



CORRELATION BETWEEN LBW HISTORY AND STUNTING INCIDENCE: A LITERATURE REVIEW

Sherina Ramadhan¹ , Rize Budi Amalia¹ , Lestari Sudaryanti¹ 

¹ Midwifery Study Program, Faculty of Medicine, Airlangga University
Surabaya, Indonesia

Correspondence address:

Jalan Major General Prof. Dr. Moestopo No. 47 Surabaya, Indonesia

Email : sherinarmdhn.sr@gmail.com

Abstract

Background: Indonesia is facing a significant nutrition problem characterized by a high prevalence of undernutrition cases. Malnutrition is a consequence of poor nutritional status. Stunting is one form of malnutrition associated with a history of inadequate nutrient intake, making it a chronic nutritional problem. One potential factor affecting child growth is a history of low birth weight (LBW). The study aims to analyze the correlation between a history of LBW (Low Birth Weight) and the occurrence of stunting. **Method:** This research used a literature review study design, using secondary data sourced from electronic databases, consisting of 111 Pubmed articles, 518 Google Scholar articles, and 138 Science Direct articles. Article searches were conducted using keywords related to low birth weight for gestational age, stunting, and children, resulting in 15 relevant articles. The searches using these keywords are limited (the last 10 years) and then screened according to inclusion and exclusion criteria. **Result:** Twelve of fifteen pieces of literature reinforce each other by finding low birth weight has a correlation with the occurrence of stunting. While some studies have confirmed a significant correlation between LBW and stunting, other studies have not found any such link. This suggests that the relationship between LBW and stunting is intricate, and there may be other factors that contribute to the occurrence of stunting. **Conclusion:** A history of LBW (Low Birth Weight) is a contributing factor in the occurrence of stunting in children.

Keyword : Low Birth Weight, Stunting, Children



INTRODUCTION

Chronic stunting is a condition in which a child's growth is inhibited, causing them to be shorter than expected for their age. Unfortunately, this problem is prevalent among toddlers around the world, with as many as 22% or around 149.2 million affected in 2020 (World Health Organization, 2021). This indicates that stunting remains a significant concern in global health efforts.

Stunting is a significant issue in Indonesia, with data from the Riset Kesehatan Dasar (2018) showing that about 7 million toddlers, or approximately 30.8%, were stunted. The Indonesian government has set a target of 14% for 2024, but the current figure is far above that (Yuana et al., 2021). From Global Nutrition Report 2016, Indonesia ranks 108th out of 132 countries worldwide in stunting prevalence and is second rank after Cambodia in Southeast Asia (Rocha et al., 2016). Moreover, Indonesia is one of 17 countries grappling with both under and overnutrition (IFPRI, 2014).

Childhood stunting can have severe and lasting effects on health and development. It can impede physical growth, cognitive development, and increase the risk of health issues in adulthood (Kementerian Kesehatan RI, 2018). One of the contributing factors to stunting is low birth weight (LBW), which occurs when a newborn weighs less than 2,500 grams. Babies born with LBW are more likely to experience stunting compared to those born at a normal weight (Ode et al., 2022). In fact, toddlers who were born with LBW are 5.9 times more likely to suffer from stunting than those born at a normal weight (Lukman et al., 2021).

The meta-analysis conducted by Upadhyay et al. (2019) showed that LBW children had cognitive scores 5 points lower and motor scores 4 points lower compared to children with normal birth weight. Individuals born with low birth weight have a lower risk of cognitive function, thus having higher academic performance, mental disorders, and developmental delays compared to long-term healthy people. This condition is associated with neurodevelopmental deficits, especially in the cerebral white matter, decreased total brain volume, changes in cortical volume and structure, decreased cell number, and deficits in myelination. Brain connectivity is also impaired as evidenced by a deficit in nerve migration,



reduced dendritic processes, and less efficient neural networks (Upadhyay et al., 2019).

There is a much higher developmental delay at the age of 2-3 years among babies born prematurely and/or LBW. Exclusive breastfeeding, timely introduction and adequacy of complementary foods, and access to effective treatment of wasting are necessary for all children, but with special emphasis on infants born preterm and/or LBW to reduce developmental delays that may reduce the prevalence of severe wasting by 61.4%, and can also reduce mortality related to malnutrition (Ahishakiye et al., 2019).

