

# Consequences of mother's diet pattern and lifestyle on weight of the newborn at delivery among the infants in Jorhat district, Assam

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## Abstract

The World Health Organization (WHO) indicates underweight infants as those weighing less than 2,500 grams at the time of delivery. The problem is still a major global public health concern. Dietary and choices regarding their lives made by the mother during pregnancy have an important influence on the development among the children and the outcome of childbirth. The risk of insufficient birth can be increased by unhealthy habits like smoking, drinking alcohol, and eating inadequately.

The principal objective of this study is to evaluate the relationship among underweight births and mother's diet and lifestyle choices. A cross-sectional study included 720 mothers and their live-born infants. Chi-square test, binary logistic regression analysis, and descriptive statistics were used to analyse the data. Tobacco use, betel nut/gutkha consumption, low fruit and vegetable intake, and low protein intake were all significantly correlated with underweight ( $p < 0.05$ ). The weight at birth is strongly affected by the mother's nutrition and eating habits throughout her life. Encouraging healthy behaviours and a sufficient diet during pregnancy is essential to reducing the effects of a low weight at birth.

The weight of the infant is greatly influenced by maternal nutrition and way of lifestyle. So as to reduce the consequences of being underweight at birth, it is crucial to encourage good behaviours and a suitable nutrition during pregnancy.

**Keywords:** Underweight birth, Mother's diet, Lifestyle variables, Nutrition, Primary data

## 1. Introduction

Weight at Birth is the most critical factor in a newborn's life and well-being. Neonatal mortality, infections, delayed development, and long-term developmental issues are more common in newborns who are underweight infants. The World Health Organization defines an underweight newborn as one who weighs below 2,500 grams at birth [8]. Underweight is still common in many developing nations, regardless of improvements in maternal healthcare services. Human foetal growth is believed to be primarily influenced by the mother's nutrition and health. A healthy child may be born to a healthy mother [5].

Low weight at birth affects an estimated 14.6% of people globally (20.5 million cases), with Southern Asia having the most cases of prevalence (26.4%) and North America and Europe having a low incidence (7% and 4-7%, respectively [2-3]. Maternal lifestyle choices that may have a detrimental effect on foetal growth include smoking, drinking, and consuming betel nut or gutkha because they reduce the mother's blood circulation and oxygen supply. Foetal growth could also suffer adverse effects by maternal eating habits, such as consuming too much refined flour and high-fat foods instead of enough fruits, vegetables, or foods high in protein.

Developing comprehensive maternal health interventions includes an understanding of the implications of both mother

lifestyle and food habits. Lifestyle-related variables have been correlated to newborn weight [1-3]. Premature birth remains to be responsible for 40-60% of neonatal deaths worldwide, according to a United Nations Children's Fund (UNICEF) report [4]. Furthermore, on the basis of the WHO, underweight is a dangerous condition that has grown to be an important indicator for a higher global disease burden [16, 17].

Underweight at birth has been found to be positively correlated with maternal use of passive smoking while pregnant [20, 29]. Additionally, a meta-analysis by [30] showed that infants who were exposed to passive smoking had lower birth weights, indicating a higher risk of underweight at birth. Specifically, women usually to eat more dairy products both before and after pregnancy. Geographical variations that impact food availability, as well as social norms and beliefs pertaining to religion and social status, may be responsible for variations in the consumption of various food groups [18, 19].

The aim of this investigation is to determine how pregnant women's food habits and life style choices during pregnancy affect the incidence of underweight births in infants in Assam's Jorhat district.

**Objective:** To examine the effect of maternal food habits and lifestyle factors during the period of pregnancy at the occurrence of underweight births among infants in Jorhat District, Assam.

## 2. Materials and Methods

### 2.1 Study design

The Jorhat District of Assam is where the primary data has been collected. The samples were identified using the structure's questioner. In September 2024 and September 2025, a long-term study of the Jorhat district in Assam was conducted performed. The study included 720 pairs of mothers and infants. The multistage sampling technique provided the foundation for the sample procedure used during this investigation. The selection procedure began with carefully considered block selection to ensure both urban and rural participation. Villages or wards were then selected at random. A pretested questionnaire was used to interview mothers in order for collecting data.

The women were asked about their alcohol consumption, Tobacco use, chewing of betel nut/gutkha, Fruit intake, Vegetable consumed, Non-vegetarian, Fat rich food consumed, Maida product consumed etc.

