

Factors Affecting Low Birth Weight

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Article Info	Abstract
Article History Submitted, 2025-11-02 Accepted, 2025-11-30 Published, 2025-12-31 Keywords: anemia, gameli, gestational age, maternal age, Nutritional status, low birth weight, parity, preeclamsia, pregnancy, spousal support	Low Birt Weight (LBW) is major cause of neonatal morbidity and mortality worldwild, especially in developing countries. Factors affecting the incidence of LBW include maternal age, parity (number of children ever born), Antenatal Care (ANC) or pregnancy examination, and maternal nutritional status. Fetal condition factors include genetic factors, congenital abnormalities inte fetus, non-optimal fetal nutrition, and factors originating from the the pregnant mother, including maternal nutrition, maternal physical condition, maternal health status (hipertension, heart deisiases, etc). This study aims to identify the factors associated with the incidence of LBW through a literature review of 7 recent studies in the last five years. The method used was a systematic literature search the PubMed, Google Scholar, and ScienceDirect database with the keyword “Bayi Berat lahir Rendah” (Low Birth Weight,” factor resiko BBLR” (LBW risk factors), “BBLR dalam 5 tahun terakhir” (LBW in the last five years). The results show that dominant factors include maternal age, gestational age, parity, pregnancy spacing, pregnancy complications, history of illness, nutritional status, preeclamsia, and gemelli (twins). Thus, a multidisciplinary approach is needed to reduce the prevalence of LBW through nutritional improvements, pregnancy monitoring, and increased health education.

Introduction

Low birth weight (LBW), defined as a baby born weighing less than 2,500 grams, is a global health issue that continues to be a serious concern because it is a major cause of high neonatal morbidity and mortality (illness and death in newborns). Babies born with LBW have a 20 times greater risk of complications than babies with normal birth weight, with impacts that occur not only in the short term (such as respiratory disorders and jaundice), but also in the long term, affecting the growth and development, communication, and physical and psychological development of the child. The factors studied include maternal age, parity (number of children born), antenatal care (ANC) or pregnancy check-ups, and maternal nutritional status (Hazimah et al., 2024).

Low birth weight (LBW) is a public health problem worldwide. LBW is prone to occur in Indonesia, which is categorized as a low- and middle-income country. The latest data from the United Nations International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO) in 2015 states that 1 in 7 babies born are LBW. In 2021, approximately 8% of babies in Asia were born LBW (Rizkika et al., 2023). Low birth weight (LBW) is a condition where a baby is born weighing less than normal. Premature birth (before 37 weeks of pregnancy) and fetal growth restriction are the most common causes of low birth weight.

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The prevalence of LBW is 39.1% of cases worldwide. LBW is associated with age, parity, weight, and height of the mother. Low Birth Weight (LBW) is a global public health issue that continues to be a serious concern. LBW is a major cause of high neonatal morbidity and mortality (illness and death in newborns) worldwide, especially in developing countries like Indonesia. Indonesia is categorized as a low- and middle-income country where LBW is prone to occur. The prevalence of LBW in Indonesia is 15.5% of births each year, placing Indonesia ninth in the world for the highest prevalence of LBW. The mortality risk for LBW infants is four times greater than that of babies born weighing more than 2,500 grams. Currently, the infant mortality rate in Indonesia is 22 cases per 1,000 live births. Efforts to minimize the occurrence of LBW are carried out by identifying all types of risk factors that may cause the condition.

The incidence of LBW is influenced by many interrelated factors, ranging from maternal factors (such as age, parity, and nutritional status) and fetal factors to environmental factors. This study aims to identify the dominant factors through a literature review of seven recent studies from the last five years to provide up-to-date information. The results of this research are necessary to formulate a multidisciplinary approach to reducing LBW prevalence through nutritional improvements, pregnancy monitoring, and health education. Babies born with LBW have a 20 times greater risk of complications than babies with normal birth weight. These infants are vulnerable to immediate health issues following birth, such as respiratory disorders and jaundice. Furthermore, LBW affects the future growth and development of the child, including physical and psychological development, communication skills, and general growth and development. Growth disturbances resulting from LBW can decrease the quality of human resources in the future if not addressed through appropriate policies.

