	61
		Amount	100	100

Tabel 2. Recapitulation of bivariate analysis result using chi square test between independent variable (independent) and dependent variable

Variable	control		case		p value	Odds Ratio (95% CI)
	n	%	n	%		
Mother's age						
No rik	35	70,0	36	72,0	1,000	-
At risk	15	30,0	14	28,0		
Upper urm circumference						
No risk	44,0	88,0	33,0	66,0	0,017	3,78
At risk	6,0	12,0	17	34,0		(1,34 – 10,6)
Maternal complication disease						

No risk	46,0	92,0	36,0	72,0	0,019	4,47
At risk	4,0	8,0	14,0	28,0		(1,35 – 14,7)
Parity						
No risk	32,0	64,0	29,0	58,0	0,682	-
At risk	18,0	36,0	21,0	42,0		
Mother's knowlegde						
No risk	22,0	44,0	23,0	46,0	1,000	-
At risk	28,0	56,0	27,0	54,0		
Access to antenatal care						
Good	36,0	72,0	24,0	48,0	0,025	2,78
Bad	14,0	28,0	26,0	52,0		(1,2 – 6,38)
Exposure to cigarette smoke						
No risk	30,0	60,0	26,0	52,0	0,546	-
At risk	20,0	40,0	24,0	48,0		
Phychology's factor						
No risk	27,0	54,0	38,0	76,0	0,035	2,45
At risk	23,0	46,0	12,0	24,0		(1,1 – 5,5)

Tabel 3. Logistic regression analysis results from the factors affecting the incidence of Low Birth Weight on labor delivery

Variable	B	P value	Exp (B)	95.0% C.I.for EXP(B)	
				Lower	Upper
Upper urm circumference	1,43	0,01	4,18	1,39	12,52
Accompanying diseases	1,45	0,023	4,29	1,22	15,0
access to health service	1,07	0,019	2,92	1,19	7,13

DISCUSSION

Based on the results of analysis it is known that upper arm circumference less than 23,5 cm has an effect on the occurrence of LBW at birth aterm with OR value of 4.18. This is in line with research conducted by Qobadiyah (2012) who said that Upper arm circumference pregnant women have an effect on the incidence of low birth weight in BPS Siti Sujalmi Jatinom Klaten[8]. The result of Susilani's research (2015) about the relationship of Upper urm circumference with the occurrence of LBW stated that there was a relationship between Upper urm circumference mother and the occurrence of LBW in Maternity Widuri [9]. Supariasa (2010) in his book states pregnant women are exposed to SEZ or nutrition less risky to give birth to babies with LBW if the size of the upper arm circumference (LILA) is less than 23.5 cm[10].

According to Waryono (2010) this SEZ condition illustrates the unmet needs of energy. This chronic energy deficiency causes pregnant women not to have adequate nutrient reserves to provide the physiological needs of pregnancy consequently consequently the growth and development of the fetus is inhibited and born with low weight. This is in line with the results obtained that respondents with LILA at risk, who gave birth to normal birth weight /BBLN (8.8%) were smaller than the respondents who gave birth to LBW (35.3%) [11].

Handayani (2011) in his research says there is an influence between education on the occurrence of Chronic Energy Deficiency[12]. According Notoatmodjo (2011) Education is an effort to provide knowledge so that there is a

change in positive behavior that increases[13]. Sediaoetama (2007) said formal education from mothers often has a positive association with the development of food consumption patterns in the family[14]. The higher the level of mother's education the better the nutritional knowledge and the more taken into account the type and amount of food chosen for consumption so that the better the nutritional status. Research data in Sumbang II PHC area showed that the number of respondents who have higher education (D3, S1 / S2 / S3 / equal) was only 4 (5.9)%. The results also showed that 4 respondents with high education who have Upper urm circumference are not at risk is 100%.

Complicated disease influences the occurrence of LBW in labor term. According to Maryunani (2010) the disease in pregnancy consists of a history of chronic diseases such as hypertension, heart, diabetes mellitus, liver disease, kidney disease and toxemia, the presence of infections such as congenital malaria, venereal disease, bladder, and vaginal and rubella infections[15]. Njokanma (2013) shows hypertension in pregnancy with regard to the occurrence of small infants during pregnancy[16]. Hypertension causes poor blood circulation in the placenta and causes calcification so that nutrients to the fetus are impaired [17].

Access to health services effect on the occurrence of LBW at birth term. Pregnancy tests include anamnesis, inspection, and palpation (Saminem, 2008)[18]. The purpose of pregnant women accessing antenatal care according to Maulana (2008) is to monitor pregnancy progress, improve and maintain mother's physical and mental health, because it can do pregnancy check up, health officer will always give advice and information very useful for mother and fetus[5]. Early recognition of any abnormalities or complications that may occur during pregnancy. Prepare mothers for safe childbirth. Research conducted by Lovin (2015) shows that access to antenatal care has a relationship with LBW incidence [19].