### 2.2 Study variables

#### Dependent variable

- Normal Weight at Birth (more than 2500 grams)
- Underweight Birth (below 2500 grams)

#### Independent Variables:

- Consumption of fruits
- Consumption of vegetables
- Consume non-vegetarian food
- Consumption of foods high in fat
- Consumption of Maida products
- Use of tobacco
- Drinking alcohol
- Chewing gutkha or betel nut

### 2.3 Statistical analysis

Software revealed that the data was entered, refined, and

analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were first used to gather data from the study population. On the other hand, categorical variables were represented by percentages and frequencies.

The association between nutrition variables, including mother's decisions regarding lifestyle, and underweight births was investigated using bivariate analysis and the Chi-square test.

## 3. Results and Discussion

### 3.1 Results

The results demonstrated that a substantial number of newborns had a low weight at birth. Underweight babies were more likely to be born to mothers who did not consume enough food during their pregnancies than to mothers who did. Underweight newborns were closely correlated with limited nutritional diversification and irregular meal patterns. Babies with underweight birth were more likely to be born to mothers who consumed fewer nutrient-dense foods, such as fruits, vegetables, and foods high in protein.

Similar findings showed that maternal dietary diversity was inversely correlated with the prevalence of underweight births [12]. The current investigation discovered a strong relationship between low birth weight and food pattern.

Underweight babies had a greater likeliness to be born to pregnant women who drank alcohol, smoked, or chewed gutkha.

The results of the investigation verified that passive smoking was associated with a low weight at birth. The relationship between the independent factors and underweight birth was investigated using the term of underweight group. Cigarette smoking may be related to underweight birth, according to a prior study [9]. According to a Dutch study, passive smoking during pregnancy was exclusively related to the term underweight [10].

**Table 1:** Maternal dietary habits and lifestyle characteristics during pregnancy

Variable	Category	Frequency (n)	Birth Weight				Chi-square Value	p-value
			Underweight at birth		Normal Weight at birth (n)			
			Total	Percentage	Total	Percentage		
Tea/coffee consumed	No	111	31	27.9	80	72.1	.160	.726
	Yes	609	159	26.1	450	73.9		
Fresh milk consumed	No	349	108	30.9	241	69.1	7.240	.009
	Yes	371	82	22.1	289	77.9		
Green leafy vegetables consumed	No	331	108	32.6	223	67.4	12.279	.001
	Yes	389	82	21.1	307	78.9		
Noodles or Bread consumed	No	396	98	24.7	298	75.3	1.221	.271
	Yes	324	92	28.4	232	71.6		
Fruits consumed	No	119	34	28.6	85	71.4	.350	.570
	Yes	601	156	26.0	445	74.0		
Non-Veg Items consumed	No	268	76	28.4	192	71.6	.852	.382
	Yes	452	114	25.2	338	74.8		
Veg consumed	No	125	37	29.6	88	70.4	.803	.373
	Yes	595	153	25.7	442	74.3		
Sugar-Rich foods consumed	No	476	122	25.6	354	74.4	.416	.533
	Yes	244	68	27.9	176	72.1		
Iron and Folic acid consumed	Less than 180	216	76	35.2	140	64.8	12.291	.001
	Equal or greater than 180	504	114	22.6	390	77.4		
	No	522	131	25.1	391	74.9	1.634	.219

Supplements/Syrups consumed during pregnancy	Yes	198	59	29.8	139	70.2		
Rest during pregnancy	Less than 2 hours	399	125	31.3	274	68.7	11.241	.001
	Grater or equal to 2 hours	321	65	20.2	256	79.8		
Smoking	No	627	153	24.4	474	75.6	9.866	.002
	Yes	93	37	39.8	56	60.2		
Consumption of Alcohol	No	628	148	23.6	480	76.4	20.149	.000
	Yes	92	42	45.7	50	54.3		
Chewing of Quid and Betelnut, Gutkha, etc	No	626	153	24.4	473	75.6	9.367	.004
	Yes	94	37	39.4	57	60.6		

Sources: Field survey data

720 mothers who gave birth to live infants participated in the current study. The multivariate analysis using the chi-square test revealed several traits that were significantly correlated with birth weight (Table 1). Fresh milk consumption during the mother's pregnancy was found to be statistically significantly correlated with underweight birth ( $\chi^2=7.240$ ,  $p=0.009$ ).

Underweight birth was significantly correlated with the types of green leafy vegetables consumed during the mother's pregnancy ( $\chi^2=12.279$ ,  $p=.001$ ).

A statistically significant association was found between birth weight and the consumption of noodles or bread during the mother's pregnancy ( $\chi^2 = 6.669$ ,  $p = .011$ ).

Quantity of Iron and Folic acid consumed at the time of pregnancy displayed strong correlation with underweight birth ( $\chi^2= 12.291$ ,  $p=.001$ )

In distinctness; tea/coffee consumed, fruits consumed, non-veg Items consumed, veg items consumed, sugar-rich foods consumed and supplements/syrups consumed during pregnancy did not portray statistically significant associations with weight at birth ( $p>0.05$ ).