Factors related to the fetus include genetic factors, congenital abnormalities in the fetus, suboptimal fetal nutrition, and factors related to the pregnant mother, such as maternal nutrition, physical condition, and health status (hypertension, heart disease, etc.). Several measures need to be taken to minimize the occurrence of LBW in infants. One of them is by identifying all kinds of risk factors that may cause LBW. Researchers argue that the mother's nutritional status, antenatal care (ANC) visits, and spousal support are closely related to the incidence of LBW experienced by newborns (Salam, 2021)

The infant mortality rate in Indonesia is currently 22 cases per 1,000 live births, with a total of 10,294 cases. LBW is defined as a birth weight of less than 2500 grams, with a mortality risk four times greater than that of babies born weighing more than 2500 grams. The prevalence of LBW in Indonesia is 15.5% of births each year, placing Indonesia ninth in the world for the highest prevalence of LBW. Risk factors that influence the incidence of LBW include maternal factors, placental factors, fetal factors, environmental factors, anemia, maternal age, birth spacing, quality of service, exposure to cigarette smoke, socioeconomic status, and maternal nutritional status (Haryanti et al., 2019).

In general, LBW is influenced by two factors: maternal factors and fetal factors. Maternal factors that influence LBW include maternal age during pregnancy (<20 years or >35 years), short birth interval, maternal health status, and maternal health issues. Fetal factors include congenital defects and infections during pregnancy. Age, parity, pregnancy interval, weight gain, anemia, and preeclampsia have a significant influence on LBW (Devaguru et al., 2023). The prevalence of LBW in a country is considered low if it is less than 5 percent. The results of the Basic Health Research show that the percentage of children under five years of age who had a birth weight of < 2500 grams in 2007 was 11.5 percent and decreased to 11.1 percent in 2010. Disparities in the proportion of LBW occurred between one region and another, ranging from 5.8% to 27.0% in 2007, and varying from 6.0% to 18.5% in 2010. The proportion of LBW was higher in rural areas (12.0%) than in urban areas (10.4%). One of the current public health issues is LBW with a weight of less than 2500 grams. The prevalence of LBW cases at Delima General Hospital in Medan in 2019 was 53.0%, in 2020 it was 59.1%, and 63.38% in 2021 (Hasibuan et al., 2023)

Methods

The method used in this research is a systematic literature review as a systematic search of electronic databases, namely PubMed, Google Scholar, and ScienceDirect. The search process was conducted between 2019 and 2024 to obtain the latest research relevant to the topic of "Low Birth Weight (LBW)". The keywords used included: "Low Birth Weight", "LBW", "LBW Risk Factors", "LBW in the last 5 years", and "Low Birth Weight". The inclusion criteria used in the selection of literature included: (1) studies published in the last 5 years, (2) articles available in full text, (3) studies using observational methods (cross-sectional, cohort, and case-control), and (4) studies in English or Indonesian. Meanwhile, the exclusion criteria were old review articles and studies with insufficient data. The selection process was carried out by reading the titles and abstracts to ensure relevance. Articles that met the criteria were then analyzed in depth to identify factors that influence the incidence of LBW.

Results and Discussion

Based on the article search, seven articles were analyzed using a matrix table (Table 1) to identify each variable studied related to the factors influencing the incidence of low birth weight (LBW). Maternal Factors and Health Status. Maternal age is a significant risk factor, where ages <20 and >35 years are proven to increase the risk of LBW with p-values of 0.026 and 0.004. Medically, at the age of <20, there is nutritional competition between the mother’s growth and the fetus, while in mothers over 35, declining endometrial function hinders nutrient distribution3333. Nutritional status, specifically Chronic Energy Deficiency (CED), is also highly influential (p=0.024 and p=0.004). A deficiency in energy and protein can reduce fetal DNA and RNA, thereby disrupting nutrient transfer through the placenta. This is further exacerbated by anemia (p=0.001 and p=0.000), where low hemoglobin levels reduce oxygen supply to the uterus, impairing intrauterine growth.

