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Socio-Demographic and Cultural Factors Associated with The Occurrence of Low Birth Weight in Kupang

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ABSTRACT

The prevalence and death due to low birth weight (LBW) is still high in Kupang. There are multifactorial causes of LBW which can be categorized into: physical and social environment, mother, fetus, placenta and umbilical cord, and health service. From maternal factors, there are sub-factors of maternal characteristic such as knowledge of pregnancy, maternal health status, and the behavior of pregnancy care. The behavior of pregnancy care can be in the form of a traditional pregnancy care, which may lead to LBW. Most researches on the risk factor of LBW are related to clinical medical factors. This research aimed to determine the socio-demographic and cultural factors which are related to the occurrence of LBW in Kupang. This research used analytic observational method with case-control design, on 50 mothers giving birth to LBW and 50 mothers who delivered normal babies, through interview and tracing of maternal and infant medical records. To eliminate the clinical factors of medical causes of LBW (anemia, hypertension, pre-eclampsia, and infection), inclusion criterion was applied, as follows: mothers who give birth to normal childbirth, single infants, and have received integrated Antenatal Care (ANC) service. Exclusion criteria were: mothers give birth to twisted umbilical cord, placental weight <500 grams, infant with congenital defect, and incomplete medical records. This research took place at Prof. DR. W.Z. Johannes Hospital, Dedari Hospital and 2 Public Health Center in Kupang. Data analysis used logistic regression. The final results of logistic regression model of this study founded 5 variables that affect the occurrence of LBW in Kupang, beside the medical clinical factors, such as: maternal age, maternal education, BMI, increase the body weight during pregnancy, and heavy work during pregnancy.

Keywords: Socio-demographic factors, Cultural factors, Low birth weight

INTRODUCTION

Low birth weight (LBW) is one of severe issues in the world, especially in developing countries and it becomes one major indicator for the reproduction health and society health status in general. Low birth weight is a condition when the new born baby weights less than 2500 gram, despite the age of pregnancy^{(1),(2)}, it has the possibility of 25-30 times for the death of the babies compared to newborn with the above cut-off weight⁽³⁾. The birth weight is an important determination for the continuity of the babies' lives and it determines the possibility of having optimal growth. In the Province of East Nusa Tenggara, the number of infant mortality is higher than the national infant mortality rate. In 2007, the number of infant mortality in East Nusa Tenggara had been 57 out of 1000 live birth and it had decreased to 39 out of 1000 in 2010, but it increased again to 45 out of 1000 live birth in 2012⁽⁴⁾. Low birth weight becomes the second highest cause of the infant mortality.

Globally, LBW prevalence is 10-20% of live birth every year. WHO (2011) has estimated there are about 25 million of LBW cases every year and 95% of the cases happening in developing countries⁽⁵⁾. According to Riskesdas 2010, LBW prevalence in Indonesia was about 11.1%, which the highest number was in East Nusa Tenggara, around 19.2%⁽⁶⁾. In 2013, there was a slightly decreased of the prevalence of LBW, around 10.2%⁽⁷⁾.

The short-term impact of LBW is illness and death of the babies. The long-term impact is the neurological developmental dysfunction which results in: learning disorder, low IQ score, attention deficit and hyperactivity disorder (ADHD), neuropsychological deficit, visual motor integration disorder, hearing impairment, speech and language disorder, emotional problem, and regulation disorder, had occurred in 50-70% of infants with very low

birth weight. In addition, severe disability may occur, such as: moderate-severe mental retardation, cerebral palsy and epilepsy in 25% of infants with very low birth weight⁽⁸⁾.

The cause LBW is multifactorial, which can be specified into: maternal factor as an environmental factor for the fetus, placental and umbilical cord factor, fetal factor, and health care factors. From maternal factors, in addition to age, anthropometry, and maternal disease, there are also socio-demographic-cultural factors that will influence pregnant women's behavior and it may increase the case LBW. From the previous research, there was a culture of traditional pregnancy care at risk for LBW occurrence, namely: dietary restrictions (taboo) and suggestions to keep working hard during pregnancy, with a philosophy for childbirth to run smoothly.

The remaining high rate of LBW cases mortality, it is important to investigate the related socio-economic and cultural factors, and hopefully it will help to decrease the number of LBW cases and infant mortality rate in East Nusa Tenggara Province.

This study aimed to determine the socio-demographic and cultural factors which are related to the occurrence of LBW in Kupang.

