

## Factors Affecting Birth Weight and its Management : Literature Review

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### ABSTRACT

The literature review has the aim of reviewing and comparing the similarities of several research results regarding the factors that influence the occurrence of low birth weight babies and their management methods in several hospitals in Indonesia. Literature review method with this study was carried out by conducting a literature review by searching several national journals. Literature search using several keywords, namely "low birthweight (LBW)", "infants", "management of LBW" for 10 literature publications from 2012-2022. Article searches used Scencedirect, Garuda Portal, Mendeley and Google Scholar for articles with quantitative and qualitative designs. Results Of the ten articles stated that LBW occurs not only in premature babies but normal babies can also experience LBW. LBW is not only influenced by the mother's knowledge but other factors such as nutrition, pregnancy interval, age, parity, lifestyle, and pregnancy complications. Discussion and Conclusion: Here the role of health workers and parents in handling LBW is very important without having to be expensive and can be done at home so that it can help increase LBW with exclusive breastfeeding, prevent hypothermia, prevent infection and keep the baby healthy so that stunting does not occur.

### INTRODUCTION

Babies with Low Birth Weight (LBW) are a health problem that requires attention in various countries, especially in developing countries or countries with low socioeconomic status. LBW today is still a significant public health problem globally because of the short and long term effects on health. The world's attention to this problem is so serious that the World Health Assembly in 2012 passed the Comprehensive Implementation Plan on Maternal, Infant, and Young Child

Nutrition with a target of 30% reducing LBW by 2025 (WHO, 2014).

LBW cases in the world reach more than 20 million (15.5%) live births per year and 96.5% occur in developing countries. The East Asia and Asia Pacific regions rank third in live births with LBW. The case of LBW in Indonesia was ranked 10th in the Asia-Pacific region in 2011. As many as 18% of babies with LBW were in the Asian region. Indonesia experienced fluctuations in the number of LBW babies from 2007 to 2017. In 2016, the percentage ISSN 1858-3385, E-ISSN 2549-7006 137

of LBW babies reached 7.6% and decreased in 2017 (6.7%). However, the number of LBW babies increased again in 2018, reaching a percentage of 7.3%. This case increased again in 2018, showing a percentage of 10.2% of live births. However, the number of LBW babies decreased in 2016 and 2017 by 6.9% and 7.1% respectively (Profil Kesh Indonesia, 2021; Profil Kesh Ibu dan Anak Indonesia, 2022)

The most common causes of neonatal death in 2021 are Low Birth Weight (LBW) conditions of 34.5% and asphyxia of 27.8%. Other causes of death include congenital abnormalities, infection, COVID-19, neonatal tetanus, and others. The condition of LBW babies is caused by the condition of the mother during pregnancy (adolescent pregnancy, malnutrition, and pregnancy complications), twin babies, fetuses with congenital abnormalities or conditions, and disorders of the placenta that inhibit the baby's growth (intrauterine growth restriction) (Kemenkes RI, 2021). Meanwhile in Central Java Province in 2021, 41.1 percent of infant deaths are due to LBW (Dinkes, 2021). LBW is not only the main cause of prenatal death and a cause of morbidity, but LBW has a greater risk of stunting and also increases the risk of non-communicable diseases such as diabetes and cardiovascular disease in the future. Therefore, as one of the efforts to

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prevent infant mortality is the handling of LBW. The high cases of infant mortality due to LBW require the role of health workers, including reducing IMR in Indonesia.

## **METHODS AND MATERIALS**

The search process using the keywords low birth weight (LBW), "baby", "treatment of LBW in database sources on the internet produced a total of 7349 articles, using AI to detect duplicates including deleting systematic review articles that were netted in the search engine, the results were obtained 1871 articles were then screened for titles and abstract reviews. Based on the title and abstract review, 1746 articles were excluded because they did not match the research objectives and 99 articles were eligible. Of the 99 articles, 36 articles could not be fully accessed, 5 articles did not discuss LBW and 38 articles showed inappropriate interventions, leaving 10 articles for 2012-2022.

