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RESEARCH

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Maternal and Pregnancy-Related Factors Associated with Low Birth Weight in Low- and Middle-Income Countries: A Scoping Review

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Abstract

Background: Low birth weight (LBW) continues to be a significant public health problem worldwide, contributing substantially to neonatal morbidity and mortality. Approx 96% of LBW cases are seen in developing countries. **Objective:** The present review aims to explore and categorize maternal risk factors for LBW in low- and middle-income countries. **Methods:** A scoping review was performed following the PRISMA-ScR framework. Literature searches were conducted in four databases: PubMed, ScienceDirect, Cochrane Library and Google Scholar for studies published from 2021 to 2025. **Results:** A total of 500 records were identified and 16 articles were included after screening and assessment of eligibility. The methodological quality of eligible studies was assessed by JBI Critical Appraisal Tools. **Results:** The included studies were 16 articles, of which 75% were from Asia and 25% were from Africa. Thematic analysis identified 8 categories of maternal and pregnancy-related factors associated with LBW: maternal nutritional status and anthropometric characteristics, maternal age, obstetric history, pregnancy complications, sociodemographic factors, adequacy of antenatal care, preterm birth and multiple gestations, lifestyle and environmental factors. Pre-eclampsia, low gestational weight gain, maternal anemia and poor antenatal care were consistently reported to be associated with LBW. Study design, population, exposure definition and statistical adjustment differences contributed to variation in effect estimates. **Conclusion:** Maternal and pregnancy factors especially pre-eclampsia, poor maternal nutritional status, anemia, poor antenatal care and pregnancy complications have significant roles in occurrence of LBW. Holistic strategies that promote nutritional optimization, early detection and management of pregnancy complications, and improve quality of ANC are essential to reduce the burden of LBW in LMICs.

Keywords: low birth weight; maternal risk factors; scoping review; low- and middle-income countries; antenatal care.

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1. INTRODUCTION

The World Health Organization says that low birth weight, or LBW, is when a baby is born weighing less than 2,500 grams, no matter how long the pregnancy was. LBW is seen as one of the most dependable signs of a population's general health because it shows not just how well the mother is doing, but also how good the healthcare services are and the economic and social conditions in the community (Blencowe et al., 2019). World-wide, 15 to 20 percent of all babies born each year are LBW. This means that each year more than 20 million newborns are affected. Almost 96% of these cases are in countries that are still developing (UNICEF; WHO, 2019). South Asia has the highest rate of low birth weight babies in the world (26.4%) followed by Sub-Saharan Africa. By comparison, in areas like North America and Europe the percentage is far less, typically 4-7%. The most recent national data from the Indonesian Health Survey 2023 in Indonesia reveals low birth weight continues to be a major concern among mothers and neonates, implying that more efforts are necessary to detect and manage the dangers during pregnancy that can cause adverse birth outcomes. Similar to Bangladesh, India and Pakistan which have experienced even higher rates of low birth weight (Alam et al., 2022; Iqbal et al., 2022; Singh et al., 2023), the rate of low birth weight in Indonesia is still a problem compared to other developing countries.

Cutland et al. (2017) reported that low birth weight (LBW) is the strongest predictor of mortality in the first month after delivery and 60 to 80 percent of all neonatal deaths. Newborns with LBW have a 20 times higher risk of death than normal weight newborns (Hughes, Black, & Katz, 2017). Adverse intrauterine conditions can lead to permanent alterations in fetal metabolic, endocrine and cardiovascular development early on in life within the DOHaD framework, increasing the risk of type 2 diabetes, hypertension, cardiovascular disease, and kidney-related conditions in adulthood (Barker, 2007; Zanetti et al., 2018). In particular, the extra care needed by LBW newborns creates a significant financial burden on families and health systems, especially in developing countries with limited resources (Poon et al., 2019).

The causes of LBW are due to multifactorial interaction of maternal, fetal, placental and environmental factors. Maternal determinants comprise nutritional status, age and parity, pregnancy complications, socioeconomic status, education, and access to antenatal care (Devaguru, Gada, Potpalle, Dinesh Eshwar, & Purwar, 2023; Dewi, Hardjito, & Kundarti, 2022). Among these, pre-eclampsia is one of the strongest clinical predictors, acting through defective restructuring of the spiral arteries, which impairs placental blood circulation and fetal growth (Hong, Kim, Cha, & Park, 2021; Y. Liu et al., 2021; Staff et al., 2022). Alcohol intake, cigaret smoking and overexertion in physical activity have also been associated with an increased probability of occurrence of LBW (Patra et al., 2011; Pineles, Park, & Samet, 2014).

