
# Association between Lifestyle Factors and Preterm Delivery: A cross-sectional observational study in Mosul City

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ABSTRACT

**Background & Objective:** Preterm birth (PTB) is a major public health concern that affects millions of newborns and their families each year. It is defined as the birth of a baby prior to 37 weeks of gestation**.** This study aimed to find the association between Maternal Lifestyle with preterm delivery in Mosul city.

**Methodology**: Quantitative cross-sectional observational design was used at maternity teaching hospitals in Mosul city to ascertain the determents of preterm birth in maternity hospitals at city of Mosul from 2 of November 2022 till 30th of March / 2023, The study was conducted in three maternity and obstetric Teaching Hospitals, at the Mosul City. the study group included 307 women give preterm birth.

**Result:** For age, The highest percentage of women (Less than 20) (37.5%). For body mass index (BMI), Most of the women "Overweight" (51.4%) category. The numbers of women in rural more than urban areas are almost (53.9%, respectively). For the degree of education, most of the women in the data set had completed secondary school (40.3%).

**Conclusion**: Maternal lifestyle factors can have an impact on the risk of preterm birth. (Physical activity during pregnancy, low birth weight (LBW). Conversely, pregnant women who experience passive smoking may have an increased risk of preterm LBW.

**Keywords:** preterm birth, maternal lifestyle.

## Introduction

Preterm birth refers to a birth of a baby before 37 completed weeks of gestation and after fetal viability. It is now the leading cause of new born deaths. Although identifying its common risk factors is mandatory to decrease preterm birth and thereby neonatal deaths [1]

Preterm birth (PTB) is a significant public health issue that annually has an impact on millions of newborns and their families. It is characterized as the delivery of a child before 37 weeks of gestation. The main cause of infant death in the US is preterm birth, which is linked to higher morbidity and mortality [1,2]

preterm birth (PTB) is a growing problem, partially due to the inclusion of cases that would have previously resulted in second trimester abortions. In industrialized countries, the increase in PTB is strongly associated with an increase in maternal age, pregnancies resulting from assisted reproductive treatments, and new lifestyle-related risk factors [2].

The challenges associated with preterm birth can include early delivery, low birth weight, and respiratory distress syndrome. Furthermore, preterm infants are at risk for a number of long-term health issues, including developmental delay, cerebral palsy, and learning disabilities. in

order to improve outcomes and reduce maternal psychological strain, it is important to identify and manage risk factors associated with preterm birth. These risk factors include prior preterm delivery, maternal smoking, and maternal substance abuse. Additionally, interventions such as cervical cerclage and bed rest have been used to reduce the risk of preterm delivery [3]

There are several medical conditions and factors that have been linked with an increased risk of preterm birth (PTB), including chronic diseases such as hypertension and diabetes mellitus, intrauterine malformations or infections, and endocrinological diseases [4].

Many lifestyle factors have been associated with preterm birth and low birth weight (LBW). Studies have shown that smoking, exposure to secondhand smoke, drinking alcohol, physical activity, and variations in energy intake may lead to higher rates of LBW. However, some studies have yielded conflicting results on the relationship between lifestyle factors and LBW. Studies have also shown that lifestyle factors can have different effects on the birth weight of preterm and term infants, but there is a lack of research exploring the association of lifestyle factors with LBW in both preterm and term infants separately [4,5]

Additionally, a history of PTB is the strongest predictor of future PTB. Previous abortions, whether spontaneous or induced, also increase the risk of PTB, and the risk increases with the number of abortions. Pregnancies resulting from assisted reproductive treatment (ART) such as in-vitro fertilization (IVF) or intracytoplasmic sperm injection (ICSI) also carry an increased risk of PTB. Invasive diagnostic procedures such as amniocentesis or chorionic villus sampling (CVS) can also pose a risk for PTB [6].

