

# Effect of Prenatal Health Care on Pregnancy Outcomes in Hamadan, Iran

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## Abstract

**Background:** Prenatal health care has a great impact on mother and neonatal health. The aim of this study was to determine the effect of prenatal health care on mother weight gain, gestational age and neonatal birth weight.

**Methods:** A retrospective study was performed in Hamadan city and 264 prenatal care records were selected randomly from 12 health care centers. Data were collected by a questionnaire which was completed by two investigators.

**Results:** The mean age of pregnant women was 25.05± 4.72 years (mean±SD). The mean of prenatal care visits was 6.32±2.89 (ranged 1 to 17). The mean of women's weight gain during pregnancy was 8010.67±3547.71 gr. The mean of neonatal birth weight was 3198.93±473.11. About 95% of newborns were full term babies and 4% were low birth weight (<2500 gr.). Only one third of women had started their prenatal care in the first trimester of their pregnancy. There were no significant relationships neonatal birth weight with numbers of prenatal care visits, women's weight gain during pregnancy and the time of starting prenatal care.

**Conclusions:** A healthy diet and regular prenatal health care improve outcome of pregnancy.

**Keywords:** Birth weight; Prenatal care; Gestational age; Weight gain; Iran

## Introduction

Pregnancy is an important stage of a woman's life, and has the potential to influence the growing fetus and the mother. It has been suggested that pregnancy weight gain within the Institute of Medicine recommended ranges are associated with better pregnancy outcome than are weight gains outside these ranges [1,2]. Maternal weight gain is depending on socio-economic status, biologic factors and cultural behaviors [3,4].

In Iran, access to prenatal care as a part of primary health-care system was established to improve access to health care for pregnant women and reduce the health gap between urban and rural areas [5]. Adequacy of prenatal care has been defined by the number of visits, the stage of pregnancy at which care was initiated, the source of care (private versus public), the spacing of visits, and medical care services for example, blood and urine tests, health education, and dental care [5]. Mothers who delayed initiation of care until the third trimester are likely to have a higher risk of low birth weight. Conversely, increased birth weight may be expected to coincide with more visits because both birth weight and the total number of scheduled visits increase with gestational age [6]. According to Tavani [7], 23.5% of Iranian women have less than two antenatal visits during pregnancy and 64% having six or more antenatal visits.

Birth weight is major determinant of neonatal and infant mortality and contributes to childhood morbidity. Nutrition status and body fat stores of mothers are associated with birth weight of infants [4]. It is shown that factors contributing to low birth weight (LBW) for a developing country include: low maternal caloric intake or inadequate weight gain during pregnancy, low pre-pregnancy weight short stature, and female sex of the fetus [6]. In Iran, low birth weight occurs 8 and 7% in rural and urban areas, respectively [8]. A recent study in 2010 showed the LBW rate was 6.8% (95%CI 6–7.5%) [9]. Low birth weight accounted for 40% of infant mortality in Iran [10]. Furthermore, LBW babies have higher risk of problems in neurological system, cognitive development, and getting metabolic syndrome in adulthood [11]. Due to these problems, LBW infants need more frequent hospitalizations and outpatient visits [12].

As known, nutritional status of mothers (before and during pregnancy) and weight gain during pregnancy have important effects on pregnancy outcome [13]. This study, aimed to investigate effect of prenatal health care on mother weight gain during pregnancy, baby birth weight and gestational age in a population of pregnant women who those referred to urban health centers in Hamadan city in 2004.

## Methods

In this retrospective study, 264 prenatal care records were selected randomly among prenatal care records of women who had delivered in a previous year in 12 Health Care Centers in Hamadan city. Data were collected by a questionnaire consisted of socio-demographic characteristics, reproductive history and prenatal health care. Women's age, educational level, occupation, parity, interval between pregnancies, histories of low birth weight baby, last menstrual period (LMP), were recorded. Prenatal health care assessed by time of starting prenatal care, frequency of visits, weight gain during pregnancy, nutritional status and having supplements (multivitamin and ferrous). Exclusion criteria were diabetes mellitus, preeclampsia, cardiovascular diseases, renal or any other disease that may affect pregnancy outcome, multiple pregnancies, and fetal anomalies.

Newborn gestational age was calculated based on LMP and sonography examination during the first trimester (complete 37 weeks was considered as term pregnancy). Preterm birth was determined as

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less than 37 weeks of gestational age. Birth weights were recorder based on hospital records, and low birth weight was defined as less than 2500 gr. Pregnancy outcome was assessed by weight gain during pregnancy, neonatal birth weight, and gestational age. Kotelchuck's Adequacy of Prenatal Care Utilization Index (>6 visits = adequate, <6 visits = inadequate) was calculated adequacy of prenatal care [14].

Investigators reviewed completed questionnaires, and any incomplete data, discrepancies or errors discovered during this review were eliminated. Using Statistical Package for the Social Sciences (SPSS version 16) data was analyzed. Statistical analysis was performed using the Chi-squared test, *t*-test and one way- ANOVA. Level of significance was set at  $p < 0.05$ .

## Results

A total of 264 women's prenatal care records entered in our study. The mean age of pregnant women was 25.05 years [95% CI: 20.33, 29.47], of these 31 (11.7%) aged 15-19 years, 195 (73.9%) aged 20-30 years, 38 (14.4%) aged >31 years.