Researchers are conducting a literature review to investigate the connection between low birth weight (LBW) and stunting incidence. This study thoroughly searches literature sources, such as scientific journals, articles, and published research reports. The researchers have selected studies that meet certain inclusion and exclusion criteria and have extracted useful data from each one.

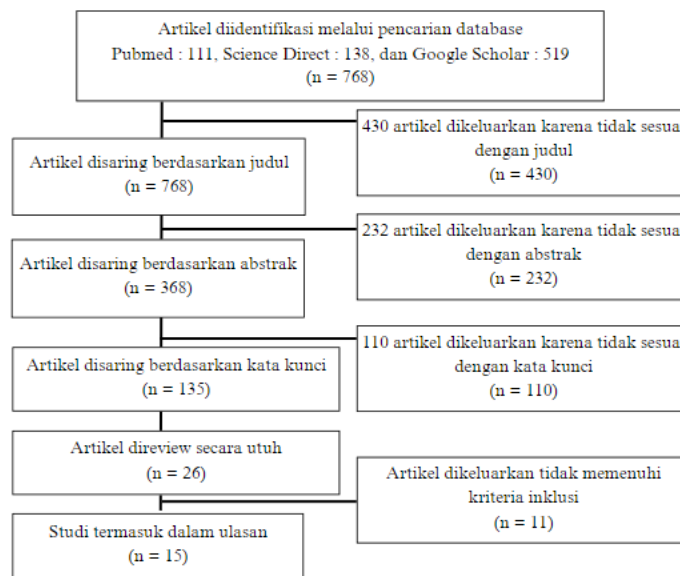
METHODS

This research employs a literature review design, using secondary data from electronic databases such as Pubmed, Google Scholar, and Science Direct. The search was conducted using specific keywords related to LBW, stunting, and children.

This research follows the PRISMA statement, which details the purpose of the review, the author's approach, and the results obtained (Page et al., 2021). Specifically, this study used the PRISMA 2020 statement. To conduct a literature search, specific inclusion and exclusion criteria were established. The inclusion criteria required studies with observational or experimental designs that contained information on LBW (birth weight less than 2500 grams or equivalent) and stunting (height below age and sex standards) in children aged 0-5 years who met the LBW criteria. The studies had to be published within the last 15 years. The exclusion criteria included articles in systematic reviews, literature reviews, and meta-analyses.

RESULTS AND DISCUSSION

We conducted a literature search across multiple sources during the data selection and analysis process. We found a total of 111 articles from Pubmed, 138 articles from Science Direct, and 519 articles from Google Scholar. Following this, we screened the articles by reviewing their title, abstract, keywords, and content.



Picture1. PRISMA Diagram (Preferred Reporting Item for Systematic Review and Meta Analysis)

Following the screening process, 15 articles were deemed relevant to this research. The next step involves interpreting and drawing conclusions from the selected articles. Specifically, researchers examined the relationship between LBW (low birth weight) status and the incidence of stunting in Indonesia using the 15 chosen articles. Table 1 provides a detailed description of the characteristics of these articles.

Table1. Study Characteristics

Researcher	Article Title	Research result
Lidia Fitri (2017)	The Relationship Between Lbw And Exclusive Breastfeeding With Stunting Incidence At The Fifty Public Health Public Of Pekanbaru	There is a significant relationship between low birth weight (LBW) and the incidence of stunting where the p value is 0.000
Etin Mei (2017)	Relationship Blbw History With Stunting Incidence In Children Aged 7-12 Months In	There is a relationship between a history of LBW and the incidence of stunting in



