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**PROGRAMME: MSC PUBLIC HEALTH AND SOCIAL CARE IN
PRACTICE**

MODULE: PUBLIC HEALTH AND SOCIAL CARE IN PRACTICE

MODULE CODE: LCHS7004

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**TOPIC: DETERMINANTS OF LOW BIRTH WEIGHT IN LOW-INCOME
COMMUNITIES: A CASE STUDY (UK)**

Declaration

I declare that this entire research has been carried out by me with proper dignity and full attention. The information derived from different sources has been properly cited and the list of references is provided. No part of this assignment has been previously presented to the university. I have not used any AI tool for producing this assignment.

Signed : Shyam gadhiya

Date : 02/02/2026

Acknowledgement

I would like to express my gratitude towards my supervisor for supporting me throughout this study by valuable guidance and knowledge. I am thankful to my family members and classmates for supporting me in completing this dissertation.

Abstract

Introduction

The research has aimed to evaluate significant proportion of deprivation-related infant outcome gaps in England are therefore attributed to maternal smoking, preterm birth, teenage pregnancy, and maternal depression, which have a clear exposure that is modifiable. Lack of awareness of the known antenatal services also postpones the engagement. The research helps to explore the needs for health benefits that reduce the risks of those being associated with LBW. Those are rising or remaining alarmingly high, for example, cognitive delays involved within the chronic illness such as diabetes and also cardiovascular diseases with lower educational attainment. The SDH model and Life course theory has been aligned to the context to provide insightful data as well. The literature gap has been depicted by defining the clear scope of the research with the outcomes.

Method

The methodology in the research has determined the social, environmental and health care related issues based on the systematic review of the previous literature based on the UK low-income community. The research included PRISMA diagrams and Boolean operators for determining the articles addressing the research question. The methodology chapter focuses on sensitivity to participant welfare is maintained by avoiding the re-identification risks and by acknowledging the emotional-content implications with interpreting the qualitative findings. This chapter has discussed the key determinants of Low Birth Weight in the UK through conducting a thematic analysis that assisted in identifying data patterns for developing relevant themes.

Findings

The key findings in terms of analysing the relevance of the article information with the thesis topic. It has been recognised from the findings section that the issues of LBW within the low- and middle-income countries are directly related to environmental determinants such as air pollution. The changing atmosphere because of chemical exposure has confirmed the heterogeneous mix of gases which impact public health negatively. The combination of primary and secondary data which has been recommended to this research with a recommendation to maintain equality in education and income by increasing public awareness about determinants of LBW.

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Chapter 1: Introduction

1.1 Overview of low birth weight/Introduction

Low birth weight (LBW) refers to a birth that is lower in weight than 2,500 grams, which is currently a burning public health concern in the UK (UNICEF, 2023). According to the Office for National Statistics, 2.9% of full-term live births in England and Wales were of low weight, and this was more common in poorer areas (Singh *et al.* 2023). LBW infants are much more vulnerable to neonatal deaths, stunting, developmental delays, and later-life chronic illnesses. LBW is associated with low educational achievement and socioeconomic disadvantage in adulthood, and intergenerational inequality cycles. Factors that determine LBW are multifactorial, such as maternal smoking, malnutrition, pre-existing conditions, exposure to the environment, and insufficient antenatal care. It has been noted that smoking in pregnancy has always been one of the most avoidable factors leading to limited fetal development and increased LBW in the low-income regions. LBW also has the issue that social and economic deprivation worsens when access to healthcare, nutritious food, and stable housing is limited (Suri, 2025). Policy reforms led by austerity have deteriorated the health outcomes of mothers and infants in disadvantaged groups. The case study is an exploration of LBW determinants among low-income communities in the UK. The analysis of biological drivers, behavioural drivers, and social drivers of the study seeks to create evidence that can be used to conduct targeted, equitable interventions, reduce health disparities, and enhance long-term outcomes.

1.2 Background

Socio demographic context: The number of births in the UK has decreased drastically in recent years. In 2023, in England and Wales, the number of live births was approximately 598400, the lowest since 2002 in the country. Fertility has fallen to 1.44 children per woman and the problem of low birth weight is still acute. In 2023, it was estimated to be 7.1% of live births, compared to 3.8% in 2003 (Martin *et al.* 2025). Infants with a weight of less than 2.5 kg at full-term increased from 2.6% in 2021 to 2.9% in 2022 (Thapa *et al.* 2022). The rise in low birth weight predisposes infants to higher risks of death, exacerbates the health conditions of children, and strengthens social inequality on a long-term basis.

Socioeconomic and Area Deprivation: Socioeconomic deprivation is still a strong predictor of low birth weight. Approximately 53,000 babies are born in the UK with a weight of less than 2,500 g (Bandyopadhyay *et al.* 2024). The study indicates that deprivation of area income increases the LBW odds regardless of personal factors. The risk of LBW is always greater among mothers who live in the poorest neighbourhoods, despite the consideration of personal income and social status (Sow, De Spiegelaere and Raynault, 2021). The deprivation also

aggravates access to healthy food, secure housing, good health care, and provokes maternal stress exposure, which multiplies risks.

Maternal Characteristics and Behaviour: The major maternal predictors are age, smoking, nutrition, and health conditions for low birth weight (Arabzadehet *et al.* 2024). Both teen and older mothers have increased risks of low birth weight and the strongest modifiable risk factor is still maternal smoking. Socioeconomic gradients in birth weight are mostly attributed to low parental education, smoking habits, and poverty (Cozzani, 2023). Infertile maternal nutrition and substance abuse put additional pressure on impoverished neighbourhoods. Poor maternal health due to limited access to healthy food, stress, and poor prenatal supplements, augments fatal growth restriction in families of deprivation.

Clinical and Service-related Determinants: The early risk assessment and intervention are curtailed by late antenatal booking that is common in low-income regions. The barriers to accessing antenatal services are an obstacle to early detection of hypertensive disorders or gestational diabetes. Maternal obesity or under nutrition is also a pre-existing condition for low birth weight. Nutrition support and antenatal contacts were decreased due to resource constraints and COVID-19 disruptions to maternal weight gain and fatal growth (Kotlar *et al.* 2021). Lack of care continuity, shortage of staff, and cultural insensitivity also do not encourage women in depressed communities to attend necessary medical visits, frequently leaving risks undetected.

Ethnicity, Stress and Environmental Exposures: Ethnic variations are an indicator of social underprivileged and institutional discrimination. The rates of stillbirths and low birth weights were highest in Black and Asian populations than in White populations in 2022-23, with chronic psychosocial stress, housing instability, poor air quality, and food insecurity in deprived urban neighbourhood's affecting fatal development (Kayode *et al.* 2025). Cultural and linguistic barriers also affect migrant families and decrease the level of access to the support of a healthy pregnancy and antenatal care.

1.3 Statement of the Problem

Problem statement: Socioeconomic deprivation, access to limited antenatal care, maternal health behaviours, environmental and structural risk factors have rendered low birth weight disproportionately high in low-income communities in the UK.

In areas of low English and Welsh income, birth weights have remained low despite the improvement on a national level. The national statistics also provide detailed birth weight statistics by local authority in 2022. In 2022, England had 605,479 live births, highlighting local disparities in performance (Office for National Statistics, 2023). The results have a strong

association between area deprivation and infant mortality as well as poor perinatal outcomes. The four major drivers were identified using a large retrospective cohort of approximately 400,000 records: preterm birth, maternal smoking, teenage pregnancy, and maternal depression explained much of the inequality (Ho *et al.* 2024). Maternal smoking is a leading controllable predictor of low birth weight, as evidenced by meta-analysis. The socioeconomic disadvantage enhances the prevalence of smoking among pregnant women (Pilehvari *et al.* 2024). COVID-19 and recent economic pressures have increased disparities in certain localities. Local authorities' reports indicate that cities with high levels of deprivation have worse infant outcomes. Numerous studies do not incorporate joint individual clinical and household socioeconomic factors. It will discourage easy causal inference between policy intervention and birth weight patterns. Existing interventions, such as smoking cessation programmes, are promising, on average.

The research will also recruit community views in explaining behavioural and access barriers. The gaps will be more useful in targeting interventions aimed at reducing local perinatal inequality. Maternity, mental health, and domestic violence in the cause and effect of poor birth outcomes (Mazza *et al.* 2021). Women in underprivileged regions are usually subjected to the aggravated effects of poor social support and poverty. Fatal growth restriction is also worsened by nutritional insecurity, particularly in situations where there is low access to affordable fresh food. The combination of these challenges contributes to the presence of inequalities and demonstrates the necessity of social and health policies that are integral to each other.

1.4 Rationale of research

Low birth weight is one quantifiable and acute population health challenge affecting most of the deprived communities in the United Kingdom. Recent cohort studies have connected deprivation of areas with increased infant mortality and clustered low birth weight risks in England. The problem is that infants with a birth weight of less than 2,500 grams have an increased risk of neonatal mortality and chronic cardiometabolic and neurodevelopmental risks (UNICEF, 2023). A related Welsh e-cohort study has also measured the relative contribution of modifiable maternal risks, clinical complications, and smaller infants, which supports the potential effect of local interventions (Bandyopadhyay *et al.* 2023). It presents a problem since disparities in perinatal health contribute to intergenerational disadvantage and higher costs to the NHS and social care in the long run. The concentration of risks in area deprivation increases the likelihood that health services are already at their limits to manage potential inequalities in infant outcomes, as recent UK evidence suggests that a small number of modifiable factors would reduce inequalities in infant outcomes.

The austerity-induced social support reductions of the last ten years have increased material distress in several communities, exacerbating the perinatal susceptibilities. COVID-19 interfered with antenatal services and intensified mental health and economic pressures, generating unstable birthweight patterns that necessitate new surveillance, which could be used to accurately target interventions (Merlanoet *al.* 2022). The contemporary linked electronic health record studies enable a powerful and place-based analysis, which was previously impossible. The research will help shed light on these determinants, which are most practical in deprived situations in the UK. Each has a relative effect on low birth weight, and the barriers are to the use of the service. The study will provide epidemiological results on place-sensitive and cost-effective interventions to minimize low birth weight and subsequent social and health outcomes.

1.5 Research question

What material health factors such as smoking as well as nutrition and other determinants are the most strongly recommended to deal with LBW in the UK community?

Element	Description
Population (P)	Pregnant women with low-income UK communities
Intervention (I)	Maternal health behaviours for example smoking cessation, improved nutrition as well as antenatal care
Comparison (C)	Women with healthier lifestyle as well as adequate nutritional support
Outcome (O)	Incidence of the low weight (<2,500 g) among the newborns and maintenance of the mothers and upcoming children having adequate birth weight

Table 1.1: PICO framework

(Source: Self-created)

1.6 Research aim

The aim of this research is to explore reasons for low weight at birth in low-income UK communities, by assessing the impact of maternal and socioeconomic factors and suggest the intervention, which would decrease perinatal inequalities.

1.7 Research objectives

- To determine maternal health determinants, such as smoking and nutrition, associated with low birth weight.

- To evaluate the socioeconomic deprivation, including income and education, on the prevalence of low birth weight.
- To study environmental and housing factors, such as overcrowding and air pollution, which influence birth outcomes.
- To assess the influence of local healthcare access and antenatal care to prevent low birth weight.

1.8 Significance of the study

The significance of exploring the determinants of LBW in low-income communities within the UK lies in the urgent need for mitigating widening health inequalities (Kassie *et al.* 2025). The World Health Organisation defines low birth weight (LBW) as a birth weight of less than 2500g. In England, roughly 7.2% of babies were born within the LBW rate for singleton births, and 7.4% for all births by 2024 (Ons.gov.uk, 2025). It also underlines the stagnation and, in some cases, deterioration of progress towards the WHO global nutrition goal of lowering LBW by 30% by 2025. In England, 9.2% of babies in the most destitute districts were born with LBW, compared to only 5.6% in the least deprived, highlighting the disproportionate burdens imposed by disadvantaged families (UNICEF, 2023). Furthermore, maternal health habits and circumstances associated with deprivation include smoking, obesity, delayed access to antenatal care, and poor nutrition.

1.9 Summary of the chapter

Determinants of the *low birth weight* (LBW) within low-income UK communities involve material factors such as low socioeconomic status, poor nutrition, high maternal age and also lack of education with socio-environmental factors. For instance, 2023-24 almost 26.2% of the pregnant women within England were recorded as obese, with rates peaking at least 32.4% within most deprived areas compared to approx. 19.8% within the least deprived (Office for Health Improvement & Disparities, 2024). Smoking during early pregnancy, though within downward trends, continues to be significantly more prevalent among the women from deprived communities. Moreover, the disparities extended within breastfeeding rates with almost 81.3% of the women within the least deprived areas initiating the breastfeeding compared to only the 59.1% within the most deprived (GOV.UK, 2023). These disparities are not only manifesting within immediate health risks that are infant mortality among LBW babies. However, England and Wales stood at 30.3 deaths per 1000 live births within 2023 that is compared to just 0.8 per 1000 for babies born at the normal weight but also translates within long-term challenges (Ons.gov.uk, 2025). Therefore, aligned with the societal levels, LBW is able to contribute to rising healthcare expenditures and those demands for special education and social care costs.