Several factors such as emotional, stress, social, racial, maternal anxiety, multiple pregnancies, infections during pregnancy, diabetes and high blood pressure, and *in-vitro* fertilization pregnancy have been shown to be associated with PTB [7]

the occupational, environmental exposure and lifestyle factors might also be associated in part with PTB; however, they are at best limited and inconclusive. Nevertheless, data on heavy metals such as lead, air pollutants and particulate matters, bisphenol A, phthalate compounds, and environmental tobacco smoke (ETS) are promising and point to higher incidence of PTB associated with exposure to them. Thus, these observations can be used to advise pregnant women or women of reproductive age to avoid such exposures and adopt positive lifestyle to protect pregnancy and normal fetal development. There is a need to conduct well-planned epidemiological studies that include all the pathology causing factors that may contribute to adverse pregnancy outcomes, including PTB [8].

## Methodology

1. **Aim of the Study**: The purpose of this study is to identify the demographic, socioeconomic, and lifestyle factors that are associated with preterm birth
2. **Design of the study**: A quantitative technique. cross-sectional observational design

**Setting and Time:** The data were collected from the three obstetrics and gynecology units of teaching hospitals in mousl city, the center of Nineveh Governorate (alkhansaa teaching hospital, alsalam teaching hospital, albatool teaching hospital). The data collection was done in the period between the 15th of November 2022 to the 20th of April 2023.

**Sample of the Study:**

This is a cross-sectional observational study at the obstetrics and gynecology units of Al Khansaa Teaching Hospital, Al-Salam Teaching Hospital, Al-Batool Maternity Hospital in Mosul, Iraq. The data collection was carried out from10 of November 2022 till 30th of March / 2023 The study's sample include 307 pregnant women under the age of twenty and more than 40 years.

**Data collection and Instrumentation:** Data were collected depending on a structured interviewing questionnaire, which was composed of three parts; first one focused on the demographic characteristics, second part concentrated on the maternal characteristics with the third portion focusing on women's lifestyle during pregnancy

**Part 1: sociodemographic characteristic includes** (age, BMI, level of education, occupation).

**Part 2: focus on maternal lifestyle during pregnancy**

including: nutrition, smoking, physical activity, sleeping, and exercising

The data were collected from the mother by direct interview after taking her verbal consent, and some information was obtained from women's records. The collected sample is 4 hours per day, 3 days per week. Each interview duration is about 20 minutes.

**Statistical Analysis:** The data were analyzed using SPSS version 26 to interpret the study's findings.

**Result**

The table (1) shows the number and percentage of women in different categories, For age, The highest percentage of women (Less than 20) (37.5%). For body mass index (BMI), Most of the women "Overweight" (51.4%) category. The numbers of women in rural more than urban areas are almost (53.9%, respectively). For the degree of education, most of the women in the data set had completed secondary school (40.3%). The table also shows the number of women who are employed, housewives, and students, with the majority of them being housewives (53.6%). Finally, the majority of the women (52.1%) have an income of less than IQD 500,000.

Table 2 The table describes the lifestyle practices of women during pregnancy. The data suggests that 40% had fair nutrition during pregnancy. In terms of smoking, the larger proportion of women (59.6%) were exposed to passive, regarding physical activity, 20.1% of women had a sedentary lifestyle, 13.6% had light activity (1-3 days/week), 26.7% had moderate activity (3-5 days/week), and 40% had vigorous activity (more than 5 days/week). In terms of sleep, 79.1% of women reported getting 6-8 hours of sleep, while 13.6% reported getting more than 8 hours of sleep, and 7.1% reported getting less than 6 hours.

**Table 1: Demographic and Socioeconomic Characteristics for PTB:**

| Category | Frequency | percentage |
|---|---|---|
| Age | | |
| Less than 20 years | 115 | 37.5% |
| 21-30 | 91 | 29.6% |
| 31-40 | 70 | 22.8% |
| More than 40 | 31 | 10.0.7% |
| Body Mass Index | | |
| Underweight | 96 | 31.4% |
| Normal weight | 80 | 26.3% |
| Overweight | 129 | 26.7% |
| Residency | | |
| Urban | 141 | 46.1% |
| Rural | 165 | 53.9% |
| Degree of Education | | |
| illiterate | 32 | 10.4% |
| Primary school | 45 | 14.6% |
| Secondary school | 124 | 40.3 % |
| Tertiary school and above | 106 | 34.5% |
| Employment | | |
| Employed | 82 | %27 |
| housewife | 164 | 53.6% |
| Student | 61 | %20 |
| Income | | |
| Less than IQD 500,000 | 160 | 52.1% |
| IQD 500,000- IQD 800, 999 | 91 | 29.6% |
| IQD 900,000- IQD 900,999 | 32 | 10.4% |
| IQD 1000,000 or more | 24 | 7.8% |

