July 2017, Volume 5, Issue 1

p-ISSN 2303-1816
e-ISSN 2503-2356

PUBLIC HEALTH AND PREVENTIVE MEDICINE ARCHIVE

Editorial

Original Articles

Public Health and Preventive Medicine Archive (PHPMA)
e-ISSN : 2503-2356 ; p-ISSN : 2303-1816

EDITORIAL

ARTICLES

Public Health and Preventive Medicine Archive (PHPMA)
e-ISSN : 2503-2356 ; p-ISSN : 2303-1816

High parity and chronic energy deficiency increase risk for low birth weight in Situbondo District

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Abstract

Background and purpose: The prevalence of low birth weight (LBW) in Situbondo District increased from 2.79% in 2008 to 5.85% in 2014. The highest prevalence in 2015 was found in Bungatan Subdistrict (11%). This study aims to determine risk factors of LBW in Bungatan Subdistrict, Situbondo.
Methods: A case control study was conducted in Bungatan Subdistrict. A total of 60 infants born at the Bungatan Community Health Centre were included in the study. Cases were infants with LBW and controls were those with normal birth weight. All infants born with LBW were taken as cases (20 infants) while 40 controls were selected using a systematic random sampling. Data were collected from February to March 2016. Data were analysed using bivariate and multivariate technique with logistic regression test.
Results: The majority of respondents were unemployed (80%), aged between 20-35 years during the pregnancy (53.33%), with parity of ≤3 (66.67%), low education level (61.67%), anemia during the pregnancy (68.33%), good nutritional status (75.00%), poor nutrition intake during the pregnancy (51.67%) and without pre-eclampsia (88.33%). Parity of >3 increased the risk of LBW (AOR=6.4; 95%CI 1.66 - 24.75). Chronic energy deficiency increased the risk of LBW (AOR=5.6; 95%CI 1.41-22.57).
Conclusions: Parity of more than three and chronic energy deficiency increase the risk for LBW in Bungatan Community Health Centre, Situbondo District.
Keywords: parity, chronic energy deficiency, LBW, case control, Situbondo

Introduction

Low birth weight (LBW) is a global public health issue. LBW is one of major causes for infant mortality. About 60%-80% of infant mortality cases were caused by LBW. Annually, 20 million or 15.5% of the global live births were LBW for which 96.5% were found in developing countries. The prevalence of LBW was 16.5% in developing countries while in developed countries was only 7%.[1] Data from Basic Health Survey (*Riskesdas*) 2013 showed that the prevalence of LBW was 10.2% from all births. The prevalence of LBW in East Java was 11.2% of all births.[2] Situbondo District, one district at East Java also experienced an increased prevalence of LBW from 2.79% in 2008 to 5.85% in 2014. The highest LBW prevalence in 2015 was found in Bungatan Subdistrict (11%).[3]

Studies examining risk factors of LBW have been conducted in many areas and countries. Findings from these studies are still inconsistent and the majority were conducted at the hospital and not many studies adopted community based research.[4,5,6,7] The high prevalence of LBW in Bungatan Subdistrict indicates the need for a further study examining its associated risk factors. Understanding these risk factors will enable further preventative measures. This present study aims to understand risk factors

associated to LBW in Bungatan Subdistrict, Situbondo.

Methods

A case control study was conducted at Bungatan Public Health Centre from February to March 2016. Case population was all new born babies with LBW and control population was all babies with normal birth weight at Bungatan District in 2015. All babies with LBW were recruited as samples (20 cases) and 40 controls were selected using a systematic random sampling. Data were collected by visiting respondents' house. Data were obtained from ANC book that include age of mother during pregnancy, parity, education level, employment status, anemia status, nutritional status, body weight prior to delivery, upper arm diameter, pre-eclampsia, gestation age, birth weight, baby conditions after the delivery such as single or twin and congenital disease. Informed consent was obtained prior to the data collection.