The literature on maternal factors associated with LBW covers a broad spectrum of biological, clinical, social and environmental factors. Therefore, a scoping review was deemed appropriate. Also the evidence available is heterogenous in populations, contexts and study designs. This approach allows for a wider exploration and mapping of the existing evidence and identification of important concepts and gaps in the literature, rather than a narrowly defined research question as in a systematic review. The present review seeks to provide a comprehensive overview of maternal factors associated with LBW especially in low-income settings where evidence remains diverse and scattered across study types through this approach.

Previous reviews have examined maternal risk factors associated with LBW, including anemia and pre-eclampsia. However, there are evidence gaps on the mapping of maternal and pregnancy-related determinants across the LMICs. This scoping review builds on the previous evidence by synthesizing recent studies published between 2021 and 2025 and mapping multiple domains associated with LBW, including maternal nutritional status, demographic characteristics, obstetric conditions, pregnancy complications, antenatal care, socioeconomic factors, and lifestyle-related factors. Moreover, this review identifies the evidence gaps and

disparities that exist to guide future research and intervention strategies in maternal and neonatal health.

2. RESEARCH METHOD

This study employed a scoping review design as its methodological framework. We followed the PRISMA-ScR reporting standards to ensure transparency and research quality, and the study protocol was officially registered on OSF (<https://doi.org/10.17605/OSF.IO/XQY2J>). The review process consisted of five consecutive steps: (1) formulation of the research question, (2) systematic searching of databases to obtain relevant articles, (3) application of inclusion and exclusion criteria to select relevant studies, (4) organization and mapping of the collected data, and (5) synthesis of the results to provide a comprehensive and coherent summary of the findings.

This scoping review uses the PCC framework to map information based on findings from articles relevant to the review questions as follows :

Table 1. PCC Framework

Population	Concept	Context
Pregnant women	Maternal-related factors linked to the occurrence of low birth weight	Developing countries
A mother giving birth to live infants		

This framework is used for this scoping review to explore and identify mothers' associated factors related to low birth weight in communities from developing countries.

Only studies meeting certain requirements are included in this review. Eligible studies must be primary research articles, freely available in full text, and published between 2021 and 2025. The articles may be written in English or Indonesian, and may take quantitative, qualitative, or mixed-method approaches. The studies had to be carried out in countries defined as low- and middle-income countries (LMICs) by the World Bank's 2025 country list. The study involved countries with low income, lower middle income and upper middle income. The country groups were defined by the World Bank classifications in effect at the time the study was being checked.

On the other hand, studies that were review articles, editorials, commentaries, or opinion pieces were not included. Research was also not accepted if it didn't clearly show LBW as a measured outcome or if it couldn't prove a clear connection between the mother's factors during pregnancy and the occurrence of LBW.

A search for articles was carried out in four online databases: PubMed/MEDLINE, ScienceDirect, Cochrane Library, and Google Scholar. The articles included were published between January 2021 and December 2025. Google Scholar was also used to locate additional related studies. To find good studies, we made keywords with the PCC framework and made them more complete by using MeSH terms, Boolean operators, and truncation methods. The search used terms such as: (pregnan* OR gestat) AND (maternal risk factor OR maternal factor) AND (low birth weight OR LBW) AND (developing country OR Asia* OR Africa* OR Latin America*). In addition to searching the databases, we also checked the reference lists of all the articles we found to identify any other studies that could be relevant and might have been overlooked during the initial database search..

Three people assisted with the selection of studies for the review. Two reviewers independently screened the titles and abstracts of the identified studies and agreed on a set of predefined rules that were used to determine eligibility. The full-text articles were then reviewed by the same reviewers. The disagreements which had arisen during the screening were discussed and resolved. If there were still differences after that, a third person was called in to help make a decision. Mendeley and Covidence were used to remove duplicate records before screening.

Once duplicates were removed, the same three-step selection process was applied, including screening of titles, screening of abstracts, and assessment of full texts. Data extraction was proceeded for articles that passed all stages. Data were independently extracted accurately by reviewers using a standardized chart. The methodological quality of the selected studies was assessed with the JBI Critical Appraisal Tools appropriate for the wide range of study designs included in this scoping review.

3. RESULTS AND DISCUSSION

The systematic search yielded 500 records from the selected databases. After removal of 47 duplicate records using Mendeley and Covidence, 453 records remained for title and abstract screening. This stage involved the exclusion of studies that were not meeting the eligibility criteria on the basis of their relevance to the review objectives.

A total of 31 articles were subsequently assessed through full-text screening. Following full-text assessment, 15 articles were excluded due to reasons including inappropriate study design (n=4), publication period outside the inclusion criteria (n=1), irrelevant population (n=1), and unrelated exposure or outcome variables (n=9). Finally, 16 studies met all eligibility criteria and were included in the final synthesis. The complete study selection process is presented in Figure 1.

