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Effects of pre-pregnancy maternal underweight on pregnancy and perinatal outcomes of the foetus.

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Abstract

Background: Maternal underweight, defined as a body mass index (BMI) less than 18.5 kg/m², poses significant challenges in maternal and fetal health. Despite being prevalent worldwide, particularly in low- and middle-income countries, the effects of pre-pregnancy underweight on pregnancy and perinatal outcomes remain under-researched compared to maternal obesity. This study aims to explore the complex interactions between pre-pregnancy maternal underweight and adverse pregnancy outcomes such as low birth weight (LBW), preterm birth (PTB), and intrauterine growth restriction (IUGR), with a focus on Nigeria's diverse socioeconomic landscape.

Materials and Methods: This study employed a retrospective analysis method, leveraging data from national health surveys, birth registries, and healthcare databases across six Nigerian states (Lagos, Osun, Anambra, Imo, Kano, and Kaduna). The study examined pre-pregnancy BMI, maternal demographics, socioeconomic factors, and pregnancy outcomes. The analysis included the systematisation setback technique to assess the relationship between pre-pregnancy underweight and pregnancy outcomes, considering regional nutritional disparities.

Results: The findings indicated a significant association between maternal underweight before pregnancy and adverse pregnancy outcomes. Underweight mothers were more likely to experience LBW, PTB, and SGA infants. Socioeconomic and demographic factors, such as low educational attainment and rural residence, were identified as significant predictors of maternal underweight. The study highlighted regional differences, with higher rates of underweight mothers in economically disadvantaged areas.

Conclusion: Addressing pre-pregnancy maternal underweight is crucial for improving perinatal outcomes. The study underscores the need for targeted public health interventions, including nutritional support, education, and enhanced healthcare access, particularly in low-resource settings. By mitigating the risks associated with maternal underweight, healthcare professionals can promote healthier pregnancies and better developmental trajectories for infants.

Keywords: Maternal Underweight, Pregnancy Outcomes, Perinatal Health, Low Birth Weight, Socioeconomic Factors.

Project Definition

The term maternal underweight is defined as when the body mass index (BMI) is less than 18.5 kg/m². Biological, cultural, and socioeconomic variables influence this complicated problem. When compared to its obese counterpart, the effects of maternal underweight on pregnancy outcomes are still not well understood despite being prevalent worldwide (5%–15%). (Hautier et al., 2022; Senbanjo, 2021)

The health of the mother has a significant impact on both the mother's and the child's health trajectory, and it is a crucial factor in foetal development and perinatal outcomes (Muglia et al., 2022). Pregnancy weight is one of the many variables influencing maternal health, and it is a crucial one with broad effects. The impact of maternal underweight before conception has received relatively less attention than the detrimental consequences of maternal obesity on pregnancy outcomes, which have been well-documented. (Dolatian, 2020)

By examining the complex interaction between pre-pregnancy maternal underweight and its effects on pregnancy and perinatal outcomes of the foetus, this study aims to close this gap. In the context of global health, understanding the effects of maternal underweight is crucial, especially in low- and middle-income nations where malnutrition is rife. To address maternal underweight holistically, it is necessary to clarify the relationship between it and unfavorable pregnancy outcomes, such as low birth weight, preterm birth, and intrauterine growth restriction. (Pelia et al., 2020)

This project is important because it has the potential to guide public health initiatives that aim to enhance maternal health and improve perinatal outcomes. The hazards of pre-pregnancy maternal underweight can be identified, and healthcare professionals can then design interventions to reduce these risks and encourage healthy pregnancies.

Project Setting

This capstone project will be carried out using a primarily retrospective study method. I will be analysing the risks associated with pre-pregnant underweight women and maternal health before and during pregnancy, as well as its role in foetal health and perinatal outcomes. The part of the study carried out in the scientific study was carried out across six states in Nigeria, representing the various parts of Nigeria such as Lagos State, Osun State, Anambra State, Imo State, Kano State, and Kaduna State. The study covers the global representation of the underweight reproductive woman as well as the risk factors using the studies carried out in Nigeria as my main study.

