

Interventions of Low-Birth Weight Babies to Prevent Stunting: A Literature Study

Dary^{1*}

¹ Faculty of Medicine and Health Sciences, Universitas Kristen Satya Wacana, Indonesia

INTRODUCTION

Stunting is a condition of failure to thrive in children under five because of chronic malnutrition so that the child's height is too short for his age (Sudikno et al., 2019). Stunting is still a major concern in the world, especially in developing countries. Indonesia is one of the countries with a high prevalence of stunting compared to other developing countries. World Health Organization (WHO) noted that Indonesia occupies the third position in Southeast Asia with a stunting percentage of 36.4% (World Health Organization, 2018). Health Survey in Indonesia showed that the prevalence of stunting in 2010, 2013, and 2018 respectively was 34.6%, 37.2%, and 30.8% (Kemenkes RI, 2013, 2018; Sudikno et al., 2019). A study of the nutritional state of children under five in Indonesia stated that in 2019, the national stunting prevalence was 27.7%, and decreased to 26.9% and 24.4% respectively in 2020 and 2021 (Kemenkes RI, 2021; Sudikno et al., 2019). Even though the prevalence of stunting in Indonesia is decreasing, the stunting prevalence is still considered high above the standard set by WHO 20% (World Health Organization, 2018). Aryastami et al. in their study showed that LBW is a primary cause of stunting in children under two in Indonesia (Aryastami et al., 2017). A similar study conducted by Lukman et al. stated that babies born with LBW had a 5.96 times greater risk of experiencing stunting compared to babies born with normal weight (Lukman et al., 2021).

Stunting can be caused by various factors, one of which is low birth weight (LBW). LBW is a condition where a baby is born with a birth weight under 2500 grams, regardless of gestational age. Based on data by UNICEF and WHO, the percentage of LBW was 15% in 2012, decreased to 14.6% in 2015, and it was expected that by 2025 the percentage of LBW could decrease to 10.5% (UNICEF & WHO, 2019). In Indonesia, it was recorded that of the 81.8% of babies whose weight was reported in 2021, 2.5% of them were babies with LBW. The data showed that not all newborns whose weight was reported, so there was a possibility the percentage of newborns with LBW could be higher than what was reported (Kemenkes RI, 2022).

Babies with LBW are prone to morbidity, disability, long-term health diseases in adulthood, and mortality (De Onis et al., 2019). Babies with LBW have a high risk of causing death in the first month of life, and if the baby can survive, it will be at risk of developing growth and developmental disorders such as cognitive development disorders and stunting. In 2021, Low birth weight was reported as the main cause of newborn mortality in Indonesia with a percentage of 34.5% (Kemenkes RI, 2022). Hence, children with a history of LBW have a high risk of developing cardiometabolic diseases in their adulthood such as obesity, diabetes mellitus, dan heart diseases (Kemenkes RI, 2022; UNICEF & WHO, 2019).

^{1*} Corresponding author email: dary@gmail.com

The problem of LBW has been a concern in the world for a long time. In 2012, The 65th World Health Assembly (WHA) established six Global Nutrition Targets for 2025, the third target was decreasing LBW incidence by 30%. This means that in the period 2012-2025, it was expected that there will be a decrease in LBW incidence of 3% a year. Reduction in the number of LBW incidence incidences still far from the target. UNICEF and WHO stated that the progress in reducing the incidence of LBW between 2000-2015 tended to be stagnant. If this situation is not addressed immediately, it can further increase the incidence of stunting, considering that

LBW is the main factor causing stunting in Indonesia. Efforts to achieve the target of reducing the incidence of LBW need to be continued to improve the health status of children and at the same time prevent an increase in other nutritional problems such as stunting and wasting. The purpose of writing this literature study is to identify various interventions related to LBW conditions and the success of these interventions, as an effort to prevent stunting.

RESULT AND DISCUSSIONS

The results of the literature study were written in Table 1.