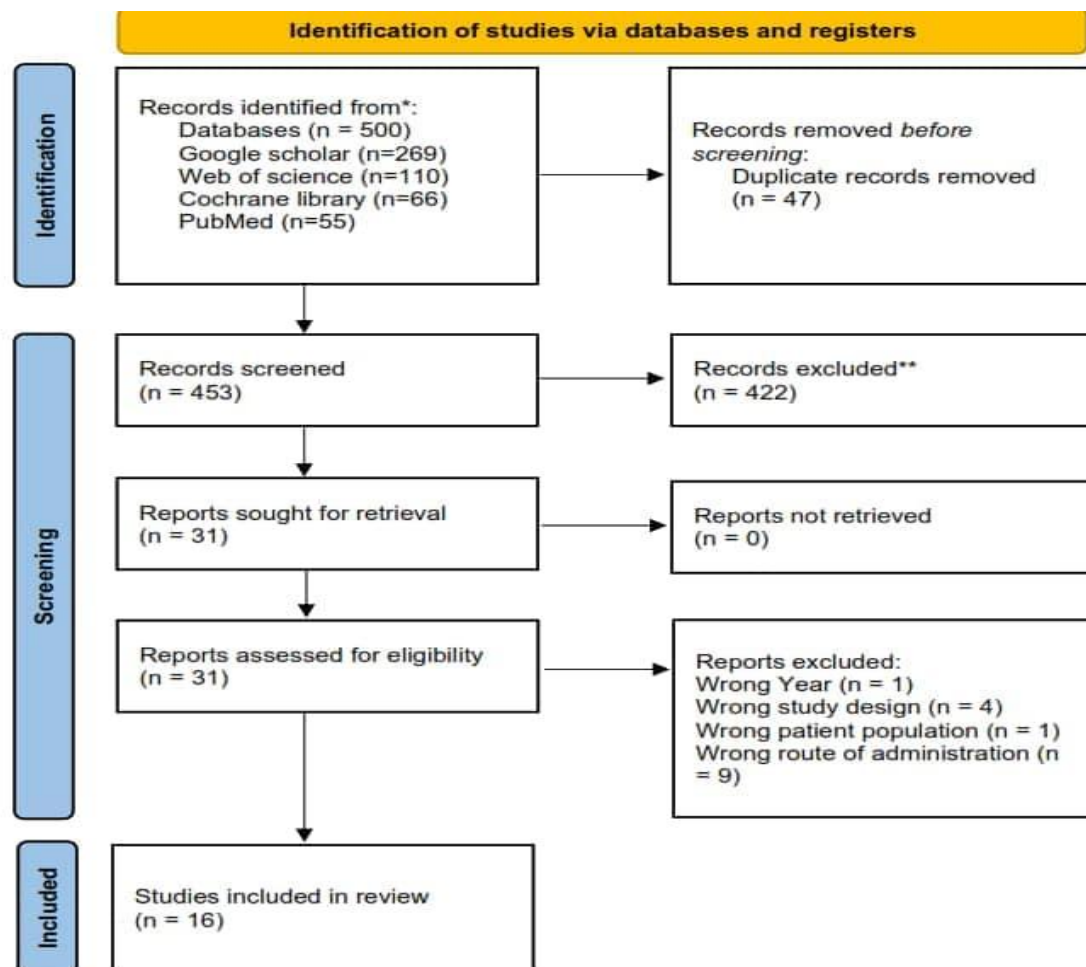


Figure 1 Prisma Flowchart

Article Characteristics

This review included 16 studies, published between 2021 and 2025. All included studies were conducted in low- and middle-income countries, which are situated in Asia and Africa.

Most of the studies (12 out of 15, 75%) were conducted in Asia, particularly in countries such as Pakistan, Bangladesh, India, China and Indonesia. The remaining 4 studies (25%) were conducted in Africa, in Ethiopia, Nigeria, Northern Ghana, and Uganda. However, Latin America was not included in the search of any of the articles' studies. This unequal distribution suggests possible missing information, and highlights the need for further studies on factors associated with mothers and their pregnancies that influence low birth weight in low-income countries of Latin America. Regarding the study designs, 10 studies (62.5%) were cross-sectional studies. Of the studies reviewed, five (31.25%) employed a case-control design. And one study, 6.25%, used a cohort design.

