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Nutritional Factors Influencing Preterm Birth Risks and Fetal Development

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ABSTRACT

Background: *Defined as delivery before 37 weeks of gestation, preterm birth (PB) still presents a serious worldwide health issue that greatly increases newborn morbidity and mortality.* ***Objectives:*** *To look at how preterm birth risks and fetal development might be affected by mother food choices, coffee intake and systematic impediments.* ***Methods:*** *Involving 400 women, a cross-sectional study was carried out in the Malakand area between March and July 2020. Data were gathered by means of standardized questionnaires sent to individuals and healthcare professionals. Important factors examined were mother caffeine intake, knowledge of dietary guidelines and socioeconomic constraints.* ***Results:*** *Of the participants, 33% suffered with PB; 75% of these women drank more than five cups of coffee daily, compared to 10.1% in full-term cases ($p = 0.001$). Of PB patients, 76.8% cut caffeine intake post-delivery; in contrast, 100% of high-caffeine consumers in full-term cases cut intake during pregnancy. Lack of awareness about nutrition (68%, $p = 0.001$).* ***Conclusion:*** *Preterm birth risks are greatly influenced by excessive caffeine use as well as by systematic obstacles including financial restrictions and lack of dietary support. Improving pregnancy results depends mostly on proactive dietary interventions, nutritional education and culturally responsive support networks.*

Introduction

Defined by the World Health Organization as delivery before 37 weeks of gestation, preterm birth remains a major worldwide health issue. Particularly in low- and middle-income nations where access to neonatal care is limited, it is a main cause of newborn morbidity and death (Ohuma et al., 2010; Pusdekar et al., 2020). Although high-income nations' prenatal and neonatal care has improved, global prevalence of PTB is rising and is therefore leading to high rates of newborn death and long-term health consequences in surviving infants (Ahmed et al., 2021). The cause of

deaths in children under five years of age are preterm births, which are linked to developmental delays, chronic diseases and cognitive problems, therefore stressing the need of efficient preventive policies (Barfield, 2018; Taqi et al., 2021; Shah et al., 2024).

Age, medical history, lifestyle and diet are a few of the several mother variables that affect the PTB likelihood. Those younger than 20 or older than 35, those with a history of past preterm deliveries, and those with maternal hypertension, urinary tract infections, or substance use (e.g., smoke, alcohol) are particularly at risk (Gibbs et al., 2012; Fortier et al., 1993). Moreover, poor prenatal care sometimes leaves these risk factors unresolved. Particularly in high-risk individuals, therapies including progesterone supplementation have shown great potential in lowering PTB risk. Still, these steps are not very effective, hence more preventative policies are desperately required (Kazemi et al., 2023; Requejo et al., 2013).

One of the most important, but also changeable elements influencing fetal growth and PTB risk is mother nutrition. Pregnancy-related deficiencies in key nutrients like proteins, vitamins and minerals can compromise placental development and function. In low-resource environments, malnutrition from poor food availability or severe diseases like *hyperemesis gravidarum*—disproportionately affects women, which raises low birth weight and PTB rates (Farias et al., 2020; Thornburg and Valent, 2024). Adverse pregnancy results like preeclampsia and fetal development limitation have been associated to micronutrient shortages including selenium, copper, zinc and manganese. These inadequacies raise the risk of chronic diseases in later life and can have long-term consequences for mother and child health (Tadese et al., 2024).

Furthermore under focus for their possible contribution in PTB are lifestyle choices including caffeine use. Studies have found links between low birth weight, spontaneous abortion, low coffee intake throughout pregnancy and fetal growth limitation. Though their exact effects are yet unknown, probiotic-rich diets, antioxidant supplements and fortified foods have become possible treatments to lower these hazards (Qian et al., 2020; Kahan, 2018).

This study thus investigated the effect on the risk of PTB and fetal development of mother nutritional elements including dietary patterns, micronutrient intake and caffeine usage. This study aimed to help to create focused treatments to improve pregnancy outcomes and lower the prevalence of PTB by filling in important voids in nutritional knowledge and supporting evidence-based dietary behaviors.

Materials and Methods

Study Design and Settings

The investigation took place in the Malakand area, Khyber Pakhtunkhwa, between March and July 2023. For this study, 400 pregnant women were enrolled. Structured questionnaires were used to guide face-to--face interviews gathering data. Convenience sampling from hospitals all around the area was done, with an eye toward women who had recently given birth.

This cross-sectional study approach was used in order to look at how nutritional elements affected preterm delivery and fetal development. Structured interviews comprising 400 women and 50 local obstetricians and gynecologists comprised the data collecting process. Two different questionnaires were created for the medical professionals and the subjects.