Table 1. Results of Literature Study

No	Author and Title	Intervention	Method	Result	Conclusion
1	Author: a. Sugiarti b. Yeni Rustina c. Dedi Efendi Title: <i>Increasing The Knowledge and Confidence of Mothers in Caring for Low Birth Weight Babies through Education from the Maternal and Child Health Handbook</i>	Education uses the maternal and child health book learning media and audiovisual mobile application media to increase the knowledge and confidence of mothers in caring for babies with LBW	Quasi-experiment pre-post with the control group on 69 mothers who have babies with LBW	Maternal and child health book-based education had a significant effect on increasing mothers' knowledge and confidence scores, namely before and after education, both in the maternal and child health book education group ($p < 0.001$) and in the mobile application education group ($p < 0.001$). Education with the addition of mobile audiovisual media applications also had a significantly better post-educational knowledge score than the other two groups ($p < 0.001$).	Mothers' knowledge regarding optimal care for LBW babies can be increased through educational practices, discussions, and the use of technology as a learning medium to support the accessibility of maternal and child health books.
2	Author: a. Dhini Anggraini Dhilon b. Eldarita Fitri	Kangaroo method of care for babies with LBW	Quasi-experiment with non-randomized	The mean weight gain for LBW babies in the experimental group increased by 448 grams and in the control group by 198.9 grams. The results of the independent T-test showed	Kangaroo method care has a significant effect on increasing

	Title: The effect of kangaroo method treatment on weight gain in low birth weight babies (LBW) in Kampat District Hospital in 2018		control group pretest-posttest design.	that there was an effect of the kangaroo method on infant weight gain with a P value of 0.008 ($\alpha < 0.05$)	body weight in babies with LBW.
3	Author: a. Michael Habtu b. Alemayehu Gebremariam Agena c. Maryse Umugwaneza d. Monica Mochama e. Cyprien Munyanshongore Title: <i>Effectiveness of Integrated Maternal Nutrition Intervention Package on Birth Weight in Rwanda</i>	<i>Integrated maternal nutritional intervention package (nutrition-specific and nutrition-sensitive)</i> 1. <i>Nutrition education and counseling (nutrition-specific)</i> 2. <i>Nutrition-sensitive</i> a. <i>Agricultural productivity</i> b. <i>Promotion of financial literacy/economic strengthening</i> c. <i>Water, Sanitation, and Hygiene interventions</i>	Post-program quasi-experimental study of 551 mothers-infant who received the intervention and 545 mothers-infant control group	The integrated maternal nutrition intervention package program reduced the incidence of LBW by 66.99%; and increased the average birth weight by 219 grams.	<i>The Integrated maternal nutritional intervention package can significantly reduce the incidence of LBW and increase the average birth weight.</i>
4	Author: a. Sohana Shafique b. Daniel W. Sellen c. Wendy	Providing complementary food fortified with vitamins and minerals to	Intervention research	Providing education on nutrition, health, and hygiene to mothers combined with the use of water-based hand sanitizer does not show	Providing complementary food fortified with vitamins and

	<p>Lou d. Chowdhury S Jalal</p> <p>e. Saira P Jolly</p> <p>f. Stanley H. Zlotkin</p> <p>Title: <i>Mineral-and Vitamin-Enhanced Micronutrient Powder Reduces Stunting in Full-Term Low-Birth-Weight Infants Receiving Nutrition, Health, and Hygiene Education: A 2 x 2 Factorial, Cluster-Randomized Trial in Bangladesh</i></p>	<p>increase nutritional intake and use of water-based hand sanitizers to prevent infection, as an effort to prevent stunting in babies with low birth weight.</p>	<p>indicators of reducing the incidence of infection and stunting in infants.</p> <p>Providing education on nutrition, health, and hygiene to mothers and complementary food fortified with vitamins and minerals to infants aged 6-12 months (with or without water-based hand sanitizers) significantly shows a minimal risk of experiencing stunting.</p>	<p>minerals significantly reduces the risk of stunting in babies with LBW.</p>	
5	<p>Author</p> <p>a. Lilyk Eka Suranny</p> <p>b. Fitriana Christi Maharani</p> <p>Title: <i>Mapping of Community Empowerment in Prevention Stunting in Kabupaten Wonogiri through "Sego Sak Ceting"</i></p>	<p><i>Community Empowerment: "Sego Sak Ceting" (Sesarengan Warga Beraksi Cegah Stunting)</i></p> <ol style="list-style-type: none"> 1. Increasing the availability of household food sources 2. Increase mother's knowledge about good nutrition during pregnancy and birth 	<p>Qualitative research through observations, interviews, and literature studies</p>	<p>The <i>Sego Sak Ceting</i> program is carried out through the following stages:</p> <ol style="list-style-type: none"> 1. Program Outreach <ol style="list-style-type: none"> a. Information about the causes, how to prevent and manage stunting b. Cultivating catfish to meet the protein needs of pregnant women and children c. Optimization of yard for growing fruits and vegetables d. Introduction and assistance of balanced nutrition menus for pregnant women and children in the first 1000 days of life e. Socialization of the local health post programs and classes for pregnant women and 	<p>Program <i>Sego Sak Ceting</i> berhasil menurunkan persentase kejadian BBLR dari 9,5% menjadi 5,42%</p>

classes for mothers
with toddlers (parenting
class)