Although methodological quality appraisal isn't required for scoping reviews, this review did a careful evaluation to clearly describe the methods used and how strong the evidence is. The Joanna Briggs Institute (JBI) Critical Appraisal Tools were used based on the study design of each included article. For cross-sectional studies, the JBI Analytical Cross-Sectional Studies Checklist was applied. For case-control studies, the JBI Case-Control Studies Checklist was used. And for cohort studies, the JBI Cohort Studies Checklist was followed. Each study was checked using the specific rules of its own appraisal tool. This included looking at how participants were selected, how exposures and outcomes were measured, how confounding factors were identified and handled, and whether the statistical analysis was done properly. The appraisal process was done to check the quality of the evidence included and did not affect whether studies were added or removed. The studies that were included showed reasonable quality in their methods, but there were some issues found, such as not properly controlling for other factors that could affect the results, small groups of participants, and research that was done at only one center. The detailed appraisal results are shown in Table 2.

Table 2. Critical Appraisal

Author/year/Study	JBI Critical Appraisal Tool	Appraisal result	Methodological quality
Shafi et al. (2022) Case-control	JBI Critical Appraisal Checklist for Case-Control Studies	Appropriate case and control groups, clear inclusion criteria, and valid measurement of exposure and outcome	Good methodological quality
Islam et al. (2022) Case-control	JBI Critical Appraisal Checklist for Case-Control Studies	Clearly defined cases and controls, appropriate statistical analysis, comparable groups	Good methodological quality
Sharma et al. (2025) Cross-sectional	JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies	Clear inclusion criteria, appropriate outcome measurement, and suitable statistical analysis	Good methodological quality
Ruan et al. (2025) Cohort	JBI Critical Appraisal Checklist for Cohort Studies	Clear cohort selection, adequate follow-up, and appropriate statistical methods	Good methodological quality
Aga & Woldeamanuel (2025) Cross-sectional	JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies	Appropriate sample selection, reliable measurement methods, and confounding factors considered	Good methodological quality
Anwar et al. (2024) Cross-sectional	JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies	Clear study population, valid outcome measurement, appropriate analysis	Good methodological quality
Nurmawati et al. (2025) Retrospective observational	JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies	Clear data source, defined variables, and appropriate statistical analysis	Moderate methodological quality

Ray et al. (2025) Case-control	JBICritical Appraisal Checklist for Case-Control Studies	Appropriate selection of cases and controls, and statistical analysis conducted appropriately	Good methodological quality
Al-Aziz et al. (2022) Case-control	JBICritical Appraisal Checklist for Case-Control Studies	Clear case-control definition, appropriate comparison groups, and valid outcome measurement	Good methodological quality
Indriany et al. (2024)	JBICritical Appraisal Checklist for Case-Control Studies	Appropriate participant selection, reliable measurement, and multivariate analysis performed	Good methodological quality
Akaba et al. (2021)	JBICritical Appraisal Checklist for Analytical Cross-Sectional Studies	Clear population definition and outcome assessment, appropriate statistical analysis	Good methodological quality
Madumey & Nareswari (2025) Cross-sectional	JBICritical Appraisal Checklist for Analytical Cross-Sectional Studies	Defined variables and appropriate statistical testing	Moderate methodological quality
Shaohua et al. (2022) Cross-sectional	JBICritical Appraisal Checklist for Analytical Cross-Sectional Studies	Large sample size, clear outcome measurement, and appropriate regression analysis	Good methodological quality
Ahenkorah et al. (2022) Cohort/prospective	JBICritical Appraisal Checklist for Cohort Studies	Prospective design, appropriate outcome measurement, and regression analysis performed	Good methodological quality
Lin et al. (2021) Retrospective cohort	JBICritical Appraisal Checklist for Cohort Studies	Very large sample, clear exposure and outcome definitions, appropriate regression modeling	Good methodological quality
Serunjogi et al. (2021) Surveillance study	JBICritical Appraisal Checklist for Cohort Studies	Large population-based dataset, clear outcome assessment, appropriate statistical analysis	Good methodological quality

Data tabulation

Data tabulation was performed on 16 relevant articles. The data were organized into a table containing the following columns: title, author, year of publication, country, purpose, participants, research methods, and research results, as presented in Table 3.

Table 3. Data Charting

Author / Year / Country	Sample Characteristics	Maternal and Pregnancy-Related Factors Associated with LBW	Main Findings
Shafi et al. (2022) Pakistan	160 mothers (80 LBW cases and 80 controls)	Maternal weight, maternal illness (hypertension/diabetes mellitus), parity, and anemia	Lower maternal weight, maternal illness, primiparity, and anemia were associated with LBW.
Islam et al. (2022) Bangladesh	96 mothers (48 LBW cases and 48 controls)	Primiparity, anemia, hypertension, and preterm birth	Maternal and pregnancy-related factors were associated with LBW; preterm birth remained