## **RESULTS AND DISCUSSION**

In searching this journal, the authors found 10 (ten) literature related to risk factors for LBW. The first literature by (Agustina and Barokah, 2018) with the title "Determinants of Low Birth Weight". This research is an observational study with a retrospective approach. The data source used is secondary data, namely data on

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medical records of mothers who gave birth in 2017 at Wates Yogyakarta Hospital. The sampling technique with fixed disease sampling with a total sample of 533 samples.

The instrument used is a checklist sheet. Data analysis using univariate analysis. The results of this study obtained that the largest variable cause of LBW is maternal parity in the grandemultipara category, which is 54.5%. In addition, there is also a history of maternal illness which is the cause of LBW. Of the 73 respondents who suffered from the disease, there were 41 respondents who gave birth to LBW, and the type of disease that caused the most LBW was severe preeclampsia/ preeclampsia, namely 23 respondents. All mothers with a potential risk of giving birth to LBW. So it is very necessary to improve LBW screening, especially at level 1 health facilities when the mother is still pregnant, so that if it is known that pregnant women with LBW risk can be treated immediately and it is hoped that the baby born will have sufficient weight.

The second literature obtained was "Weight Increase in LBW Babies with Kangaroo Method (PMK) Treatment at Wates Kulonprogo Hospital (Yulaikhah, Eniyati and Ardiana Sari, 2019). The research method in this study was a pre-experimental design with a One-Group Pretest Posttest Design (One pretest posttest

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group, namely assessing weight before PMK and after PMK. Weight before PMK was assessed based on birth weight, while weight after PMK was assessed after PMK was carried out. The study was conducted in Kerman province. The population in this study were all LBW mothers and babies treated at Wates Hospital.

While the sample in this study was obtained from the LBW population who were treated from March to August 2017. The sample for this study was determined using a consecutive sampling technique. The results obtained were based on the characteristics of the respondents based on the age of the mother, mostly 20-35 years old, 56% (5 respondents), based on gestational age, mostly

The third literature entitled Relationship between Maternal Age and the Incidence of Low Birth Weight Babies (LBW) at Cilacap Hospital (Sujianti, 2018a). This study uses a type of descriptive correlative research. with a case control approach. In this study, the case subjects were mothers with birth weight 2500 – 4000 grams.

In this study, the target population was all mothers who gave birth to LBW in 2014 as many as 409. The technique used in sampling was purposive sampling with the criteria of mothers who gave birth to LBW in 2014 and complete medical records with the number of samples after using the formula to 89 people. LBW cases

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and 138 for control cases. Secondary data collection was carried out by looking at the report book and dummy table medical record records obtained at Cilacap Hospital in 2014 by paying attention to the format on the checklist. The data includes the mother's age. Data were analyzed univariately and bivariately with the Chi Square test. The results of the study were that of 89 respondents for cases and 138 for controls, the age of the mother with the most LBW was the age of not being at risk as many as 60 people (67.4%) cases and 99 people (71.7%) case controls. Analysis of the relationship between maternal age and the incidence of LBW found that there were as many as 29 (32.6%) of maternal age who were at risk of giving birth to LBW babies. Meanwhile, among mothers who were not at risk, there were 60 (67.4%) who gave birth to LBW. The statistical test results obtained P value = 0.504, so it can be concluded that there is no difference in the proportion of LBW incidence between at-risk and non-risk ages (there is no significant relationship between maternal age and LBW). From the analysis results, the value of OR = 1.272 was also obtained, meaning that the age of the mother who was not at risk had 1.27 times the chance of giving birth to low birth weight babies compared to the age at risk.