Chapter 2: Literature Review

2.1 Introduction

The chapter provides a brief overview of the existing and well-established literature regarding the determinants of low-birth-weight issues within low-income communities in the UK. The chapter evaluates the determinants, such as smoking and nutrition, along with socioeconomic factors that impact the low-income communities in the UK and cause low birth weights among young mothers in the UK. Theoretical implication is also evaluated for understanding for knowledge creation regarding the effective management of healthcare issues in low-income communities of the UK. Lastly, a conceptual framework is also developed for identifying, analysing and defining the key variables of the study, including low-birth weight, healthcare outcome and low-income communities in the UK.

2.2 Literature search strategy

The structured literature search strategy has been employed with initial scoping conducted across the selected databases including ScienceDirect, Springer, ResearchGate and Google Scholar. The scoping has refined the key concepts, keywords and inclusion boundaries in which this strategy has ensured comprehensive analysis of relevant studies by maintaining focus on low birth weight within low-income UK populations.

2.3 Literature review

2.3.1 Global prevalence of LBW

LBW defined that the birth weight of the less than 2500g, that remains the persistent of the global public health challenges as well as the powerful indicator those are aligned well with the social as well as the economic inequalities. The international commitments towards maternal as well as child health, the global prevalence of the LBW continues towards the reflected entrenched structural disparities between the countries. It is further estimated that around 20 million infants across the world represent approximately 15% of all live births that are born with a low birth weight each year. Critically it is identified that over 90% of these births have occurred within the low and the middle-income countries (Okwarajiet *al.* 2024). Thus, highlighting that LBW is not merely considered as a medical issue but as a consequence of broader social and also economic political failures.

The global burden of the LBW cannot be adequately explained through the biological risk factors alone. Roşca *et al.* (2023) states that prematurity as well as intrauterine growth restrictions are considered to have an immediate effect. Those that are aligned with these

conditions themselves are shaped by maternal malnutrition, gender inequalities, and poverty as well as limited access to the analysis of healthcare. South Asia as well as sub-Saharan Africa has been consistently reported to have the highest prevalence rates, with South Asia alone accounted for nearly half of the LBW cases across the globe. Siva *et al.* (2025) stated that, the geographical concentration has strongly faced issues within the notion that LBW is determined to focus on the prevalence within declining of the uniform worldwide as well as endeavour suggested that the global progress has been uneven as well as inequitable. Moreover, the persistence of the LBW within the LMICs have been reflected based on the inadequacy of the international developmental strategies that are determined to be focusing on the narrow aspects of healthcare provision as these are determined to neglect the upstream social determinants. For example, the maternal under nutrition has remained based on the dominance drivers of LBW, those are particularly involved within the regions that are affected based on the food insecurities, the rise in conflicts as well as the climatic instabilities. Moll *et al.* (2024) explained women have been aligned well with the contexts as these are often entered based on the pregnancy already malnourished as well as the global nutrition programmes that have faced failures for mitigating the intergenerational cycles of the deprivation. Therefore, LBW is determined to become both a symptom as well as a mechanism of the poverty transmission that is determined to reinforce the poor health outcomes that are across the life courses.

Critically, the global health governance has further been determined to contribute towards the disparities within the LBW prevalence. The high-UK income countries have been further benefitted based on the adverse within the antenatal care and the neonatal technologies used. It has been identified that there are several LMICs that continue to experience the underfunded maternal health services. The emphasis of the cost-effective interventions for example the micronutrient supplements has further been insufficient within the isolation procedure (De Hoop *et al.* 2025). Therefore, without the parallel investments within the women's education aspects, the employment security as well as the reproductive autonomy is determined to focus on the risk mitigation procedure that is considered as the symptoms rather than any structural roots of LBW.

The significance of the under-acknowledged determinant is aligned well with the global LBW prevalence is aligned within the gender inequalities. The societies, and the women's have seen a limited form of decision-making power that are assessed based on the early marriage and also restricted access within the education contributes directly within the adverse pregnancy outcomes. As opined by Biswas, (2025), adolescents' pregnancies are determined to focus on

more common in LBW regions that are facing strong associations with the LBW because of the biological immaturity as well as the socio-economic disadvantages. Moreover, these are underscored based on the arguments that LBW is determined to reduce the safety rules that are framed based on broader gender equity as well as human rights agendas rather than being treated as the isolated health objectives (Bohren *et al.* 2024). Thus, the continued connections of the LBW are determined to align proper LBW regions; those are further demonstrated on the failure of fragmented health-focused interventions for producing sustainable changes.

2.3.2 UK prevalence of LBW

The UK is facing high-income countries that are aligned well with public funded healthcare systems, the low birth weight is stated to remain a significant as well as unequal distributed public health concerns. It is identified that approximately 6 to 7% of the live births within the UK have been classified based on the LBW as a figure that has remained relatively stable over the revenue decades (Okwarajiet *al.* 2024). It is further persistent based on the challenges as these are aligned well with the assumptions as the advanced healthcare systems are alone sufficient. Thus, these are based on the elimination of the adverse birth outcomes as well as highlight the key role of the social inequalities within healing the maternal as well as infant health causes.

The prevalence of the LBW is determined to focus on the UK; those are not evenly distributed based on the population. The infants are born within the most deprived areas as these are considered to significantly be more likely to have male birth weight considerations as these are born within affluent communities. McEachanet *al.* (2022) mentioned that the socio-economic gradient is determined to provide a strong sense of evidence as the LBW is considered to be in the UK as a driven mess through the biological inevitability; those are more through the structural disadvantages. Therefore, the factors are determined to have such as low household income, the poor housing conditions, the food insecurities as well as precarious employment disproportionately those affecting the women in low-income communities that are also increasing the vulnerabilities during the pregnancy.

One of the most contentious debates surrounding the LBW within the UK concerns the role of maternal behaviours. These have particularly been focused on smoking as well as substance usage during the pregnancy. Delcroix-Gomez *et al.* (2022) argued that the undeniable aspects are that smoking is considered as the major risk factor for LBW, as these are over ephemera based on the final dual responsibility risks obscuring the social conditions that shape such

behaviours. Smoking is determined to be the prevalence of the substantially higher among the women from the lower social economic backgrounds to further imaging as the LBW prevention studies are widely focused mainly within behaviour changes. Therefore, these are determined to inadvertently stigmatise the disadvantages mothers with failing to also mitigate the root causes of the inequalities.

Ethnic disparities are further considered to be complicating the UK's LBW landscape. The study of Nongmaithemet *et al.* (2022) has shown that the higher rate of LBW among the absurd born within Black, South Asian as well as certain minority ethnic groups. The genetic explanations are determined to focus on sometimes cited arguments that are increasingly critical based on oversimplifying the complicated social realities. The structural racism, the differential access towards the quality of antenatal care as well as the chronic stress are better associated based on the discrimination those are aligned well with the more compelling explanations. Thus, the concealment of the weather is suggested with the prolonged exposure to the social adversity as these are accelerated based on the health deterioration as it offers a critical framework for understanding the ethnic inequalities.

The presence of the NHS is determined to assess timely as well as high quality antenatal care as these are not uniform. The women within the deprived aspects are aligned well with the communities as these are more likely to book late for the antenatal appointments as these are often because of the unstable housing, unsecured employment as well as the lack of awareness concerns. Moges *et al.* (2025) investigated that the delays are further able to reduce the opportunities as early risk identification as well as interventions are determined to reinforce the arguments as healthcare systems alone cannot be able to compensate for the wider social exclusion. The policy responses are aligned within the UK; those have often been prioritised based on the medical surveillance as well as targeted interventions without sufficiently addressing upstream determinants. The austerity measures implemented based on the past decades have led towards the reductions within funding for the local authority services that involves the maternity support programmes, smoking cessation services as well as nutritional assistance. Curtis *et al.* (2022) argued that is determined to cut disproportionately affected low-income women, potentially undermining progress within the reducing the LBW rates. Therefore, the persistence of the LBW reflects on the broader political choices in regards the welfare provision as well as social investments.

2.3.3 Impacts of LBW on child outcomes

The increasing prevalence and rates of low birth rates in low-income communities of the UK have an adverse impact on the overall child outcome during growth years and early development stages. Kleine *et al.* (2022) have outlined that low birth weight impacts the growth prospect of infants through causing psychiatric sequelae, restricting psychological development and hampering behavioural and emotional outcome. The findings of the study show that ineffective nutritional intake along with the increased risks of low birth weight among low-income communities increase the risk of depressive symptoms on both mother and the infants, limiting emotional, physical and psychological development. In contrast, Sandoniset *al.* (2023) have evaluated that Low birth weight is a major pregnancy complication, especially in low-income communities, as it affects 10% of births in 26%–28% of regions. The low birth weight increases the risks of stillbirth along with neonatal mortality, short and long-term neonatal morbidity including preterm birth. On the other hand, diverse empirical studies have outlined that the risks of low birth weight among individuals are primarily caused by medical and genetic conditions that increase pregnancy complications and hamper child outcomes. Thus, emphasizing on the overall health and wellbeing of the mother during pregnancy and genetic conditions also impact overall child outcome.

The emphasis on maternal complications has also been highlighted in the healthcare systems that are leading the rates of low birth weight among low communities in the UK. Chaudhary *et al.* (2025) have analysed that the risks associated with low birth rate are majorly caused by polycystic ovary syndrome and endometriosis that limit the growth prospect of the infant during pregnancy and lead to increased mortality and still birth rates. The lack of accessibility to required care is a major factor that increases the risks and rates of low birth weight as a healthcare issue among low-income communities in the UK. Boccia *et al.* (2023) have outlined that the LBW rates in the general population with access to require care has declined from 1.6% to more than 10%. The results outlined that accessibility of the low-income communities to care including maternal care, health and social care along with mental health are crucial for improving child outcomes during birth. The systematic discrimination with the low-income communities along with poor transportation and healthcare accessibility are also major factors that impact child outcomes through limiting health literacy, awareness of nutritional intake among mothers.

The health outcomes of the children during birth are also associated with the overall health outcome and wellbeing of the mothers, leading to increased complications during birth. Landman *et al.* (2022) analysed that issues of high blood pressure along with Preeclampsia and

prematurity are major risks that are positively correlated with increased risk of low-birth-weight incidence. Management of mother's health during pregnancy through controlling blood pressure, glucose levels and overall access through regular check-ups are significant for addressing and improving child outcomes during birth in low-income communities. Thus, the overall health and wellbeing including the improved birth outcome through reduced rates of low birth weight in low-income communities are positively associated with overall health management of the mothers.

LBW has further far-reaching consequences for the child outcomes, extending well beyond the neonatal period; those are particularly in low-income communities in the UK. Alur *et al.* (2024) consistently demonstrated that LBW is not merely based on short-term clinical issues but the structural determinants of long-term health as well as social inequalities. The children born with LBW are significantly more likely to experience the neonatal morbidity, involving the respiratory distress, hypothermia as well as increased susceptibility for the infections. Therefore, the critical concerns are aligned based on the persistence towards the disadvantages within childhood as well as adolescence.

From the developmental perspective, LBW is determined to strongly believe associated with the delayed cognitive developments as these are being reduced to the academic attainments as well as the behavioural difficulties. Isaac *et al.* (2023) have shown that the UK's LBW children are disproportionately being represented based on the required special educational needs that are supported by suggesting early biological disadvantages as compounded by the adverse socio-economic environments. It further supports the life-course approaches as the early-life deprivation is determined to focus on the interactions with social disadvantages for entrenching inequalities rather than being biologically predetermined.

Subsequently, the LBW increases the risk of the chronic conditions for example asthma, obesity as well as type 2 Diabetes as well as cardiovascular disease later within life. The LBW UK communities tend to focus on the risks that are amplified by the limited access for nutritious food, overcrowded housing as well as reduced healthcare engagement process (Ucci *et al.* 2022). Therefore, the burden of the LBW is considered to contribute directly to widening of health inequalities, the challenges of the effectiveness there are aligned well with the NHS's principle of growth within the outcomes.

2.3.4 Policies and interventions addressing LBW in the UK

The UK has been implemented based on the range of policies as well as interventions those are aimed at reducing LBW. However, less effectively remains contested particularly within the low-income communities. The national strategies for example the NHS Long Term Plan as well as the Healthy Child Programme is determined to organize the antenatal care, the smoking cessation as well as the maternal nutrition (Meaton *et al.* 2023). The interventions are evidence based on the adoption of individualized behavioural frameworks that are inadvertently addressed based on the structural drivers of the LBW for example puberty and also employment precarity. For example, the smoking cessation programmes are determined to target the pregnant women who are able to contribute towards reductions within LBW rates. Therefore, further suggests that interventions rely within the personal responsibilities that might inadvertently reinforce the health inequalities rather than reducing them.

Similarly, the nutritional support scheme for example Healthy Start vouchers are determined to aim towards developing the maternal diet but persistent eligibility gaps as well as low benefits value limits the impacts. Singh *et al.* (2025) argued that such programmes mitigated based on the symptoms of deprivation without challenging the economic conditions that are producing nutritional insecurity. The involvement of Sure Start Children's Centres is determined to demonstrate the measurable success in developing maternal and child health outcomes. However, the austerity driven aspects are aligned to the closure of scaling back of the centres that are undermining long-term preventive strategies. The UK intervention is determined to mitigate the LBW that remains fragmented as well as insufficient for integrating across the health, social care facilities as well as welfare systems. Therefore, the policies are aligned with regression highlighted based on the contradiction between the public health evidence as well as political priorities.

