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ANEMIA AND NUTRITIONAL STATUS AS DOMINANT FACTOR OF THE EVENT LOW BIRTH WEIGHT IN INDONESIA: A SYSTEMATIC REVIEW

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Abstract

Background: Low birth weight is one cause of newborn death. Babies with low birth weight tend to have slower cognitive development and risk of death. Report data from the World Health Organization (WHO) in 2014, estimates that each year there are 20 million babies have low birth weight of all births in the world. Based on data from the Health Research Association from Health Department of Indonesia in 2013, showed the percentage of low birth weight in Indonesia according to the child's age (0-59 months) amounted to 10.2% in 2013.

Objective: Identify risk factors and dominant factors that influence the incidence of low birth weight in some areas in Indonesia with approach systematic review.

Method: This research used some database of public health such as Google Scholar, UGM journals, UI journals and UNAND journals in 2012-2015 with amounts 2084 journals. Data were filtered using keywords "Risk Factors" AND "Cause low birth weight" with amounts 56 study. The filtrate obtained 5 public health researches that meet the criteria.

Results: Risk factors associated with low birth weight, among other environment factors (exposure to cigarette smoke and residence), social demographics (age and socio-economic) and maternal factors (anemia, placental abnormal, nutritional status of mothers, examinations antenatal, preeclampsia, parity and complications in pregnancy). Anemia and nutritional status becomes the dominant factor affecting low birth weight.

Conclusions: The risk factors that affect low birth weight, most commonly found in the maternal factors. The dominant factors are big effect on low birth weight is anemia and nutritional status of the mother during pregnancy.

Keywords

Low Birth Weight, Anemia, Nutritional Status, The Dominant Factor

1. Introduction

Infant Mortality Rate (IMR) is one of the indicators measuring public health. According report data from World Health Organization (WHO) in 2014, every year nearly 45% of all children under age 5 years occur death, include newborn or neonatal. In the neonatal period, 75% of occur death early neonatal life that is on his first life week of life infants and 25%-24% occurred within 24 hours of first soon after baby is born. One causes of death of newborns is more low birth weight (LBW) (WHO, 2016)

Low birth weight (LBW) according WHO definition is a newborn baby who weighs less than 2500 gram. Various risk factors associated with LBW, among others parity, maternal weight, birth spacing, antenatal care, and pregnant double. Spacing pregnancies less than two years as a risk factor for mothers suffer anemia caused childbirth LBW (Dahlui, 2016) (Suryati, 2013) Babies with LBW tend to experience growth cognitive development, growth retardation, more at risk of infectious disease event at risk of death. This can increase the incidence of morbidity and infant mortality. Another complex impact due to LBW during adulthood are at risk of coronary heart disease, diabetes, metabolic disorders and immune system as well as physical endurance that led the economic burden of individuals and public (Pramono Setyo, 2009).

WHO report estimates that babies born each year worldwide there are 20 million babies have LBW and 72% incidence LBW occurred in developing countries, namely South Asia and Afrika (WHO, 2014), (UNICEF, 2004). Data base from Health Research Association from Health Department of Indonesia in 2013, show that the percentage of LBW in Indonesia according to child's age (0-59 months) decreased from 2010 and 2013. In 2010 the percentage of low birth weight decreased by 11,1% to 10,2% in 2013. The percentage by provinces, showed percentage varies, the highest percentage found in the province of Central Sulawesi, namely 16,7%, and the lowest percentage in North Sumatera by 7,2% (Health Department of Indonesia, 2013). Based on the description above, the purpose of this study with approach systematic review was to identify risk factors and dominant factor that effect of LBW in Indonesia.

2. Method

This study uses systematic review. Source of research data is derived from the literature obtained via internet from research public health on LBW from University of Indonesia's leading publication covering the faculty of public health, University of Indonesia, University of Airlangga, of University Gadjah Mada, University of Hasanuddin, University of Diponegoro and other colleges regarding LBW in the journals collected through an online database that in website jurnal.fkm.unand.ac.id, journal.jurnalkesmas.ui.ac.id, jurnal.ugm.ac.id, and google scholar.