1. Participant Questionnaire: Captured demographic information, pregnancy history, gestational age at birth, dietary patterns, coffee intake, probiotic use and healthcare service access.
2. Healthcare Provider Questionnaire: Focused on clinical observations, professional experiences, and preterm birth and mother nutrition related practices, the healthcare provider questionnaire

To guarantee accurate and consistent data collecting, trained interviewers visited each participant for thirty-minute sessions. Healthcare providers were likewise questioned in 20-minute sessions.

Ethical Considerations

The institutional review board granted ethical approval for this study. Before data collecting, each participant signed written informed permission. Throughout the study, all participants' anonymity and confidentiality were rigorously preserved.

Nutritional and Lifestyle Variables

The research concentrated on a number of important variables:

- Caffeine Intake: Recorded the cups of coffee, tea and energy drinks consumed by the participants through interview. High caffeine consumers were the women who drank more than five cups of coffee daily.
- Probiotic-Rich Foods: Yogurt, fermented milk and other probiotic-rich foods were evaluated for inclusion into the participants' diets.
- Antioxidant-Rich Foods: Examined the consumption of fruits, vegetables and fortified foods including selenium, zinc and manganese—essential micronutrients.
- Food Insecurity: Assessed the frequency of food insecurity and how it affected dietary habits.

Sampling and Inclusion Criteria

- Women who had delivered preterm or full-term during the study period were included.
- Women eligible were those with gestational age at delivery who recorded faithfully and were eager to participate.
- Participants with inadequate records or declining permission were not included.

Data Analysis

Data entered into the excel sheets were subjected to statistical software analysis using SPSS version 25.0. Clinical and demographic aspects were gathered using descriptive statistics. Significant relationships between dietary elements and preterm birth were found by means of chi-square tests and logistic regression analysis.

Results

Of the 400 women surveyed, 67% (268 women) delivered full term whereas 33% (132 women) experienced preterm birth. A major contributing factor was high coffee intake; 75% of the women who suffered PB drank more than five cups daily, compared to just 10.1% among those who carried full term. This suggested strong correlation between preterm births and too high a coffee intake. Groups made different efforts to cut their caffeine use. Out of all the PB instances, only

18.2% cut their caffeine intake throughout pregnancy; 76.8% cut it following their first preterm birth. On the other hand, all high caffeine drinkers among full-term patients (100%) cut their intake during pregnancy, implying that proactive restriction of caffeine intake may have a protective effect in averting preterm birth (Table 1). Supported by a chi-square value of 50.12 ($p = 0.0001$), suggesting its great statistical relevance, a sizable fraction of the participants—68%—cited lack of understanding concerning premature birth and nutritional advice as a key issue. Likewise, underlining systematic gaps in mother healthcare, absence of nutritionists in healthcare centers (68%, $p = 0.0002$) and budgetary concerns (68%, $p = 0.0003$) were clear obstacles. Reflecting the impact of conventional standards on pregnancy outcomes, 45% of women adopted cultural practices ($p = 0.002$). Affected 16% of the participants ($p = 0.008$), low education and food insecurity underlined the socioeconomic issues influencing mother health. Usually due to accessibility problems or personal preferences, a smaller fraction (12%, $p = 0.015$) eschewed healthcare services (Table 2).

With the most important being a lack of awareness of dietary guidance and preterm birth (68%), absence of nutritionists at healthcare centers (68%), and financial constraints (68%), the graph emphasized the main difficulties pregnant women encounter. Of women, 45% of them were influenced by cultural traditions; 16% by low education and food insecurity. A low percentage (12%) avoided healthcare facilities because to cultural or accessibility issues. These results underlined how urgently focused actions were needed to solve structural and financial obstacles, increase access to healthcare and raise mother education levels (Figure 1). With chi-square values almost at 50, the graph showed the frequency and statistical relevance of important pregnant challenges: lack of knowledge, absence of nutritionists and financial problems (each at 68%). With chi-square values about 20 and 12, respectively, cultural behaviors (45%) and poor education/food insecurity (16%) suggested modest frequency and impact. The least common problem was avoidance of healthcare (12%), which showed a smaller chi-square value (~8). These results highlighted the critical necessity of interventions targeted on mother education, dietary support and financial aid to minimize these major obstacles and enhance pregnancy outcomes (Figure 2).