The proposed recommendations are for encouraging early antenatal booking as well as sustained attendance as evidence consistently links late booking with the increased risks of LBW. According to Howard *et al.* (2025), recommendations are clinically sound, it fails to acknowledge as women within women in deprived areas often delay accessing care. Factors for example unstable housing, precarious employment, fear of the immigrant scrutiny as well as limited awareness of the antenatal entitlements significantly restricting engagement. Bastick *et al.* (2025) stated that effectiveness of the early booking initiatives depends territorially less on awareness campaigns and more on the proactive outreach strategies. The community-based midwifery teams are determined to be operating within the local strata for example children's

centres, community halls and also GP practices within deprived neighbourhoods. However, from a critical perspective, the scalability of the model is constrained by the NHS workforce shortages as well as uneven funding across the regions. Therefore, the sustained investment of these initiatives risks remaining pilot projects rather than systemic solutions.

Similarly, the key recommendations are the implementation of the continuity of carer models as women receive antenatal, intrapartum as well as postnatal care from the same midwife or the small team. The model has further been associated with the improved maternal trust, reduced anxiety and also increased uptake of the health factors that contributed to healthier fetal growth. Feyissa *et al.* (2025) examined that women in low-income communities, continuity of the case might be partially beneficial within further addressing the stress linked to the social disadvantages, that is itself a risk factor for LBW. However, despite the strong evidence supporting the approach, the adoption across the UK has further been inconsistent. The organizational inflexibility and the staffing constraints often limits the continuity to low-risk populations, inadvertently excluding the women those might benefit most. Therefore, this raises the critical concerns that policy intentions might intentionally reinforce the inequality with implementation that fails to prioritize the high-risk groups.

Developing the access to the smoking cessation as well as nutritional support in the antenatal care is another enforced recommendation, the strong association within the maternal smoking, inadequate nutrition and the LBW is embedding the targeted interventions that are aligned with the routine antenatal appointments that appear logical. Nevertheless, several programs relied within the individual behaviour change models that are also determined to emphasize personal responsibility. Pineau *et al.* (2021) argued that approaches overlooked the socioeconomic realities of the low-income women that involve food insecurity, chronic stress as well as limited autonomy over the household duties. Consequently, advice-based interventions often yield limited long-term impact. As mentioned by Comfort *et al.* (2022), the most effective recommendations would further involve the integration of antenatal care with the social support mechanisms for example, food voucher schemes, housing services and also welfare advice. Therefore, the integrated approach is frequently undermined by the fragmented service provision as well as lack of coordination between the healthcare and the social care systems.

The use of the digital health technologies is considered to develop the antenatal access that has gained increasing policy attention, particularly following the COVID-19 pandemic. As opined by Zhang *et al.* (2023), telehealth appointments and the mobile health applications are promoted well with cost-effective solutions that help in developing the engagement and the feasibility. The innovations are further able to offer potential benefits as these are suitable for low-income

communities as contested. The digital exclusion further remains a significant barrier with limited access to reliable internet, smartphones and also digital literacy disproportionately affecting the deprived populations. Prosen and Ličen, (2025) stated that over-reliance on the digital antenatal care risks the exacerbating resistance of the inequities. Therefore, the critical recommendations would be considered to be adopting the blended care model, combining the digital tools with the face-to-face support that ensures technological advancement to enhance rather than replace the traditional care pathways.

The cultural competence as well as the trust-building within the antenatal service represents another crucial yet often underestimated recommendation. Wishart *et al.* (2021) highlighted that women from low-income communities are particularly those from the minority ethnic backgrounds as the individuals experience language barriers, discriminations or previously negative encounters with the healthcare providers. The experiences have further discouraged the engagement with antenatal care; those are indirectly increasing the LBW risks. The trafficking of healthcare professionals within culturally sensitive care as it implies bias awareness is very essential. Therefore, the training is often delivered as a one-off intervention that is limiting the effectiveness.

2.4 Literature Gap

The key gap from the literature is the lack of emphasis on evaluating and outlining the health determinants of low birth weight as a healthcare issue in low-income communities of the UK. Darmstadt *et al.* (2023) have outlined that low-birth-weight accounts for 11%, globally, including infants that are born preterm and have lower birth rates, leading to high infant mortality. However, the existing literature and contextual information lack emphasis on the rising rates of lower birth weight in low communities of the UK, due to socioeconomic deprivation, poor financial stability and lack of access to healthcare. Thus, the current study focuses on the low-birth-weight issues among infants in the UK that is a rising healthcare issue within the low-income communities.

2.5 Theoretical implication

2.5.1 Social determinants of health (SDH) model

The Social determinants of health (SDH) model provide a basic theoretical perspective for comprehending low birth weight (LBW) as an outcome shaped by wider social, economic and environmental conditions over the individual behaviour. The SDH model focuses that health outcomes are produced through the distribution of power, resources and opportunities across society by rooting in public health and social epidemiology (Downey and Thompson-Lastad, 2023). This model provides maternal health and pregnancy outcomes across the structural

conditions including income inequality, housing quality, education, employment and access to healthcare in the low-birth-weight context.

The application of SDH model to low birth weight focuses on the way environmental and housing conditions function as upstream determinants which influence maternal exposures throughout pregnancy. The poor housing, neighbourhood deprivation and environmental pollution are focused across the socio economically disadvantaged populations without having random distribution. These conditions shape maternal stress levels, nutritional opportunities and exposure to health risks all of which are recognised contributors to fetal growth. The framework encourages a shift away from individualised explanations of low birth weight towards a more holistic understanding of structural inequality.

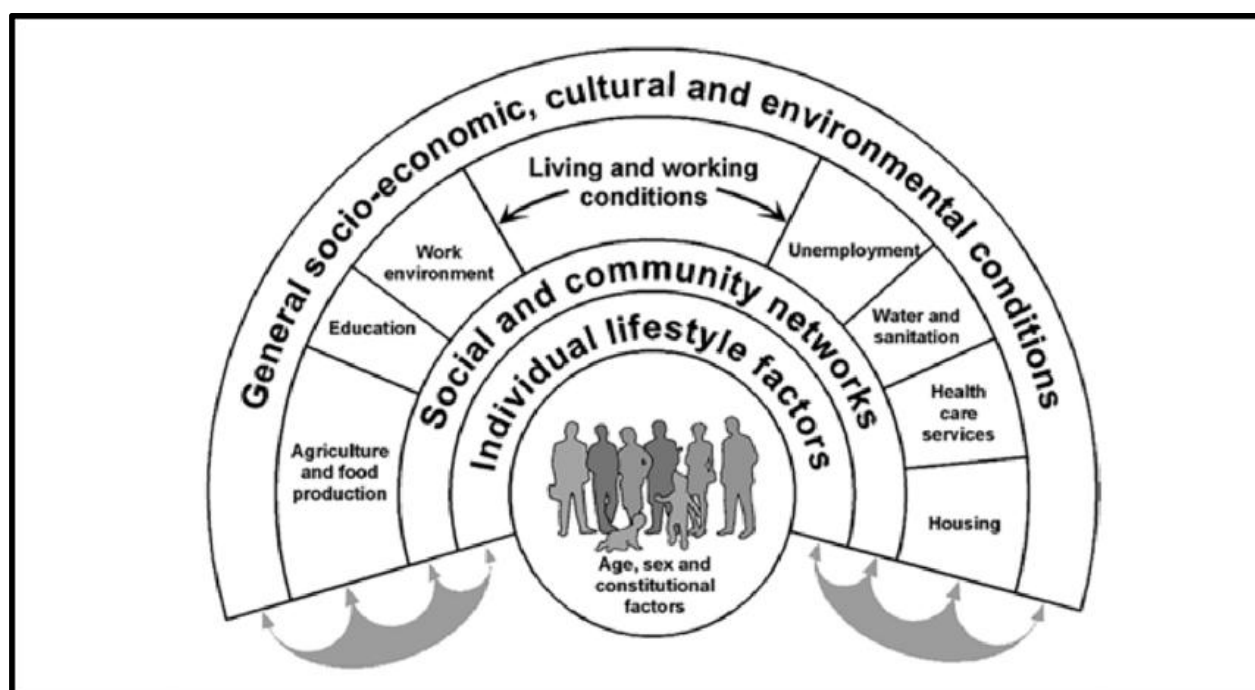


Figure 2.2: Social determinants of health (SDH) model

(Source: Downey and Thompson-Lastad, 2023)

The SDH model also undermines the role of policy and governance in shaping birth outcomes. The housing policies, urban planning decisions and environmental regulations influence the conditions in which pregnant women live. The framework supports the arguments that effective prevention needs multi-sectoral interventions beyond healthcare to frame low birth weight across the broader systems. The SDH framework does not prioritise specific determinants but instead highlights the way multiple social and environmental factors interact over the time. This perspective aligns with the need for comprehensive analysis which contextualizes low birth weight across the broader social structures rather than preventing definitive causal conclusions.

2.5.2 Life course theory

The life course theory provides a complementary theoretical aspect for comprehending low birth weight by focusing the cumulative and longitudinal nature of health influences across an individual's life. This theory suggests that the health outcomes are shaped by exposures and experiences occurring during pregnancy across earlier life stakes including childhood and adolescence. The life course theory highlights the way maternal health before conception and during pregnancy reflects long-standing social and environmental conditions within the context of low birth weight.

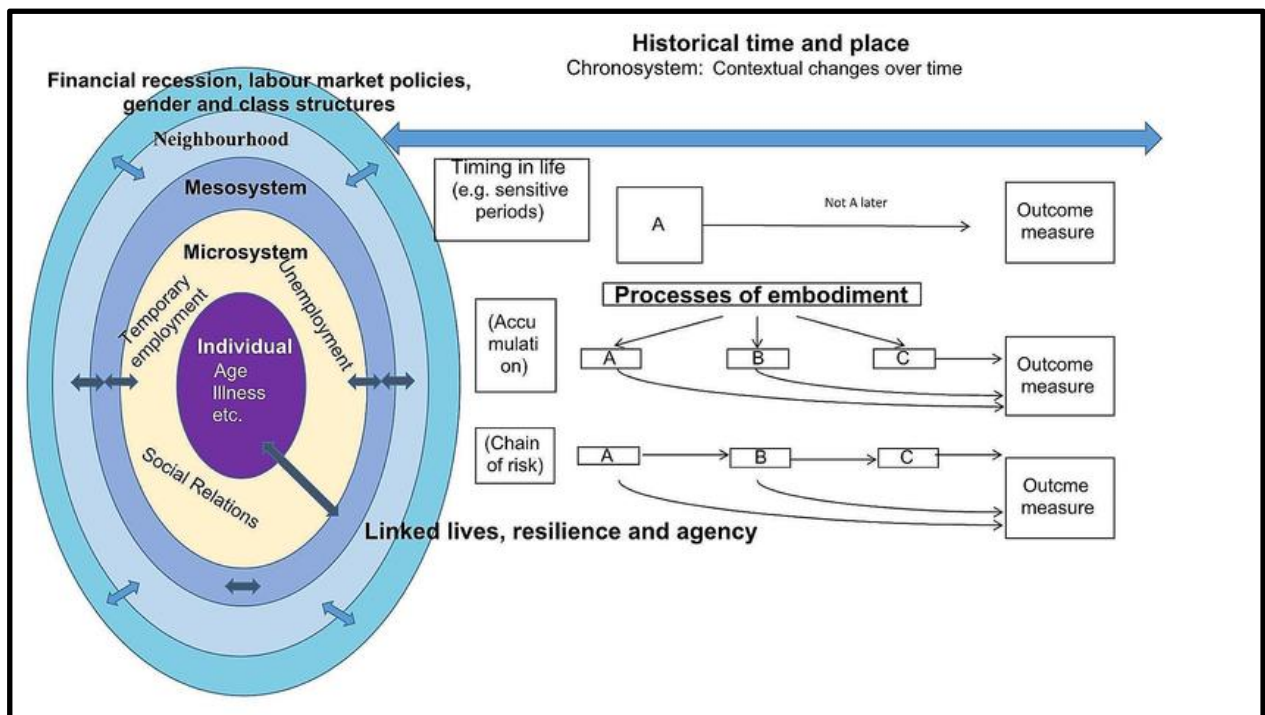


Figure 2.3: Life course theory

(Source: Hammarström *et al.* 2024)

The environmental and housing factors are comprehended as persistent exposures that accumulate over the time from life course perspectives. The women who have grown up in deprived neighbourhoods or experienced long-term housing insecurity, may enter pregnancy with pre-existing health vulnerabilities including chronic stress, poor nutritional status or underlying medical vulnerabilities such as chronic stress, poor nutritional status or underlying medical conditions (Hammarström *et al.* 2024). These accumulated disadvantages can influence pregnancy outcomes independently of behaviours adopted during pregnancy itself. The theory enhances the temporal perspective through which low birth weight is investigated with moving beyond the short-term risk factors.

This theory also introduces the concept of critical and sensitive periods recommending that certain exposures may have enhanced effects during specific stages of developments. The pregnancy shows one such critical period during which environmental stressors including poor housing conditions or air pollution may have amplified impacts on the fetal growth. However, the theory emphasizes that these exposures are often rooted in earlier life experiences shaped by social and environmental inequalities. The evidence on low birth weight can be interpreted as showing the interconnected pathways over isolated events to apply life course theory.

Hence, this theoretical approach reinforces the significance of addressing structural and environmental conditions across the lifespan supporting the rationale for research which highlights low birth weight across the wider social and contextual models over the attributing outcomes to maternal behaviour during pregnancy.