The fourth literature is "Knowledge of Mothers on LBW Management at Dr  
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Soekardjoe Hospital, Tasikmalaya City" (Sukmawati, 2017). The purpose of this study was to determine the mother's knowledge on the management of LBW at Dr Soekardjo Hospital, Tasikmalaya City. This research is a quantitative study, the design used is descriptive, which describes the mother's knowledge of the management of LBW. The variable is a single variable, namely the knowledge of the mother on the management of LBW. The population in this study were all mothers who gave birth to babies with LBW at RSUD Dr. Soekardjo City of Tasikmalaya in June-July 2016. In this study, the sampling used Accidental Sampling with a total sample of 35 respondents. The inclusion criteria were mothers who gave birth to LBW at RSUD dr. Soekardjo, Tasikmalaya City, while the exclusion criteria were mothers who gave birth to normal babies at dr. Soekardjo Hospital, Tasikmalaya City. The data collection technique used accidental sampling.

The results of this study are that the knowledge of mothers on the management of LBW regarding thermoregulation and prevention of infection results is lacking. While knowledge of nutrition management about LBW results are good. The literature on increasing LBW needs to be improved. Facilities and infrastructure for personal protective equipment (PPE) are equipped and education regarding the management  
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of LBW needs to be increased. The fifth literature is research by Annisa Khoiriah entitled *The Relationship Between Age and Parity of Maternity with Low Birth Weight Babies (LBW) at Siti Khadijah Islamic Hospital Palembang*. This type of research uses an analytic survey method with a "cross sectional" approach, where the independent variables and dependent variables are collected at the same time (Notoatmodjo, 2014). The population in this study were all mothers giving birth at Siti Khadijah Palembang Islamic Hospital in 2016 with a large population of 1000 people. The sample of this study were some of the mothers giving birth at Siti Khadijah Palembang Islamic Hospital in 2016, totaling 91 people.

The sampling technique used in this research is by using random sampling technique. The simple random sampling technique is random or random sampling. This random sampling technique is only permissible if each unit of the population has the same opportunity to be selected as a sample. From the results of research that was conducted at Siti Khadijah Islamic Hospital Palembang in 2017 it can be concluded that the frequency distribution of Low Birth Weight Babies (LBW) was 32 respondents, who did not experience low birth weight babies as many as 59 respondents, Frequency distribution that the age of the mother at risk 42 respondents to high, 49 respondents to low

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risk, 41 respondents to the frequency distribution of high parity mothers, 50 respondents to low parity mothers and There is a significant relationship between age and the incidence of low birth weight babies, with a  $\gamma$  value of 0.003.

The sixth literature is the research of (Dwihestie, Sulistyoningtyas and Nofiasari, 2019). Luluk Khusnul Dwi Hestie et al entitled *Factors related to the incidence of Low Birth Weight (LBW) at Wonosari Gunungkidu Hospital, Yogyakarta (2021)*. This study aims to determine the factors associated with the incidence of LBW in RSUD Wonosari Gunungkidul, Yogyakarta. This research is a type of descriptive research with a cross-sectional design. The population is all LBW cases at Wonosari Gunungkidul Hospital, Yogyakarta. The sampling technique is total sampling, obtained 180 samples. Secondary data collection, namely medical records with univariate data analysis presented using the frequency distribution and bivariate analysis using chi-square. The results showed that the majority of low birth weight babies in Wonosari Gunungkidul Hospital came from mothers with safe parity (parity 2-4) of 100 babies (55%), the majority of preterm gestational ages were 96 babies (53%), and the majority were accompanied by pregnancy complications of a number of 93 babies (52%). Based on the results of the study it can be concluded that there is

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no relationship between parity and the incidence of LBW (p-value 1.000). There is a relationship between gestational age and the incidence of LBW (p-value 0.000) and there is a relationship between complications during pregnancy and the incidence of LBW (p-value 0.000).