	Selomartani Village, The Working Area Of Kalasan Puskesmas	children aged 7-12 months with a strong relationship
Fatimah et al (2020)	The Relationship Between Low Birth Weight (Lbw) With Stunting Incidence In Toddlers Aged 2-5 Years In Umbulrejo Village, Ponjong, Gunung Kidul	There is a significant relationship between LBW and the incidence of stunting in toddlers aged 2-5 years in Umbulrejo Village.
Dewi et al (2020)	Factors related to the incidence of stunting at the Tamalate health center in Makassar city	There is no relationship between LBW ($p = 0.172$) and the incidence of stunting in the Working Area of the Tamalate Public Health Center, Makassar City
Afif D Alba, et al (2021)	Relationship Between Lbw History And Stunting Incidence In Toddlers In The Work Area Of Sekupang Community Health Center, Batam City, 2019	The results of the research conducted by the Chi Square test for history of LBW and Stunting events obtained p value = 0.000
Gabrielisa, et al (2017)	The Relationship Between Child Born Weight And Stunting Incidence In Batita Children In The Working Area Of Sonder Health Center, Minahasa District	The statistical test results between LBW and stunting showed a value of $p = 0.411$ ($p > 0.05$). There is no relationship between birth weight and stunting in toddlers in the working area of the Sonder Health Center, Minahasa Regency
Erna Eka Wijayanti (2019)	Relationship Between Low Birth Weight, Exclusive Breastfeeding and the incidence of stunting in toddlers aged 2-5 years	By using the chi square test, LBW was obtained with the incidence of stunting $p = 0.000$ less than 0.05 and the relationship between breastfeeding and the incidence of exclusive breastfeeding $p = 0.000$ less than 0.05. This shows that H_1 is accepted, which means that there is a significant relationship between LBW, exclusive breastfeeding and the incidence of stunting in children aged 2-5 years in the District.
Ade Ira Z (2019)	The Effect Of Lbw Lbw On Stunting Incidence In Children	The statistical by using the chi-square test and calculated

	Aged 12-60 Months In The Working Area Of Tanjung Langkat Puskesmas, 2017	using SPSS version 21 with significance level α (0.05), the LBW is obtained with a stunting event $p=0,000$ less than 0.05 and the relationship between ASI and the exclusive breastfeeding event $p=0,000$ is smaller than 0.05. This shows that H1 is accepted which means there is a significant relationship between LBW, Exclusive breastfeeding, and the incidence of stunting in children aged 2-5 years in Jadi Subdistrict, Semanding District, Tuban Regency.
D Nasution, et al (2014)	The Relationship Between Low Birth Weight (Lbw) Stunting Incidents In Children Aged 6-24 Months In Yogyakarta City	The proportion of children aged 6-24 months who have LBW is 15.7%. There is a significant relationship between LBW and the incidence of stunting in children aged 6-24 months, children born with LBW have a 5.6 times greater risk of becoming stunted than children born with normal weight .
Maya Trisiswati, et al. (2021)	Relationship between Bblr History (Low Birth Weight) and Stunting Incidence in Pandeglang Regency	Respondents who were not LBW were stunted as many as 170 people or 25.6% were not stunted 493 people or 74.4%, LBW babies under 2 years old as many as 16 people or 35.6% experienced stunting while 29 people or 64.4% did not experience stunting with a p-value of 0.144 or a p-value greater of 0.05, OR 1.6 with 95% CI (0.848 – 3.019) or CI. The results of the bivariate analysis showed that there was no significant or significant relationship between LBW and the incidence of stunting



		in 10 villages in Pandeglang Regency
Ayuningstyas, et al. (2020)	Correlation Between Low Birth Weight And Stunting In Under Two Years Old Babies In Koncang, Keroncong, And Kadugadung Village, Cipeucang District, Pandeglang Regency, Banten Province, Indonesia	The babies with low birth weight are 22, divided 10 are stunting and 12 are unstunting. The babies with normal body weight are 177, divided 37 are stunting and 144 are unstunting. The statistical analysis of the pvalue is 0,01(<0,05) which indicates there is a relationship between LBW and the occurrence of stunting at under two years old.
Rochmah, et al. (2017)	Factors Associated With Stunting In Toddlers Aged 24-59 Months In The Working Area Of Puskesmas Wonosari 1	The results of bivariate analysis showed that economic status had a p value (0.002<0.05), maternal height had a value (p<0.05), and LBW had a pvalue (0.045). The results of multivariate analysis of economic status (OR: 4.8), maternal height (OR: 10.1), LBW (OR: 5.8). : There is no relationship between maternal age and exclusive breastfeeding stunting in toddlers aged 24-59 months in the working area of the Wonosari I Health Center. There is a relationship between economic status, maternal height, and LBW with stunting in toddlers aged 24-59 months in the working area of the Wonosari I Health Center.
Rr. Dewi Ngaisyah (2016)	The Relationship Birth History Of Stunting And Lbw With Nutritional Status Of Children Aged 1-3 Years In Potorono, Bantul, Yogyakarta	The results showed that there was a relationship between a history of stunting and short toddlers (p-value 0.001) and malnourished toddlers (p-value 0.004). While the history of LBW has a significant relationship with short toddlers (p-value 0.02)