2.6 Conceptual framework

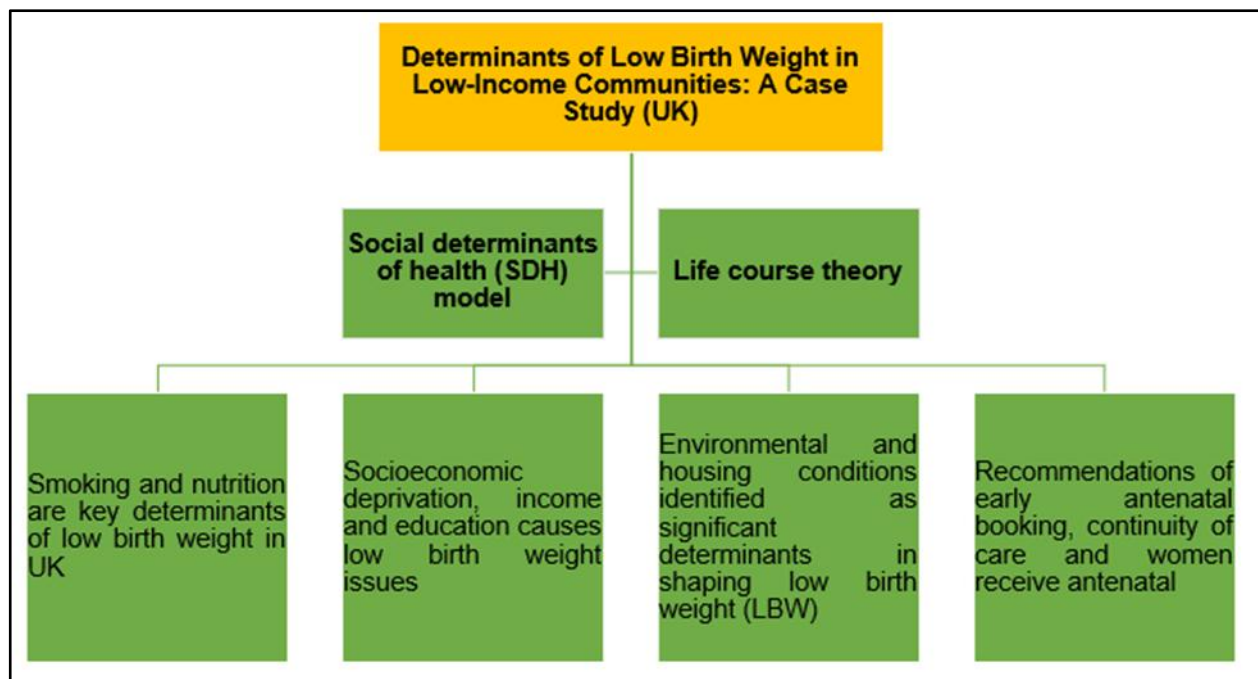


Figure 2.4: Conceptual Framework

(Source: Created by the author)

The conceptual framework outlines the key variables of the studies including the determinants of low birth weights including socioeconomic deprivations, poor living conditions and lack of accessibility to required care. Darmstadt et al. (2023) have outlined that preterm and low birth weight of infants among young mothers have increased, globally with a rate of 10.9%, accounting for 15.2 million of infant deaths. The key issues associated with high mortality rates

and lower birth weights are caused by poor care accessibility, living conditions and social inequities. Thus, the conceptual framework outlines the variables along with the theoretical implication for understanding the determinants of Low birth weights among low-income communities of the UK.

2.7 Summary of the chapter

In summary, LBW in low-income UK communities is driven not only by the medical factors but also by unequal access to the effective antenatal care with wider social support. The analysis has further shown that the recommendations are aligned well with the early antenatal engagement, continuity of the carer and the targeted behavioural interventions that are aligned with the evidence-based. The impacts are limited with the structural barriers that involve poverty, workforce shortages and also service fragmentation. However, preventing LBW needs a shift from the healthcare individualized antenatal models towards integration. Therefore, the community-based and the equity-focused healthcare strategies are determined to be mitigated both clinically and also social determinants of maternal health.

Chapter 3: Research Methodology

3.1 Methods and methodology

The systematic review method has helped in determining the factors that create an impact of maternal health behaviours, socioeconomic issues and maternal health behaviours on LBW by systematically analysing the pre-existing data.

3.2 Introduction

The methodology chapter has included the outline of method and design used in the research for determining the contribution of low birth weight (LBW) within the low-income population in the UK. This has provided the design and techniques used in the research for conducting systematic literature review to determine the prevalence of LBW among the prevalence of LBW across the UK.

3.3 Research philosophy

The research study adopts an ***interpretivism research philosophy*** to explore the LBW is experienced, explained and also constructed within the low-income UK communities. The interpretivism privileges participants' meanings, social procedures for example maternal decision-making, community norms and also perceptions of the health services. The quantitative metrics alone cannot capture, thus by treating LBW as a socially embedded phenomenon rather than a purely biomedical outcome, the interpretivism stance enables the researcher to synthesize qualitative insights from existing studies (Gladstone *et al.* 2021). The stress of access to care and loved experiences for marginalization produces meanings and behaviours influencing pregnancy outcomes (Heys *et al.* 2021). Subsequently, the interpretivism supports the chapter's aim for surfacing nuanced explanations, identifying the context-sensitive determinants and also informing the interventions properly.

3.4 Ethical consideration

The research relies solely within secondary data by a systematic review; ethical rigour remains very crucial. The study further complies with the UK data protection and research governance frameworks principally the ***Data Protection Act 2018 and the UK General Data Protection Regulation (UK GDPR)***. This further ensures that any accessed datasets or reports are lawfully published that are not Personally Identifiable Information (PII) from the original studies is disclosed. Primary studies contain individual-level data that are only aggregated outcomes reported within published sources that are used (LeBreton *et al.* 2023). Any datasets are further accessed from repositories that would be checked for appropriate consent and the governance statements; the review further adheres to good practice standards for the secondary conflicts of interest and the critical appraisal of original studies ethical approvals.

3.5 Research approach and study design

The systematic review is required to synthesise fragmented evidence on low-birth-weight determinants in low-income UK communities. The existing studies depend on focus, design and quality in which the systematic review ensures transparency, reduces bias and finds the consistent determinants by supporting strong, evidence-informed public health and policy decision-making. The research employs a **systematic review approach** to comprehensively locate, evaluate and also synthesize the literature on LBW determinants within UK-income communities. The systematic review methodology includes the structured search strategies, explicit selection criteria, and critical appraisal of the study quality as well as transparent synthesis proceedings that ensures reproducibility with reducing selection bias (Shaheen *et al.* 2023). The approach permits integration of the epidemiological studies (for example, identifying associations), qualitative research (for example illuminating the lived experiences and mechanisms) and the policy analysis (for example revealing service-level determinants). The systematic review further allows the researcher to interrogate the underlying reason, contextual drivers and also stakeholder perspectives that are aligned with the research.

The core keywords sets involve: 1) “low birth weight”, “socioeconomic factors”, “air pollution”, “overcrowding”, “low-income family”, “UK”, “Pregnancy outcomes”, “low-income family”, “UK”, 2) “low-income weight”, “maternal care”, “public health interventions”, 3) “low birth weight”, “socioeconomic factors”, “low-income family”, “UK”, 4) “low birth weight”, “maternal care”, “public health interventions”, “UK”. The review prioritises at least 12 high-quality articles to ensure analytical depth and validity.

3.6 Research strategy

This research adopts a deductive research strategy by considering established public health theories with empirical evidence related to low birth weight. The research starts with predefined assumptions informed by the Social Determinants of Health and Life Course theory which guide objectives formulation and thematic development. The existing literature is systematically analysed to evaluate whether recognised maternal, socio-economic, environmental and healthcare factors consistently influence low birth weight in low-income UK communities. This deductive approach allows structured hypothesis testing through the secondary data analysis by ensuring theoretical alignment across the research with strengthening the validity and policy relevance of the research findings. The main approaches are also making explicit gaps within the evidence based on geographic, demographic or the methodological guidelines for future primary research (Friedman *et al.* 2025). A **descriptive systematic review design** is further

chosen for mapping and summarizing existing evidence to determine the LBW within low-income UK communities. The design further provides a transparency of replicable approaches for identifying, appraising and also synthesizing secondary studies. These are emphasizing the systematic description rather than meta-analytic pooling while heterogeneity is expected (Kepes *et al.* 2024). The secondary data further reduces the cost and time by offering the breadth needed to understand the complicated casual webcams within deprived communities (Dennis, 2024). Therefore, the main design supports rigorous, policy-oriented conclusions about the determinants that are most consistently associated with LBW in the UK low-income context. Likewise, the deductive approach provides a defensible, comprehensive evidence for mapping informed targeted interventions for LBW reduction in deprived UK communities.

3.7 Method of data collection

3.7.1 Search strategy

The search strategy used by the research is a keyword search strategy for determining the article from the database using key terms related to the research. The key terms are “Low birth weight”, “socioeconomic factors”, “Pregnancy outcomes”, “maternal care”, “air pollution”, “overcrowding”, “prenatal care” “ low-income family” “UK” and “Public health interventions” .

3.7.2 Framing research question: PICO

PICO	Search Terms
Population	• Pregnant women from low-income UK communities
Intervention	• Smoking cessation, nutrition support, antenatal care
Comparison	• Women with adequate care and healthier lifestyles
Outcome	• Low birth weight
SETTING	• UK healthcare community settings

Table 3.1: PICO table

The research question has been structured using the PICO framework to ensure clarity and methodological precision. PICO facilitated systematic identification of the target population, relevant interventions, appropriate comparisons and measurable outcomes. This approach enhanced database searching, study selection consistency and alignment between research objectives, evidence synthesis and thematic analysis.

3.7.3 Database search procedure

The databases used by the research for searching the article are Science Direct, Springer, Research Gate and Google Scholar for determining the precedence of low-birth-weight outcomes among the low-income population of the UK. Boolean operators are the keywords such as AND OR searches in databases for refining the search terms for narrowing the search results. As mentioned in the report of Scellset *al.* (2021), the Boolean is used in the systematic review based on the phrase using keywords to search the articles.

3.7.4 HAND search

The hand search has been conducted to complement electronic database searches by minimising publication bias. The reference lists of key studies and relevant systematic reviews have been manually screened to recognise additional eligible articles. This process has ensured inclusion of influential studies not indexed across the selected database but relevant to the research objectives.

3.7.5 Grey literature

The grey literature has been reviewed to strengthen contextual and policy relevance. The sources have included the UK government reports, NHS publications, Office for National Statistics data and documents from organizations such as WHO and UNICEF. The inclusion of the grey literature has enabled implementation of real-world evidence and policy perspectives with no understanding in peer-reviewed articles.

3.7.6 Inclusion and Exclusion criteria

PICO	INCLUSION CRITERIA	EXCLUSION CRITERIA
Population	Low-income pregnant women in the UK	Non-UK or high-income populations
Intervention	Antenatal, nutritional, smoking interventions	No maternal or public health focus
Comparison	Higher SES or adequate care groups	No comparator
Outcome	Low birth weight	No birth weight outcome
SETTING	UK healthcare or community	Non-UK settings

Table 3.2: Inclusion and exclusion criteria used in the research

The clear inclusion and exclusion criteria have been applied using the PICO framework to ensure consistency and relevance. The criteria have focused on population characteristics, interventions, outcomes and UK-based contexts. This structured strategy has improved transparency, reduced selection bias by ensuring that only methodologically appropriate studies addressing low birth weight determinants have been included.

3.8 Screening results

Database	Search Dates	Inclusion Year	Search Results	Excluded	Included
Science direct	Jan-Feb 2025	2021-2025	18	16	2
Springer	Mar-Apr 2025	2021-2025	15	13	2
ResearchGate	May-Jun 2025	2021-2025	14	11	3
Google Scholar	Jul-Aug 2025	2021-2025	22	17	5
TOTAL ARTICLES	-	-	69	57	12

Table 3.3: Screening results

The table above has illustrated the roadmap for selecting 12 articles from the databases for addressing the research objective. The advantage of using the PRISMA diagram is that it helps in improving the transparency in collecting the data source and methodological quality within the systematic reviews because of LBW among the low-income population in the UK.

3.9 Study selection

The inclusion criteria have been included in the research for deterring the sustainable article for the systematic review about low birth weight among the low-income families of the UK. The article has included the peer-reviewed sources published after 2021 and before 2025 to have the recent data about the factors influencing the LBW among the UK population.

3.10 Left articles form whole process

Several articles have been excluded from the review process following the title, abstract and full-text screening. The exclusion has occurred due to duplication, lack of UK focus, absence of socio-economic variables or failure to report low birth weight outcomes. The studies published before 2021 or lacking methodological transparency have also been removed. The quality appraisal using the CASP tool further excluded studies with insufficient rigour or unclear ethical reporting. The remaining 12 articles have described strong alignment with research objectives,

acceptable methodological quality and relevance to low-income UK settings to ensure a credible and focused evidence base for analysis.

3.11 PRISMA chart

The PRISMA flow diagram is used in the search for screening of the article within the data base by considering the inclusion criteria to illustrate the factor influencing the LBW among the UK population. As highlighted in the report of Sarkis-Onofre *et al.* (2021), PRISMA Statement has encountered transparency and complete reporting of the system review in the methodology [see figure 4.1].

3.12 Quality assessment (QA)

The CASP tool is used in the research for deterring the quality of the article used in the research based on the set of questionnaires to determine the research objectives. As illustrated by Humayoun *et al.* (2024) in the report that CASP in the SLR helps in discussing the quality criteria of the article used in the data analysis. Thus, the application of the CASP tool has reduced information overload based on the checklists to deliver high-quality research on the impact of low income and pollution on the LBW across the UK.