Pregnancy Factors and Complications. Pregnancy conditions such as preeclampsia show a very strong correlation with LBW (p=0.00 and OR=23.74). Preeclampsia causes vasoconstriction in the uterine blood vessels, drastically reducing the supply of oxygen and nutrients and leading to Intrauterine Growth Retardation (IUGR). Additionally, short pregnancy spacing (<2 years) was found to be a dominant factor (p=0.000) that increases the risk of LBW because the mother’s body has not fully recovered. Parity or the number of births also has an effect (p=0.002 and p=0.03), where mothers with high parity (>4) are at risk due to uterine dysfunction and changes in uterine elasticity.

Fetal Factors and External Support. From the fetal perspective, gestational age or premature birth is the most common cause of LBW (p=0.000 and p=0.005) with an OR of 21.76. Infants born before 37 weeks have not had sufficient time to grow optimally. Multiple pregnancies (gemelli) are also statistically significant (p=0.00 and OR=10.46) because the average weight of a fetus in a twin pregnancy is typically 1,000 grams lighter than in a singleton pregnancy. Finally, spousal support has a real influence (p=0.04) in ensuring the mother receives adequate nutrition and routinely attends Antenatal Care (ANC) visits to monitor fetal development early on.

Three of the seven articles used quantitative methods with a case-control design, while the remaining articles used quantitative methodologies with a cross-sectional study design (two journals), analytical observational analysis with a case-control and retrospective approach, and correlational analysis with a cross-sectional approach. All seven articles were published in Indonesia. Below is a list of the 7 articles found and summarized in a table:

Table 1. Jurnal Analysis Result				
No	Citation	Method	Sample	Results
1	Hazimah, M., Akbar, S., Pane, A. H., & Diba, F. (2024). Factors that influence the incidence of low birth weight in Bangka Regency. <i>STM Medical Journal (Science and Medical Technology)</i> , 7(1), 42-52	Study type: Quantitative with a case-control design	Population: 66 people. The sample consisted of mothers who gave birth to low birth weight babies (33 people) and control mothers who gave birth to normal babies (33 people)	1. Maternal age: Mothers aged <20 years still require a lot of nutrients for their body growth, while those aged >35 years experience a decline in reproductive function and circulation to the uterus. Both ly increase the risk of LBW with a <i>p-value</i> of 0.026 2. ANC: Although not statistically significant, ANC frequency <4 times shows a tendency to increase the risk of LBW. Regular ANC visits provide education and health monitoring that help prevent LBW with a <i>p-value</i> of 0.084 3. Nutritional Status: This factor has a significant effect. LILA <23.5 cm indicates a risk of Chronic Energy Deficiency (CED), which can inhibit fetal growth. These results are in line with Zulfikar's (2023) research, but differ from Litriani's (2022), who found no significant relationship with a <i>p-value</i> of 0.024 4. Parity: Not significantly influential in this study, differing from previous studies that showed a positive relationship

				between high parity and LBW with a <i>p-value</i> of 0.602
2	Haryanti, S. Y., Pangestuti, D. R., & Kartini, A. (2019). Anemia and anemia in pregnant women as risk factors for low birth weight (LBW) (a study in the working area of the Juwana Community Health Center, Pati Regency). <i>Journal of Public Health</i> , 7(1), 322-329	The research method used was quantitative, observational analytical research with a case-control study design and a retrospective approach	The population consisted of 763 infants, with a sample of 20 cases and 20 controls	Significant variables associated with LBW were Anemia in mothers (p=0.001), and KEK (p=0.004)[cite: 58]. Only the cigarette smoke exposure variable was not associated with LBW (p = 0.027)
3	Hasibuan, N. F., Raja, S.L., Fitria, A., Nasution, Z., & Wulan, M. (2023). Factors Influencing the Occurrence of Low Birth Weight (LBW) at Delima General Hospital, Medan, in 2022. <i>Journal of Educational Innovation and Public Health</i> , 1(1), 149-164	quantitative analytical survey, with a case-control study.	The study population for this was mothers who gave birth to babies with LBW from January 2022 to April 2022, with a sample size of 56	Factors influencing the occurrence of LBW: maternal age with p(sig) 0.004, gestational age with p(sig) 0.005, parity with p(sig) 0.002, inter-pregnancy interval with p(sig) 0.000, medical history with p(sig) 0.002, pregnancy complications with p(sig) 0.005[cite: 58]. The factor that is not influential is the mother's occupation with p(sig) 0.252[cite: 58]. The most dominant influential factor is the pregnancy interval with Exp(B)0.001
4	Rizkika, A., Rahfiludin, M. Z., & Asna, A. F. (2023). Factors Associated with Low Birth Weight at Kertek 2 Community Health Center, Wonosobo District. <i>Amerta Nutrition</i> , 7(1), 37-44	A quantitative study with a cross-sectional design.	The population in this study consisted of all babies born at Kertek 2 Community Health Center, Wonosobo District, in 2020, totaling 396.	Maternal factors associated with LBW were maternal age (p=0.003), gestational age (p=0.000), parity (p=0.022), and inter-pregnancy interval (p=0.018)[cite: 58]. Other factors such as anemia, upper arm circumference, maternal weight gain, illness and infection, environmental factors, and socioeconomic factors did not show significant associations
5	Indah, F. N., & Utami, I. (2020). Factors Associated with Low Birth Weight (LBW). <i>Intan Husada: Scientific Journal of Nursing</i> , 8(1), 19-35.	Analytical observational study using a case-control and retrospective approach	The population in this study consisted of all infants born at Panembahan Senopati General Hospital, Bantul, in 2017, with a sample size of 406 infants (203 cases, 203 controls).	The results of this study showed that maternal age had a p-value = 0.07, parity had a p-value = 0.03, birth interval had a p-value = 0.01, OR = 1.77, gestational age had a p-value = 0.00, OR = 21.76, anemia had a p-value = 1.00, preeclampsia had a p-value = 0.00, OR = 23.74, and twins had a p-value = 0.00. OR = 10.46.