			significantly associated in multivariate analysis.
Sharma et al. (2025) India	5,133 live births	Maternal age, underweight, alcohol use, inadequate antenatal care, anemia, short birth interval, preterm birth	Maternal nutritional status, inadequate ANC, anemia, short birth interval, and preterm birth were associated with LBW.
Ruan et al. (2025) China	34,104 pregnant women	Pre-eclampsia, infection, inadequate gestational weight gain, pre-pregnancy underweight	Pre-eclampsia, inadequate gestational weight gain, infection, and maternal underweight were associated with increased LBW risk.
Aga & Woldeamanuel (2025) Ethiopia	722 singleton full-term mothers	Maternal age, family size, pregnancy planning, alcohol use, antenatal care, maternal nutritional status	Maternal nutrition and adequate antenatal care were important factors associated with LBW.
Anwar et al. (2024) Pakistan	171 women with singleton pregnancies	Maternal age, height, weight, anemia, parity, and smoking	Maternal age, short stature, low maternal weight, and anemia were associated with LBW.
Nurmawati et al. (2025) Indonesia	83 mothers from Kemuning Lor Village, Jember	Maternal nutritional status (MUAC/LiLA), maternal age, hemoglobin level, maternal height, gestational age	Low maternal MUAC/LiLA and maternal age were associated with the occurrence of LBW.
Ray et al. (2025) Bangladesh	150 mothers (75 LBW cases and 75 controls)	Maternal age, parity, hypertension, pre-eclampsia, PROM, socioeconomic status, antenatal care	Obstetric complications, inadequate ANC, and socioeconomic factors were associated with LBW.
Al-Aziz et al. (2022) Bangladesh	200 mothers (100 LBW cases and 100 controls)	Maternal weight, height, age, parity, education, socioeconomic status, ANC, pregnancy complications	Maternal anthropometric characteristics, socioeconomic conditions, inadequate ANC, and pregnancy complications were associated with LBW.
Indriany et al. (2024) Indonesia	128 mothers (64 LBW cases and 64 controls)	Pre-eclampsia, maternal age, parity, and education level	Pre-eclampsia was consistently identified as an important risk factor for LBW.

Akaba et al. (2021) Nigeria	335 pre-eclampsia/eclampsia cases among 9,760 deliveries	Pre-eclampsia/eclampsia, maternal age, education, ANC, sociodemographic factors	Pre-eclampsia/eclampsia was associated with adverse maternal and neonatal outcomes, including LBW.
Madumey & Nareswari (2025) Indonesia	135 mothers	Maternal age, parity, and hemoglobin level	Maternal age and hemoglobin levels were associated with LBW, whereas parity was not.
Shaohua et al. (2022) China	7,421 parturient women	Marital status, gestational age, hypertension, maternal characteristics	Hypertension and pregnancy characteristics were associated with LBW.
Ahenkorah et al. (2022) Ghana	312 primigravid women	Hypertension, pre-eclampsia, preterm delivery, blood transfusion, cesarean section, and obstetric complications	Maternal obstetric complications and pregnancy-related factors increased LBW risk.
Lin et al. (2021) China	746,410 singleton live births	Maternal age, parity, and gestational characteristics	Maternal age and parity were associated with LBW and adverse birth outcomes.
Serunjogi et al. (2021) Uganda	100,189 births	Adolescent pregnancy, maternal age, and sociodemographic characteristics	Adolescent maternal age was associated with increased risk of LBW, preterm birth, and adverse neonatal outcomes.

Based on the literature search, 16 articles met the predefined inclusion criteria and were subsequently subjected to thematic analysis. This process yielded eight overarching themes, which are elaborated upon in the sections that follow.

Theme 1: Maternal Nutritional Factors and Anthropometric Status

Maternal nutrition and body measurements were frequently cited as important factors related to low birth weight. Other studies show that the mother's weight, what she eats before she gets pregnant, and the amount of weight she gains during pregnancy are important factors that can affect the chances of a baby being born with a low birth weight. In 2022, Shafi and their team found that a baby is more likely to be born with low birth weight if the mother weighs less. In 2025, Ruan and their team discovered that not gaining enough weight during pregnancy can also increase the risk of a baby being born at low birth weight. Ray and colleagues (2025) and Al-Aziz and colleagues (2022) found that in Bangladesh, mothers with low body weight are more likely to have babies with low birth weight. If mom isn't getting enough nutrition, her body may not have enough nutrients stored up to share with the baby. This can lead to slower growth of the baby and a lower birth weight.

Other factors such as height and mid-upper arm circumference (MUAC) were found to play a role in low birth weight in addition to a mother's weight. Al-Aziz et al. in 2022 and Aga and Woldeamanuel in 2025 reported that short mothers were more likely to have low birth weight babies. In 2025, Nurmawati et al. and Madumey and Nareswari in the same year found

that low mid-upper arm circumference was associated with poor maternal nutrition and increased risk of low birth weight babies. The results suggest that a mother's body measurements are a reflection of how well she has eaten and taken care of her health over time, which may influence how much the baby grows. The idea of the Developmental Origins of Health and Disease suggests that not eating enough healthy food at certain times in pregnancy can affect the way the placenta works, the way nutrients reach the baby, and the way the baby develops. This may translate into poorer birth outcomes like lower birth weight or other complications (Barker, 2007; Zanetti et al., 2018).