Zulaika Febriana Asikin, et al (2021)	The Relationship Between Lbw And Nutrition Care With Stunting Incidence In Tabumela Village, Tilango Sub-District, Gorontalo District	The results of the study showed that the results of the chi square test obtained a Pvalue for the LBW factor, namely 0.009 and for the nutritional parenting pattern, which was 0.000, which means less than $\alpha = 0.05$.
Sutarto et al (2021)	Relationship Between Low Born Weight (Lbw) And Stunting Events In Children (Age 24-59 Months).	28% of children under five years have a history of low birth weight (LBW). LBW children have a 2.595 times higher chance of stunting than children without LBW, indicating a higher risk of stunted growth in LBW children.

The studies conducted have shown varying results regarding the relationship between low birth weight (LBW) and stunting. Some studies have found a correlation between the two, while others have not. According to research by Lidia Fitri et al (2017), 72.7% of 22 LBW toddlers were found to be stunted. The chi-square analysis yielded a p-value of $0.000 < 0.05$, indicating a significant correlation between low birth weight and stunting in toddlers at the Lima Puluh Health Center (Fitri, 2018). According to research by Fatimah et al (2020), 71.9% of toddlers who experienced LBW were also stunted, while only 12.5% of LBW toddlers were not stunted. Additionally, 28.1% of toddlers who were stunted did not experience LBW, and 87.5% of toddlers who were not stunted also did not experience LBW (Murti *et al.*, 2020).

According to Afif et al's (2021) research, there was a significant relationship between LBW history and stunting incidence at the Sekupang Health Center in Batam City in 2019, as evidenced by a p-value of 0.000 from the Chi-Square Test Analysis (Alba *et al.*, 2021). According to Nasution's (2014) research, there is a significant relationship between low birth weight (LBW) and stunting in children aged 6-24 months. Children born with LBW have a 5.6 times greater risk of becoming stunted than those born with normal weight (Nasution, Nurdiati and Huriyati, 2014).

According to research by Ade Ira et al (2017), children aged 12-60 months born with low birth weight (LBW) have three times the risk of suffering from



stunting. The statistical test results showed a p-value of 0.049 with an odds ratio of 3 (0.97-9.3), indicating a significant relationship between LBW and stunting incidence (Zahriany, 2017).

According to Ayuningtyas et al's (2020) research, 199 respondents from Koncang Village, Koroncong Village, and Kadugadung Village in Cipeucang District, Pandeglang Regency, Banten were studied. Of these respondents, 11.1% were underweight children with a history of LBW, 23.6% were underweight and experiencing stunting, and 5.0% who experienced stunting had a history of LBW. The study found a correlation between a history of LBW and the incidence of stunting in toddlers (Ayuningtyas, 2020)

According to Rochmah et al's (2017) research, there is a correlation between low birth weight, maternal height, economic status, and stunting in the Wonosari I Health Center's working area. The odds ratios for maternal height, low birth weight, and economic status are 10.1, 5.8, and 4.8, respectively, indicating that these variables are risk factors for stunting. (Rochmah, 2017)

According to research by Sutarto (2021), there is a correlation between Low Birth Weight (LBW) and stunting incidence in toddlers (aged 24-59 months) at Way Urang Health Center in South Lampung Regency. Additionally, providing complementary food for six months during the growth period is effective in addressing stunting, in conjunction with improved quality of health examination services (ANC) during pregnancy and childbirth in health care facilities (Sutarto *et al.*, 2021)

Research by Zulaika et al (2021), A study found that LBW was associated with stunting in toddlers in Tabumela Village. Out of 30 respondents, 16.7% born with LBW had short stature, while 56.7% had very short bodies. The chi square test showed a significant relationship ($p < 0.05$) between LBW and stunting.(Asikin, Nurdin and Ahmad, 2021)