Based research journals about LBW obtained with using the research keywords "Low Birth Weight" and acquired totaled 4338 journals or article. Then, data then narrowed by year 2012-2015 become 2084 journals. This is done to review the recency keep writing based on the latest research findings. Data then narrowed again based on inclusion criteria set by researcher namely literature discuss "Risk Factors" AND "LBW Causes". Result of excluded with 56 journals. Excluded during inclusion criteria using multivariate analysis and obtained 5. Journals during inclusion based on multivariate analysis to obtain a dominant factor of the factors that significantly affect LBW. The unit analysis of this research is a journal. Limitations in this study were not conducted further analysis. The purpose of this study with approach systematic review was to review risk factors and dominant factors cause of LBW in Indonesia.

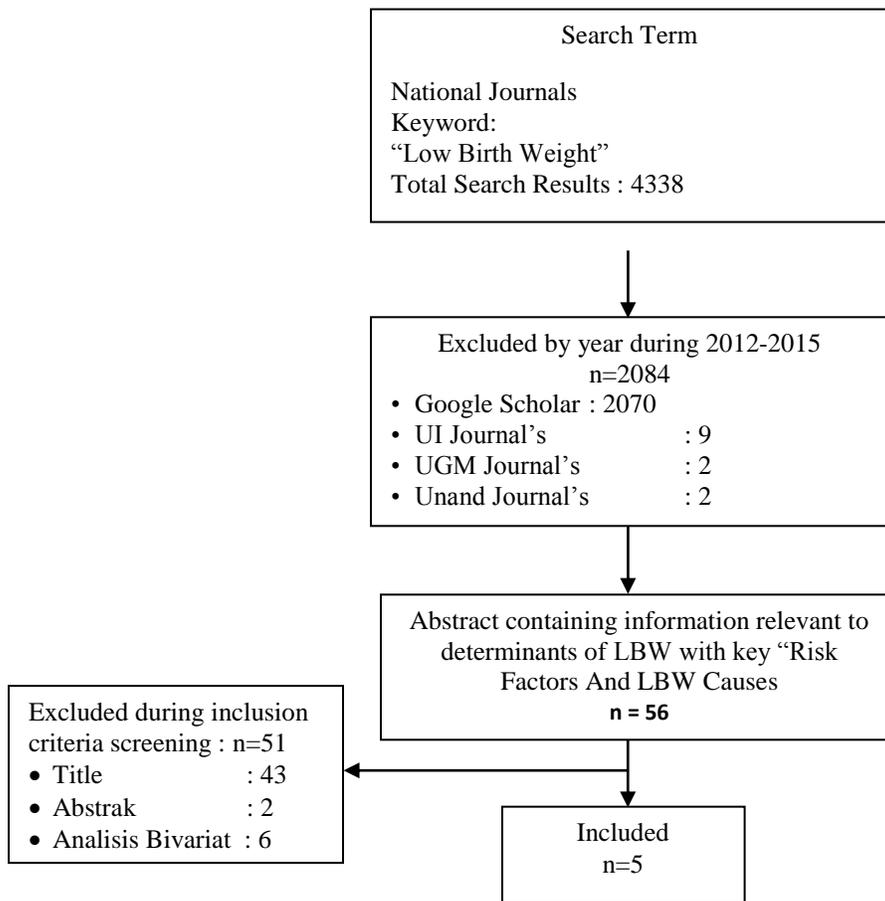


Figure 1: Flowchart that Illustrated the Systematic Review of Low Birth Weight

3. Result

Total research selected that have many as five study of the 4338 research that has been identified and selected in accordance with the inclusion criteria for analysis. Each study uses a different method to analyzed, among others cross sectional and case control obtained from national journals relevant to the theme of this systematic review. The number of samples studied diverse range of 25-7439 peoples.