6	Salam, P. R. (2021). Factors Associated with the Occurrence of LBW in Jember District. <i>Medical Journal of Al-Qodiri</i> , 6(2), 98-106.	Correlational with a cross-sectional approach.	The total population in this study was 50 respondents	Variables and Coefficient Values Obtained: Maternal Nutritional Status with Low Birth Weight (LBW) = 0.00 [cite: 58], Antepartum Care History with Low Birth Weight (LBW) = 0.00 [cite: 58], Spousal Support with Low Birth Weight (LBW) = 0.04.
7	Amiruddin, N. A., Delima, A. A., & Fauziah, H. (2022). The relationship between anemia in pregnancy and the incidence of low birth weight (LBW). <i>UMI Medical Journal</i> , 7(2), 132-140	quantitative analytical, Cross-sectional design	Consecutive sampling The study included 100 pregnant women who gave birth with anemia in the third trimester, taking into account the inclusion and exclusion criteria	The p-value obtained was 0.000, which means that the chi-square test results prove a significant relationship between anemia in pregnancy and the incidence of LBW

Overall, this study shows that LBW is a complex health problem influenced by several factors. Addressing this problem requires a multidimensional approach involving the health, education, and community sectors to create an environment that supports maternal and infant health. Based on the analysis of seven articles conducted by researchers, the factors influencing LBW are:

Maternal age

The at-risk age for mothers giving birth, which is under 20 or over 35 years old, was more prevalent in the case group (30.3%), while the non-at-risk age for mothers giving birth, which is 20-35 years old, was most prevalent in the control group (33.3%). The high-risk age group is very susceptible to low birth weight (LBW) babies because at <20 years of age, mothers still need a lot of nutrients for their own growth, but pregnancy requires competition between the mother's and baby's nutrients. Meanwhile, in mothers aged over 35 years, endometrial function has declined, resulting in inadequate support for nutrient distribution between the mother and the baby (Hazimah et al., 2024).

ANC History

ANC plays a crucial role in the health of pregnant women. ANC is also useful for monitoring various developments and issues that arise during pregnancy. During pregnancy, many things can affect the health of the mother because at that time the mother is very vulnerable to various complications during pregnancy, and these complications can also affect the condition of the fetus. Therefore, pregnant women who regularly visit ANC will always be able to monitor the development of their pregnancy, which can also monitor the health of the mother and the fetus she is carrying. Pregnant women who regularly attend ANC visits will always receive information on how to improve nutrition during pregnancy. For example, by consuming foods that contain iron, vitamins, and so on, which can improve the health of pregnant women so that if nutritional needs are met, the mother's nutritional status will be good. However, pregnant women who regularly undergo antenatal care will receive comprehensive pregnancy care, so that prevention can be carried out as early as possible, such as improving the nutrition of pregnant women and ensuring compliance with consuming foods that are high in nutrients, which can lead to improved nutrition, which is also very good for the condition of the baby after birth (Salam, 2021).