Project Relevance and Rationale

Pregnancy-related maternal underweight prevalence: According to research, the frequency of maternal underweight in Russia is comparatively low, estimated to be between 6 and 8% (Khasnutdinova and Grjibovski 2010; Chelchowska et al., 2020; Vats et al., 2021). On the other hand, rates in Nigeria seem to be significantly higher, ranging from 15% to 25% in different areas (Koffi et al., 2024; Alamu et al., 2020). These variations demonstrate how socioeconomic variables, the healthcare system, and cultural values all have an impact on maternal nutritional conditions. (Diabelkova et al., 2023; Mayo et al., 2022)

Though sparse, the research on the relationship between maternal underweight prior to pregnancy and pregnancy outcomes in Nigeria and Russia is intriguing. According to studies conducted in Nigeria, underweight moms are more likely to have unfavourable outcomes such as low birth weight (LBW), preterm birth (PTB), and short for gestational age (SGA) infants as seen in research conducted in Thailand (Boriboonhirunsarn and Srikureja., 2022;

Ngandu et al., 2020; Said-Mohammed et al., 2020). Though less consistent across research, comparable increases have been noted in Russia. These results highlight the need for additional research on how maternal underweight affects neonatal outcomes in these settings (Dialbekova et al., 2023; Treskina et al., 2023; Ayazbekov et al., 2020).

Globally, there are several factors at play in the multifactorial relationship between pre-pregnancy maternal underweight and unfavourable pregnancy outcomes. Contributing factors include maternal health status, insufficient prenatal care, and malnutrition (Karemoi et al., 2020; Young et al., 2020; Iqbal and Ali, 2021; Akeredolu, 2021). Socioeconomic differences and restricted access to healthcare facilities increase the risk of unfavourable pregnancy outcomes for underweight mothers (Thomson et al., 2021; Aji et al., 2022; Simoncic et al., 2022).

Maternal underweight in Nigeria is significantly influenced by socioeconomic and demographic characteristics, including poverty, low educational attainment, and living in a rural area, which indicates limited access to healthcare professionals and facilities (Goson et al., 2022; Ngandu et al., 2020; Hammed et al., 2021). Similarly, in Russia, differences in mothers' nutritional condition are strongly associated with socioeconomic variables, such as income and geographical disparity. Differences in healthcare access are strongly associated with variations in maternal nutritional status in Russia (Shartova et al., 2021; Jutz, 2020). Improving maternal health outcomes and lessening the burden of unfavourable pregnancy outcomes in both nations need to address these underlying variables.

Regarding the foetus, the risk of intrauterine growth restriction is seen, as maternal nutrition is its primary non-genetic risk factor (Armengaud et al., 2021). It could also include low blood sugar (hypoglycemia), respiratory distress syndrome (difficulty breathing), jaundice (yellowing of the skin and eyes), and trouble controlling body temperature. These issues may have long-term effects on the health and development of the child and necessitate urgent medical treatment in the newborn intensive care unit (NICU) (Zinjani, 2023).

Thus, educating the population on ways to discourage malnutrition of women of reproductive age will greatly decrease their mortality and reduce maternal causes of neonatal complications.

Final Project Overview

1. To look at the relationship between a mother's underweight before becoming pregnant and the consequences of the pregnancy, such as low birth weight, preterm delivery, and neonatal problems.

2. Investigating possible demographic and socioeconomic factors that may contribute to pre-pregnancy maternal underweight.

3. To make specific recommendations for tactics and interventions aimed at enhancing maternal health and nutrition.

By thoroughly examining these goals, this research aims to add significant perspectives of knowledge already available on perinatal care and maternal health. This research aims to provide evidence for evidence-based practices and policies that promote mother well-being and ensure optimal foetal development by shedding light on the effects of pre-pregnancy maternal underweight.

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Research Summary

1. I have gathered from already-existing sources such as national health surveys, birth registries, and healthcare databases. Mother pre-pregnancy BMI, pregnancy outcomes (e.g., low birth weight, preterm birth, small for gestational age), mother demographics, and socioeconomic determinants were among the variables of interest.
2. I will assess age and BMI using the systematisation setback technique.
3. I will be using the data acquired from the resources to shed light on challenges faced by women of reproductive health who are underweight.
4. I will assess how pre-pregnancy socioeconomic and demographic characteristics, including maternal age, education, and access to healthcare services, significantly predict maternal underweight and unfavourable pregnancy outcomes.
5. For relevance, I will assess regional differences in the nutritional health of mothers in Russia, with greater percentages of underweight mothers in rural areas.
6. I will assess the rate of prevalence of Maternal underweight being more common in Nigerian areas of lower socioeconomic status and among women who had less schooling.
7. I will assess the relationship between maternal underweight and fetal complications.
8. I will ask my supervisors for advice to get more suggestions.
9. I will compile a clear list of references that includes all pertinent facts and information. (arranged in APA format).

Project Timetable

Week 1: Researching and selecting the project's subject, definition, parameters, and justification.