**Table 2: maternal lifestyle during pregnancy**

| Category | Frequency | Percentage |
|---|---|---|
| Nutrition | | |
| Poor | 54 | 17.5% |
| Fair | 120 | 40.0% |
| Good | 100 | 33.3% |
| Excellent | 33 | 10.7% |
| Smoking | | |
| smoker | | |
| Yes | 10 | 3.2% |
| No | 297 | 96.7% |
| Passive | 183 | 59.6% |

| | | |
|---|---|---|
| Smoker | | |
| Physical Activity | | |
| Sedentary lifestyle | 62 | 20.1% |
| Light activity (1-3 days/week) | 123 | 40.0% |
| Moderate activity (3-5 days/week) | 80 | 26.7% |
| Vigorous activity (more than 5 days/week) | 42 | 13.6% |
| Sleeping | | |
| Less than 6 hours | 22 | 7.1% |
| 6-8 hours | 243 | 79.1% |
| More than 8 hours | 42 | 13.6% |
| Exercising | | |
| No exercise | 100 | 33.3% |
| Light exercise (1-3 days/week) | 124 | 40.3% |
| Moderate exercise (3-5 days/week) | 61 | 19.8% |
| Vigorous exercise (more than 5 days/week) | 22 | 7.1% |

**Discussion:**

PTB remains a significant cause of morbidity and mortality among neonates and children. Many Research has identified several maternal sociodemographic factors that are associated with an increased risk of preterm birth which include: (younger maternal age, low socioeconomic status, maternal stress and advanced age, Residency, BMI, Degree of Education and maternal occupation). These factors can interact in complex ways leads to PTB.

In this study we will see what is the relationship between preterm birth and demographic characteristics of the study sample.

In term of maternal age: In this study, the age of mother divided to four groups: group 1 (less than 20), group 2 (21-30), group 3 (31-40), group 4 (more than 40) years.

The highest rate of BTP was among mothers in group 1 (37.5%), for group 4, the lowest rate of BTP was the highest (10.1%). Several study that agrees with these results is a population-based study conducted in Sweden, which found (28.8%) that the risk of preterm birth was highest among younger mothers aged less than 20 years. The study also found that maternal age was particularly important in determining the risk of very preterm birth [5,8]

**In term of body mass index**

Mothers who were overweight had the highest rate of preterm birth (42.3%) compared to mothers who were normal weight (26.3%) and underweight (31.4%).

Some studies agree with our results in Denmark which found (39.2%) that maternal overweight was associated with an increased risk of preterm birth, especially early preterm birth (less than 32 weeks gestation). The study also found that maternal underweight was also associated with an increased risk of preterm birth, particularly in the later stages of pregnancy [1,2,9]

Overall, these results suggest that maternal weight is an important factor to consider when assessing the risk of preterm birth. Mothers who are overweight or underweight may be at increased risk, while those who are in the normal weight range may have the lowest risk. It is important to note that preterm birth can also be caused by other factors, such as infections, stress, smoking, and medical conditions, and that further research is needed to fully understand this complex issue.

**Regarding Educational level**: The highest were low educational level (65.3%). Result of several study conducted in European agree with this, found (37.6%) low educational level more susceptible to preterm [2,5,10]

This may be due, in part, to the fact that women with higher levels of education are more likely

to have better access to healthcare, engage in healthier behaviors during pregnancy, have healthier diets, and have greater control over their work and home environment.