References	SECTION A: Are the results valid?						SECTION B: What are the results?			SECTION C: Will the results help locally?
Authors and Year	Was there a clear statement of the aims of the research	Is a qualitative methodology appropriate?	Was the research design appropriate to address the aims of the	Was the recruitment strategy appropriate to the aims of the research	Was the data collected in a way that addressed the	Has the relationship between researcher and participants	Have ethical issues been taken into consideration?	Was the data analysis sufficiently rigorous?	Is there a clear statement of findings?	How valuable is the research?

	?		research ?	?	research issue?	been adequate ly consider ed?				
Ruan et al. (2025)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Diabelkov áet al. (2022)	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Günther et al. (2021)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Panico et al. (2024)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

Zhou et al. (2025)	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Yamane and Tsutsui (2025)	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Fussell et al. (2023)	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No
Bandyopa dhyay et al. (2023)	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Thomson et al. (2021)	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Hunter et al. (2023)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Devagurue t al. (2023)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Schuler et al. (2023)	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
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Table 3.4: CASP tool in Appraisal

3.13 Data characteristics and data extraction

The data extraction has been considered using a structured template to ensure consistency and accuracy. The extracted characteristics have included author, year, study design, population, determinants investigated and key findings. Both quantitative and qualitative data have been included enabling comprehensive synthesis of socioeconomic, maternal, environmental and healthcare-related factors influencing low birth weight.

3.14 Data synthesis

The research has included **thematic analysis** based on the development of **4 themes** addressing the objective for determining the impact of socio-economic factors on LBW presence in low-income communities of the UK. The themes are related with maternal health behaviours, healthcare access with antenatal care, physical environmental determinants and socioeconomic stressors (Janaki and Prabakar, 2024). As mentioned in the report of Cooper *et al.* (2022), the thematic analysis of prior work within the systemic review helps in reflecting the findings of a research.

3.15 Limitation of the methods

The review has depended exclusively on secondary data limiting causal inference and exclusion of lived experiences. The heterogeneity in research designs and outcomes measures have reduced comparability. Furthermore, the language and publication bias may exist due to English-only inclusion. The limited database coverage and grey literature appraisal constraints may have led to exclusion of relevant evidence.

3.16 Chapter summary

It can be summarised from the research that the methodology used is systematic LR that helps in deterring the LBW is influenced by socio-environmental factors across the UK. The research has used the secondary data from the peer review article related to LBW prevalence among low-income communities across the UK. The method approach is associated with pre-specified inclusion and exclusion criteria based on quality appraisal of sources and thematic analysis of the collected data. The application of systematic review approach has integrated the deteriorating quality of the article based on CASP tool and PRISMA diagram for transparency in data selection. The research has integrated the available secondary data from the determined database to consist of peer-review articles related key terms such as LBW and UK low-income population. Thus, the research has integrated the systematic review based on the ethical strategy for avoiding the risk of plagiarism.

Chapter 4: Findings and Analysis

4.1 Introduction

The chapter of findings covers all the collected and analysed data relevant to the determinants of Low Birth Weight or LBW in Low-Income Communities by considering the case study of the UK. This chapter will present a Systematic Literature Review or SLR based on the sources relevant to the research objectives. A thematic analysis will be present in this section to critically analyse the chosen literature for the SLR to develop a logical conclusion on the created research objectives-based themes. Moreover, this chapter will present a critical analysis of the selected articles to reach a concluding remark for understanding the determinants of LBW in low-income communities of the UK.

4.2 Systematic search databases

The screening process has followed PRISMA guidelines to ensure transparency and methodological rigour. The total 69 records have been identified across the four databases. After removing duplicates and applying eligibility criteria, 12 peer-reviewed articles met the inclusion requirements. These studies have generated the final evidence base for thematic analysis [see table 3.3].

4.3 Prisma table

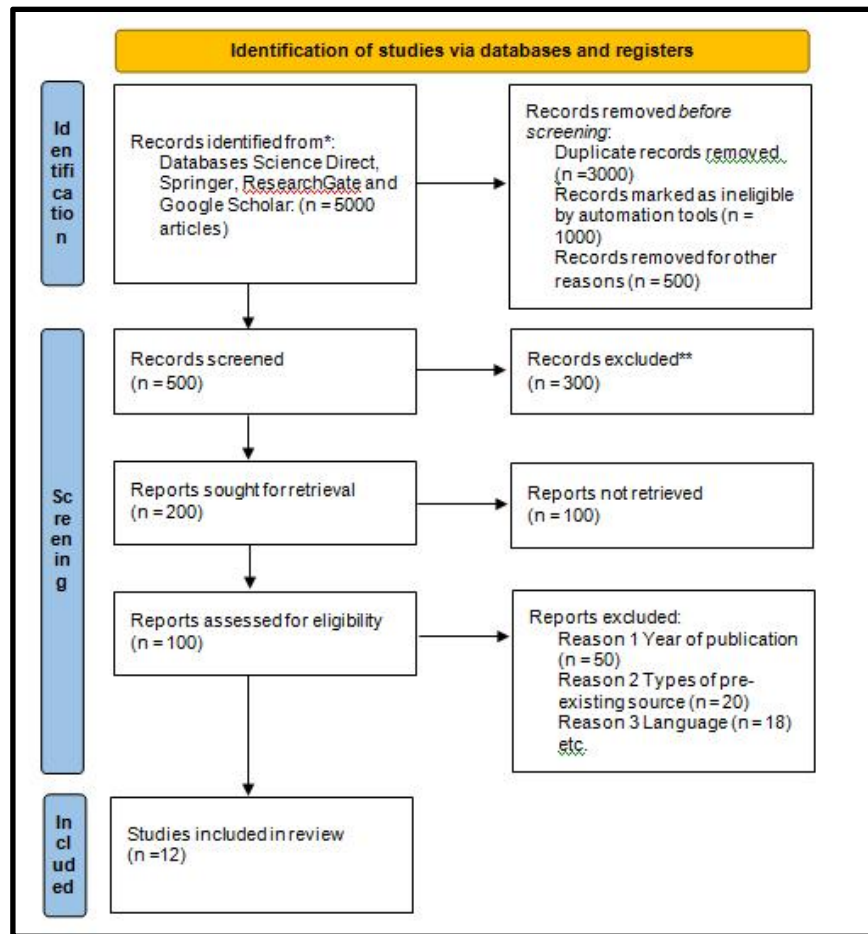


Figure 4.1: PRISMA flow diagram

(Source: Developed by the author)

4.4 Findings

Study author's name	Objective/Purpose	Settings/Sample	Methodology	Strengths	Weaknesses	Results	Conclusion	Data extraction criteria	Data extraction criteria	Themes per each articles
Ruan et al. (2025)	To Examine maternal lifestyle impact on low birth weight	Pregnant women cohort	Prospective cohort study, Appropriate	Large sample, strong statistical analysis	Self-reported lifestyle data	Smoking and poor nutrition increase LBW risk	Maternal lifestyle significantly affects birth weight	Maternal smoking and poor nutrition significantly increase low birth weight risk	Socioeconomic factors indirectly influence maternal behaviours	Theme 1: Maternal health factors, including smoking and nutrition have significant impact on low-birth-weight outcomes in the UK
Diabelkov á et al. (2022)	To identify risk factors associated with low birth weight	Hospital medical records	Retrospective record-based study, Appropriate	Reliable clinical data; clear outcomes	Limited generalisability; no causality	Maternal illness increases LBW risk	Maternal health strongly predicts LBW	Maternal illness linked to adverse birth outcomes	Maternal illness significantly increases risk of low birth weight outcomes	
Günther et al.	To Investigate the impact of	Survey-based maternal	Cross-sectional survey study,	Clear variables; reproducible	Cross-sectional bias; self-	Smoking reduced BMI and	Nicotine indirectly increases	Smoking-related nicotine	Socioeconomic influence	

(2021)	nicotine and BMI on birth weight	sample	Appropriate	measures	reported data	birth weight	LBW risk	reduces maternal BMI, increasing low birth weight risk	not primary focus	
Panico et al. (2024)	To investigate LBW gradients by maternal education	UK, US, France population samples	Comparative cohort analysis appropriate	Cross-country comparison; large datasets	Contextual differences between countries	Lower education linked to higher LBW rates	Education is key socioeconomic LBW determinant	Indirect maternal lifestyle influence	Lower maternal education and income increase low birth weight prevalence	Theme 2: Socioeconomic deprivation, such as income and education, increases prevalence of low-birth-weight in the UK
Zhou et al. (2025)	To assess socioeconomic outcomes linked to VLBW	Adult participants, pooled datasets	Individual participant data meta-analysis appropriate	Large pooled sample; high statistical power	Heterogeneity across studies	Education and income disparities associated with VLBW	Socioeconomic disadvantage increases VLBW risk	Indirect maternal influence	Education and income disparities significantly increase very low birth weight risk	
Yamane and Tsutsui, (2025)	To examine nonlinear LBW risk factors internationally	Datasets from 143 countries	Cross-national comparative analysis appropriate	Very large dataset; strong external validity	Limited country-specific depth	Higher income and employment linked to lower	Socioeconomic status inversely relates to LBW	Indirect maternal BMI influence	Lower income and employment increase	

						LBW			low birth weight prevalence globally	
Fussell <i>et al.</i> (2023)	To review mechanisms linking air pollution to birth outcomes	Experimental and epidemiological literature	Mechanistic literature review, appropriate	Strong theoretical grounding; biological explanation	No primary empirical data	Air pollution impairs placental development, increasing adverse outcomes	Environmental exposures contribute to LBW risk	Indirect maternal physiological impact	Socioeconomic exposure inequalities implied	Theme 3- High rates of air pollution, environmental exposure and overcrowded increases
Bandyopadhyay <i>et al.</i> (2023)	To find the weight risk factors associated with low birth weight	Wales, UK births (1998–2018)	Linked routine data cohort study (highly appropriate)	Large longitudinal dataset; strong reliability	Limited qualitative insight	Smoking and air pollution increase LBW odds	Environmental exposures significantly increase LBW risk	Smoking as maternal behaviour risk	Socioeconomic and environmental deprivation	the risks of low birth weight and compromised fatal growth in UK
Thomson <i>et al.</i> (2021)	To examine socioeconomic inequalities and adverse pregnancy outcomes	UK and Republic of Ireland studies	Systematic review and meta-analysis (appropriate)	Robust synthesis; multiple databases	Heterogeneity between studies	Crowded housing increases LBW odds	Living conditions significantly influence LBW risk	Indirect maternal stress and nutrition impact	Housing insecurity and deprivation increase LBW	

Hunter et al. (2023)	To evaluate antenatal interventions preventing low birth weight	Controlled trial evidence across settings	Modular systematic review, appropriate	High-quality trial evidence; intervention-focused	Variability in intervention contexts	BPE supplementation reduces LBW and prematurity	Antenatal nutrition interventions effectively prevent LBW	Balance d protein energy supplementation improves maternal nutrition and birth outcomes	Addresses nutritional deprivation contexts	Theme 4: Providing balanced protein and energy (BPE) supplementation, health management of mothers during pregnancy and coordinated care process enhance birth outcomes
Devaguru et al. (2023)	To assess prevalence of LBW and associated maternal risk factors	Hospital-based sample of 327 LBW newborns	Cross-sectional hospital study, appropriate	Clear outcome focus; diverse family backgrounds	Single-centre; no causal inference	Early identification of maternal risks reduces LBW	Early detection of maternal factors improves birth outcomes	Maternal hypertension, overweight increase LBW risk	Social and economic factors influence maternal health	
Schuler et al. (2023)	To examine health-system drivers influencing LBW care continuity	Family members of LBW infants (n=11)	Constructivist grounded theory study, appropriate	Rich qualitative insight; care-process focus	Small sample; context-specific	Coordinated, continuous care improves LBW outcomes	Care continuum and communication reduce LBW risks	Indirect maternal care support impact	Health-system coordination reduces LBW	

Table 4.1: Results

4.5 Data synthesis

4.5.1 Theme 1: Maternal health factors, including smoking and nutrition have significant impact on low-birth-weight outcomes in the UK

Low birth weight is a considerable maternal health factor which can reduce the long-term health of children. As per the views of Ruan *et al.* (2025), maternal demographics and nutrition factors are highly associated with the risk of facing LBW among the children. This article has highlighted the significant relation between different maternal health factors such as nutrition and smoking with the risk of LBW. According to the findings of Ruan *et al.* (2025), the prevalence of LBW is forecasted to reach 14.6% at the end of 2025 where the risk of LBW is high for the person with high nutritional imbalance and smoking tendency during pregnancy. This implies the negative impact of smoking and nutritional imbalance among the children's risk of having LBW. Supporting this argument, Diabelková *et al.* (2022) stated the significant relationship between LBW and lifestyle factors of pregnant women. Hence, it can be said that poor lifestyle reduces nutritional behaviour of human beings which can increase the risk of low birth weight.

The above figure showcases the relationship between BMI and total number of daily basis cigarette smoking tendencies. According to the above graph, pregnant women with smoking habits have a high tendency of facing maternal BMI or Body Mass Index (Günther *et al.* 2021). In this context, it has been found that smoking tendency indicates poor nutritional balance which can increase maternal health issues such as LBW. Supporting this argument, Diabelková *et al.* (2022) highlighted the relation between poor nutritional status and maternal health factors such as low BMI and LBW. Hence, it can be said that poor nutritional status of women is a valuable maternal health condition determinant in the case of LBW.