METHODS

This study was an analytic observational research with the case-control design. This research was held in a province referral hospital, a mother and child hospital, and two community health centers of BEMONC (Basic Emergency Obstetric and Neonatal Care). The research subject is divided into two groups, there were mother who gave birth of LBW babies as a case group and control group is mothers gave birth the normal birth weight babies. The number of sample for each group was 50, counted with formula from Lemeshow, *et al.* (1990)⁽⁹⁾.

$$n = \frac{\{Z_{1-\alpha/2} \sqrt{2 P_2 (1-P_2)} + Z_{1-\beta} \sqrt{P_1 (1-P_1) + P_2 (1-P_2)}\}^2}{(P_1 - P_2)^2}$$

The sampling method for the case group was composed in total sample, and control group with systematic random sampling. To eliminate the medical clinical factor which cause LBW (anemia, hypertension, pre-eclampsia, and infection), inclusion and exclusion criterion was applied. The inclusion criteria were: mothers who give birth to normal childbirth, single infants, and have received integrated Antenatal Care (ANC) service. Exclusion criteria: mothers gave birth with twisted umbilical cord, placental weight <500 grams, infant with congenital defect, and incomplete medical record. The dependent variable in this research was LBW, with independent variable such as: the age of mother, the level education of mother, the family income, the mother height, and the early weight of the first Antenatal Care (ANC), the total amount of ANC, the parity, the distance period of pregnancy, the history of LBW, the cigarette smoke exposure, body mass index (BMI), and the weight gaining during pregnancy. Two variables which were related to the traditional pregnancy care which at risk for LBW also integrated as the independent variable, those were: keep the hard working during pregnancy and dietary restriction (taboo). The research data was the combination of the primary data from the direct interview and the secondary data which were collected from the KIA book also the medical record from the hospital or the community health center. Categorical data were presented in the form of frequency⁽¹⁰⁾, while numerical data were presented in the form of minimum, maximum, mean and standard deviation⁽¹¹⁾. Then, the data was analyzed statistically using the logistic regression.

RESULTS

Table 1. Description of mother's anthropometry and antenatal care

	n	Minimum	Maximum	Mean	Std. Deviation
Height	100	140.00	173.00	153.00	6.05204
Early Weight	100	29.00	68.00	45.3730	7.56773
Final Weight	100	36.00	80.00	54.4350	8.50208
First ANC	100	0.00	9.00	3.6200	1.71022
Total ANC	100	1.00	13.00	5.8900	2.82805
Weight Gaining	100	2.00	20.00	9.0620	5.08006
BMI	100	13.20	28.50	19.3600	2.97189

Table 1 showed the description of mother's anthropometric value and the ANC data. The mean height was in the normal range, while the early and final weight, also the BMI were below the normal value. This phenomena described that most women in Kupang undergone chronic malnutrition. From table 1 also shown that there were some mothers with obesity at the beginning of the pregnancy (maximum early weight: 68.00 kilograms). It could be explain that the double burden of malnutrition also happened here. From the ANC data, there were 2 mothers who did the ANC once during the pregnancy, and held at the 9th month of the pregnancy.

Table 2. Description of mother's characteristic

		Frequency	Parameter coding
Age of the mother	20-35	84	1.000
	<20/>35	16	0.000
Family income	>=1,5million	39	1.000
	<1,5million	61	0.000
Parity	<= 2infants	61	1.000
	>2 infants	39	0.000
Period of pregnancy	>=24months	82	1.000
	<24months	18	0.000
History of LBW	No history of LBW	85	1.000
	History of LBW	15	0.000
Cigarette smoke exposure	No	43	1.000
	Yes	57	0.000
Hard working during pregnancy	No hard working	72	1.000
	Hard working	28	0.000
Dietary restriction (taboo)	No Dietary Restriction	76	1.000
	Dietary Restriction	24	0.000
Education Level	High / Senior high school-university	62	1.000
	Low/ Primary-junior high school	38	0.000

Table 2 showed that most of mother with the age of non risky for being pregnant (84%), most mother with the low family income, but 62% of the respondent had the high level of education. It could be explain that some of them were the university student and being pregnant in the extra marital status. Most of the mother had the good parity and distance period of pregnancy, also no history of having LBW, because some of them were held the first pregnancy.