According to research by Erna Eka et al. (2019), 100% of 28 under-five LBW respondents experienced stunting. Nearly half of toddlers with normal birth weight also experienced stunting, with 46% or 24 respondents. The Chi Square test showed that $p = 0.000$, indicating a relationship between LBW and stunting in

toddlers aged 2-5 years in Jadi village, Semanding District, Tuban (Wijayanti, 2019)

Research by Etin Mei's, the results showed that out of a total of 17 respondents aged 7-12 months with a history of LBW, there were 3 respondents (17.6%) with a history of LBW who did not experience stunting, and 14 respondents (82.4%) with a history of LBW who experienced stunting. This shows that the majority of children with a history of LBW will experience stunting. The results of the chi square test showed a significance result of 0.000, there was a relationship between history of LBW and the incidence of stunting in children aged 7-12 months with a p value <0.05 and with a strong relationship where the phi value was 0.603. The results of this study are in accordance with the theory which states that one of the causes of stunting is LBW. Babies born with LBW can experience digestive tract disorders because they are not functioning properly so that food absorption is poor and electrolyte disturbances occur. LBW babies also experience problems with breastfeeding because the baby's body size is small, weak and has a small stomach and cannot suck well. As a result, the baby's growth will be disrupted, if this situation continues with inappropriate feeding, such as not exclusive breastfeeding, the child often experiences infections and grows into stunting. (Sari and Soimah, 2017)

Low birth weight (LBW) is associated with stunting, and overall body weight is strongly associated with long-term growth and development. LBW can manifest as growth faltering. Early growth delay will be difficult to catch up in infants born with LBW. The growth of a child who lags behind normal growth will cause the child to experience stunting (Ode *et al.*, 2022). Low birth weight can be caused by the mother's poor nutritional state during pregnancy, causing intrauterine growth retardation, and at birth. it is manifested by low birth weight. Long-term problems caused by LBW are stunted growth and development. Low birth weight is believed to be one of the factors causing malnutrition in the form of stunting in children (Fitri, 2018).

LBW babies will grow and develop more slowly because babies with LBW have experienced intrauterine growth retardation since birth and will continue until the next age after birth, namely experiencing growth and development that is slower



than babies who are born normally, and often fail to catch up with the growth rate that should have been achieved at the age after birth. LBW also experience digestive disorders, because the digestive tract is not yet functioning, such as being unable to absorb fat and digest protein, resulting in a lack of reserves of nutrients in the body. As a result, the growth of LBW babies will be disrupted, if this situation continues with insufficient feeding, frequent infections and poor health care will cause stunting (Dewi *et al*, 2020)

These results confirm that LBW can be a significant risk factor in the development of stunting in toddlers. However, there are also studies such as research by Dewi *et al* (2020), Gabrielisa, *et al* (2017), Maya *et al* (2021), and RR Dewi (2016), which found no relationship between birth weight and stunting in the context of the population studied. The occurrence of stunting in children can be affected by various factors, including nutrition, access to health services, sanitation, and environment. If these factors are not controlled or measured accurately in research, the results may not indicate a significant relationship between low birth weight (LBW) and stunting. It is crucial to consider other variables that can influence stunting, such as environmental factors, nutrition, socioeconomic status, and their interactions. Low income is influenced by several factors, such as education and work productivity. It will also have an impact on access to food, the quality of the residential environment, and access to health services, which can all impact the health status and nutritional status of children. (Lukman *et al.*, 2021)

Infants born with low birth weight or premature birth are at higher risk for negative impacts on cognitive function and childhood stunting at age 2 due to smaller brain volume compared to normal birth conditions (Upadhyay *et al.*, 2019; Savanur *et al.*, 2015). The meta-analysis by Upadhyay *et al.* (2019) found that LBW children had lower cognitive and motor scores compared to those with normal birth weight. LBW is associated with neurodevelopmental deficits, decreased brain volume, cortical changes, cell number reduction, and myelination deficits. Brain connectivity is also impaired as evidenced by nerve migration deficits, reduced dendritic processes, and less efficient neural networks (Upadhyay *et al.*, 2019)