Table 1: Search Results

Researcher	Sample	Variable	Study Design	Result
Mahayana, S.R; Chundrayetti and Yulistini, 2015 ⁹	72	Dependent: LBW Independent: maternal age; Parity; Birth Spacing; Type of pregnancy Anemia; Illness maternal; Teratogen (cigarette, alcohol, drugs); Obstetric history; Nutritional status of mothers/Chronic lack of energy; Placental abnormalities; Sex of fetus; Congenital abnormalities; Altitude of residence; Maternal education, and Socioeconomic status	<i>Cross sectional</i>	1 Anemia and placental abnormalities correlate significantly with LBW 2 Parity, anemia, bad obstetric history, placental, type of pregnancy meet the criteria multivariate analysis 3 Risk factor anemia and parity become the most dominant factor on LBW.
Ekayani, Karunia, P. N., 2014 ¹⁰	Case: 75 Control: 75	Dependent: LBW Independent: Age; Parity; Education; Socio economy status; Anemia; History of complications in pregnancy Nutritional status; Chronic lack of energy status; Antenatal care	<i>Case Control</i>	1 Anemia, weight gain, chronic lack of energy status, and antenatal care correlate significantly with LBW 2 The risk factors that contribute to LBW and multivariate analysis meet the criteria are anemia, weight gain during pregnancy and chronic lack of energy status. R2=32% which means that 32% of these three factors affect the incidence of LBW and 68% are influenced by other factors 3 Anemia became the most dominant factor the increase on LBW.
Sulistyorini, Dewie and Putri, Siswono, S., 2013 ¹¹	25	Dependent: LBW Independent: Parity, Age; Spacing pregnancies; Gestation; Anemia; Nutritional status of pregnant; Preeclamsia, and Gemeli	<i>Survey Analitic</i>	1 Nutritional status of pregnant; pre eclamsia correlate significantly with LBW 2 The risk factors that contribute directly to LBW include nutritional status, gemeli, and anemia. 3 The most dominant factor affecting LBW is nutritional status
Reza, Chaerul and Puspitasari, Nunik, 2013 ¹²	Case: 35 Control: 35	Dependent: LBW Independent: Age; Parity;	<i>Case Control</i>	1 Age, anthropometric maternal and and exposure to cigarette smoke during pregnancy correlate significantly with LBW 2 Anthropometric maternal becomes

		Gestation; Planning pregnancy; Anthropometric maternal; Exposure to cigarette smoke during pregnancy and Antenatal care		the dominant factor for the birth LBW with OR=3,678
Pramono, Setyo, M and Paramita Astridya, 2013 ¹³	7136	Dependent: LBW Independent: Education; Work; Age; Maternal smoker; Parity; Complications during pregnancy; Economy status; Residence; and Sex baby's	<i>Cross Sectional</i>	1 Age, parity, economic status, residence, and complications during pregnancy correlate significantly with LBW 2 Complications during pregnancy is factor that most impact on LBW

4. Discussion

Based on review of five studies on the determinants of LBW in Indonesia, will be described risk factors that significantly affect LBW and dominant risk factor LBW. The risk factors that lead to LBW among other socio-demographic factor, environment and maternal factor. Environment factors discussed several aspects, such as exposure to cigarette smoke and height of residence. Risk factors associated with LBW by maternal factors include anemia, placental abnormal, maternal nutritional status/ chronic lack of energy status, antenatal care, pre eclamsia, parity, and complications during pregnancy. While the socio demographics factors were age and economy status.

Exposure cigarette smoke as one of the environment factor have an influence on LBW. Chemicals contained in cigarette cause adverse effects on the mother's active and passive smokers. Passive smoker can cause a decrease in birth weight of about 25 gram. While active smokers influence showed non-significantly influence LBW (Mahayana, 2015) (Reza, 2013).

Other environment factor that significantly effect of LBW is residence. Low economic status and place of residence in the countryside have a higher risk of giving birth LBW compared with high economic status and living in urban areas. This resulted in difficult family needs nutritional, especially in maternal (Mahayana, 2015) (Ekayani, 2014) (Pramono, 2013). Maternal

age factor as socio demographic factor is closely related in determine birth weight infant. Maternal with age <21 years are more at risk of having a baby with LBW. Biologically, the function of immature reproductive organs can lead to supply blood flow to the cervix and uterus that can lead to reduced intake of nutrients to developing fetus is reduced. While maternal age >35 years, risk include high blood pressure, obstructed labor, bleeding and risk of giving birth infants <2500 g (Reza, 2013).