Regarding residence, there are slightly more women residing in rural areas (53.1%) than in urban areas (46.9%). A study conducted by Cameron et al, the results showed that women living in rural areas (52.2%) were at a higher risk of preterm birth compared to women living in urban areas (47.8%)[11]

This result due to rural women had a higher risk of inadequate prenatal care, which was associated with a higher risk of preterm birth

In this study, the maternal employment had the majority of the respondents are housewives (53.6%). Some study conducted in Canada found (38.3%) was a housewife pregnant women susceptible to[11,12]

**Regarding the effect of employment status** on preterm birth, it is widely accepted that stress and physical demands associated with some types of work may impact the risk of preterm [9,13]

Pregnant women who are employed may face certain risk factors for preterm birth, depending on their job and work conditions. Several studies have identified a range of factors that may contribute to the risk of preterm labor and birth, including physical strain, long working hours, exposure to chemicals or radiation, and job stress.

**Regarding maternal lifestyle factors** may be associated with an increased risk of preterm birth. For example, smoking during pregnancy has been linked to preterm birth, as well as exposure to secondhand smoke. Additionally, poor maternal nutrition, including a low intake of fruits and vegetables, has also been associated with an increased risk of preterm birth. Other factors that may contribute to preterm birth risk include maternal stress, lack of physical activity, and inadequate prenatal care.

**For Nutrition** : A validated food frequency questionnaire (FFQ) was used to obtain maternal dietary intake Multivariate analysis of variance (MANOVA) was conducted to compare differences in the dietary nutrients of women in preterm .in our study found (42%)had fair nutrition and about(33.3%) had a poor nutrition during pregnancy .this result a agreements with several study sub-Saharan Africa (12 %) Pakistan (35 %), Nepal (30 %) of maternal nutrition[14] .Low-income households may face greater challenges in accessing and affording nutrient-dense foods, leading to inadequate maternal nutrition and an increased risk of poor pregnancy outcomes, including preterm birth. Additionally, maternal stress related to financial difficulties and food insecurity may further exacerbate the risk of poor nutrition and preterm birth[11,15]

**In term of Smoking** : This study found that the majority of pregnant women are non-smokers(96.7%) and this contradicts many studies by the Author-Michel-Henri-Delcroix conducted on the effect of smoking during pregnancy on gestational age, which found (77.4%) maternal smoking[13,16]

**Physical activity:** in our study the light activity found (40%) had majority percentage. this study Agreement with the some study in United States The light physical activity, such as gentle stretching or walking, does not seem to have a negative effect on maternal and fetal health, and may even have benefits. Several studies have found that light physical activity during pregnancy is not associated with an increased risk of preterm birth , and may have potential benefits such as reduced risk of gestational diabetes, pre-eclampsia, and excessive gestational weight gain

**Regarding Exercise during pregnancy:**

In this study found (40.3%)do light exercise(1-3)day / weeks, there are some study in United States similarity with our study which found Regular exercise during pregnancy has been associated with a decreased risk of preterm birth. Physical activity helps maintain healthy blood pressure, improves circulation, and strengthens the heart and lungs, which contributes to a healthier pregnancy. Exercise has been shown to reduce the risk of gestational diabetes and gestational hypertension[1,6,17].

## Conclusion

The study revealed that maternal socio-demographic factors, short birth space, lack of antenatal care, exposure to previous adverse birth outcomes and that maternal lifestyle factors can have an impact on the risk of preterm birth. (physical activity during pregnancy ,low birth weight (LBW). Conversely , pregnant women who experience passive smoking may have an increased risk of preterm LBW.

Finally , It should be noted that while certain maternal lifestyle factors may increase the risk of preterm birth, there are many other risk factors involved as well, such as maternal age, late or no health care during pregnancy, smoking, and ethnicity. Further research is needed to fully understand the impact of maternal lifestyle on preterm birth and to identify effective interventions to reduce the incidence of preterm birth this study shows a positive relationship between maternal lifestyle and preterm birth

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**Ethical consideration:** Prior to data collection, Ministry of Education/Nineveh Directorate
formal consent was received on October 20, 2022.
Before data collection began, participants' verbal
consent was also requested**.**

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