Moreover, there was a strong relationship ( $\chi^2=11.241$ ,  $p=.001$ ) between the weight at birth and the pregnancy rest during pregnancy period.

During the pregnancy period consumption of alcohol is highly significant with low birth weight ( $\chi^2=20.149$ ,  $p=.001$ ). Here also found that act of smoking at the time of pregnancy is significantly related to underweight birth ( $\chi^2=9.866$ ,  $p=.002$ ) and chewing of quid and betelnut, and gutkha at the time of pregnancy is strongly related to underweight birth ( $\chi^2=9.367$ ,  $p=.004$ ).

**Table 2:** Maternal food habits during pregnancy were investigated using binary logistic regression analysis

Variable	Category	Odd Ratio	95% CI for EXP(B)		p- value
			Lower	Upper	
Tea/coffee consumed	No (Ref)	Ref	-		0.689
	Yes	1.10	0.698	1.724	
Fresh milk consumed	No	Ref			0.007
	Yes	1.58	1.131	2.206	
Green leafy vegetables consumed	No	Ref	-		0.000
	Yes	1.81	1.298	2.534	
Noodles consumed	No	Ref			0.270
	Yes	0.83	0.595	1.156	
Fruits consumed	No	Ref	-		0.555
	Yes	1.14	0.737	1.767	
Sugar-Rich foods	No	Ref	-		0.519
	Yes	0.89	0.630	1.262	
Quantity of Iron folic acid tablets consumed	Less than 180	Ref	-		0.000
	Equale or greater than 180	6.38	4.426	9.184	
Supplements/Syrups consumed during pregnancy	No	Ref	-		0.202
	Yes	0.79	0.549	1.135	
Butter consumed	No	Ref	-		0.421
	Yes	0.87	0.613	1.227	
Ghee consumed	No	Ref	-		0.000
	Yes	3.48	2.461	4.906	
Rest during pregnancy	Less than 2 hours	Ref	-		0.001
	Grater or equal to 2 hours	1.80	1.273	2.536	
Smoking	No	Ref	-		0.002
	Yes	0.49	0.310	0.769	
Consumption of Alcohol	No		-		0.000
	Yes	0.37	0.234	0.576	
Chewing of Quid and Betelnut, Gutkha, etc	No	Ref	-		0.003
	Yes	0.50	0.317	0.783	

Sources: Field survey data

A binary logistic regression analysis identified a number of significant dietary and lifestyle factors associated with low birth weight, including Fresh milk consumed, green leaves consumed, Noodles or Bread consumed, Quantity of tablets consumed, Ghee consumed, Smoking/Consumption, Consumption of Alcohol and Chewing of Quid and Betelnut, Gutkha (Table 2).

Mothers who consumed tea/coffee had 10% higher odds of delivering a normal birth weight baby compared to those who did not. (OR:1.10, 95% CI: .698-1.724,  $p=0.689$ ) However,  $p$ -value is greater than 0.05 and it is not statistically reliable.

Consumption of fresh milk at the time of pregnancy is essential for a baby's healthy development, it is a major factor in underweight births. Mothers who consumed fresh milk had 74% higher odds of delivering a normal birth weight baby compared to those who did not. (OR:1.58, 95% CI: 1.131-2.206,  $p=0.007$ ).

Similarly, eating green leafy vegetables is essential for a baby's optimal development in during pregnancy, the green leafy vegetables eaten have a highly significant impact on birth weight. Mothers who eating had green leafy vegetables had 81% higher odds of delivering a normal birth weight baby compared to those who did not. (OR: 1.81,95% CI: 1.298-2.534,  $P=0.000$ ).

Consumption of noodles is not essential for a baby's optimal development during pregnancy. Woman who consumed noodles had 11% lower odds of delivering a normal birth weight baby compared to those who did not. (OR: 0.83, 95% CI: 0.595-1.156,  $p=0.270$ ). However, the  $p$ -value is 0.270, which indicates that this result is not statistically significant.

Mothers who ate fruits had 14% higher odds of delivering a normal birth weight baby compared to those who did not. (OR: 1.14, 95% CI: 0.737- 1.767,  $P=0.555$ ). But since the  $p$  value is greater than 0.05, this value is not statistically significant.

Also, mothers who consumed sugar-rich foods had lower odds (about 11% less) of delivering a normal birth weight baby compared to those who did not (OR: 0.89, 95% CI: 0.630-1.262,  $P=0.519$ ). Since the OR is close to 1, the effect is weak and the  $p$ -value is greater than 0.05, it indicates that this result is not statistically significant.