A mother's eating habits are important for her general well-being, and they shouldn't be seen as just one thing that affects low birth weight. Not getting enough of the right nutrients can cause anemia, make it harder for the body to handle changes during pregnancy, and increase the chances of a woman developing issues during pregnancy, such as high blood pressure conditions like pre-eclampsia. If a woman is pregnant and doesn't receive enough care during her pregnancy, it becomes more difficult to discover and address problems such as poor nutrition, low blood levels, and other issues that can occur during pregnancy. So, the link between a mother's diet and low birth weight is probably influenced by how her eating habits, the care she gets during pregnancy, and any health problems she has while pregnant all work together.

Low birth weight may be associated with deficiencies of micronutrients, especially iron and folate, perhaps. In 2025, Ruan and their team found that the risk of having a low-birth-weight baby was associated with poor diet and folic acid deficiency before and during the early stages of pregnancy. These findings indicate that eating the right foods before and during pregnancy is critically important as part of the overall effort to prevent low birth weight. The findings emphasize the need for better nutrition monitoring during pregnancy in Indonesia, particularly in areas where mothers struggle to access adequate nutrition. This would help detect early problems such as low energy and iron deficiency, and provide ongoing advice on healthy nutrition as part of care for mothers and babies.

But you need to look at the different ways the studies are done to understand these links. For example, how body measurements were obtained, how nutrition was evaluated, who was included in the study, and what kinds of studies were used. Most of the studies were observational, so the relationships they found are more like associations or correlations, not definitive evidence that one thing causes another." More research is needed to determine if providing mothers specific nutrients may help reduce the chances of babies being born with low birth weight.

Theme 2: Maternal Demographic Factors

Maternal age was one of the common demographic factors looked at in the studies and was noted as something that could influence the chance of a baby being born with low birth weight. Several studies found that both younger and older maternal ages are at higher risk for low birth weight outcomes. Serunjogi and their team in 2021 did a big study at a hospital in Uganda that looked at 100,189 births. They found that teenage moms were more likely to have babies with low birth weight compared to moms who were between 20 and 34 years old. Ray and their team in 2025 discovered that moms who were younger than 20 years old were more often seen giving birth to babies who weighed less than normal. These findings suggest the possible association of teenage pregnancy with low birth weight due to its interaction with maternal nutrition, pregnancy complications, access to medical care and the broader social environment. In considering these associations, it is necessary to consider the different attributes of mothers and health care settings in these groups.

Several studies included in the research mentioned that having an older mother, known as advanced maternal age, is linked to a higher chance of low birth weight. Aga and Woldeamanuel found that moms who are 34 years or older are more likely to have babies with low birth weight. Indriany and their team also noticed that moms over 35 years old are

connected to a higher chance of having low birth weight babies. The results are in line with other research suggesting there may be more problems in pregnancies among older mothers that can affect the delivery of babies. The strength of the associations, however, varied from study to study, though the associations were identified in different studies. That is because the groups of people that were studied were different, the way the studies were set up were different, and the factors that could have affected the results were addressed in different ways. So instead of just looking at the age of the mother, we need to think about it with other health problems that she might have and other things that happen during pregnancy because they can also affect the weight of the baby,” she added.

Theme 3: Maternal Obstetric History

Maternal obstetric history, especially parity, was identified as a pregnancy-related characteristic associated with LBW across the included studies. In several studies, LBW was observed to occur more often in primiparity. [Islam et al. \(2022\)](#) and [Ray et al. \(2025\)](#) and [Shafi et al. \(2022\)](#) reported associations between primiparity and LBW outcomes for mothers in Bangladesh and Pakistan. In contrast, higher parity has also been associated with LBW in other studies. [Indriany et al. \(2024\)](#) reported an association between grand multiparity and LBW and [Ruan et al. \(2025\)](#) found higher parity categories as risk factors for LBW. Such variations indicate that the relationship between parity and LBW is complex and may be influenced by maternal characteristics, pregnancy history, access to healthcare and contextual factors in each population. Thus, parity should be considered in a wider context of maternal obstetric history rather than as a separate factor affecting LBW.