The seventh literature is a study by Maya Trisiswati et al entitled The Relationship between LBW History (Low Birth Weight) and Stunting Incidents in Pandeglang Regency in 2020. This research is a descriptive analytic study. The research design was cross sectional. Respondents who were not LBW were stunted as many as 170 people or 25.6% were not stunted 493 people or 74.4%, LBW BADUTA 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 p-value  $> 0.05$ , 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.

The eighth literature is Risk Factors associated with the incidence of low birth weight in neonates treated at Prof. Hospital. DR.RD Kandaou for the period January 2015-July 2016 conducted by Eny Susilowati, et al. This study aims to determine the risk factors associated with

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the incidence of LBW in neonates who are treated at Prof. Hospital. Dr. RD Kandou Manado for the period January 2015-July 2016. This type of research is a retrospective descriptive with a field survey method. The research sample was neonate patients with LBW who were treated at the Pediatrics Department of Prof. Hospital. Dr. RD Kandou Manado in January 2015- July 2016. The results showed that based on maternal risk factors (age, parity, infection, premature birth, multiple pregnancies, and previous history of LBW), fetus and placenta (congenital abnormalities), and environment (cigarettes and alcohol) found the most common risk factor is prematurity.

The ninth literature is the relationship between low birth weight babies (LBW) and the incidence of hyperbilirubinemia in neonates at Wangaya Hospital, Bali, Indonesia in 2019 which was studied by Conchita Christal Yasadipura et al. Methods This research is an analytic observational study with a cross-sectional approach which was carried out in August - September 2019 at Wangaya Hospital. The research subjects were infants aged 0-28 days who were treated at Wangaya Hospital during August - September 2019 who met the inclusion and exclusion criteria. The research sample was taken by consecutive sampling. Bivariate analysis was performed using the Chi-Square test and using the prevalence ratio calculation.

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Data were analyzed with SPSS version 17 for Windows. In this study, a sample of 98 samples was obtained, of which LBW samples were 24.5% and 9 samples were obtained. Some of them have hyperbilirubinemia. The results of hypothesis testing with the Chi-Square test obtained  $p = 0.042$  and  $RP = 2.13$ . In conclusion, there is a significant relationship between LBW and hyperbilirubinemia in neonates at Wangaya Hospital and LBW is a risk factor for hyperbilirubinemia in neonates.

The tenth literature is a 2014 study by Adhein Ayu M and Murdoyo Rohmanoe entitled Medical Therapy for Babies with Low Birth Weight (LBW). This case study was conducted on By. TA 1 day with a birth weight of 1700 grams with a birth length of 46 cm was born spontaneously, head presentation, immediately cried loudly, active movements. From the results of the physical examination, malnutrition status was  $< - 3$  SD according to WHO 2005 standards. Meanwhile, a ballard score of 20 corresponds to 32 weeks' gestation. The results of this study in patients with LBW, were given trophic therapy feeding 5cc/3 hours via OGT which was gradually increased to good tolerance. Antibiotics are also needed in infants to prevent nosocomial infections. As well as administration of aminophylline to prevent respiratory problems. The appropriate

amount and type of fluid is also needed in the management of LBW babies.

According to (Yunanto M sholeh, Dewi R A, G I Sarosa, 2014), Babies with low birth weight (LBW) are newborns who at birth have a weight of  $< 2500$  grams without assessing gestational age. LBW can not only occur in premature babies, it can also occur in full-term babies who experience a process of inhibition in their growth during pregnancy (Tanziha, Utama and Rosmiati, 2016). This is evidenced by research (Khusnul Dwihestie, Sulistyoningtyas and Nofiasari, 2022), which states that there is a relationship between gestational age and the incidence of LBW ( $p$ -value 0.000) and there is a relationship between complications during pregnancy and the incidence of LBW ( $p$ -value 0.000).