Table 1: Caffeine Consumption and Preterm Birth

Category	Number of Women	Percentage	Remarks
Total women	400	100.0	Total participants in the study.
Experienced Preterm Birth (PB)	132	33.0	Women who experienced preterm birth.
Consumed > 5 Cups of Caffeine Daily (PB)	99	75.0	High caffeine consumers among PB cases.
Reduced Caffeine by 50% During Pregnancy	18	18.2	PB cases who reduced caffeine during pregnancy.
Reduced Caffeine by 50% After 1st PB	76	76.8	PB cases who reduced caffeine after first PB.
Did Not Experience Pre-term Birth (No PB)	268	67.0	Women who delivered full-term.
Consumed > 5 Cups of Caffeine Daily (No PB)	27	10.1	High caffeine consumers among full-term cases.
Reduced Caffeine by 50% During Pregnancy (No PB)	27	100.0	Full-term cases who reduced caffeine during pregnancy.

Table 2: Women's Perspectives on Pregnancy Challenges

Challenges	Number of Women (n=400)	Percentage (%)	χ^2	p-value
Lack of awareness about premature birth and nutritional guidance	272	68.0	50.12	0.0001
Lack of nutritional officers in healthcare centers	272	68.0	48.76	0.0002
Did not approach healthcare centers	48	12.0	8.45	0.015
Followed cultural practices	180	45.0	20.35	0.002
Lack of education and food insecurity	64	16.0	12.89	0.008
Financial issues	272	68.0	47.55	0.0003