Data were analysed using univariate, bivariate and multivariate technique in Stata 12.1. Univariate analysis was conducted to describe characteristics of respondents and other variables. Bivariate analysis was done by creating cross-tabulation and chi square test was performed. Variables with p-value <0.25 on bivariate analysis and theoritically have an association with LBW were included in the multivariate analysis using logistic regression model to calculate the adjusted odd ratio (AOR) with 95% confidence interval. This present study has been approved by Human Research Ethics Committee of Malang Health Polytechnic.

Results

Table 1 shows that the majority of respondents were mothers with parity ≤3, unemployed during pregnancy, aged between 20-35 years, with low education level, anemic, without chronic energy deficiency (CED), without pre-eclampsia and with inadequate body weight gain during pregnancy. Table 2 shows the comparison between cases and control regarding parity, employment status, age of mother, education level, anemia status, CED status, improved weight gain and pre-eclamsia status. It reveals that only parity and CED status were significantly different between cases and controls.

Table 3 shows that CED status increased risk for LBW (OR=4.6; 95%CI: 1.34-15.96). In order to obtain the adjusted odd ratio, all variables with p value of <0.25 from bivariate analysis were included in the logistic regression model that were parity, employment status, age during pregnancy, anemia status, CED status and weight gain status. Table 4 shows that parity of >3 and CED status were risk factors for LBW. Parity >3 increased risk for LBW (AOR=6.4; 95%CI: 1.66–24.74). CED status increased risk for LBW (AOR=5.6; 95%CI: 1.41–22.57).

Table 1. Respondent characteristics

Variables	n=60	%
Parity		
>3	20	33.33
≤3	40	66.67
Employment status		
Employed	12	20.00
Unemployed	48	80.00
Age during pregnancy		
<20 or >35 years	28	46.67
20-35 years	32	53.33
Education level		
Low	37	61.67
High	23	38.33
Anemia status		
Yes	41	68.33
No	19	31.67
CED status		
Yes	15	25.00
No	45	75.00
Body weight improvement		
Poor	31	51.67
Adequate	29	48.33
Pre-eclampsia status		
Yes	7	11.67
No	53	88.33

Table 2. Comparison between cases and controls based on several variables

Variables	LBW n (%)	Normal weight n (%)	p value
Parity			
>3	11 (55.00)	9 (22.50)	0.012
≤3	9 (45.00)	31 (77.50)	
Employment status			
Employed	6 (30.00)	6 (15.00)	0.171
Unemployed	14 (70.00)	34 (85.00)	
Age of mothers during pregnancy			
<20 or >35 years	12 (60.00)	16 (40.00)	0.143
20-35 years	8 (40.00)	24 (60.00)	
Education level			
Low	14 (70.00)	23 (57.50)	0.348
High	6 (30.00)	17 (42.50)	
Anemia status			
Yes	16 (80.00)	25 (62.50)	0.170
No	4 (20.00)	15 (37.50)	
CED status			
Yes	9 (45.00)	6 (15.00)	0.011
No	11 (55.00)	34 (85.00)	
Weight gain status			
Inadequate	13 (65.00)	18 (45.00)	0.144
Adequate	7 (35.00)	22 (55.00)	
Pre-eclamsia status			
Yes	3 (15.00)	4 (10.00)	0.570
No	17 (85.00)	36 (90.00)	
Total	20 (100.00)	40 (100.00)	

*Chi Square test

Table 3. Crude odd ratio for LBW

Variables	LBW n (%)	Normal weight n (%)	Crude OR	95%CI	p value
Mother's age during pregnancy					
<20 or >35 years	12 (60.00)	16 (40.00)	2.2	0.75-6.73	0.147
20-35 years	8 (40.00)	24 (60.00)			
Education level					
Low	14 (70.00)	23 (57.50)	1.7	0.54-5.41	0.350
High	6 (30.00)	17 (42.50)			
Anemia status					
Yes	16 (80.00)	25 (62.50)	2.4	0.67-8.53	0.176
No	4 (20.00)	15 (37.50)			
CED status					
Yes	9 (45.00)	6 (15.00)	4.6	1.34-15.96	0.015
No	11 (55.00)	34 (85.00)			
Weight gain status					
Inadequate	13 (65.00)	18 (45.00)	2.2	0.74-6.88	0.148
Adequate	7 (35.00)	22 (55.00)			
Pre-eclampsia status					
Yes	3 (15.00)	4 (10.00)	1.5	0.31-7.89	0.572
No	17 (85.00)	36 (90.00)			