The above figure showcases the relationship between BMI and Smoking habit in different stages in the consumption of cigarettes per day. According to the above figure, pregnant women with high cigarette consumption face low BMI (less than 1850) whereas non-smoker pregnant women found high BMI (greater than 3000) (Günther *et al.* 2021). This supports the significant impact of smoking and nutritional behaviour of pregnant women on their BMI. On the other hand, it has been found that parent's education, employment status and income level have significant impacts on the birth weight of children (Yamane and Tsutsui, 2025). This implies that poor lifestyle of parents due to lack of education, employment status and income level can reduce birth weight of their children due to poor nutritional behaviour. As a concluding remark, it can be

said that maternal health factors such as smoking and nutrition have significant impacts on low-birth-weight risks.

4.5.2 Theme 2: Socioeconomic deprivation, such as income and education, increases prevalence of low-birth-weight in the UK

The concept of socioeconomic deprivation refers to the social condition of individuals without any social and economic benefits such as lower educational quality and lower income range. According to the perspectives of Panico *et al.* (2024), socioeconomic deprivation or socioeconomic inequalities have a significant impact on the low birth weight of the UK, France and US. This implies that lack of equality in socioeconomic factors such as education and income range can reduce the lifestyle of people which is not suitable for balancing LBW. On the other hand, Yamane and Tsutsui (2025), highlighted the interconnection between socioeconomic disparities in different countries on the risk of LBW. According to this article, the range of LBW is different in different countries in terms of income.

The above described a country's income level as a risk factor for LBW when it can increase the risk of LBW due to the presence of inequality in healthcare access. According to the above figure, the range of LBW is comparatively higher in the low-income countries in comparison to middle- and high-income countries (Yamane and Tsutsui, 2025). This implies that inequality in income range can affect a person's lifestyle by reducing healthcare accessibility and affordability. Hence, poor nutritional status is related to poor income status which is not suitable in balancing birth weight. On the other hand, as per the views of Zhou *et al.* (2025), the range of BW among adults is high when educational quality is high. This implies the impact of educational qualification on the birth weight range.

According to the above analysis, it has been observed that people with LBW have low educational attainment. As opined by Zhou *et al.* (2025), lower maternal education and income can increase the risk of LBW. Due to the presence of socioeconomic disparity such as inequality in education and employment, maternal awareness about healthcare can be reduced which is a primary reason for health risks such as LBW. According to the views of Panico *et al.* (2024), income is a significant key factor in terms of creating socioeconomic disparity which can increase the risk of LBW. In this context, it can be said that lower income levels reduce the birth weight rate by reducing the competency and accessibility of leading a healthy lifestyle. Hence, poor healthcare knowledge and awareness with limited income can affect maternal health by creating LBW. Furthermore, high income or employment status can increase birth weight which supports the positive correlation between income and LBT for maternal health.

4.5.3 Theme 3- High rates of air pollution, environmental exposure and overcrowded increases the risks of low birth weight and compromised fetal growth in UK

The increasing rates of LWB and its prevalence in the UK are impacted through different risk factors including air pollution, environmental exposure and overcrowded living conditions, impacting fetal growth. Fussell *et al.* (2023) have highlighted that air pollution is associated with placental vascular resistance to blood flow, restricting supply of oxygen and vital nutrients to the foetus. The restriction of the oxygen and vital nutrients causes the higher risks of LWB among fetuses that are caused by increased exposure of the mothers to air pollution. On the other hand, Bandyopadhyay *et al.* (2023) have argued that environmental exposures are associated with causing LWB among new mothers along with increased rates of smoking and alcohol intake. The author emphasized that the physical environment of the mother is a major factor that needs to be managed effectively and efficiently to reduce the risks of LWB. The physical environment as a key risk factor causing LWB includes unhealthy behaviour such as smoking, poor socioeconomic conditions, higher exposure to air pollutants, inadequate nutrition (Bandyopadhyay *et al.* 2023). The management of the environment exposure and reducing stress on the mother is also crucial for enhancing the overall wellbeing of the mother, leading to enhanced birth outcomes in the UK.

Socioeconomic inequalities towards women in the UK have a major impact on the overall health and wellbeing of women that also directly impact the children. Thomson *et al.* (2021) have argued that socioeconomic status (SES) exposures that impact birth weight in the UK include overcrowded living conditions along with education and poor financial conditions. The author emphasised that the overcrowded living conditions are associated with increased exposure to air pollution, poor nutrition, lack of privacy along with stress and depression. In comparison, Fussell *et al.* (2023) discussed that low-cost sensors are effective for mothers in initial stages of pregnancies to reduce air pollution exposure and tobacco smoke exposure. Maintaining a healthy lifestyle including the management of nutritional intake is also crucial for enhancing LWB rates among young others in the UK. Overcrowded living conditions prevent new mothers from taking self-care; improve the living environment for ensuring nutritional intake, and compromise fetal growth. Moreover, Thomson *et al.* (2021) have identified that the odds of LBW and small for gestational age (SGA) are also higher among individuals living in educationally deprived neighbourhoods. Thus, addressing the risk factor for reducing LWB rate among mothers in the UK is crucial through facilitating local healthcare access and coordinated care.

4.5.4 Theme 4: Providing balanced protein and energy (BPE) supplementation, health management of mothers during pregnancy and coordinated care process enhance birth outcomes

The management of maternity care and quality is crucial in the UK to reduce the risks of LWB through offering balanced protein intake, diet and enhancing the environment of the mothers. Hunter *et al.* (2023) have argued that offering Antenatal dietary education programs to new mothers during pregnancy reduces the risks of LBW through strengthening dietary and nutrient deficits. The author also emphasised that monitoring the weight and nutritional intake of the mother throughout the pregnancy is also a key intervention, positively associated with reducing LWB risks. The World Health Organisation also supports that offering continuous education to new mothers regarding iron and folic acid and supplementation with calcium and vitamin A is crucial for balanced protein intake. On the other hand, Devaguru *et al.* (2023) have outlined that detecting maternal factors including physical activities, smoking and other health conditions are crucial to reducing LWB odds in the UK. The early detection of maternal factors is crucial as it assists in identifying risk factors that might impact the overall health of mothers and its impact on the fetal. Thus, the detection of risk factors including hypertension, inadequate nutrition and bad obstetric history of the mother is associated with increasing the odds of LWB.

The findings of the articles reveal that daily or weekly supplementation through continuous education programs to new mothers in deprived communities of the UK are significant for reducing LWB risks. Hunter *et al.* (2023) emphasised on providing accurate and individualised care plans and educational programs to the new mothers for maintaining nutritional balance throughout pregnancies. The local healthcare organisations also play a significant role that assists the new mothers in the UK to access educational programmes for expanding understanding on maintaining nutritional benefits. In contrast, Schuler *et al.* (2023) have highlighted that local health institutions are responsible for offering coordinated care processes to new mothers for enhancing the rates of LWB. This outlines that the effectiveness and the management of LWB rates among young mothers in the UK can be strengthened through implementing coordinated care processes. Schuler *et al.* (2023) have also highlighted that the effective communication between the care providers, healthcare institutions and the families of their new mothers is also effective for LWB management. Thus, educational programs for mothers, coordinated care processes and nutritional supplements related education is crucial to be provided to mothers by the local care institutions for mitigating the risks of LWB.

3.5 Chapter Summary

In summary, the chapter has discussed the findings obtained from 12 peer-reviewed articles that have been gathered from secondary databases including Google Scholar. The discussion of key maternal health factors such as smoking, nutritional intake, living conditions and overall socio-economic condition has been outlined for analysing the prevalence of LWB. Socioeconomic deprivation is also a major issue new mother's experience during pregnancy that impacts overall health and growth of the fetes, leading to increasing rates of LWB in the UK. Moreover, the assessment of environmental and housing conditions, including overcrowded living conditions has also been outlined that increase the risks of maternal stress, impacting health and improve wellbeing of the fetes. Thus, the recommendations have been offered in the study based on findings from the article for addressing LWB among UK mothers including balanced protein and energy (BPE), coordinated care process.

Discussion

1 Introduction

The chapter is going to evaluate overall research findings in terms of determining the relevance of the information compared to the thesis topic. Additionally, the compare and contrast of the information will be held within this chapter in terms of establishing in-depth analysis of the key objectives. This can help this research to provide a unique interpretation regarding the research findings and can explain their significance relating to existing literature. The discussion chapter is also going to simplify their overall findings as well as connect them to a broader field of knowledge.

2 Critical Discussion of Thematic Findings

Quantitative generic data extraction

Details of study	Study 1 Ruan <i>et al.</i> (2025)	Study 2 Günther <i>et al.</i> (2021)	Study 3 Zhou <i>et al.</i> (2025)	Study 4 Yamane and Tsutsui, (2025)	Study 5 Bandyopadhyay <i>et al.</i> (2023)	Study 6 Thomson <i>et al.</i> (2021)	Study 7 Hunter <i>et al.</i> (2023)	Study 8 Devaguru <i>et al.</i> (2023)	Study 9 Schuler <i>et al.</i> (2023)
Date of extraction	22/12/2025	24/12/2025	23/12/2025	21/12/2025	24/12/2025	24/12/2025	27/12/2025	29/12/2025	30/12/2025

Title	“The impact of maternal health and lifestyle on low birth weight: a prospective cohort study”	“Impact of nicotine and maternal BMI on fatal birth weight”	“Socioeconomic outcomes in very preterm/very low birth weight adults: individual participant data meta-analysis”	“Non-linear association of low birthweight with risk factors including women’s BMI: evidence from an international comparison”	“Weighting of risk factors for low birth weight: a linked routine data cohort study in Wales, UK”	“Socioeconomic inequalities and adverse pregnancy outcomes in the UK and Republic of Ireland: a systematic review and meta-analysis”	“A modular systematic review of antenatal interventions to address undernutrition during pregnancy in the prevention of low birth weight”	“The prevalence of low birth weight among new-born babies and its associated maternal risk factors: a hospital-based cross-sectional study”	“Health-system drivers influencing the continuum of care linkages for low-birth-weight infants at the different care levels in Ghana”
Source	Springer	Springer	Google Scholar	Springer	Google Scholar	Google Scholar	Google Scholar	Research Gate	Springer
Purpose	To identify maternal risk	To examine BMI–	To identify socioeco	To examine cross-country	To identify modifiable LBW risk	To examine socioeconomic	To evaluate antenatal	To evaluate LBW	To explore continuum-of-care

	factors	smoking interaction effects	nomic risk predictors	birthweight determinants	factors	pregnancy outcome associations	nutritional interventions effects	prevalence risk factors	influencing factors
Study design	NA	Observational	NA	Longitudinal	Longitudinal	Systematic review and meta-analysis	Systematic	Cross-sectional	Grounded theory
Population	Adults	Pregnant	VPT/VLBW individuals	Adults	Mother and child	Adults	Pregnant	Babies	LBW-infants
Sample size	NA	110.047 singleton pregnancies	11 birth cohorts from 8 countries	143	N=693 377	9 databases	NA	327 LBW babies	11
Diagnosis criteria	LBW	LBW	LBW	LBW	LBW	LBW	LBW	LBW	LBW
Setting	Community	German Community	Community	Community	Community	UK or Ireland	Community	Community	Community

		y							
Intervention	Nutritional and behavioural measures	Stop smoking	Improved neonatal care to reduce NSI prevalence	Policy intervention	Increasing awareness	Women in intermediate-level employment were also at a higher risk of certain pregnancy complications	Antenatal care	Factorial analysis	Effective communication and different care levels
Comparator	NA	NA	NA	NA	NA	NA	NA	NA	NA
Outcomes	Preventive measures	Birth weight	Socio-economic outcomes	Socio-economic	Improving maternal health, reducing preterm births,	Socio-economic	LBW related outcomes	Socio economic and health	Health
Adverse effects	None	None	None	None	None	None	None	None	None

Table 5.1: Quantitative generic data extraction

(Source: Self-created)

Qualitative generic data extraction

Details of study	Study 1 Diabelková <i>et al.</i> (2022)	Study 2 Panico <i>et al.</i> (2024)	Study 3 Fussell <i>et al.</i> (2023)
Date of extraction	23/12/2025	24/12/2025	22/12/2025
Title	“Risk factors associated with low birth weight”	“Gradients in low birth weight by maternal education: A comparative perspective”	“Ambient air pollution and adverse birth outcomes: a review of underlying mechanisms”
Source	Google Scholar	Google Scholar	Google Scholar
Purpose	To examine maternal lifestyle health impacts	To compare education-related LBW inequalities	To analyse air-pollution birth outcomes
Study design	Cohort	Observational	Narrative
Population	Maternal	Mothers	Pregnant
Sample selection	Primary	Secondary	Secondary
Sample size	NA	NA	NA
Age	Adults	Adults	Adults
Education/ethnicity	NA	NA	NA
Setting	Community	Community	Community

Primary diagnosis	LBW	LBW	LBW
Exposure	Nutritional and health	Maternal education	Air-pollution
Outcomes	Health determinants	Reduced inequalities	Adverse birth outcomes
Adverse effects	None	None	None

Table 5.2: Qualitative generic data extraction

(Source: Self-created)

3 Discussion of Findings in Relation to Research Objectives

Low birth-weight serves as a common measure regarding national morbidity, mortality as well as pregnancy outcomes. As per the opinion of Ruan *et al.* (2025), low birth-weight refers to the weight of new born babies fewer than 2500 gm during the initial time of birth. The use of chemicals such as cadmium within the manufacturing of tobacco as well as cigarettes can negatively impact both mother and child during the time of birth. However, Ruan *et al.* (2025) have argued that the presence of presentational diseases among maternal women such as hypertension, liver and kidney disease, thyroid and others can result in lowering the weight of new born babies. The in-utero period is considered to be a pivotal moment of an individual life as well as makers that are strongly correlated with future health and development trajectories. As per the opinion of Panico *et al.* (2024), mothers with low education faced the issue of LBW as compared to the high educated mothers.