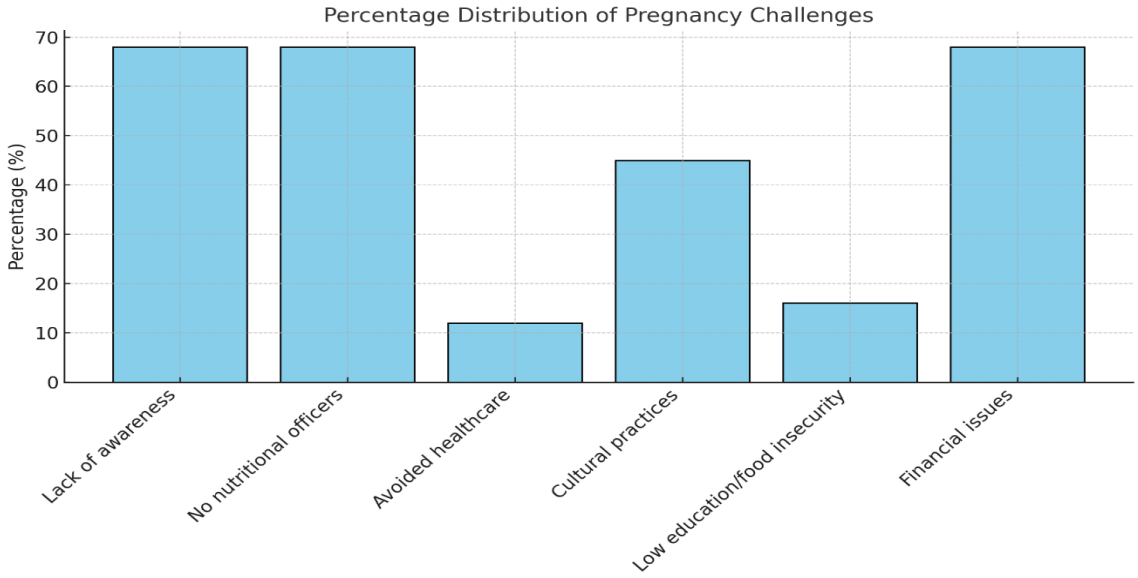

Figure 1: Prevalence of pregnancy challenges among women

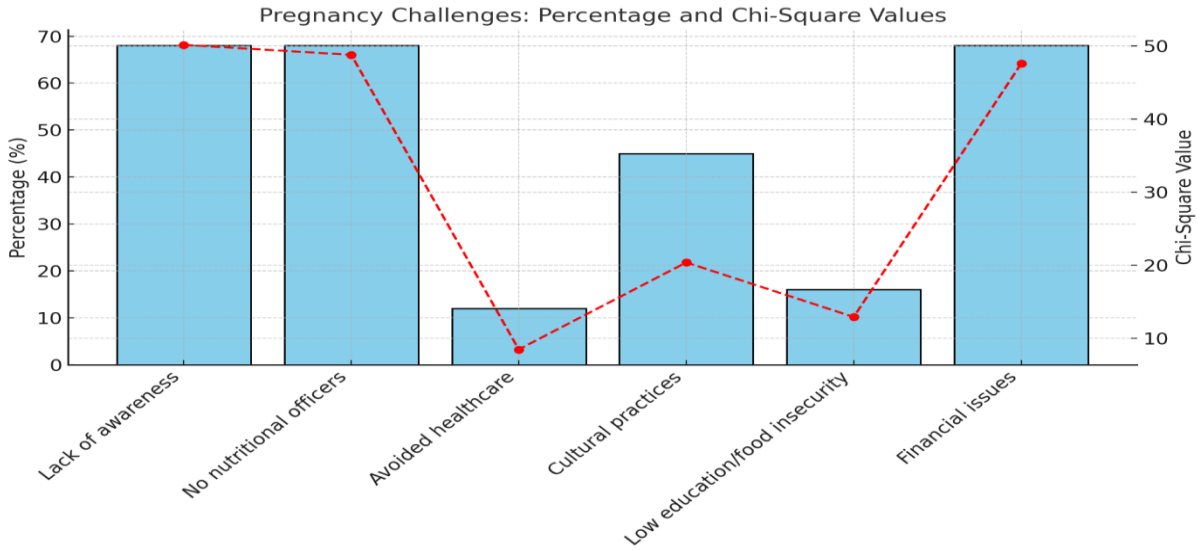

Figure 2: Pregnancy challenges: Percentage and chi-square values

Discussion

The important influence on preterm birth risks and fetal development of nutritional elements, lifestyle choices and systematic obstacles was underlined in this study. The results highlighted the complicated interaction among mother caffeine use, knowledge of nutritional practices and socioeconomic constraints in deciding pregnancy results.

One clear factor causing premature birth is too much coffee. Of women who suffered PB, 75% drank more than five cups of coffee daily, compared to just 10.1% among women who carried full-term. This robust correlation fits earlier studies connecting low birth weight, spontaneous abortion, high coffee use to fetal growth restriction. Fascinatingly, 76.8% of women who had PB cut their caffeine usage following their first preterm delivery, suggesting a reactive behavioral change (Maslova et al., 2010). Nonetheless, the proactive decrease of caffeine during pregnancy by all high-caffeine consumers in the full-term group (100%) points to the preventive potential of awareness and quick intervention. These results highlighted the need of early behavioral changes and the need of educational efforts informing pregnant women about the hazards of too high caffeine consumption (Román-Gálvez et al., 2022).

Apart from coffee use, this study revealed important systematic and socioeconomic obstacles influencing mother health. Among the most often mentioned difficulties, were lack of awareness of nutritional guidance and premature birth and the absence of nutritionists in healthcare centers. These results underlined the important weaknesses in the healthcare system and stressed the immediate requirement of including specialized nutritional support and dietary instruction into prenatal care treatments. Dealing with these shortcomings can empower women with the information and tools required for better pregnancies (Shahid et al., 2022; Malik et al., 2022).

Affecting 45% of the participants, cultural practices, food insecurity mixed with low education (16%) and poor education itself presented major obstacles influencing access to enough nutrition and healthcare. Sometimes evidence-based medical methods contradict cultural norms, hence community involvement and culturally sensitive teaching programs are rather important for the improvement of mother and fetal health. Another major obstacle was financial limitations, which emphasized the need of economic support programs and laws that reduce the financial load on expecting women (Oldroyd et al., 2022).

Notwithstanding these results, the study had restrictions including reliance on self-reported data, which could introduce recall bias, and the cross-sectional design, which restricts the capacity to prove causality. Future long-term research are essential to confirm the links noted and investigate the long-term consequences of dietary and behavioral changes on pregnancy results.

Conclusion

This study notes as major causes of preterm birth and negative fetal outcomes mother nutrition, too much coffee use and systemic difficulties. Given 75% of PB cases had high caffeine intake, dietary changes during pregnancy became even more important. Key obstacles included ignorance of dietary advice, lack of nutritionists in hospitals, budgetary limitations and cultural customs. These results emphasized how urgently prenatal care should include specialist assistance, dietary instruction and culturally specific treatments. Dealing with these elements helps to lower PB risks and enhance mother and newborn health results.