It is found that, consuming at least 180 IFA (Iron and Folic acid) tablets was significantly related with birth of normal weight infants, with mothers in this group being 6.38 times more likely to deliver a normal-weight infant than those consuming fewer tablets. (Here OR:6.38, CI: 4.426-9.184,  $P=0.000$ ).

Mothers who consumed supplements/Syrups at the time of pregnancy had lower odds (about 21% less) of delivering a normal birth weight baby compared to those who did not. (OR: 0.79, 95% CI: .549-1.135,  $P=0.202$ ). Since the OR is close to 1, the effect is weak and the  $p$ -value is greater than 0.05, it indicates that this result is not statistically significant.

Similarly, it is found that Mothers who consumed butter had lower odds (about 13% less) of delivering a normal birth weight baby compared to those who did not (OR: 0.87, 95% CI: 0.613-1.227,  $P=0.421$ ). Since the OR is close to 1, the effect

is weak and the  $p$ -value is greater than 0.05, it indicates that this result is not statistically significant.

Ghee is essential to a baby's full development during pregnancy and it is a major contributor to normal birth weight infants. Here it is found that women who consumed ghee had higher odds (about 3.48 times) of delivering a normal birth weight baby compared to those who did not (OR: 3.48,95% CI: 2.461-4.906,  $p=0.000$ ).

This analysis indicates that rest during pregnancy was significantly associated with birth weight of infants. Rest duration of at least 2 hours was significantly related with normal weight at birth infants, with mothers in this group being 80% more likely to deliver a normal-weight infant than those with fewer duration of rest (OR:1.80, CI: 1.273- 2.536,  $p=0.001$ ).

Smoking during the time of pregnancy has a major impact on insufficient birth weight. Since smoking is harmful for foetal development at the time of pregnancy, mothers who smoked had lower odds (about 51% less) of delivering a normal birth weight baby compared to those who did not (OR: 0.49, 95% CI: 0.310- 0.769,  $p=0.002$ ).

Similarly it is found that mothers who consumed alcohol had lower odds (about 63% less) of delivering a normal birth weight baby compared to those who did not (OR: 0.37, 95% CI: 0.234- 0.576,  $p=0.000$ ) and mothers who chewed quid and betelnut, and gutkha had lower odds (about 50% less) of delivering a normal birth weight baby compared to those who did not (OR: 0.050, 95% CI: 0.317- 0.783,  $p=0.003$ ).

### 3.2 Discussion

Consistent with similar findings reported in a different research [23], this study found a significant correlation between consumption of fresh milk by mothers during pregnancy and the underweight births of infants. Fresh milk consumption while being pregnant has been in correlation with the increase in the infant's weight because it offers necessary nutrients and vitamins that promote foetal growth.

We found a significant correlation between smoking at the time of pregnancy with underweight birth of infants, which is consistent with findings published in a different study [22]. Smoking at the time of pregnancy has also been correlated to reduced weight in newborns, according to earlier research [19]. The growing foetus is negatively impacted by smoking during pregnancy in various ways. Smoking leads to vasoconstriction, which limits blood flow to the developing baby in the foetus, while exposure to carbon monoxide lowers oxygen supply. Consequently, it is closely linked to intrauterine growth restriction (IUGR), underweight at birth, preterm birth, and a higher chance of stillbirth and infants' mortality.

This result indicates a strong correlation between maternal alcohol consumption at the time of pregnancy and low birth weight, which is consistent with similar findings reported in a different study [13]. Alcohol use at the time of pregnancy increases the risk of being underweight at birth because of its negative effects on foetal growth and development.

The current study also found that green leafy consumed is significantly related to being underweight at birth and the same findings were demonstrated by another study [24].

This result indicates that the quantity of iron-folic acid tablet consumed among mothers is significantly correlated with underweight births in infants in the present study, which is consistent with findings from a similar study [25].

Being underweight at birth is significantly correlated with the duration of rest taken by the mother during pregnancy. Similar findings were reported by several other researchers [26-28] who found that hard physical labour at the time of pregnancy is significantly correlated to underweight birth.

#### 4. Conclusion

Due to numerous of maternal factor, underweight birth weight (<2500g) is still a major public concern. The current demonstrates that mother's dietary habits, nutritional status and lifestyle choices have a major on the birth weight of infants in Jorhat District, Assam.

By encouraging healthy lifestyle choices during pregnancy, ensuring appropriate prenatal care, and enhancing maternal nutrition, the occurrence of underweight birth infants can be diminished. Increasing awareness of healthy eating during pregnancy and encouraging maternal health programs are necessary to enhance parental and child well-being outcomes.

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