Preterm and/or LBW babies have a higher risk of developmental delay at 2-3 years. Proper breastfeeding, timely introduction of complementary foods, and

effective treatment of wasting can reduce delays and mortality related to malnutrition (Ahishakiye *et al.*, 2019). Although malnutrition can manifest in multiple ways, the path to prevention is virtually identical: adequate maternal nutrition before and during pregnancy and while breastfeeding; optimal breastfeeding in the first two years of life; nutritious, diverse and safe foods in early childhood; and a healthy environment, including access to basic health, water, hygiene and sanitation services and opportunities for safe physical activity. (WHO, 2021) Community programs that provide proper sanitation, clean water, diverse food options, poverty reduction assistance, education on child feeding and infection prevention, and accessible healthcare can collectively reduce stunting in populations. (WHO, 2015).

CONCLUSIONANDSUGGESTIONS

After analyzing the results and having a discussion, a clearer understanding of the connection between low birth weight (LBW) and stunting in children has been achieved. While some studies have confirmed a significant correlation between LBW and stunting, other studies have not found any such link. This suggests that the relationship between LBW and stunting is intricate, and there may be other factors that contribute to the occurrence of stunting.

ACKNOWLEDGMENTS

Special thanks to my research advisors and mentors Rize Budi Amalia, S.Keb, M.Kes and Dr. Lestari Sudaryanti, dr., M.Kes for their continuous guidance and support throughout the research process. I am also grateful to the funding agencies for their financial assistance, which made this research possible.

REFERENCE

- Alba, A. D., Suntara, D. A. and Siska, D. (2021) 'Hubungan Riwayat Bblr Dengan Kejadian Stunting Pada Balita Di Wilayah Kerja Puskesmas Sekupang Kota Batam Tahun 2019', *Jurnal Inovasi Penelitian*, 1(12).
- Asikin, Z. F., Nurdin, S. surya I. and Ahmad, Z. F. (2021) 'HUBUNGAN BBLR DAN POLA ASUH GIZI DENGAN KEJADIAN STUNTING DI DESA TABUMELA KECAMATAN TILANGO KABUPATEN GORONTALO', *Madu : Jurnal Kesehatan*, 10(2). doi: 10.31314/mjk.10.2.1-8.2021.
- Ahishakiye, A., Abimana, M. C., Beck, K., Miller, A. C., Betancourt, T. S., Magge, H., ... & Kirk, C. M. (2019). Developmental outcomes of preterm and low



- birth weight toddlers and term peers in Rwanda. *Annals of global health*, 85(1).
- Ayuningtyas, Anisa et al. (2020). ' HUBUNGAN BERAT BADAN LAHIR RENDAH DENGAN KEJADIAN STUNTING PADA BADUTA DI DESA KONCANG, KORONCONG DAN KADUGADUNG, KECAMATAN CIPEUCANG, KABUPATEN PANDEGLANG, BANTEN, INDONESIA', *Jurnal Kedokteran Yasri*.
- Fitri, L. (2018) 'HUBUNGAN BBLR DAN ASI EKSLUSIF DENGAN KEJADIAN STUNTING DI PUSKESMAS LIMA PULUH PEKANBARU', *Jurnal Endurance*, 3(1). doi: 10.22216/jen.v3i1.1767.
- IFPRI. (2014). Actions and Accountability to Accelerate the World's Progress on Nutrition, Washington, DC. In *Global Nutrition Report 2014*.
- Kementerian Kesehatan Republik Indonesia. (2018). Laporan Hasil Riset Kesehatan Dasar (Riskesdas) Indonesia tahun 2018. In *Riset Kesehatan Dasar 2018*.
- Lukman, T. N. E. et al. (2021) 'Birth Weight and Length Associated with Stunting among Children Under-Five in Indonesia', *J. Gizi Pangan*, 16.
- Murti, F. C., Suryati, S. and Oktavianto, E. (2020) 'HUBUNGAN BERAT BADAN LAHIR RENDAH (BBLR) DENGAN KEJADIAN STUNTING PADA BALITA USIA 2-5 TAHUN DI DESA UMBULREJO KECAMATAN PONJONG KABUPATEN GUNUNG KIDUL', *Jurnal Ilmiah Kesehatan Keperawatan*, 16(2). doi: 10.26753/jikk.v16i2.419.
- Nasution, D., Nurdiati, D. S. and Huriyati, E. (2014) 'Berat badan lahir rendah (BBLR) dengan kejadian stunting pada anak usia 6-24 bulan', *Jurnal Gizi Klinik Indonesia*, 11(1). doi: 10.22146/ijcn.18881.
- Ngaisyah, Rr Dewi. (2016). ' Hubungan Riwayat Lahir *Stunting* dan BBLR dengan Status Gizi Anak Balita Usia 1-3 Tahun di Potorono, Bantul Yogyakarta. *Jurnal Ilmiah Kesehatan Medika Respati*.
- Ode, D., Murti, B., & Budihastuti, U. R. (2022). Correlation between Low Birth Weigth and Stunting in Children Under Five: Meta Analysis. *Journal of Maternal and Child Health*, 7(5), 498–509. <https://doi.org/10.26911/thejmch.2022.07.05.01>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ*, 372. <https://doi.org/10.1136/bmj.n71>
- Rocha, C., Constante Jaime, P., & Ferreira Rea, M. (2016). How Brazil's Political Commitment to Nutrition Took Shape. In *Global Nutrition Report - From promise to impact: ending malnutrition by 2030*.
- Rochmah, A. M. (2017) 'Faktor-Faktor Yang Berhubungan Dengan Stunting Pada Balita Usia 24-59 Bulan Di Wilayah Kerja Puskesmas Wonosari I', *Naskah Publikasi*.
- Sari, E. M. and Soimah, N. (2017) 'Hubungan Riwayat BBLR Dengan Kejadian Stunting Pada Anak Usia 7-12 Bulan Di Desa Selomartani Wilayah Kerja Puskesmas Kalasan', *Universitas 'Aisyiyah Yogyakarta*.
- Sutarto et al. (2021) 'Relationship Between Low Born Weight (Lbw) And Stunting