Week 2: Complete the idea for the project.

Week 3: Complete my study.

Week 4: Coordinating the date, time, and location of meeting with Doctors in Nigeria to discuss the current state of the Obstetrics and gynaecological department at their various hospitals.

Week 5: Create a manual guide and arrange the meeting schedule.

Week 6: Create a draft of the research project's input sheet.

Week 7: Carrying out the last research preparations. Getting to know the chief physicians, research assistants, physicians, experts, and consultants.

Week 8: Complete the participation input form, assess staff meetings, and obtain a signed letter of appreciation.

Project Analysis and Evaluation

The results of this study highlight how critical it is to treat maternal underweight as a public health issue globally. Maternal underweight was found to be a substantial risk factor for unfavourable pregnancy outcomes in both settings, notwithstanding the disparities in socioeconomic situations.

The burden of negative perinatal outcomes linked to maternal underweight can be decreased by implementing interventions targeted at enhancing maternal nutrition and access to healthcare.

The use of secondary data sources, which can contain biases and inconsistent reporting of data, is one of the study's limitations.

Furthermore, the study's retrospective design restricts the ability to draw conclusions about causality, and unmeasured confounders could affect the connections that are found. Future studies should examine the fundamental processes that relate maternal underweight to unfavourable pregnancy outcomes and assess the efficacy of programmes aimed at improving mother nutrition and access to healthcare.

Figures

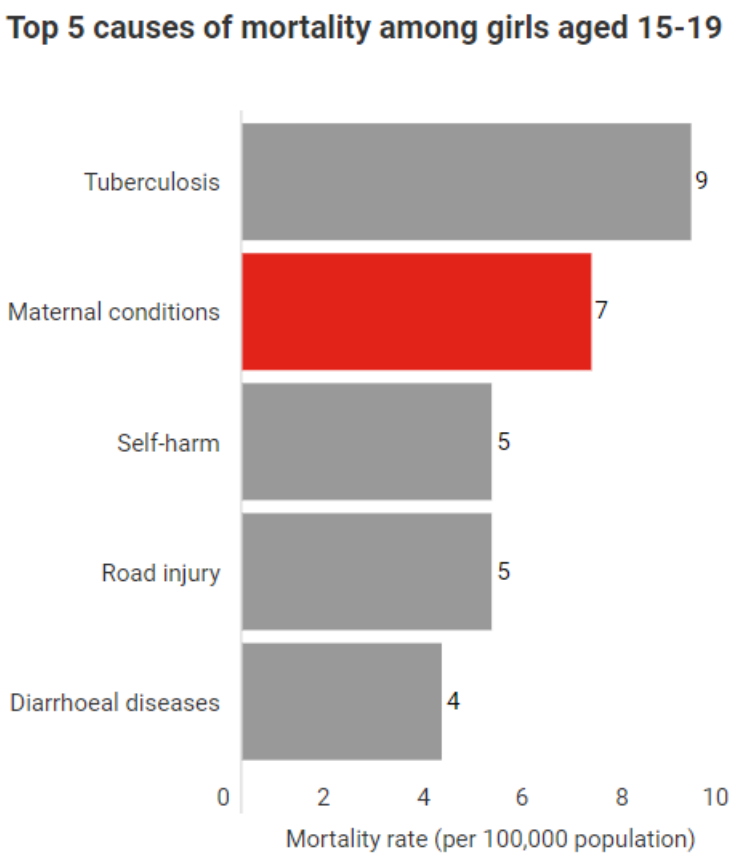

Figure 1. Among adolescent girls, maternal conditions are among the top causes of disability-affected life years and mortality globally. https://data.unicef.org/topic/child-health/adolescent-health/#:~:text=Globally%20in%202022%2C%20an%20estimated,their%20education%2C%20livelihoods%20and%20health.