As per the regression analysis of the article, it has been observed that the existence of LBW during the time of birth is high within countries such as the UK, US and France. This is considered to be an increasing addiction for smoking among females during the time of maternity period. Apart from this, the presence of social economic inequalities among a country's population is also considered to be a key reason behind the rise of LBW issues for infants during the time of birth. On the other hand, Zhou *et al.* (2025) have argued that approximately, 1 to 2 babies among 100 are born premature, having very low birth weight. Understanding the long-term challenges of LBW is considered to be a crucial aspect for spreading awareness among females during their time of maternity period.

The infants with LBW are considered to be having higher risk of neurosensory impairment that includes cerebral palsy, severe hearing as well as cognitive impairments. According to the findings of Yamane and Tsutsui (2025) the current generation of LBW among infants has developed a challenging phase for medical practitioners as well as patients. It has been recognised that the influence of social economic status, ethnic as well as racial disparities has impacted the level of LBW among infants during the time of birth. Apart from this, medically complex deliveries that are generally common within preterm infants can further widen economic disparities through enhancing neonatal healthcare cost and long-term medical expenses. Birth weight is considered to be indicators of infant health that influence later health aspects. On the other hand, Panico *et al.* (2024) have argued that the presence of low education level among maternal females mostly faces the issue of low birth weight among the

infants during the time of birth. Similar to the context, it has been addressed that social economic status is measured as well as interpreted within health inequalities.

The different approach of illustrating social-economic status can give rise to different relationships with health outcomes. As mentioned by Zhou *et al.* (2025), Adults having NSI have revealed lower educational attainment as well as programme enrolment compared to normal-birth controls. This signifies that socioeconomic deprivation, particularly low income and limited education, is consistently associated with an increased prevalence of low birth weight. Low-income limits access to essential resources that promote healthy pregnancy and child development. On the other hand, Yamane and Tsutsui (2025), have argued that the ability to afford nutritious foods is reduced, leading to inadequate intake and potential malnutrition. Mothers with lower socioeconomic status often face inadequate nutrition, poorer living conditions, less access to healthcare as well as prenatal care, and may have other risk factors such as anaemia, all of which contribute to LBW babies.

The key concept of socioeconomic deprivation refers to the social condition of individuals without any social as well as economic benefits such as lower educational quality and lower income range. As per the findings of Panico *et al.* (2024), socioeconomic deprivation or socioeconomic inequalities have significantly impacted on low birth weight of the UK, France and US. Apart from this, Zhou *et al.* (2025) have contradicted that the range of LBW among adults is high when educational quality is high. This signifies the impact of educational qualification on the birth weight range. It has been recognised that lower income levels reduce the birth weight rate by reducing the competency and accessibility of leading a healthy lifestyle. Furthermore, high income as well as employment status is considered to be pivotal in terms of increasing birth weight which supports the positive correlation between income and LBT for maternal health. Based on this aspect, the necessity for addressing such issues has been a complex situation of healthcare practitioners as well as affecting the further health condition of the infants. Hence, poor healthcare knowledge and awareness with limited income can affect maternal health by creating LBW.

It has been recognised from the findings section that the issues of LBW within the low- and middle-income countries are directly related to environmental determinants such as air pollution. The changing atmosphere because of chemical exposure has confirmed the heterogeneous mix of gases which impact public health negatively. Based on the views of Fussell *et al.* (2024), ambient air pollutant factors exposure in the environment have promoted cardio respiratory diseases as well as threatened the public health with diabetics, along with suboptimal cognitive development. An adverse birth outcome regarding low birthweight and preterm delivery have

been associated with maternal exposure and high exposure of air pollutants. On the other hand, maternal age in the deprived area has been considered a determinant of low birth-weight. Based on the views of Bandyopadhyay *et al.* (2023), high deprived areas within a geographical segment are directly related to low qualification. Environmental exposure as well as its numerous health outcomes during pregnancy is unknown to the population. The cohort studies provided by the author and the responses by the survey participants stated the positive relation of LBW with highly deprived areas. The first-born children in deprived areas are at a high risk of low birth-weight because of maternity smoking.

Deprived area is one of the key determinants of LBW that is associated with low-income regions. Lack of facilities during pregnancy regarding healthy diet and environment has been recognised in such areas. Severe anxiety and depression have come upon pregnant women from deprived areas which promoted the consequences of LBW. As per the views of Bandyopadhyay *et al.* (2023), anaemia and diabetes among pregnant women in deprived urban areas are common. Mental health is another determinant during maternity age which has promoted the risks of LBW. The statistics collected from pregnant women in the UK have reflected these domestic exposures in the context of LBW.

The individual level belonging to social class is considered to be associated with rising LBW as well as infant mortality. As per the views of Thomson *et al.* (2021), the sustained increase in infant mortality within England has disproportionately affected most deprived areas. Apart from this, it has been recognised that areas with low level education and high rate of poverty faced issues regarding LBW among infants during the time of birth. Populations with high levels of poverty faced issues regarding poor nutrition intakes during the time of pregnancy, resulting in increasing the level of LBW. On the other hand, Fussell *et al.* (2024) have stated that the alternative environmental determinants of smoking have been considered as air pollution. Long term medical effects of these exposures have affected both the adults and children's bodies. Inflammation and oxidative stress among the body have been promoted through tobacco smoke. The UK Government's Committee has examined the medical effects of smoking as well as air pollution on birth outcomes. Nitrogen dioxide as well as ozone is the modern as well as most critical air pollutants in urban environments that lower the fetal growth in pregnancy. Increased oxidative burden during increased air pollutants exposure during pregnancy is recognised to be associated with preterm indices which directly lower the fetal growth. Therefore, low-income countries, where individuals are unaware about oxidative properties of air pollution, have experienced LBW widely.

The restriction of the oxygen as well as vital nutrients causes the higher risks of LWB among foetuses that are caused by increased exposure of the mothers to air pollution. Apart from this, Bandyopadhyay *et al.* (2023) have argued that environmental exposures are associated with causing LWB among new mothers along with increased rates of smoking and alcohol intake. Similar to the context, Fussell *et al.* (2023) have discussed that low-cost sensors are effective for mothers in initial stages of pregnancies in terms of reducing air pollution exposure as well as tobacco smoke exposure. The physical environment as a key risk factor causing LWB includes unhealthy behaviour such as smoking, poor socioeconomic conditions, higher exposure to air pollutants as well as inadequate nutrition. Maintaining a healthy lifestyle including the management of nutritional intake is also crucial for enhancing LWB rates among young others in the UK. Thus, addressing the risk factor for reducing LWB rate among mothers in the UK requires facilitating local healthcare access and coordinated care.

The influence of BEP supplementation is considered to be one of the effective measures that have effectively addressed the issue of LBW among infants during the time of birth. As per the opinion of Hunter *et al.* (2024), there is a direct relationship between maternal under nutrition as well as poor fetal growth. The presence of inadequate nutrition reduces immunity to infections, contributes to poor mental health as well as exacerbates chronic illness within women belonging from the maternal stage. According to the recommendation of WHO, women within their maternity period are required to in-take food that is rich in protein as well as energy supplements. Apart from this, daily or weekly nutrition supplementation having iron as well as folic acid and vitamins A and calcium can be beneficial in addressing the level of LBW among infants during the time of birth. On the other hand, Devagurue *et al.* (2023), have mentioned that the prevalence of LBW has been noted to be 36.33% among mothers belonging to the age group of less than 19 years and greater than 35 years. Grand multipara women have revealed the highest rate of LBW babies in present times. This signifies that the best time to adopt a baby is between the ages of 20 to 34 years. Thus, women during their maternal period are required to be aware of their nutrition in terms of avoiding the change of LBW babies.

Effective maternal health management and coordinated care are critical for improving birth outcomes, reducing risks, and ensuring the well-being of both mother and child. As per the argument of Schuler *et al.* (2023), factors such as low-income level, resource limited developing countries are considered to be the potential determinants of LBW. In this respect, the author has suggested in-take adequate supplements as well as habits in terms of addressing the issues of LBW babies during the time of birth. The management of maternity care and quality is considered to be crucial within the UK in terms of reducing the risks of LWB through offering

balanced protein intake, diet as well as enhancing the environment of the mothers. Hunter *et al.* (2023) have contradicted that offering Antenatal dietary education programs to new mothers during pregnancy reduces the risks of LBW through strengthening dietary as well as neutral deficits. Similar to the context Schuler *et al.* (2023) have suggested that local health institutions are considered to be responsible for offering coordinated care processes to new mothers for enhancing the rates of LWB. This outlines that the effectiveness and the management of LWB rates among young mothers within the UK can be strengthened through implementing coordinated care processes. Thus, the above-mentioned suggestion can be beneficial for pregnant women in terms of addressing the chances of low weight babies during the time of birth.

4 Comparison with Existing Literature and Theoretical Context

The prevention of low birth weight can be established by lifestyle as well as nutrition interventions during the time of pregnancy such as achieving adequate weight, abstaining from tobacco and maintaining an adequate diet. It has been recognised that low birth weight is mostly found within the female babies, while male babies are considered to be having higher birth weight. As per the findings of Diabelková *et al.* (2022), the p-value for smoking during the time of pregnancy has been observed to 0.154. This signifies that the habit of smoking among females during the time of pregnancy enhances the chances for low weight birth. The practice of smoking or exposure to second hand smoke as well as variation within energy intakes can lead to higher rates of LBW.

The increasing incidence of LBW has enhanced due to the lack of knowledge regarding prevalent maternal risk factors. The lack of knowledge is considered to be a prerequisite as it is necessary regarding the development of prevention strategies through the national health system, and awareness initiative among public health professionals. As per the analysis of Günther *et al.* (2021) the consumption of nicotine during the time of pregnancy results in narrowing the blood vessels that reduces the blood flow to the placenta. The presence of poor blood circulation within the placenta may also be caused due to the lack of dietary practice among females during the maternal period. It has been recognised that the number of cigarettes consumed by a maternal female per day influences on the child birth weight as well as enhances the risk of preterm birth. Apart from this, BMI as well as smoking interactions with regard to prenatal results. According to the statistical analysis of Günther *et al.* (2021), birth weight among non-smoker was considered to be higher as compared to smokers. This signifies that the habit of smoking has negatively impacts on birth weight to great extent.

5 Implications for Practice, Policy, and Research

Providing pregnant women with advice to increase their energy as well as protein intake can effectively raise their intake. As per the findings of Schuler *et al.* (2023), more than 200 million babies are born with underweight that is considered to be less than 2500 grams. Based on these aspects, the author has suggested reducing economic burden, obtaining standardised care through developing structure coordination among healthcare systems. Managing maternal nutritional and mental health is crucial for optimal fetal development and should be a key part of prenatal care. Apart from this, healthcare workers, specialists, and nutritionists working together ensure comprehensive supervision for pregnant women as well as support healthy child development. On the other hand, Hunter *et al.* (2023), have argued that the habit of excessive smoking during the time of pregnancy is considered to be one of the reasoned causes behind the rise of LBW babies. Similar to the context, the habit of alcoholism and chronic hypertension is considered to be another cause behind the rise of such issues. However, BEP supplementation has been most effective for undernourished pregnant women as well as is a WHO-recommended intervention for them.

6 Strengths and Limitations

Low birth weight is a considerable maternal health factor which can negatively impact children's long term health aspects. Ruan *et al.* (2025) have contradicted that the maternal demographics and nutrition factors are highly associated with the risk of facing LBW among the children. This article has highlighted the significant relation between different maternal health factors such as nutrition and smoking with the risk of LBW. Apart from this, factors related with maternal presentational status have been observed to be aligned with the risk of LBW among the population belonging to urban residence, low education level as well as advanced maternal age at pregnancy. Additionally, it has been contradicted that the presence of increasing air pollution within urban areas has also contributed to LBW.

On the other hand, Diabelková *et al.* (2022) have argued that the consumption of drugs during the time of maternal period has increased the risk of LBW to great extent. It has been recognised that mothers living without a partner are considered to be more socially vulnerable. The presence of such marital status enhances the risk factors for gynaecological and health indicators. In line with this, Diabelková *et al.* (2022) has highlighted the relation between poor nutritional status as well as maternal health factors such as low BMI and LBW. This supports the significant impact of smoking and nutritional behaviour of pregnant women on their BMI. It can be said that maternal health factors such as smoking and nutrition have significant impacts

on low-birth-weight risks. Therefore, it can be said that poor nutritional status of women is a valuable maternal health condition determinant, especially within the case of LBW.

7 Conclusions

The above-mentioned chapter has highlighted that Low birth-weight serves as a common measure regarding national morbidity, mortality as well as pregnancy outcomes. Additionally, the rising incidence of LBW has enhanced due to the lack of knowledge regarding prevalent maternal risk factors. The lack of knowledge is considered to be a prerequisite as it is necessary regarding the development of prevention strategies through the national health system as well as awareness initiative among public health professionals. The infants with LBW are considered to be having higher risk of neurosensory impairment that includes cerebral palsy, severe hearing as well as cognitive impairments. Therefore, low-income countries, where individuals are unaware about oxidative properties of air pollution, have experienced LBW widely.