Antenatal care visit is very significantly effect on birth weight. Good antenatal care visit with quantity and quality of regular visit, lower risk of having a baby of LBW than bad antenatal care visit. The purpose of antenatal care is to identify development of the pregnancy and detection of abnormal that occur during pregnancy. Pregnancy test's undertaken include a physical examination an laboratory test. Maternal who regularly check in accordance with recommended pregnancy, obtain counseling related to pregnancy such as balanced diet that can detect the risk of LBW¹⁴.

Low birth weight with risk factor for parity occurs because the mother's reproductive system is already experiencing thinning due to frequent childbirth. The higher maternal parity, endometrial quality decreases. Repeated pregnancies will affect the circulation of nutrients from the mother to fetus where the amount of nutrients will be reduced compared with previous pregnancies. This condition is risk of experiencing barriers and development fetal (Assefa, 2012).

Based on a study of five studies, maternal factors become dominant factors that greatly affect LBW, that are anemia, nutritional status or anthropometric and complications during pregnancy. Two studies showed anemia in pregnant women giving birth affect LBW and preterm infants. Anemia can lead to decreased oxygen supply to placental that can disrupt fetal growth, especially mothers who have low hemoglobin levels in early pregnancy (Mahayana, 2015) (Ekayani, 2014). Anemia in the first trimester can be prevented by the consumption of iron. However, the risk of LBW with maternal anemia occurs in the third trimester. The average weight of babies the born to mothers in the third trimester anemia have lower birth weight than women not anemic. Even the risk of anemia in third trimester can cause premature birth. Anemia during pregnancy can be caused by lack of food intake, digestion and mal absorption disorders, iron deficiency, blood loss and complications of pregnancy and labor (Kumar, 2013).

Two of the five studies suggest that nutritional status is a dominant factor in determining the baby's weight at birth. Weight gain during pregnancy can be used to determine the nutrition status of pregnant women with used anthropometric measurement upper arm circumference mother¹⁶. Maternal nutrition status is measured through anthropometric good category if upper arm circumference >23,5 cm and bag of <23,5 cm, so that through these measures can be seen less risk maternal with chronic energy. As well as weight gain can lead to inadequate maternal fat reserves that is useful during lactation reduced (Sulistiyorini, 2013) (Reza, 2013).

Another dominant factor is a major influence of LBW is complication of pregnancy, bleeding, previa placenta, and gestational diabetes. Abnormal placental implantation, such as placenta previa influence in limited space to grow, so it will impact the surface area of the placenta. In these circumstances, the placental edge off accompanied by high mortality and morbidity. Factor mother's with pre-eclampsia is a condition in which high blood pressure during pregnancy even without history of hypertension. Hypertension pregnancies found on the second and third trimester that use requires a good handling. Clinical symptoms of pre-eclampsia, include edema, hypertension, urinary protein, convulsions to coma. Hypertension spasms of blood vessels lead to impaired placental function. This disorder will disrupt the supply of nutrients will utero placental circulation of oxygen, so that causing a disruption in fetus and babies born with LBW (Pramono, 2013).

5. Conclusion

Incidence of low birth weight in some areas in Indonesia still vary. The results of the review indicate factors that affect the risk of LBW, most commonly found in the maternal factor. Maternal factors that are anemia, weight gain, nutritional status, antenatal care, preeclampsia, parity and complication of pregnancy. The dominant factor is major influence on LBW are anemia and nutritional status of the mother during pregnancy. Through systematic review can be helpful to see some research on LBW so we get the new findings about the factors that are at risk of low birth weight

6. Recommendation

Based on this review the systematic necessary to evaluate maternal health through antenatal care. Good quality antenatal care can minimize the risk having a baby with low birth

weight mothers through counseling services and related nutrition during pregnancy. Anemia maternal can be checked with blood test on pregnant women.

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