Table 4. Adjusted odd ratio for LBW

Variable	Initial model			Final model		
	Adjusted OR	95%CI	p value	Adjusted OR	95%CI	p value
Age of mother <20 or >35 years	1.6	0.40-6.48	0.502	-	-	-
Anemia	2.1	0.50-9.54	0.294	-	-	-
CED	5.3	1.26-22.85	0.022	5.6	1.41-22.57	0.014
Inadequate weight gain	3.2	0.82-12.82	0.092	3.0	0.80-11.21	0.101
Employed	0.7	0.14-3.58	0.696	-	-	-
Parity >3	5.7	1.27-25.53	0.023	6.4	1.66-24.74	0.007

Discussion

This study showed that parity of >3 increases the risk of LBW (AOR=6.4; 95%CI: 1.66-24.74; p=0.007). This finding is consistent with several studies in Gorontalo, Malaysia, Poland and Congo.[8,9,10,11] Higher parity (>3) is associated with LBW and perinatal mortality.[12] Repeated pregnancies lead to alteration of blood vessels in the uterus. This disturbs the nutrient flow from mother to the baby that leads to interruption of fetal growth and results in LBW infant.[13] Family planning is a government's program to control population growth through limiting the number of pregnancies. However, community participation in family planning program at Bungatan Community Health Centre is lacking, with the coverage is only 50%.[14] Level of knowledge regarding contraception methods and its availability at the health centre are essential for community participation in the family planning program.[15] Providing information, education and communication on contraception methods may improve the uptake of family planning program.[16] It is expected that Bungatan Community Health Centre is more proactive in providing information and education on family planning. These activities should target not only married couple but also reproductive aged women more generally.

Multivariate analysis showed that CED status increases the risk of LBW (AOR=5.6; 95%CI: 1.41-22.57; p=0.014). Pregnant women with CED are 5.6 times more likely giving birth to LBW infant. This finding is consistent with other studies in Singkawang, Sumenep and Bantul.[5,17,18] CED during pregnancy is caused by the lack of nutrient intake. CED during pregnancy may reduce the blood volume thus decreases the cardiac output and blood volume to the placenta. The lack of blood being pumped into the placenta reduces the nutrient flow from mother to the baby and may lead to fetal growth inhibition.[19]

The measurement of upper arms diameter is one method which can be used to detect CED among pregnant women.[20] However, the coverage of nutrition program in Bungatan Community Health Centre is still 81.13%. In addition, the coverage of nutrition program for pregnant women is only 54%.[14] The nutrition improvement program targeting pregnant women is implemented by the health centre by providing milk and nutrition counselling. However, the milk supplementation is not routinely conducted by the district health office. Nutritional improvement program for pregnant women with CED is done based on local contexts which include epidemiological, socio-cultural and local capacity. This program consists of education on consumption pattern, food supplementation equal to ±500 kcal and 15 gr of protein daily, and monitoring of fetal development. If the weight gain of 1 kg/month during first trimester or 2 kgs/month during second trimester are not achieved, they should be referred to the health centre and the nutritionist.

Addressing CED in pregnant women requires collaboration between programs and cross-sectoral partnership including family, health cadre, village midwives, community health centres, nutritionist, head of community health centre, nutritional team at the health centre and health offices.[21] It is suggested that health offices should support the provision of nutrition program targeting pregnant women with CED by encouraging participation from cross programs and sectors.

This study has several limitations. Firstly, this study only covers Bungatan Subdistrict Situbondo Regency therefore it might not be applicable to other areas across Indonesia. Secondly, cases and controls in this study were taken from the delivery register at the community health centre which may not sufficiently represent the whole population.

Conclusion

Parity of >3 and CED status are risk factors for LBW in Bungatan Public Health Centre, Situbondo District.

Acknowledgement

We would like to thank the Health Office of Situbondo District, the head of Bungatan Public Health Centre, midwives and all respondents who have participated in this study.

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