Table 3. Variables in the equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Education level of the mother	1.228	.554	4.922	1	.027	3.415
Hard working during pregnancy	-1.214	.582	4.359	1	.037	.297
Age of the mother	-1.552	.745	4.337	1	.037	.212
Weight gaining during pregnancy	-.183	.062	8.685	1	.003	.833
BMI	-.161	.086	3.548	1	.060	.851
Constant	6.201	2.038	9.260	1	.002	493.343

Table 3 described the final result of the multivariate logistic regression model. Variables that were significant for the occurrence of LBW in Kupang were: mother's age, education level, BMI, weight during pregnancy, and hard workload during pregnancy. The latest variable was related to the traditional pregnancy care, proposed to continued hard working with the philosophy for the smooth of babies delivery.

DISCUSSION

The low birth weight babies (LBW) is the condition when the newborn baby weight less than 2500 grams without envisage the gestational period⁽²⁾. The occurrence of LBW is the one of important issues in the society, especially in the developing countries. According to Singh (2009) this case could be avoided⁽¹²⁾. The final result of the logistic regression model, found five risk socio-demographic-cultural factors of LBW in Kupang, in addition of medical factors, are: the age of mother, the level education of mother, BMI, the weight gaining during pregnancy, and hard-working during pregnancy.

Most mothers gave birth in 20-35 years of age (84%), and the percentage of mothers with the age of <20 or >35 years old was more in the LBW (24%) group compared to group without LBW (8%). This result is in conformity with the research result in Manado, which found the relationship between the age of mothers with low birth weight⁽¹³⁾. Study in Malaysia found that mothers with the young age had higher risks in experiencing low birth weight⁽¹⁴⁾. In several researches also discovered that the age of mothers is the risk factor of LBW case^{(15),(16),(17)}. The optimal reproduction age of woman is among 20-35 years old, under and above those ages will increase the risk in pregnancy or child birth. The pregnancy in early age (< 20 years old) becomes the problem for mother and fetus. This caused by the premature reproduction organ for pregnancy, so this will harm mother's health also the fetal growth and development, which can cause premature birth, low birth weight, and congenital defect. Mother who has pregnant at more than 35 years old also at risk in low birth weight⁽¹⁸⁾. The result of this research was different from the previous research in Yogyakarta which there had been no relationship between

the age of mother with LBW case⁽¹⁹⁾. Also the study of Negi, *et al.* (2006)⁽²⁰⁾ and Pinzon-Rondon, *et al.* (2015)⁽²¹⁾ said that age of the mother was not the risk factor of LBW.

Mother with low educational level (elementary and junior high school) tends to have low birth weight babies caused by the lack of awareness about the health of pregnancy. This case is inline with the result of the study of Rini and Trisna (2013), explained that pregnant women with the low level of education (no educational background and elementary school) had 19.2 times higher risk to have low birth weight babies than pregnant women with higher level of education (junior-senior high school and university)⁽²²⁾. The research of Pinzon-Rondon, *et al.* (2015)⁽²¹⁾ and Bayingana, *et al.* (2010)⁽²³⁾ also found that LBW is experienced by mother with the low level of education.

The body mass index (BMI) describes the nutrition status of pregnant women. Body mass index counted base on weight and height of the mother before being pregnant. Mother who has low body weight before the pregnancy period has higher risk to experience LBW compared with mother who has normal body weight. Mother who has body height < 145 cm tends to have LBW. The result of this research found the average body weight of mother was 45.37 with the standard deviation of 7.56 kilograms. The average of body height was 153.00 with the standard deviation of 6.05 centimeter. The study of Mumbare, *et al.* (2012) in India, found that one of the LBW risk factor is the body weight of the mother before pregnancy below 55 kilogram and the body height below 145 centimeter⁽²⁴⁾. Body mass index is one of the variable which influences the LBW case. This fact is related with the research of Singh, *et al.* (2009) which found the mother with BMI <20 and >25 tends to have LBW⁽¹²⁾. This fact is different from the research in Malaysia and Iran which found that BMI has no influence with the LBW cases^{(14),(25)}.

According to WHO the cause of the low birth weight babies is complex and has the relationship among each variable with the other⁽⁵⁾. The mother's anthropometry and the nutrition intake are important factors. The body weight before pregnancy and weight gaining during pregnancy have the strongest and positive effect to the fetal growth⁽²⁶⁾. The ideal weight gaining during pregnancy is between 9-12 kg. The research of Risvi, *et al.* (2007) in Karachi, Pakistan found that the body weight of postpartum mother as the one of the factors which influences the low birth weight⁽¹⁵⁾. This facts are different with the previous research which has explained the body weight has no relation with the risk of LBW⁽²⁵⁾.