Nutritional Status / Nutrition

A higher level of protein adequacy during pregnancy is needed by the placenta to carry food to the fetus, as well as for the formation of maternal and fetal hormones and enzymes. A deficiency of energy and protein nutrients in pregnant women can reduce DNA and RNA, which can affect the fatty acid profile, thereby disrupting the transfer of nutrients from the mother to the fetus. Brain size may also decrease in this mechanism due to changes in protein structure, growth factor concentration, and neurotransmitter production. Pregnant women with KEK will experience complications during childbirth, such as difficult and prolonged labor, premature birth, postpartum hemorrhage, and an increased likelihood of cesarean section. Pregnant women with KEK will also affect fetal growth, such as miscarriage, abortion, stillbirth, neonatal death, congenital defects, anemia in stillborn babies, and babies born with low birth weight (Haryanti et al., 2019).

Anemia in mothers

If the mother's hemoglobin level is higher, it means that the amount of iron that functions to transport oxygen and form blood is greater, so that more blood is formed and the fetus and placenta get what they need according to the mother's hemoglobin level. Anemia during pregnancy can occur due to an increase in blood plasma volume, which causes hemoglobin levels in the blood to decrease. Nutritional anemia begins with the depletion of iron stores (ferritin) and increased iron absorption, as indicated by an increase in iron-binding capacity, resulting in depleted iron stores, decreased transferrin saturation, and a reduction in the amount of protoporphyrin converted into heme as ferritin levels decrease in serum. This results in anemia characterized by low hemoglobin levels. Pregnant women suffering from anemia experience a reduced blood supply to the placenta, which affects the placenta's function in relation to the fetus. During pregnancy, women undergo physiological changes that cause an imbalance in the amount of blood plasma and red blood cells, which can be seen in the form of decreased hemoglobin levels. This will affect oxygen delivery to the uterus and disrupt the intrauterine environment, particularly impairing fetal growth, resulting in the birth of a low birth weight infant (Haryanti et al., 2019).

Gestational age

Gestational age is the length of time a fetus remains in the uterus, calculated from the First Day of the Last Menstrual Period (FPMP) until the mother gives birth to her baby. The most common cause of LBW is premature birth (before full term). A shorter gestational age increases the risk of low birth weight (LBW) because the baby's growth is not yet complete. The younger the gestational age, the greater the risk of short-term and long-term s that may occur. A gestational age of 37 weeks is considered optimal for fetal development. Babies born before 37 weeks of gestation have not had sufficient time to grow optimally, increasing the risk of having a birth weight below 2500 grams (Safira, 2020). Gestational age affects the incidence of LBW because the shorter the mother's gestational age, the less complete the development of the baby's organs, which in turn affects the baby's weight. This is because the uterus has undergone changes in its elasticity. One complication that can arise from having more than four children is LBW, which is caused by uterine dysfunction, particularly in terms of blood vessel function, which can affect nutrition to the fetus, leading to growth disorders (Hasibuan et al., 2023).

Parity

There is a relationship between parity and the incidence of LBW. This is because a uterus that has given birth to many children tends to be inefficient during all stages of labor. This is because the uterus has undergone changes in its elasticity. One complication that can arise from carrying more than four children is LBW, which is caused by uterine dysfunction, particularly in terms of blood vessel function, which can affect fetal nutrition and lead to growth disorders (Saswita, 2021). The researcher's assumption in this study is that parity 2 to 4 is the safest parity when viewed from the perspective of maternal mortality, while parity 1 and more than 4 have higher maternal mortality rates. Mothers with more than 4 children increase the risk of death for both mother and baby. Mothers with high parity are more likely to experience complications during pregnancy. High parity combined with short pregnancy intervals can lead to several adverse pregnancy outcomes and cause mothers to become too exhausted to give birth, breastfeed, and care for their children (Hasibuan et al., 2023).