2. Implementation of activities
3. Monitoring and evaluation of activity implementation

The program was a success as indicated by:

1. Reducing the percentage of pregnant women with caloric energy deficiency from 9.5% to 5.42%
 2. Reducing the percentage of LBW from 5.25% to 3%
 3. The participation of pregnant women in classes for pregnant women increased from 82.48% to 85.10%
 4. Increasing the percentage of attendance at the local health post for mothers with children under five from 82.48% to 85.10%
-

Stunting is a serious nutritional problem that is still a major concern in the world, including in Indonesia. Stunting can be observed from short stature in children under five, which occurs as a result of malnutrition over a long period. Around 20% of stunting in Indonesia is caused by LBW, and Indonesia occupies the fifth highest position in the world for the incidence of LBW (Kemenkes RI, 2018; World Health Organization, 2018). Interventions regarding LBW need to be implemented to prevent and reduce the incidence of stunting. Based on the literature study, the researcher identified and discussed various interventions related to LBW to prevent stunting.

Interventions related to LBW are categorized into two types according to the subject of the intervention. First, interventions for the mother, and second, interventions for the baby with LBW. Interventions for mothers include health education and counseling, as well as

providing integrated nutrition intervention packages (Nutrition-Specific and Nutrition-Sensitive). Interventions for babies with LBW include Kangaroo Mother Care and providing complementary food fortified with vitamins and minerals in powder form for infants aged 6-12 months. These interventions were carried out to prevent stunting in the future.

Education is a common method of health intervention in society. Education is an approach to health promotion, that aims to change perception and increase knowledge as well as awareness toward better behavior. A baby born with LBW tends to experience various health problems and needs special care either in a hospital or at home. Oftentimes, the mother has no confidence in caring baby with LBW due to a lack of knowledge, experience, and skill that are needed to care for a baby with LBW (Premji et al., 2017). A study conducted by Sugiarti, Rustina, and Efendi stated that health education related to optimal care of a baby with LBW has a significant impact on

increasing the knowledge, skill, and confidence of mothers of a baby with LBW (Sugiarti et al., 2020). A similar study showed that health education and counseling programs using various learning media could increase mother's knowledge, skill, and confidence in caring for a baby with LBW (Bhoknal, 2018; Çınar & Öztürk, 2014; Prabhakaran, 2015). Having good knowledge and skill, as well as positive confidence can help the mother provide optimal care to a baby with LBW, so that it improves the baby's health status, and prevents stunting, and other nutritional problems and diseases in the future. In addition to the need for information on caring for babies with LBW, mothers also need education regarding nutritional intake for both mothers and babies. Nutritional education for mothers is one of the activities in an integrated nutrition intervention program to prevent stunting.

The integrated nutrition intervention package program includes nutrition-specific by providing nutritional education and counseling, and nutrition-sensitive which consists of three components namely increasing household food security through increasing productivity of agricultural products, strengthening the economy, and increasing access to clean water, hygiene, and sanitation. Habtu et al. in their research in Rwanda, provided nutrition education and counseling to pregnant women by involving health cadres and nutritionists. Health cadres are first given training, then health cadres can provide nutrition education directly to pregnant women in the community. Nutritional counseling is provided by nutritionists directly to pregnant women when checking their pregnancies. In addition, nutritionists also train pregnant women through cooking demonstrations in preparing food with a balanced nutritional menu. The application of nutrition-sensitive is carried out by

increasing the productivity of agricultural products for household food security, providing training to mothers on household financial management skills, and increasing access to clean water, hygiene, and sanitation through a community-based environmental health improvement program aimed at increasing healthy behavior in society. This program was conducted on 551 mothers-infant who received integrated nutrition interventions (intervention group) and 545 mothers-infants who only received education and counseling (control group). The integrated nutrition intervention program succeeded in reducing the incidence of LBW by 66.99%; and increased the average birth weight by 219 grams (Habtu et al., 2022).