Based on the results of the analysis obtained the conclusion of maternal age during pregnancy has no effect on the occurrence of LBW at birth term. Data from the research results in the working area of Sumbang II PHC and Kedungbanteng PHC showed that respondents with age at risk of giving birth to BBLN (38.2%) were more than those who gave birth to LBW (20.6%). This is in line with the research Rahayu et al (2015) which says maternal age factors have no relationship to the occurrence of LBW with the results of respondents with age at risk who gave birth to LBW only as much as 29.4%[20]. Arisman (2008) said the incidence of LBW in women with healthy reproductive age is also influenced by various other factors such as anxiety, stress, and maternal factors such as lack of nutrient intake, or because of disease[21]. The results of the study stated that the mother aged 20-35 years gave birth to the baby with LBW as much as 79.4%. This is because the possibility of a mother who is not at risk during pregnancy is less concerned about her pregnancy both in terms of nutritional status seen from Upper urm circumference and maternal risk / complication. The result of analysis obtained from 15 respondents with risky Upper urm circumference, was dominated by respondents with healthy reproductive age (20-35 years) that is 80% compared with respondents with risky age (<20 and> 35 years) only 20%. This shows that mothers aged 20-35 years are less concerned about the state of nutritional status when viewed from the results of Upper urm circumference measurements.

The analysis results inform parity has no effect on the occurrence of LBW at birth term. This is because of 34 respondents who gave birth to LBW was more prevalent in the parity of no risk that is equal to 52.9% (table 2). This is not in line with the Masyita (2010) study which showed mothers with parity 1 and ≥ 4 times had a risk for preterm labor 2,246 times compared to mothers with parity 2-3 times[22]. The result of this research shows that there is no influence of parity with LBW in Working Area of Puskesmas II Sumbang and

Kedungbanteng because the more respondents with parity do not risk on access and quality of service which less support. This can be seen from 32 respondents with access and quality of service less support, more happened in group of parity which is not at risk (53,1%) compared to risk parity (46,9%). Meanwhile, according to Saifudin (2006) principle in prevention of low birth weight is by providing counseling to pregnant women to perform a good and regular antenatal examination. Antenatal checks include pregnancy checkups, pregnancy education, and early detection of LBW[23]. Unfortunate access and quality of antenatal care at parity is not risky causing early detection of LBW is not optimal so that pregnant mother safe parity will risk giving birth LBW.

The results showed that maternal education was not associated with the occurrence of LBW at birth aterm. This result is in line with the Case control Study Sumarmi & Soleha (2015) in Probolinggo District which states that maternal education is not a risk factor for LBW incidence.[24] This is caused by the racial knowledge of a mother not only in the last education. The hope of mothers to improve knowledge is driven by the progress of science and technology. Paramita et al (2009) reported similarly that there was no significant correlation with LBW incidence[25]. However, Bendhari and Haralkar (2015) reported different things, stated that there is a significant relationship of maternal education to the occurrence of LBW[26]. According Notoatmodjo (2011) knowledge is an expression of the state of know as a result of sensing of a particular object and is a potential domain of human behavior formation. Therefore knowledge may affect mother's behavior including health behavior that impact on prevention of LBW occurrence[13].

The result of analysis stated that there is no effect of cigarette smoke exposure on the occurrence of LBW at aterm birth in Banyumas regency. This is because of 34 respondents who gave birth to LBW, exposed to cigarette smoke by 50% the same as those not exposed to cigarette smoke is 50% as well. This is not in line with research

conducted by Irnawati (2011) informs that pregnant women who smoke passively increase the risk of LBW. Mothers who gave birth to LBW, 78% occurred in women exposed to cigarette smoke from their husbands and families[27]. Research conducted by McCowan (2010) shows that smoking can increase the occurrence of small birth babies during pregnancy. The magnitude of the effect of exposure to secondhand smoke on pregnant women as a cause of low birth weight infants is influenced by the number of cigarettes smoked, exposure time, and duration of exposure to cigarette smoke from husbands inhaled by pregnant women[28]. Khattar's (2013) study in India showing pregnant women exposed to secondhand smoke from husbands who consumed cigarettes between 11-20 cigarettes daily was 4.06 times the risk of low-birth-weight babies compared with those who did not smoke at all[29]. This is different from the results of research showing no effect of exposure to cigarette smoke on the occurrence of LBW at birth aterm. Limitations of research that do not examine the exposure of cigarette smoke based on the number of cigarettes smoked by the husband and family, and the duration of exposure to cigarettes inhaled by pregnant women who may make no hearing of cigarette smoke exposure to the occurrence of LBW at birth aterm.

Maternal psychological factors do not affect the occurrence of LBW at aterm birth based on statistical analysis. The results of this study are not in line with previous research (Martinez et al, 2004) which describes that psychological factors affect the occurrence of LBW includes physical, sexual, emotional abuse of mother. Emotional violence of pregnant women occurs in mothers who work more than 45 hours per week while in this study most of the respondents were unemployed (88%)[30]. Kumar et al's case study control (2014) reported that 70% of newborns categorized as LBW were born to mothers who worked as factory workers. Mothers who work as factory workers 7.14 times are at greater risk of LBW incidence[31].

The size of the mother Upper urm circumference, the disease and access to the antenatal care service is an important factor in the occurrence of Low Birth Weight on the childbirth, and the disease is the most influential factor. Advice is to involve mothers as a key target and involve the closest family and utilize existing health facilities (Village Polyclinic, Integrated Service Center /Posyandu) through activities to the mother of toddlers in improving the knowledge and education of nutrition. Increasing the participation of husbands and communities in improving the nutrition of pregnant women through the use of activities with the improvement of infrastructure facilities, village polyclinic and Posyandu as the service of village health information and the provision of access and information facilities Health.

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