Available online: http://journal.ipb.ac.id/index.php/jgizipangan ***J. Gizi Pangan, December 2023, 18(Supp.1):22-24***
Accredited based on DGHE, Republic of Indonesia No. 28/E/KPT/2019
ISSN 1978-1059 EISSN 2407-0920

A Review of Nutritional and Health Risk Factors for Low Birth Weight Infants in Indonesia

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ABSTRACT

This review aimed to identify the determinants of nutritional and health factors associated with high risk of Low Birth Weight (LBW) among infants in Indonesia. The review was conducted systematically based on all articles published between 2012–2022 in PubMed, ScienceDirect, and SAGE databases. In the end, four articles were used in this review. The results showed that potential risk factors associated with LBW are maternal nutritional factors such as Mid-Upper Arm Circumference (MUAC) (25%) and pre-pregnancy Body Mass Index (BMI) (50%), and maternal health factors that can be assessed during routine Antenatal Care (ANC). Therefore, identification of risk factors for LBW is important to minimize the incidence of LBW.

Keywords: low birth weight, maternal, pregnancy, risk factors

INTRODUCTION

Low Birth Weight (LBW) increases the likelihood of infant mortality in developing countries, including in Indonesia. Individuals with a history of LBW tend to have a greater incidence of non-communicable diseases later in adulthood. The Indonesian government has implemented various programs to promote maternal and child health. However, LBW remains a significant maternal and child health challenge, especially among underprivileged women of childbearing age. The prevalence of LBW in Indonesia was 6.2%. However, some Indonesian provinces, such as North Maluku, have a higher prevalence than the national level (MoH RI 2018). It is well known that poor maternal nutritional and health factors have a significant impact on the general well-being and health of their offspring. The review was conducted to identify all potential risk factors influencing on LBW among the population in Indonesia. The results of this review may be useful for other developing countries.

METHODS

The present scientific review study was systematically conducted using numerous scientific literature databases such as PubMed, ScienceDirect, SAGE and also hand searches of national journals published locally. The inclusion criteria were literature searched from 2012 to 2022 for studies conducted in the last ten years. The search terms and Boolean operators in English used in the search strategies were "risk factors or maternal risk factors" and "Low Birth Weight or LBW" and "Indonesia". The type of articles included were original article, conducted in the Indonesian region with cross-sectional study, observational study, or experimental study, full text literature and open access. Exclusion criteria were non-research study and systematic review. The search yielded 422 articles. This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement. In total, only 4 articles met the inclusion criteria.

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(Received 02-06-2023; Revised 28-07-2023; Accepted 06-08-2023; Published 30-12-2023)

All risk factors associated with LBW were grouped into nutritional and health factors.

RESULTS AND DISCUSSION

The nutritional status of pregnant women is crucial because it influences the fetal growth and birth weight. Maternal nutritional status determined by Mid-Upper Arm Circumference (MUAC) and Body Mass Index (BMI) before pregnancy (Yongky *et al.* 2009; Sebayang *et al.* 2012) can be used to assess nutritional status before pregnancy. Measurements of MUAC less than 23.5 cm indicate that the pregnant woman suffers from chronic energy deficiency and is at risk of having an LBW infant (Sebayang *et al.* 2012). Pre-pregnancy BMI is also crucial as it affects birth weight (Yongky *et al.* 2009) (Table 1). It is important to monitor maternal weight gain. Because of the various adverse effects of inadequate or excessive weight gain, the Institute of Medicine (IOM) proposed Gestational Weight Gain (GWG) based on pre-pregnancy BMI. Women should attempt to gain an appropriate amount of weight during pregnancy as this is critical for fetal growth.

Maternal health factors is another important factor on the risk of LBW infants. incidences, but also maternal health factors be one of the factors that determine the incidence of LBW infants. Women with a history of previous LBW infants and health comorbidities such as previous and current gestational diabetes, hypertension, obesity and asthma have been significantly associated with a higher risk of LBW infants (Utami & Susilaningrum 2022). Antenatal Care (ANC) and use of iron-folic acid supplementation are also associated with the risk

Table 1. The general characteristics of the selected studies

Author (Year)	Location	Population	Type of study	Statistical method	Result
Oktriyanto *et al.* (2022)	All provinces in Indonesia (34)	Data from IDHS as much as 14.372 women aged 15–49 years which gave birth in the last 5 years prior to the survey	Cross-sectional study design	Chi-Square, Binary logistic regression	Nutritional factors affecting LBW such as ANC visits less than 4 times, no consumption of iron tablets during pregnancy. Other factors such as type of birth of twins, the order birth of the 4th child or more, experiencing pregnancy complications, and households with low wealth quintiles also affected the LBW incidence.
Sebayang *et al.* (2012)	Lombok	Data from The Supplementation with Multiple Micronutrient Intervention Trial (SUMMIT); 14.040 respondents	A double blind cluster randomized controlled trial	Hierarchical logistic regression	One of the determinant maternal factors of LBW was MUAC. The other factors such as education, height, residence, wealth, and pregnancy interval also affected the LBW incidence.
Utami and Susilaningrum (2022)	Surabaya	498 mothers from 2019, recruited using simple random sampling	Cross-sectional	Logistic regression	Maternal health history (includes previous LBW infants and comorbidities) contributed to the incidence of LBW infants.
Yongky *et al.* (2009)	East Jakarta and Bekasi	638 pregnant women	Cross-sectional	Logistic regression	Pre-pregnancy BMI affected the LBW incidence. The most significantly factor affecting LBW incidence were gestational weight gain and marital age.

ANC: Antenatal Care; IDHS: Indonesia Demographic and Health Survey; LBW: Low Birth Weight; MUAC: Mid-Upper Arm Circumference

of LBW infants. Mothers who attended ANC services less than four times were 2.6 times more likely to have LBW infants compared to those who attended at least four times ANC services (Thapa *et al*. 2022). Antenatal care is important because it is during this care that mothers are likely to receive supplementary care, such as iron supplementation, and health services, which are key to improving birth outcomes.

CONCLUSION

Maternal nutritional status (based on MUAC, pre-pregnancy BMI) and maternal health status (based on ANC visits, iron supplementation, history of LBW infants, and comorbidities) are risk factors associated with LBW infants in Indonesia. Therefore, it is important to develop a screening tool to assess the risk of pregnant women having LBW infants from the early stages of pregnancy.

ACKNOWLEDGEMENT

The authors would like to thank the Directorate of the Higher Education, Ministry of Research, Technology, and Higher Education of the Republic of Indonesia for granting scholarship for Master-to-Doctorate Program for Superior Scholars (No. 077/SP2H/LT/DRPM/2021).

DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflicting interests to declare.

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