It has also been proven in research according to (Susilowati, Wilar and Salendu, 2016), there are several risk factors that can cause LBW problems, namely maternal factors and pregnancy factors. Maternal factors that can affect LBW are age, parity, malnutrition during pregnancy, interval between pregnancies, lifestyle. Based on the results of the study (Khoiriah, 2017), showed that there was a significant relationship between maternal age ( $\bar{y}$  value = 0.003) and maternal parity ( $\bar{y}$  value = 0.025) with the incidence of low birth weight babies. The odds ratio = 4.290, which means that respondents who are at risk are 4.290 times more likely to have low birth weight babies than those who are not at risk. The odds ratio = 3.016, which means that respondents with high parity have a 3.016 times greater chance of having a low birth weight baby than low

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parity. Supported by research (Susetyarini *et al.*, 2019), which states that the highest incidence rate of neonates with LBW is in mothers with the age group 20-35 years followed by the age group >35 years and < 20 years the highest incidence of LBW is in mother who only had 1 child while the least number of incident was mother who had 5 children, mothers who smoked were fewer than mother who did not smoke. Mothers do not consume alcohol are more than mothers who consume alcohol. However, this is not in line with research (Sujianti, 2018), which states that there is no statistically significant maternal age factor and the incidence of LBW in RSUD Cilacap 2014. As well as research results (Dwihestie, Sulistyoningtyas and Nofiasari, 2019), the results of the chi square test obtained a p-value of 1,000 indicating that there is no relationship between maternal parity and the incidence of LBW in infants.

Pregnancy factors that can affect LBW are Eclampsia/Pre-Eclampsia, Premature Rupture of the Membranes, Antepartum Bleeding and gestational age of less than 37 weeks. The results of the study (Dwihestie, Sulistyoningtyas and Nofiasari, 2019) found that the majority of mothers who gave birth to LBW babies at Wonosari Gunungkidul Hospital were accompanied by pregnancy complications, as many as 93 mothers (52%). The results of the chi square test obtained a p-value of

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0.000 which indicated that there was a relationship between pregnancy complications and the incidence of LBW.

Knowledge is a result of knowing that occurs after a person senses a certain object, through the senses of sight, hearing, smell, feeling and touch. Most of human knowledge is obtained through sight and hearing, only a small amount is obtained through smelling, feeling and touching. Knowledge about health includes what a person knows about ways to care for LBW babies (Notoatmodjo, 2014). Based on research (Sukmawati, 2017), namely mother's knowledge of LBW management consisting of thermoregulation, nutrition and prevention of LBW infection shows that the highest frequency is less knowledgeable 65.7%.

Knowledge is strongly supported by several extrinsic factors (community environment, other people's experiences, mass media) and intrinsic factors (understanding and knowledge, personal experience). According to (Sukmawati, 2017), inadequate prevention of infection will affect the health status of LBW because LBW is perfectly formed. Respondents on infection prevention management were 21 people (60.0%) in the less category. Respondents did not carry out management of infection prevention in LBW, namely not washing their hands. The practice of hand washing as infection prevention is considered

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important and must be taught to the patient's parents and family. In accordance (Hanifah, 2019) (, one of the midwives' roles is as an educator. In this case, to provide education regarding the general handling of LBW babies because further care for the baby will be carried out by the baby's parents at home so that mothers must understand very well how to care for babies with LBW.

Management that can be carried out for LBW babies according to (Proverawati, 2013) in (Prameswari, 2021), includes medication, administering oxygen, weighing, administering, regulating and monitoring nutritional intake, maintaining the baby's body temperature, and preventing infection. One of the treatments for LBW in terms of maintaining thermoregulation is the Kangaroo Method of Treatment (PMK). PMK does not require sophisticated and expensive equipment and is very easy to apply to all services that care for newborns. LBW treatment with PMK, lower incidence of hypothermia, higher breastfeeding, higher average weight gain and earlier discharge compared to conventional LBW care (kulon undip, 2022). This is in line with research (Yulaikhah, Eniyati and Ardiana Sari, 2019), that PMK is stated to affect weight gain in LBW babies. In the first week, the baby's weight may go down first and then rise again and at the age of 7-10 days it has generally reached its birth

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weight. Maximum weight loss for newborns a maximum of 10% for full months and for preterm babies a maximum of 15% (RI, 2021).