References

1. Ahmed, J., Huckel Schneider, C., Alam, A., & Raynes-Greenow, C. (2021). An analysis of the impact of newborn survival policies in Pakistan using a policy triangle framework. Health Research Policy and Systems, 19(1), Article 86.
2. Barfield, W. D. (2018). Public health implications of very preterm birth. Clinical Perinatology, 45(3), 565–577.
3. Farias, P. M., Marcelino, G., Santana, L. F., de Almeida, E. B., Guimarães, R. C. A., Pott, A., Hiane, P. A., & Freitas, K. C. (2020). Minerals in pregnancy and their impact on child growth and development. Molecules, 25(23), 5630.
4. Fortier, I., Marcoux, S., & Beaulac-Baillargeon, L. (1993). Relation of caffeine intake during pregnancy to intrauterine growth retardation and preterm birth. American Journal of Epidemiology, 137(9), 931–940.
5. Gibbs, C. M., Wendt, A., Peters, S., & Hogue, C. J. (2012). The impact of early age at first childbirth on maternal and infant health. Paediatric and Perinatal Epidemiology, 26(Suppl. 1), 259–284.
6. Kahan, J. (2018). The effects of maternal caffeine intake on a fetus. The Science Journal of the Lander College of Arts and Sciences, 11(2). https://touroscholar.touro.edu/sjlcas/vol11/iss2/8.
7. Kazemi Aski, S., Sharami, S. H., KabodMehri, R., Rahnemaei, F. A., Milani, F., & Sabetghadam, S. (2023). Association between the duration of progesterone supplementation treatment and premature neonates outcomes: A retrospective cohort study. Health Science Reports, 6(11), e1721.
8. Malik, S. I. A., Shahzad, L., Hussain, S., Qurban, S., Durrani, H., & Ashraf, M. N. (2022). How poverty, malnutrition and other socioeconomic factors affect maternal health: A quantitative study from Lahore, Pakistan. Pakistan Journal of Medical & Health Sciences, 16(9), 230.
9. Maslova, E., Bhattacharya, S., Lin, S. W., & Michels, K. B. (2010). Caffeine consumption during pregnancy and risk of preterm birth: A meta-analysis. American Journal of Clinical Nutrition, 92(5), 1120–1132.
10. Ohuma, E. O., Moller, A.-B., Bradley, E., Chakwera, S., Hussain-Alkhateeb, L., Lewin, A., et al. (2023). National, regional, and global estimates of preterm birth in 2020, with trends from 2010: A systematic analysis. The Lancet, 402(10409), 1261–1271.
11. Oldroyd, L., Eskandari, F., Pratt, C., & Lake, A. A. (2022). The nutritional quality of food parcels provided by food banks and the effectiveness of food banks at reducing food insecurity in developed countries: A mixed-method systematic review. Journal of Human Nutrition and Dietetics, 35(6), 1202–1229.
12. Pusdekar, Y. V., Patel, A. B., Kurhe, K. G., Bhargav, S. R., Thorsten, V., Garces, A., Goldenberg, R. L., et al. (2020). Rates and risk factors for preterm birth and low birthweight in the global network sites in six low- and low middle-income countries. Reproductive Health, 17, 187.
13. Qian, J., Chen, Q., Ward, S. M., Duan, E., & Zhang, Y. (2020). Impacts of caffeine during pregnancy. Trends in Endocrinology & Metabolism, 31(3), 218–227.
14. Requejo, J., Merialdi, M., Althabe, F., Keller, M., Katz, J., & Menon, R. (2013). Born too soon: Care during pregnancy and childbirth to reduce preterm deliveries and improve health outcomes of the preterm baby. Reproductive Health, 10(Suppl. 1), S4.
15. Román-Gálvez, M. R., Martín-Peláez, S., Hernández-Martínez, L., Cano-Ibáñez, N., Olmedo-Requena, R., Martínez-Galiano, J. M., et al. (2022). Caffeine intake throughout

pregnancy and factors associated with non-compliance with recommendations: A cohort study. Nutrients, 14(24), 5384.

16. Shah, M. N., Mumtaz, S., & Sibt-e-Ali, M. (2024). Nexus between Women Empowerment and Sustainable Development in Low-Income Countries: Insights from Panel ARDL Model. *Review of Education, Administration & Law*, *7*(4), 383-393.
17. Shahid, M., Cao, Y., Ahmed, F., Raza, S., Guo, J., Malik, N. I., et al. (2022). Does mothers' awareness of health and nutrition matter? A case study of child malnutrition in marginalized rural community of Punjab, Pakistan. Frontiers in Public Health, 10, 792164.
18. Tadese, M., Damesa, W. A., Solomon, G. S., Fitie, G. W., Mitiku, Y. M., Tessema, S. D., & Endale, A. (2024). Prevalence and determinants of adverse perinatal outcomes of preeclampsia with severe features at two selected public hospitals in Addis Ababa, Ethiopia. Frontiers in Pediatrics, 12, 1345055.
19. Taqi, M., Shah, S. Z. A., Ali, M., & Yousuf, M. (2021). Access to Finance for African SMEs: Do Women Entrepreneurs face Discrimination. *Journal of Contemporary Issues in Business and Government Vol*, (06).
20. Thornburg, K. L., & Valent, A. M. (2024). Maternal malnutrition and elevated disease risk in offspring. Nutrients, 16(16), 2614.