This research found that if pregnant women keep doing the hard work during the pregnancy, it creates a risk of LBW to two times higher, compared to pregnant women who do not work hard during their pregnancy. The changes of social-economic condition that happens currently, affects the changing role of women. This alteration of chance and role of women in economic sector affects many women to work and involve themselves to fulfill the economic status of family. Although they are in pregnancy, there are many women who are forced to work, including their domestic workload. Moreover, there is a cultural belief that encourages pregnant women to work hard, thus their delivery process can run smoothly. If the delivery was smooth, so they will have normal childbirth, will not give more burden for the economic condition of the family. Pregnant women will obey this suggestion, because if they disobeyed this, they would be blamed for whatever happens to their pregnancy.

Banarjee (2009) stated that the use of physical force during pregnancy has a risk for a pregnancy outcome of LBW⁽²⁷⁾. It has also been proven in previous research that working mothers have more risks of giving birth to LBW compared to those who are not working hard. Unfavorable working environment conditions such as bad humidity, standing or sitting position for long time, will increase the risk of LBW, as well as the pressure situation at work also related to the occurrence of LBW⁽²⁵⁾. The research by Elhissi (2012) on pregnant women in the Gaza Strip, found that working mothers were more likely to experience trauma and it results the premature rupture of membranes, tend to anemic, miscarriage, and emesis gravidarum, compared to unemployed pregnant women⁽²⁸⁾. Niedhammer *et al.* (2009) in Ireland, conducted a prospective cohort study of various pregnant women's occupational factors, gaining a significant relation between physical work demands and LBW cases⁽²⁹⁾. This study found that working hard during pregnancy is one of the risk factor for low birth weight babies in Kupang.

CONCLUSION

Besides medical clinical factors, the risk of low birth weight babies (LBW) in Kupang is also from the age of pregnant women, the education level of mother, IMT, weight gaining of during pregnancy, and keep hard work during pregnancy. Keep hard working during pregnancy was related to the cultural belief about pregnancy and the ease of delivery process.

REFERENCES

1. Unicef & WHO. Low Birth Weight: Country, Regional and Global Estimates. New York: Unicef; 2004.
2. Kemenkes RI, Ditjen Bina Gizi dan KIA. Low Birth Weight Baby Management for Midwives and Nurses (Reference Book) (Manajemen Bayi Berat Lahir Rendah untuk Bidan dan Perawat (Buku Acuan)), Jakarta: Ditjen Bina Gizi dan KIA Kemenkes RI; 2011.
3. Chang S, O'Brein KO, Nathanson MS, Mancini N. Witter, FR. Characteristics and Risk Factors for Adverse