Chapter 5: Conclusion and recommendation

5.1 Conclusion

In conclusion, this research has addressed the key determinants of 'low birth rate (LBW)' in lower-income communities in the UK by this systematic review method. LBW remains a significant public health challenge since this has a strong association with neonatal morbidity, developmental delays and long-term health complications. Evidence has explained the socio-economic deprivation, maternal health behaviours, environmental exposures and access to antenatal care by interlinking to shape LBW outcomes. The synthesis of peer-reviewed literature has confirmed that the children born in deprived areas experience high risks compared to those in more affluent regions in the UK.

The review has highlighted the major role of maternal smoking, poor nutrition, insufficient housing and restricted access to health services as recurring and modifiable determinants. The research has underscored the influence of structural inequalities where poverty and deprivation has reinforced behavioural risks and environmental challenges by making complex and casual pathways. The findings have shown that LBW is not the medical issue, this is the reflection of high health inequalities. This systematic review has contributed evidence that supports the development of targeted interventions, health policies and community-based approaches for minimising LBW prevalence's. Managing LBW in low-income communities is crucial for enhancing maternal and child health outcomes and enhancing the health equalities within the UK.

5.2 Linking with research objectives

The research objectives have assessed here with the maternal health factors by investigating socio-economic deprivation to analyse environmental and housing conditions. This has also been evaluated healthcare access in relation to LBW. The findings have demonstrated that all objectives have successfully been addressed in terms of using the major keywords of the subject. The maternal health behaviours including smoking and nutrition are emerging as the key contributors of this study. On the other hand, the socio-economic status and education strongly influenced risk exposures as well. The environmental conditions including overcrowding and air pollution further combined the research outcomes. The access to antenatal care has been confirmed as a protective determinant in this study. The research has effectively connected the identified determinants to LBW by achieving the research aims and objectives outlined in this systematic review study.

5.3 Effectiveness of the topic

The determinants of low birth weight (LBW) in the low-income UK communities have addressed the effectiveness due to their alignment with pressing public health emphasising and health inequalities. LBW is a critical indicator of maternal and child health with long-term implications for morbidity, development and socio-economic burdens. This systematic review has highlighted the intersection of poverty, maternal health behaviours, environmental risks by limiting healthcare access by focusing on deprived communities all of which disproportionately influencing outcomes.

This systematic review has improved the effectiveness of this topic to ensure the comprehensive, transparent and evidence-based synthesis of the existing literature sources. This has provided insights which are relevant to the policymakers, practitioners and healthcare planners directly. Furthermore, this topic has bridged the gap between UK national statistics and local inferences to develop the context-specific evidence. This has informed the targeted interventions as well as strategies aiming to minimise LBW prevalence by promoting health inequalities within disadvantaged populations.

5.4 Implications drawn from the research findings for final outcomes

The examined literature goes a long way in indicating the key factors and possible actions to be taken to reduce low birth weight among poor communities in the UK. The environmental exposures, such as air pollution and smoking, were also demonstrated to hamper the placental development and heightened the risk of adverse outcomes, highlighting the importance of community-level prevention approaches. Housing insecurity and overcrowded situations were also mentioned among the key factors, and stress and poor nutrition aggravated maternal health, which further supported the need to pay attention to social determinants. Nutritional support in the form of interventions like balanced protein and energy supplementation was proven to meaningfully enhance fetal growth, which proved the usefulness of nutritional support in high-risk mothers. It was observed that early identification of maternal health risks such as hypertension and obesity was key in preventing complications as the healthcare teams can intervene before the risks are aggravated. Model coordinated care was also highlighted to be very useful, and it guarantees close supervision and proper information sharing between the various levels of care. The results demonstrate that comprehensive interventions, relying on environmental, social, nutritional, and medical measures, can significantly decrease the rate of low birth weight. The advantages are improved baby health, less neonatal morbidities, and sustainable enhancement of community health inequity.

5.5 Recommendations

- ***Maintaining equality in education and income level with awareness of nutrition to balance birth weight***

Equality in education and income level is a vital factor in terms of equal health care accessibility and affordability. As per the discussion by Schenkman and Bousquat (2021), inequality in education and income level has a significant influence on the health equity maintenance. This implies that the lack of knowledge and awareness about the maintenance of nutrition status can reduce birth weight. Hence, increasing public awareness about different maternal health factors on LBW is highly recommended to the UK-based population. In this stage, the UK government can take immediate action through online and offline public awareness campaigns to directly interact with the social community, especially the low-income community of the UK. This strategic solution can help the UK government in developing healthcare equity to ensure a suitable balance in birth weight of new born children.

Engaging pregnant women and newly parents with the social campaigns will be effective to grab the attention of low-income communities in the UK. According to the perspectives of Ruan *et al.* (2025), pregnant women have a high tendency of having LBW among their children due to the increase of smoking tendency during pregnancy. Hence, involving pregnant women from the UK-based hospitals can be useful in developing campaign effectiveness as it can attract society's attention towards the maintenance of birth weight. As a concluding remark, online and offline governmental campaigns can increase public awareness and knowledge of birth weight and its determinants such as education, income and nutrition.

- ***Combining primary research with secondary data to improve quality of research outcomes***

Using primary research, the research outcomes can be improved as it can raise the validity of the collected data due to the direct involvement of the participants. Primary research offers a rich source of quality knowledge relevant to the research contexts when participants are involved directly to produce research outcomes (Walker, 2023). Hence, the use of primary research can improve in-depth knowledge relevant to the determinants of Low Birth Weight or LBW in Low-Income Communities by involving women from the UK. In this research, the combination of primary and secondary research can be helpful in terms of verifying the collected primary data with secondary data to ensure maximum data authenticity and accuracy without any kind of manual error.

Use of primary data with secondary data can enhance researcher's efficiency to produce the most relevant data which is helpful to improve data reliability. According to the view of Ajayi

(2023), primary research allows real time data whereas secondary data offers past data which are available in authentic sources. This implies the benefits of using combined data which are collected from primary and secondary sources at the same time to enhance data authenticity, credibility and validity as well. Therefore, use of primary and secondary data at the same time can be recommended in this study to improve in-depth knowledge relevant to determinants of Low Birth Weight or LBW in Low-Income Communities.

5.6 Research limitations

The low-birth-weight study in the UK has a number of limitations. The standard datasets do not tend to include information regarding maternal weight gain, dietary intake, and psychosocial stress. The missing variables can also lead to biased associations and restrict a causal inference. The heterogeneity between meta-analyses is high; in certain studies, differences in age, ethnicity, socioeconomic status, or geographic background have not been explored, and the strength of the results is lower. The use of interconnected clinical and deprivation records can also fail to capture private healthcare users and those who did not have their records included in usual maternity datasets, which can compromise the generalizability to the entire low-income group (Alberto *et al.* 2023). The ecological fallacy could occur where the area-level indices of deprivation are applied as data to indicate personal risk, failing to consider within-area variation. A lack of longitudinal follow-up limits the knowledge of the long-term outcomes of low birth weight in deprived communities.

5.7 Future research

The future research should be the examination of the interplay between socioeconomic, behavioural, and environmental determinants of low birth weight in low-income communities in the UK. Causal evidence of maternal health, nutrition, and stress levels across pregnancy could be better determined by longitudinal studies (Naaz *et al.* 2023). Place making studies that relate clinical outcomes and local deprivation levels are required to detect the high-risk areas more precisely. Qualitative research on mothers' experiences, obstacles to receiving antenatal care, and beliefs about available public health interventions would improve the contextual factors. It is necessary to examine the effectiveness of integrated community programmes on smoking cessation, nutrition, and mental health support. The results should be used to shape future research that will inform evidence-based, sustainable, and focused interventions to decrease the disparity of low birth weight.

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Appendix

Study author's name	Objective/Purpose	Setting/Sample	Methodology Study design was it appropriate or not	Strengths (Validity, reliability, generalizability)	Weaknesses (e.g. bias, small sample size, stats tests not explained well. No intervention)	Results/outcomes	Conclusion	Data extraction criteria (derived from research objective 1)	Data extraction criteria (derived from research objective 2)	Themes per each articles
Ruan et al. (2025)	To Examine maternal lifestyle impact on low birth weight	Pregnant women cohort	Prospective cohort study, Appropriate	Large sample, strong statistical analysis	Self-reported lifestyle data	Smoking and poor nutrition increase LBW risk	Maternal lifestyle significantly affects birth weight	Maternal smoking and poor nutrition significantly increase low birth weight risk	Socioeconomic factors indirectly influence maternal behaviours	Theme 1: Maternal health factors, including
Diabelková et al. (2022)	To identify risk factors associated with low birth weight	Hospital medical records	Retrospective record-based study, Appropriate	Reliable clinical data; clear outcomes	Limited generalisability; no causality	Maternal illnesses increase LBW risk	Maternal health strongly predicts LBW	Maternal illness linked to adverse birth outcomes	Maternal illness significantly increases risk of low birth weight outcomes	ng smoking and nutrition have significant

Günther et al. (2021)	To Investigate the impact of nicotine and BMI on birth weight	Survey-based maternal sample	Cross-sectional survey study, Appropriate	Clear variables; reproducible measures	Cross-sectional bias; self-reported data	Smoking reduced BMI and birth weight	Nicotine indirectly increases LBW risk	Smoking-related nicotine reduces maternal BMI, increasing low birth weight risk	Socioeconomic influence not primary focus	ant impact on low-birth-weight outcomes in the UK
Panico et al. (2024)	To investigate LBW gradients by maternal education	UK, US, France population samples	Comparative cohort analysis appropriate	Cross-country comparison; large data sets	Contextual differences between countries	Lower education linked to higher LBW rates	Education is key socioeconomic LBW determinant	Indirect maternal lifestyle influence	Lower maternal education and income increase low birth weight prevalence	Theme 2: Socioeconomic deprivation,
Zhou et al. (2025)	To assess socioeconomic outcomes linked to VLBW	Adult participants, pooled datasets	Individual participant data meta-analysis appropriate	Large pooled sample; high statistical power	Heterogeneity across studies	Education and income disparities associated with VLBW	Socioeconomic disadvantage increases VLBW risk	Indirect maternal influence	Education and income disparities significantly increase very low birth weight risk	such as income and education, increases prevalence
Yamane and Tsutsui, (2025)	To examine nonlinear LBW risk factors internationally	Data sets from 143 countries	Cross-national comparative analysis appropriate	Very large data set; strong external validity	Limited country-specific depth	Higher income and employment linked to lower LBW	Socioeconomic status inversely relates to LBW	Indirect maternal BMI influence	Lower income and employment increase low birth weight prevalence globally	nance of low-birth-weight in the UK
Fussell	To review	Expe	Mech	Stron	No	Air	Environme	Indirect	Socioecon	Theme

<i>et al.</i> (2023)	mechanisms linking air pollution to birth outcomes	systematic and epidemiological literature	systematic literature review, appropriate	strong theoretical grounding; biological explanation	primary empirical data	pollution impairs placental development, increasing adverse outcomes	antenatal exposure contributes to LBW risk	maternal physiological impact	socioeconomic exposure inequalities implied	3- High rates of air pollution, environmental exposure and overcrowded increases the risks of low birth weight and compromised fetal growth in UK
Bandyopadhyay et al. (2023)	To find the weight risk factors associated with low birth weight	Wales, UK births (1998–2018)	Linked routine data cohort study (highly appropriate)	Large longitudinal data set; strong reliability	Limited qualitative insight	Smoking and air pollution increase LBW odds	Environmental exposures significantly increase LBW risk	Smoking as maternal behaviour risk	Socioeconomic and environmental deprivation	
Thomson et al. (2021)	To examine socioeconomic inequalities and adverse pregnancy outcomes	UK and Republic of Ireland studies	Systematic review and meta-analysis (appropriate)	Robust synthesis; multiple databases	Heterogeneity between studies	Crowded housing increases LBW odds	Living conditions significantly influence LBW risk	Indirect maternal stress and nutrition impact	Housing insecurity and deprivation increase LBW	
Hunter et al. (2023)	To evaluate antenatal interventions preventing low birth weight	Controlled trial evidence across settings	Modular systematic review, appropriate	High-quality trial evidence; intervention-focused	Variability in intervention contexts	BPE supplementation reduces LBW and prematurity	Antenatal nutrition interventions effectively prevent LBW	Balanced protein energy supplementation improves maternal nutrition and birth outcomes	Addresses nutritional deprivation contexts	Theme 4: Providing balanced

Devaguru et al. (2023)	To assess prevalence of LBW and associated maternal risk factors	Hospital-based sample of 327 LBW newborns	Cross-sectional hospital study, appropriate	Clear outcome focus; diverse family backgrounds	Single-centre; no causal inference	Early identification of maternal risks reduces LBW	Early detection of maternal factors improves birth outcomes	Maternal hypertension, overweight increase LBW risk	Social and economic factors influence maternal health	protein and energy (BPE) supplementation, health management of mothers during pregnancy and coordinated care processes enhance birth outcomes
Schuler et al. (2023)	To examine health-system drivers influencing LBW care continuity	Family members of LBW infants (n=11)	Constructivist grounded theory study, appropriate	Rich qualitative insight; care-process focus	Small sample; context-specific	Coordinated, continuous care improves LBW outcomes	Care continuum and communication reduce LBW risks	Indirect maternal care support impact	Health-system coordination reduces LBW	