Time between pregnancies was another birth-related factor reported to be associated with the likelihood of a baby being born with low birth weight. In a 2025 study, Sharma and colleagues found that babies born less than 24 months apart are associated with an increased risk of low birth weight. However, [Aga and Woldeamanuel \(2025\)](#) found an association between longer birth intervals and lower odds of low birth weight. The findings suggest that interpregnancy interval may be related to maternal recovery, nutrition and subsequent pregnancy course. The different populations studied, the definitions of birth spacing and statistical methods used make direct comparisons difficult however. There is evidence that a mother’s previous experience of pregnancy, both in terms of how many children she has had and the spacing of her pregnancies, is an important factor in understanding the causes of low birth weight babies.

Theme 4: Pregnancy Complications

A number of the studies listed noted that pregnancy problems such as high blood pressure, pre-eclampsia and anemia in the mother were often related to low birth weight. Low birth weight babies were often regarded as a pregnancy problem and pre-eclampsia was often viewed as a pregnancy problem with low birth weight babies. In 2024, Indriany and their team discovered that pre-eclampsia is connected to low birth weight. Even when looking at other possible influences, the link between pre-eclampsia and low birth weight remained strong. Similarly, [Ruan et al. \(2025\)](#) stated that pre-eclampsia is connected with a greater risk of low birth weight. [Akaba et al. \(2021\)](#) also discovered that many babies born to mothers who had pre-eclampsia or eclampsia were classified as having low birth weight. These findings are in agreement with previous research which has shown that high blood pressure during pregnancy can cause problems for the baby. Biologically, pre-eclampsia may cause poor fetal growth due to a poorly developed placenta, less blood flow to the placenta from the uterus and less nutrients and oxygen to the baby. However, differences in study design, populations studied, definitions of exposure, and statistical approaches make it difficult to compare results from one study to another.

Maternal anemia was another pregnancy-related factor that was frequently reported as associated with low birth weight. In 2022 Shafi and others found that if a mother has anemia,

this can lead to the baby being born with a low birth weight. Meanwhile, Islam and others in 2022 also mentioned that anemia is one of the factors in mothers that can cause low birth weight in babies. Also, [Anwar et al.\(2024\)](#) and [Madumey and Nareswari \(2025\)](#) found a significant link between a mother's hemoglobin levels and the probability of a baby being born with low birth weight. These results indicate that when the mother has low iron, it can lead to poor growth of the baby, because there is less oxygen available for the baby, and the mother is not getting enough nutrients. The results are useful, but it's important to remember that the definition of anemia can vary, its severity can vary and how studies are done may not be all the same. This may change how we interpret and apply the findings. Most of the studies were observational, so the associations found should be interpreted as links rather than evidence for causation.

Theme 5: Socioeconomic Factors

Studies included in the review mentioned that socioeconomic factors, like how educated the mother is and the overall financial and social situation of the family, are related to low birth weight. Maternal education was often used to show a person's social and economic standing and was linked to differences in how often low birth weight occurred. [Ruan et al.\(2025\)](#) found that the risk of low birth weight varied depending on how much education the mother had. [Akaba et al.\(2021\)](#) noted that mothers with less education were more likely to have poor health conditions during pregnancy. Research from Ethiopia has found that mothers with lower levels of education are at greater risk of having a child with low birth weight ([Engidaw, Eyayu, & Tiruneh, 2022](#); [Minda et al., 2024](#)). These findings indicate that a mother's education can have an effect on the chances of a baby being born with a low birth weight. This could be influenced by a range of factors, including the frequency of her use of health services, the way she seeks medical attention when necessary, the amount of information she receives on pregnancy, and the degree to which she looks after her own nutrition during pregnancy. When considering these connections, it's essential to take into account the different social situations and healthcare systems in the places where the studies were done.

Reasons linked to low birth weight also included lower income and less education. socioeconomic factors and low birth weight in infants [Aga and Woldeamanuel \(2025\)](#), [Al-Aziz et al.\(2022\)](#), and [Ray et al.\(2025\)](#) found that there is an association between the socio-economic factors and low birth weight in infants and this pattern was found in various low and middle-income countries .

Socioeconomic disadvantages can influence how a mother and her baby do during pregnancy. This is because they may not have enough access to healthy food, proper medical care, and supportive services while they are pregnant. Previous research from UNICEF and WHO has found that social and economic conditions greatly influence the health of mothers and children ([United Nations Children's Fund & World Health Organization, 2019](#)). Even though that's true, socioeconomic factors are just one part of a larger story, not the only reason things happen. Their effect can vary based on how accessible healthcare is, the cultural attitudes in the area, and the kind of support available for mothers in different situations.