Pregnancy spacing

Ideally, the pregnancy interval should not be less than 9 months to 24 months since the previous birth. The interval between the last delivery and the next pregnancy (pregnancy spacing) should be between 2 and 10 years. A pregnancy interval of less than 2 years is one of the risk factors for death due to abortion and low birth weight (LBW). The closer the interval between the previous pregnancy and the current one, the greater the risk of abortion and LBW. Another fact is that the risk of death for children increases by 50% if the interval between two births is less than 2 years. This is a biological fact that cannot be avoided (Hasibuan et al., 2023).

Pregnancy complications

Pregnancy complications are associated with LBW, where mothers who experience pregnancy complications are four times more likely to give birth to LBW babies compared to those without complications during pregnancy (Dhirah et al., 2020). The researchers' assumption in this study is that pregnancy complications experienced by mothers may also be influenced by dietary and occupational factors. Mothers who are pregnant without complications can give birth to healthy and normal babies. In addition, babies born with LBW can also be experienced by mothers who do not experience complications during pregnancy, such as mothers who experience KPD, which can be caused by heavy work factors that cause contractions and premature birth (Hasibuan et al., 2023).

Preeclampsia

Preeclampsia occurs due to vasoconstriction of blood vessels in the uterus, which causes an increase in peripheral resistance, resulting in an increase in blood pressure. Vasoconstriction

of blood vessels in the uterus can result in decreased blood flow, thereby reducing the supply of oxygen and nutrients to the fetus. When this occurs, it can cause intrauterine growth retardation (IUGR) and the birth of a low birth weight (LBW) baby. Another condition is also clarified as a result of the failure of the spiral arteries in the myometrium to maintain their muscular elasticity. In addition, acute arteriosclerosis occurs in the spiral arteries, which can cause the lumen of the arteries to become smaller. This condition will cause placental infarction and can result in fetal hypoxia and fetal death. Preeclampsia increases the risk of IUGR and low birth weight due to reduced uteroplacental blood flow, which can result in low birth weight (Indah & Utami, 2020).

Gamelli

Fetal weight in twin pregnancies is lighter than in singleton pregnancies. The average weight of one fetus in a twin pregnancy is 1000 grams lighter than in a singleton pregnancy. Up to 30 weeks of pregnancy, the weight gain of twins is the same as that of a single pregnancy (Melamed & Hirsch, 2022). Multiple pregnancies can also cause pregnancy complications in the second and third trimesters related to the fetus, such as Intrauterine Growth Retardation (IUGR), premature growth, growth anomalies, and can also cause the fetus to be small or even die (Indah & Utami, 2020).

Spousal Support

Spousal support refers to all activities undertaken by the husband for his wife during pregnancy. Spousal support during pregnancy can take various forms of activities aimed at fulfilling the pregnant woman's needs, including physical, psychological, and even spiritual needs. All of these activities are undertaken by the husband to ensure that all pregnancy and childbirth-related needs are adequately met, thereby ensuring the health of both the mother and baby at birth. A husband who provides support to a pregnant woman throughout her pregnancy and in fulfilling her pregnancy needs will always pay attention to everything the pregnant woman does so that all decisions made by the pregnant woman to fulfill her needs are also known and decided by the husband. Therefore, husbands also have a role in fulfilling all kinds of needs of their wives. Husbands' support is closely related to the condition where pregnant women need support in everything related to their needs during pregnancy, such as ANC visits. A mother needs her husband's support during every ANC visit, where she will typically gain knowledge about improving nutrition for the fetus so that the baby is not born with low birth weight (Indah & Utami, 2020).

Conclusion and Suggestion

These studies show that low birth weight (LBW) is a significant public health problem with short- and long-term effects on infant health. Factors that influence LBW include maternal age, ANC history, nutritional status, maternal anemia, gestational age, parity, birth spacing, medical history, pregnancy complications, preeclampsia, gamelli, and spousal support. Mothers who experience anemia, malnutrition, and preeclampsia are more likely to give birth to low birth weight babies. Prevention of LBW requires a comprehensive approach, including improving the nutrition of pregnant women, routine pregnancy monitoring, and health education. These efforts are expected to reduce the incidence of LBW and improve the health of mothers and babies. The high infant mortality rate due to LBW in Indonesia emphasizes the need for greater attention to these risk factors. This literature confirms that interventions focused on improving maternal health and access to prenatal care are essential to reduce LBW rates.

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