- Birth Outcomes in Pregnant Black Adolescents. *The Journal of Pediatrics*. 2003;143(2):250-257.
4. BPS, BKKBN, Kemenkes RI, ICF International. *Indonesia Demographic and Health Survey 2012 (Survei Demografi dan Kesehatan Indonesia 2012)*. Jakarta: BPS, BKKBN, Kemenkes RI, & ICF International; 2012.
 5. World Health Organization. *Guidelines on 2011 Optimal feeding of low birthweight infants in low-and middle-income countries*. 2011. Available from: http://www.who.int/maternal_child_adolescent/documents/9789241548366.pdf
 6. Kemenkes RI. *Basic Health Research 2010 (Riset Kesehatan Dasar 2010)*. Jakarta: Balitbangkes Kemenkes RI; 2010.
 7. Kemenkes RI. *Basic Health Research 2013 (Riset Kesehatan Dasar 2013)*. Jakarta: Balitbangkes Kemenkes RI; 2013.
 8. Vandenberg KA. Individualized Development Care for High Risk Newborns in the NICU: A Practice Guideline. *Early Hum Dev*. 2007;83(7):433-442.
 9. Lemeshow S, Hosmer DW, Klar J, Lwanga SK. *Adequacy of Sample Size in Health Studies*. England: John Willey & Sons; 1990.
 10. Nugroho HSW. *Descriptive Data Analysis for Categorical Data (Analisis Data Secara Deskriptif untuk Data Kategorik)*. Ponorogo: Forum Ilmiah Kesehatan (Forikes); 2014.
 11. Nugroho HSW. *Descriptive Data Analysis for Numerical Data (Analisis Data Secara Deskriptif untuk Data Numerik)*. Ponorogo: Forum Ilmiah Kesehatan (Forikes); 2014.
 12. Singh CG, Chouhan R, Sidhu K. Maternal Factors for Low Birth Weight Babies. *Medical Journal Armed Forces India*. 2009;65:10-12.
 13. Rantung FA, Kundre R, & Lolong J. Relationship between Maternal Maternal Age and Low Birth Weight Incidence at Pancaran Kasih GMIM Hospital, Manado (Hubungan Usia Ibu Bersalin dengan Kejadian Bayi Berat Lahir Rendah di Rumah Sakit Pancaran Kasih GMIM Manado). *Ejournal Keperawatan*. 2015;3(3):1-6.
 14. Sutan R, Mohtar M, Mahat AN, Tamil AM. Determinant of Low Birth Weight Infants: A Matched Case Control Study. *Open J of Prev Med*. 2014;4(3):91-99. <http://doi.org/10.4236/ojpm.2014.43013>
 15. Rizvi SA, Hatcher J, Jehan I, Qureshi R. Maternal Risk Factors Associated with Low Birth Weight in Karachi: A Case - Control Study. *Eastern Mediterranean Health Journal*. 2007;13(6):1343-52.
 16. Viengskhone L, Yoshida Y, Harun-Or-Rashid MD, Sakamoto J. Factors Affecting Low Birth Weight at Four Central Hospitals in Vientiane, Lao PDR. *Nagoya Journal of Medical Science*. 2010;72:51-58.
 17. Isiugo-Abanihe UC, Oke OA. Maternal and Environmental Factors Influencing Infant Birth Weight in Ibadan, Nigeria. *African Population Studies*. 2011;25(2):250-266.
 18. Manuaba IBG. *Obstetrics, Gynecology and Family Planning (Ilmu Kebidanan, Penyakit Kandungan dan Keluarga Berencana)*. Jakarta: EGC; 2006.
 19. Rokhmah NL. Relationship between Mother's Age with Low Birth Weight (LBW) in PKU Muhammadiyah Hospital Yogyakarta 2012 (Hubungan Usia Ibu Dengan Kejadian Bayi Berat Lahir Rendah (BBLR) Di RS PKU Muhammadiyah Yogyakarta Tahun 2012). Yogyakarta: Stikes Aisyiyah Yogyakarta; 2013.
 20. Negi KS, Kandpal SD, Kukreti M. Epidemiological Factors Affecting Low Birth Weight, *JK Science*. 2006;8(1):31-34.
 21. Pinzon-Rondon AA, Guitierrez-Pinzon V, Madrinan-Navia H, Amin J, Aguilera-Otalvaro P, Hoyos-Martinez A. Low Birth Weight and Prenatal Care in Colombia: A Cross-sectional Study. *BMC Prenancy and Childbirth*. 2015;15:118-125.
 22. Rini SS, Trisna IGA. Faktor risiko kejadian berat bayi lahir rendah di wilayah kerja unit pelayanan terpadu kesmas Gianyar II [Internet]. 2013 [cited 2017 Sep 28]. Available from: <file:///C:/Users/Simplicia%20Maria/Downloads/13057-1-24193-1-10-20150427.pdf>
 23. Bayingana C, Muvunyi CM, Africa CWJ. Risk Factors of Preterm Delivery of Low Birth Weight (PLBW) in An African Population. *Journal of Clinical Medicine and Research*. 2010;2(7):114-118.
 24. Mumbare SS, Maindarkar G, Darade R, Yenge S, Tolani MK, Patole K. Maternal Risk Factors Associated with Low Birth Weight Neonates: A Matched-pair Case Control Study. *Indian Pediatrics*. 2011;49:25-28.
 25. Mahmoodi Z, Karimlou M, Sajjadi H, Dejman M, Vameghi M, Dolatian M, Mahmoodi A. Association of Maternal Working Condition with Low Birth Weight: The Social Determinants of Health Approach. *Annals of Med Health Sci Res*. 2015;5(6):385-391.
 26. Muthayya S. Maternal Nutrition & Low Birth Weight - What is Really Important? *Indian J Med Res*. 2009; 130(November):600-608.
 27. Banerjee B. Physical Hazards in Employment and Pregnancy Outcome. *Indian Journal of Community Medicine*. 2009;34(2):89-93.
 28. Elhissi JH. Mother Work and Pregnancy Outcome in the Gaza Strip. *Journal of Al Azhar University-Gaza (Natural Sciences)*. 2012;14:35-46.
 29. Niedhammer I, O'Mahony D, Daly S, Morrison Jj, Kelleher Cc. Occupational predictors of pregnancy outcomes in Irish working women in the Lifeways cohort. *BJOG*. 2009;116(7):943-952.