- Events In Children (Age 24-59 Months)', *Indonesian Journal of Medical Anthropology*, 2(1), pp. 31–35. doi: 10.32734/ijma.v2i1.4696.
- Tristiwati, Maya *et al.* (2021). ' Hubungan Riwayat Bblr (Berat Badan Lahir Rendah) dengan Kejadian Stunting di Kabupaten Pandeglang. *Jurnal Majalah Saintikes* 8(2): 061-070.
- Upadhyay, R. P., Naik, G., Choudhary, T. S., Chowdhury, R., Taneja, S., Bhandari, N., ... & Bhan, M. K. (2019). Cognitive and motor outcomes in children born low birth weight: a systematic review and meta-analysis of studies from South Asia. *BMC pediatrics*, 19, 1-15.
- Winowatan, Gabrielisa *et al.* (2017). 'HUBUNGAN ANTARA BERAT BADAN LAHIR ANAK DENGAN KEJADIAN STUNTING PADA ANAK BATITA DI WILAYAH KERJA PUSKESMAS SONDER KABUPATEN MINAHASA'. *Jurnal Kesma*, Vol 6, Issue 3.
- WHO. (2021) 'Levels and trends in child malnutrition. Joint Child Malnutrition Estimates Key findings of the 2021 edition', *World Health Organization*.
- WHO. (2015). 'Stunting in a Nutshell', <https://www.who.int/news/item/19-11-2015-stunting-in-a-nutshell>, (November).
- Wijayanti, E. E. (2019) 'Hubungan Antara BBLR, ASI Eksklusif dengan Kejadian Stunting Pada Balita Usia 2-5 Tahun', *Jurnal Kesehatan dr. Soebandi*, 7(1).
- Yuana, N., Larasati, T. and Berawi, K.N. (2021) ' Analisis Multilevel Faktor Resiko Stunting di Indonesia: Sebuah Tinjauan Literatur', *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, 6(2), pp. 213–217. Available at: <https://doi.org/10.30604/jika.v6i2.510>.
- Zahriany, A. I. (2017) 'PENGARUH BBLR TERHADAP KEJADIAN STUNTING PADA ANAK USIA 12-60 BULAN DI WILAYAH KERJA PUSKESMAS TANJUNG LANGKAT TAHUN 2017', *Jurnal Riset Hesti Medan Akper Kesdam I/BB Medan*, 2(2). doi: 10.34008/jurhesti.v2i2.79.