A similar program was done in Wonogiri Indonesia through the "*Sego Sak Ceting*" program, it stands for "*Sesarengan Warga Beraksi Cegah Stunting*" which means acts to prevent stunting together. This program includes providing education about the causes of stunting, prevention of stunting, and treatment, cultivating catfish to meet the protein needs of pregnant women and children, optimizing the yard for growing vegetables and fruits, providing introduction and assistance to a balanced nutrition menu for pregnant women and children, especially at first 1000 days of life, and the local health post program socialization, classes for pregnant women and parenting classes for mothers and toddlers. The program was accomplished, indicated by the decrease in the percentage of pregnant women with deficit caloric energy from 9.5% to 5.42%, and the percentage of babies with LBW decreased from 5.25% to 3% in Wonogiri Indonesia.

Babies with LBW require special care to improve their health status, one of which is the Kangaroo method. Kangaroo Mother Care (KMC) is a method of neonatal care in which the mother provides direct skin-

to-skin contact by holding the baby vertically against the mother's chest (Liyanage, 2005; WHO, 2003). The KMC method is recognized as effective in giving warmth to babies, making babies breastfeed more often, increasing baby weight, protecting babies against infection, providing stimulation, security, and affection, and reducing physiological stress for mothers and babies (Liyanage, 2005). The results of Dhilon and Fitri's research on kangaroo method care for babies with LBW showed that there was an effect of kangaroo method care on baby's weight gain with a P value of 0.008 ($\alpha < 0.05$). The study results also showed that the average weight gain in LBW babies who received kangaroo method treatment increased by 448 grams compared to the control group (Dhilon & Fitri, 2019). Babies with LBW who receive kangaroo method care show better growth, as evidenced by a significant increase in body weight, body length, and head circumference compared to the control group (Swarnkar & Vagha, 2016). The Kangaroo method has been proven to be effective in supporting better growth and development in babies with LBW. Good growth and development in babies with LBW are expected to reduce the risk of stunting in the future.

In the care of babies with LBW, one of the important things to note is the baby's nutritional intake. LBW conditions coupled with inadequate nutritional intake, will certainly worsen the baby's health status. Exclusive breastfeeding is recommended in the first 6 months of a baby's life to meet their nutritional needs. After 6 months of age, breastfeeding can be continued until the child is 2 years old along with complementary foods (MPASI). The quality of complementary foods needs to be considered, poor quality complementary foods can cause babies to experience vitamin and mineral deficiencies which are important to

support their growth and development. The results of the research by Shafique et al. stated that providing additional food fortified with vitamins and minerals significantly reduced the risk of stunting in LBW babies (Shafique et al., 2016).

CONCLUSION

Low Birth Weight conditions contribute to the high incidence of stunting in Indonesia. Efforts to handle LBW need to be done early to prevent and reduce the incidence of stunting. Based on the results of the literature study, efforts that can be made to treat LBW include increasing mother's knowledge about balanced nutritional intake, increasing household food security, strengthening the family economy, improving environmental hygiene and sanitation, providing additional food fortified with vitamins and minerals and applying kangaroo methods in caring for babies with LBW. Efforts to handle LBW babies need to be carried out early to prevent stunting in the future, and it is a joint responsibility of the cross-sectoral community. It is hoped that these efforts can be implemented and/or modified to reduce the incidence of stunting in all regions of Indonesia.

REFERENCES

- Aryastami, N. K., Shankar, A., Kusumawardani, N., Besral, B., Jahari, A. B., & Achadi, E. (2017). Low birth weight was the most dominant predictor associated with stunting among children aged 12-23 months in Indonesia. *BioMed Central Nutrition*, 3(16). <https://doi.org/10.1186/s40795-017-0130-x>
- Bhoknal, K. (2018). Effectiveness of health education package on knowledge and practice regarding care of low birth weight babies (LBW) among post-natal mothers. *International Journal of Health Sciences and Research*, 8(3), 167-172.