Theme 6: Antenatal Care (ANC) as a Protective Factor

Antenatal care usage was often mentioned as a factor linked to low birth weight in the studies that were included. Several studies showed that not getting enough prenatal care, starting care too late, or not having access to healthcare for mothers was linked to a higher chance of having a low birth weight baby. [Aga and Woldeamanuel \(2025\)](#) found that going to regular antenatal care visits was linked to a lower chance of having a baby with low birth weight. Meanwhile, [Ray et al.\(2025\)](#) and [Al-Aziz et al.\(2022\)](#) discovered that mothers who gave birth to low birth weight babies were less likely to attend enough antenatal care sessions. [Akaba and their team in 2021](#) found a link between using antenatal care and better outcomes for mothers who had high blood pressure during pregnancy. These results show that ANC could help lead to better results during pregnancy by finding problems early, checking the mother's nutrition, and giving her important information about her health.

The connection between using ANC services and having a low birth weight baby might depend on more than just how many times a woman visits. It could also depend on how good and what kind of care she gets during her checkups. The World Health Organization suggests having full antenatal care to help find problems early in pregnancy, give advice on good nutrition, and encourage healthy habits during pregnancy. In 2025 Ruan and their team found that the lack of folic acid intake before and during early pregnancy increases the risk of having a baby with low birth weight. This finding emphasizes the importance of good nutrition for the care of a mother during pregnancy. Note that there is variation in the definitions of ANC, the time point for initiation of ANC, levels of healthcare access, and measurement of ANC in different studies when interpreting these findings.

Theme 7: Pregnancy and Birth Characteristics

Pregnancy and birth characteristics, like preterm birth and multiple pregnancies, were commonly pointed out as important reasons connected to low birth weight in the studies that were included. Several studies show that having a baby before it's fully developed is a major reason why babies are born with low birth weight. Sharma and colleagues reported an association of preterm birth and low birth weight for live infants born in India in 2025. In 2022, Islam and his group found that preterm birth was one of the main pregnancy-related causes of low birth weight in babies born to mothers in Bangladesh. In a further study, Shaohua and his team in 2022 discovered that premature babies born before 37 weeks of pregnancy in China were more likely to be born with low birth weight. These findings suggest that short pregnancies are strongly correlated to low birth weight as babies do not have enough time in the womb to gain enough weight. But because most of the studies were observational, these findings indicate an association, but not that one thing causes the other.

Multiple pregnancy was also reported as a characteristic of low birthweight associated pregnancies. In 2022, Al-Aziz et al. found that twin pregnancies are one of the complications of childbirth for mothers with babies with low birth weight. Other studies also stated that problems during pregnancy and the birth characteristics of the baby can affect the odds of a baby being born with low birth weight. Having multiple babies at the same time can naturally cause low birth weight. The babies compete for the mother's nutrients and there is a higher chance of health problems during pregnancy. Nevertheless, the small number of studies investigating multiple pregnancies within this scoping review implies that more research is required to enhance the knowledge of its impact on diverse contexts in low- and middle-income countries.

Theme 8: Lifestyle and Environmental Exposures

Lifestyle and environmental exposures were among the less frequently examined factors associated with LBW in the included studies. Sharma and their team in 2025 found that drinking alcohol while pregnant is one of the mother's behaviors linked to babies being born with low birth weight. The study also said that a mother's lifestyle should be looked at along with other health factors she has during pregnancy, like her nutrition, how often she gets prenatal care, and other things related to her pregnancy, when trying to understand why a baby is born with low birth weight (Sharma et al., 2025). These results suggest that a mother's behavior might play a role in causing low birth weight, possibly through different ways that affect her health and how she manages her pregnancy. However, because few of the studies investigated lifestyle factors, further studies are needed to better understand the influence of lifestyle factors on different countries with lower income levels. Environmental exposures were not adequately addressed in the included studies, suggesting the scarcity of evidence regarding the impact of environmental factors on low birth weight. The review of environmental factors shows that most studies so far have mainly looked at the mother's health, nutrition, pregnancy-related issues, and social and economic background, rather than looking at the outside environment. Future research should look into including environmental factors along with information about

the mother and her pregnancy to better understand the causes of low birth weight, especially in countries with fewer resources.

4. CONCLUSION

This scoping review provides the most current evidence overview on factors related to maternal health and pregnancy associated with low birth weight in low and middle income countries using studies published between 2021 and 2025. This review is different from earlier reviews on individual risks. Instead it combines a number of related themes such as maternal nutrition, problems of pregnancy, prenatal care, economic and social circumstances and lifestyle choices. Pre-eclampsia, inadequate weight gain during pregnancy, low iron levels in the mother, poor nutrition and insufficient antenatal visits were the common factors for low birth weight. These results underscore the importance of focused maternal health improvement. This means screening a woman's nutrition before she becomes pregnant, identifying early if she has anemia or high blood pressure during her prenatal visits, monitoring her weight gain and ensuring that she has access to good quality prenatal care, especially for those who are more at risk.

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