Most mothers (70%) and fathers (65%) had received 8 years of education or more, and approximately 87% lived in urban areas. Only 13% of mothers had an activity outside the home, and 87% were housewives. 123 (46.6%) experienced their first pregnancy. Regarding the prenatal care visits, the mean of prenatal care visits was 6.32 [95% CI: 5.43, 9.21]. One hundred and eight (41%) of the subjects were visited less than 6 times and 59% were visited more than 6 times during their pregnancies. Data of maternal weight gain showed 22% were less than 6 kg, 50.4% 6–12 kg, 17.7 % more than 12 kg. The mean of women weight gain during pregnancy was 8010.67 grams [95% CI: 4462.96, 11558.38].

The mean of neonatal birth weight was 3198.93 grams [95% CI: 2725.82, 3672.04]. About 3.4% of neonates were low birth weight (<2500gr), 84.1% of them were between 2500-3999 gr. And 6.1% were above 4000 gr. Only 27.3% of women had started their prenatal care during the first trimester, 62.9% in the second and 2.7% in the third trimester of their pregnancy. About 95% of newborns were born at full-term gestational age. There were no significant relationship between neonatal birth weight with numbers of prenatal care, women's weight gain during pregnancy and the time of starting prenatal care (Table 1).

## Discussion

Results have revealed absence of statistically significant relationships

between socio-demographic variables and anthropometric measures with pregnancy outcome which may be explained by the relative homogeneity of the sample in terms of socio-demographic characteristics, and small variance of neonatal birth weight.

Prevalence of low birth weight found in this sample was smaller to those reported by the other studies [9,15]. No significant association was found between maternal weight gain and neonatal birth weight that it could be due to lower prevalence of LBW in our study, missing values and lack of accurate weight records.

The fact that there was no relation between neonatal birth weight and prenatal care is in agreement with findings reported by other researchers [16,17]. Rosso [17] has reported that most studies in different countries have found no correlation between maternal diet and consequence of pregnancy. He suggests that positive dietary effects can be expected in only two groups: women with a low pre-pregnancy weight, and those with gestational under nutrition. Even, among pregnant women who will reach or even exceed a critical body mass near term, no correlation between maternal diet and birth weight would be expected [7]. Based on the findings of other studies [18,19], it seems that any effect of the dietary intake on birth weight could be associate to pre-pregnancy body weight. Scholl et al. [18] suggested that when maternal stores are low or under conditions of poverty, there may be a more direct relationship between maternal intake and birth weight. Susser [19] reported an inconsistent results among studies attempting to correlate birth weight with maternal food intake. He stated that "the causal sequence of maternal nutrition, weight gain, and infant birth weight were not sustained by available evidence except in situations of extreme nutritional deprivation" [19].

Due to lack of information on pre-pregnancy weight and height of mothers' records, calculating of body mass index (BMI) was not available. The independent association between pre-pregnancy BMI and pregnancy weight gain was found in previous study [20].

The impact of socio-economy status on birth weight has shown in many studies [21-27]. Living in a poor condition and rural areas are associated with a higher chance of low birth weight infants [21-23]. Our study was done in a low socio-economic status living in urban areas; however, no significant association was seen between socio-economy status and birth weight. Free of charge access to prenatal health care in both rural and urban women may be cause of this result [9].

Mothers 'prenatal care variables	Neonatal birth weight			Statistics	p
	LBW (<2500g)	NBW (2500-4000g)	HBW (>4000g)		
Prenatal care visits				t= 0.123	NS (0.720)
Inadequate (<6)	4 (1.7%)	101 (38.4%)	6 (2.5%)		
Adequate (>6)	5 (2.1%)	135 (51.2%)	11 (4.1%)		
Total	9 (3.8%)	236 (89.6%)	17 (6.6%)		
Women's weight gain				F=0.35	NS (0.700)
<6 kg	3 (1.3%)	60 (22.8%)	1 (0.5%)		
6-12 kg	6 (2.5%)	137 (52.1%)	12 (4.5%)		
>12 kg	0 (0.0%)	40 (15.3%)	2 (1.0%)		
Total	9 (3.8%)	237 (90.3%)	15 (6.0%)		
Starting prenatal care				F=0.38	NS (0.680)
First trimester	1 (0.5%)	75 (28.4%)	2 (1.0%)		
Second trimester	8 (3.1%)	157 (59.5%)	12 (4.5%)		
Third trimester	0 (0.0%)	8 (2.7%)	0 (0.0%)		
Total	9 (3.8%)	240 (90.9%)	14 (5.6%)		

LBW: Low Birth Weight  
NBW: Normal Birth Weight  
HBW: High Birth Weight  
NS: Non Significant

Table 1: Relationship between neonatal birth weight and mothers' prenatal care.

The most important limitation of this study was that it did not follow pregnant women throughout their pregnancy, and depend on existing data in health records. The second limitation was a relatively small sample size. Although this study cannot assess all determinants of pregnancy weight gain and birth weight, it might help to describe how total pregnancy outcome varies in this population.

## Conclusions

The findings have shown implication of prenatal health care, counseling nutritional support and education may have an important role to play in pregnancy outcome. Healthcare providers should take more attention into account for high risk population. They may provide valuable information on dietary habits, birth-spacing behavior and assist in designing a comprehensive care plan to promote mother and neonatal health status.

A healthy diet and regular prenatal care can help to reduce problems for both mother and fetus during pregnancy. For this reasons, it is suggested that women who are thinking about getting pregnant take steps to improve or maintain their own level of health before they get pregnant and keep it during their pregnancy.

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