The baby's weight gain is also influenced by several factors, one of which is the provision of nutrition. Adequacy of nutrition in premature babies is the amount of intake needed by the baby to reach a speed and body composition similar to the growth of the fetus. Premature babies have higher nutrient requirements than full-term babies. This is because premature babies miss a period of rapid growth, which starts at 24 to 40 weeks' gestation Growth acceleration will be achieved if nutritional and fluid needs are met adequately (IDAI, 2016). LBW is not only the main cause of prenatal death and a cause of morbidity, but LBW increases the risk of non-communicable diseases such as diabetes and cardiovascular disease in the future. The impact that occurs can occur in the short term or in the long term.

Hyperbilirubinemia is one of the most common causes of infant death, apart from low birth weight (LBW), asphyxia, neonatal sepsis, birth trauma, and congenital abnormalities (Baradwan, Alyousef and Turkistan, 2018). Hyperbilirubinemia occurs in 60% of neonates > 35 weeks and 80% of neonates < 35 weeks. The prevalence and severity of hyperbilirubinemia is higher in low birth weight (LBW) babies. This may be due to

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the immaturity of the liver in low birth weight babies, insufficient glucuronyl transferase enzymes, and low levels of albumin in the liver. This is also in accordance with the results of the study (Yasadipura, Suryawan and Sucipta, 2020), namely that there is a significant relationship between LBW and hyperbilirubinemia in neonates at Wangaya Hospital and LBW is a risk factor for the occurrence of hyperbilirubinemia in neonates.

Very low birth weight carries a risk of long-term complications and disability. Long-term complications that may occur include cerebral palsy, blindness, deafness, developmental delay. In cases where the baby is born with this condition and there are no other complications, the baby often develops normally. In some cases, babies may experience developmental delays, mild mental disabilities, or health problems that persist throughout their lives. Treatment Treatment will depend on the baby's symptoms, age, and health, and also on how severe the condition is. Treatment for this condition often includes: treatment in the neonatal intensive care unit (NICU), temperature-controlled beds, special feeding. How well a low birth weight baby does depends largely on the baby's weight at birth. Babies weighing less than 500 grams have the most problems and are least likely to survive. Babies with low birth weight can usually catch up with their

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physical growth if there are no other complications. The prognosis for babies with low birth weight (LBW) who is treated properly is generally quite good. However, currently the highest cause of neonatal death is LBW, especially LBW with complications.

These complications must be quickly handled properly and provide proper nutrition. If it is not treated immediately, the growth of LBW babies will be disrupted. If this condition continues with insufficient feeding, frequent infections, and poor health care, it can cause stunting in children. Research (Alba, Suntara and Siska, 2021), states that from the results of the Chi Square Test Analysis, a value of  $p = 0.000$  is obtained. This means that there is a significant relationship between LBW history and the incidence of stunting at the Sekupang Health Center in Batam City in 2019. Therefore, the handling of LBW requires the role of health workers to anticipate the shortterm and long-term impacts of LBW.

numbering.

## **CONCLUSIONS AND SUGGESTIONS**

LBW is a problem in Indonesia that needs great attention and is an important factor in perinatal mortality and morbidity. Risk factors that play a role in the incidence of LBW are maternal age, parity and pregnancy complications. Mother's knowledge in LBW care must be increased

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so that the mother's ability to care for babies with low birth weight increases so that the incidence of infant morbidity and mortality does not occur. The management of LBW is carried out by weighing, preventing infection by washing hands, keeping warm by caring for the kangaroo method, and anticipating immediately if an infection is found such as hyperbilirubinemia so that there are no complications that result in short-term and long-term impacts that occur such as stunting.

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