Figure 2

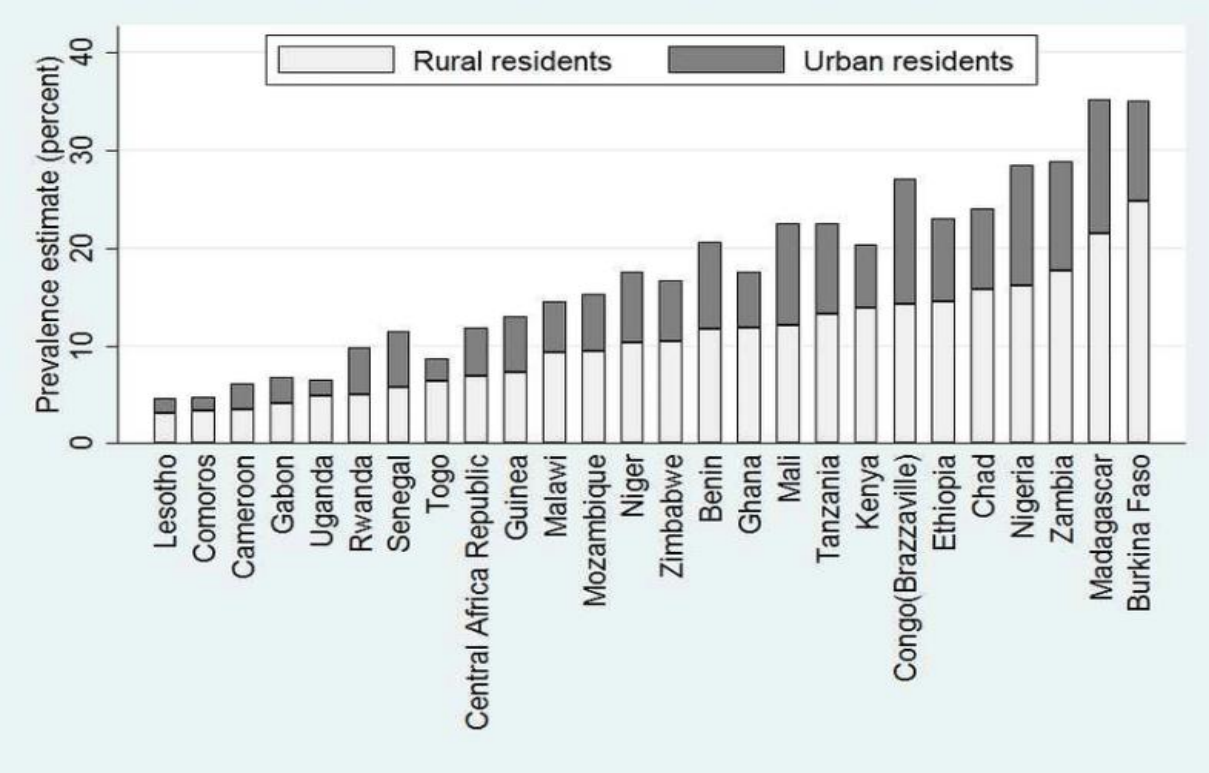

Figure 2: The proportion of women classified as underweight in selected countries included in the study by type of residence. https://www.researchgate.net/figure/Proportion-of-women-classified-as-underweight-for-selected-countries-included-in-the_fig2_5306338

Recommendations

1. Underweight women of reproductive age should be given individualised counselling, emphasising the significance of reaching a healthy weight prior to pregnancy. Advice on nutrient-dense foods, portion sizes, and balanced diets should all be part of this counselling.

2. To ensure expectant women underweight are getting enough nutrients, supplementation, especially folic acid, iron, calcium, minerals, and vitamin D, should be given.

3. Routine physical examinations and screenings for expectant mothers to detect and treat any dietary inadequacies or health problems as soon as possible. This entails determining dietary status, haemoglobin levels, and BMI.

4. Expectant mothers of the benefits of gaining a reasonable amount of weight to promote the growth and development of the foetus. Advice on weight gain goals depending on BMI before pregnancy should be given and implemented.

5. On the legislative call to action, offering assistance in the form of food vouchers, nutrition education courses, or community food projects that work to make healthy foods more widely available and reasonably priced should be implemented.

6. Pre-pregnancy underweight women should be given access to appropriate nutrition and health information, a forum for sharing experiences, and encouragement by forming peer support groups or educational initiatives.

7. Without endangering the health of the mother or the foetus, physical activity should be encouraged because it is seen to promote weight gain in underweight women and help them become healthier overall.

8. To guarantee comprehensive care for underweight women before pregnancy, covering nutritional and medical needs, encourage collaboration between obstetricians, nutritionists, dietitians, and other healthcare providers.

9. To deal with socioeconomic issues such as food insecurity, poverty, and restricted access to healthcare that may be linked to being underweight before pregnancy, adopt social support initiatives and legislative measures to mitigate inequalities and enhance the general state of maternal health.

10. After giving birth, support the mother to maintain a healthy weight and nutritional status. Also, help them with any difficulties they may be having breastfeeding or taking care of their newborn.

With these strategies and measures, medical professionals and legislators can endeavour to improve nutrition and maternal health, ultimately improving perinatal and pregnancy outcomes for mothers and infants who are underweight before pregnancy.

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