- Çinar, İ., & Öztürk, A. (2014). The effect of planned baby care education given to primiparous mothers on maternal attachment and self-confidence levels. *Health Care Women Int.*, *35*(3), 320–333. <https://doi.org/doi:10.1080/07399332.2013.842240>
- De Onis, M., Borghi, E., Arimond, M., Webb, P., Croft, T., Saha, K., & Flores-Ayala, R. (2019). Prevalence thresholds for wasting, overweight, and stunting in children under 5 years. *Public Health Nutrition*, *22*(1), 175–179. <https://doi.org/10.1017/S1368980018002434>
- Dhilon, D. A., & Fitri, E. (2019). Pengaruh perawatan metode kanguru terhadap kenaikan berat badan pada bayi berat badan lahir rendah (BBLR) di RS Sekabupaten Kampar tahun 2018. *Jurnal Doppler Universitas Pahlawan Tuanku Tambusai*, *3*(1).
- Habtu, M., Agena, A. G., Umugwaneza, M., Mochama, M., & Munyanshongore, C. (2022). Effectiveness of integrated maternal nutrition intervention package on birth weight in Rwanda. *Frontiers in Nutrition*, *9*(874714). <https://doi.org/10.3389/fnut.2022.874714>
- Kemenkes RI. (2013). *Riset kesehatan dasar 2013*. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI.
- Kemenkes RI. (2018). *Laporan nasional riskesdas 2018*. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI.
- Kemenkes RI. (2021). *Buku saku hasil studi status gizi Indonesia (SSGI) tingkat nasional, provinsi, dan kabupaten/kota tahun 2021*. Kementerian Kesehatan RI.
- Kemenkes RI. (2022). *Profil kesehatan Indonesia tahun 2021*. Kementerian Kesehatan Republik Indonesia.
- Liyanage, G. (2005). Kangaroo mother care. *Sri Lanka Journal of Child Health*, *34*, 13–15. <https://doi.org/10.4038/sljch.v34i1.564>
- Lukman, T. N. E., Anwar, F., Riyadi, H., Harjomidjojo, H., & Martianto, D. (2021). Birth weight and length associated with stunting among children under five in Indonesia. *Jurnal Gizi Pangan*, *16*(1).
- Prabhakaran, H. (2015). Enhancing maternal knowledge in improving the life of low birth weight babies. *IOSR Journal of Nursing and Health Science*, *4*(4), 71–77.
- Premji, S. S., Pana, G., Currie, G., Dosani, A., Reilly, S., Marilyn, Y., Williamson, T., & Lodha, A. K. (2017). Mother's level of confidence in caring for her late preterm infant: A mixed methods study. *Journal of Clinical Nursing*, *25*(5–6), 1120–1133. <https://doi.org/10.1111/jocn.14190>
- Shafique, S., Sellen, D. W., Lou, W., Jalal, C. S., Jolly, S. P., & Zlotkin, S. H. (2016). Mineral- and vitamin-enhanced micronutrient powder reduce stunting in full-term low-birth-weight infants receiving nutrition, health, and hygiene education: A 2 x 2 factorial, cluster-randomized trial in Bangladesh. *American Journal of Clinical Nutrition*, *103*(5), 1357–1369. <https://doi.org/10.3945/ajcn.115.11770>
- Sudikno, Irawan, I. R., Setyawati, B., Sari, Y. D., Wiryawan, Y., Puspitasari, D. S., Widodo, Y., Ahmadi, F., Rachmawati, R., Amaliah, N., Arfines, P. P., Rosha, B. C., Pambudi, J., Aditianti, Julianti, E. D., & Safitri, A. (2019). *Studi status gizi balita di Indonesia tahun 2019*. Pusat Litbang Upaya Kesehatan Masyarakat, Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan RI.
- Sugiarti, Rustina, Y., & Efendi, D. (2020). Increasing the knowledge and confidence of mothers in caring for low birth weight babies through education from the maternal and child health handbook. *Jurnal Keperawatan Soedirman*, *15*(2), 11–13.
- Swarnkar, K., & Vagha, J. (2016). Effect of kangaroo mother care on growth and morbidity pattern in low birth weight infants. *Journal of Krishna Institute of Medical Sciences University*, *5*(1), 91–99.

UNICEF, & WHO. (2019). *UNICEF-WHO low birthweight estimates: Levels and trends 2000-2015*. World Health Organization.

WHO. (2003). *Kangaroo mother care A practical guide*. World Health Organization.

WHO. (2014). *Global nutrition targets 2025: Low Birth weight policy brief (WHO/NMH/NHD/14.5* (hlm. 8). World Health Organization.

World Health Organization. (2018). *World health statistics 2018: Monitoring health for the SDGs, sustainable development goals*. World Health Organization.