

## Original Article

**The Study of Impact of Employment on Gestational Age and Weight of Newborn**Mojgan Firouzbakht<sup>1</sup> Maryam Nikpour<sup>1</sup> \*Aram Tirgar<sup>1</sup>

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**Abstract**

**Background and purpose:** Women's health, as almost "half of the population of each society" and in recent years as "half of the workforce," is of particular importance in achieving sustainable development goals. The aim of this study is to investigate the relationship between birth weight and gestational age and mother's employment.

**Materials and Methods:** This descriptive analytic study was implemented among 390 cases (180 employees and 210 housewives) from pregnant women referred to Imam Ali Hospital in Amol, Mazandaran, Iran. Sampling was done by available methods, and data collection was conducted using a researcher made form appropriate to the purpose of the study. After collecting demographic and birth characteristics information (gestational age and birth weight), the results were analyzed using chi-square and t-test.

**Results:** The mean birth weight in the case (employed mothers) and control groups was  $3262.5 \pm 506.3$  and  $3369.1 \pm 450.8$  g, respectively; in case group was significantly lower than control group ( $P = 0.029$ ). This difference was not observed in gestational age between the two groups with mean age  $38.8 \pm 1.7$  in unemployed mothers and  $38.5 \pm 2.0$  weeks in employed mothers.

**Conclusion:** Women's employment during pregnancy is associated with some consequences such as effects on birth weight. Given the important role of the birth weight in the health and survival of babies, establishing greater co-ordination between the job and conditions of a pregnant woman will be effective on the health of the mother and baby.

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**Key words:** Women, Employment, Pregnancy, Birth Weight, Gestational Age

## 1. Introduction

Humans have played a pivotal role in sustainable development and are deserved to take benefit from a healthy and productive life, in coordination with the environment. This phrase is interpreted from the ergonomics and occupational health perspective as requirements for a job and other production processes, without creating a hazard to human health, ecosystems, and basic resources during the short or long term (1). Undoubtedly, women, as half of the population and in recent years as “half of the workforce,” are not the exception in this regard (2).

According to the International Labor Organization, the female share of the labor force has changed from 38% in 1970 to 41% in 1996 (3) and 50% in 2010 (4). Given the fact that approximately 70% of employed women are in the reproductive age (5) most women experience biological and transient events such as pregnancy and breastfeeding (6), and many women give birth to 1 or 2 children during their employment (7), it is very important to give special attention to the women's health during their pregnancy and keep balance in job conditions.

Based on the results provided by Solis et al. in USA, about 76% of nulliparous women, 87% during the last trimester of pregnancy, and 64% during the 9<sup>th</sup> month of pregnancy are constantly working (8). The situation in our country, according to the Statistical Center of Iran in the winter of 2012, was slightly more than 11% in a population of women over 15 years old (9).

Mother's employment may affect pregnancy outcomes in different ways (10). On one hand, by increasing family income can improve some issues such as diet and adequate care during pregnancy (11,12). But, according to the working conditions and environment, the mother is exposed to occupational hazards (13).

Most available documentation indicated that working conditions and occupational exposures (physical, chemical, emotional factors in the workplace) can have negative effects on health, pregnancy, and fetal growth, and cause adverse outcomes such as miscarriage (14), and fetal abnormalities (15,16).

Previous studies have shown that physical activity may cause an increase in uterine contractions during pregnancy and risk of preterm delivery through the reduced uterine-placental blood flow and increased body temperature, decreased glucose and oxygen, and increased catecholamines (17,18). Also, employment may have effects on maternal weight gain during pregnancy, and effects on fetal weight (19,20). Although in some studies, no significant association has been confirmed between maternal employment and low birth weight and preterm birth (21).

Given the inconsistent findings regarding the effects of employment on pregnancy outcomes, this study has been carried out to examine the employment relationship with gestational age and birth weight

## 2. Materials and Methods

This descriptive-analytic study (preliminary phase) was implemented among 390 pregnant women referred to the maternity ward of Imam Ali Hospital in Amol, Iran, for delivery, during June-October 2014. Data collection method was available sampling method and was performed to investigate the relationship between maternal employment with variables such as gestational age and birth weight.

To determine the sample size, the total number of 390 pregnant women was calculated according to the incidence of preterm birth, which was estimated as 12% (22) in confidence level of 95% and given the likely drop in sample (180 mothers were employed and 210 mothers were housewife).

The inclusion criteria for the study group was women (employed) singleton pregnant, aged 20-40 years, spent at least 3 months of their pregnancy in employment. Exclusion criteria included age under 20 years, history of preterm delivery history of low birth weight, pre-eclampsia, twin pregnancy, rupture or membrane and periodontal disease, the presence of systemic disease in the mother, twin pregnancy, age over 35, and the mother's unwillingness to participate in the study.

The researcher created form appropriate to the purpose of the study consisted of demographic, obstetric, and delivery was used for data collection process. Information on pregnancy outcomes, in addition to completion by mothers and the researcher's presence in the hospital, was also performed referred to the hospital records.

The scientific validity of the questionnaire was done through content validity method (the questionnaire was assessed by five persons of the academic member in Babol University of Medical Sciences and confirmed). The reliability of questionnaire was confirmed by test-retest. In this test, the correlation of 20 samples for assessing the reliability was  $r = 0.8$ . After the necessary permissions, the researchers attended at hospital maternity ward and started sampling according to the

desire of mothers and study criteria. For each sample, data were collected through face-to-face interview. The gestational age was calculated using last menstrual period and ultrasound under 12 weeks (23), and infant weight was measured using Mikasi standard scales made in Japan, presented at the hospital, with the sensitivity of 50 g. Additional data with respect to the delivery and postpartum information were collected obstetric records. For data processing, descriptive statistical indicators such as dispersion and central tendency indicators, and inferential statistics such t-test and chi-square tests were used. SPSS software (version 16, SPSS Inc., Chicago, IL, USA) was used to analyze the obtained data.

### 3. Results

The demographic characteristics in 480 women (employed women = 180, unemployed women = 210) showed summarized in table 1.

There was no significant difference in demographics characteristics in employed and unemployed women.

Comparison of gestational age was no significant difference in two groups ( $P = 0.088$ ), but the birth weight was significant differences in two groups ( $P = 0.029$ ) (Table 2).

**Table 1.** Comparison of demographics and obstetric characteristics in employed and unemployed women

Variable	Employed	Unemployed	Statistics test	P
Age (year) mean $\pm$ SD	27.60 $\pm$ 5.28	27.40 $\pm$ 4.79	t = 0.407	0.684
Maternal weight gain during pregnancy men $\pm$ SD	11.86 $\pm$ 5.45	11.70 $\pm$ 4.59	t = 0.176	0.861
Gravida N (%)				
Primipara	86 (47.7)	105 (54.1)	$\chi^2 = 1.505$	0.22
Multipara	94 (52.2)	89 (45.9)		
Education N (%)				
Junior high school	69 (38.3)	71 (34)	$\chi^2 = 1.92$	0.38
High school	52 (28.8)	74 (35.4)		
University	59 (32.7)	64 (30.6)		

SD: Standard deviation

**Table 2.** Comparison of birth weight and gestational age in employed and unemployed women

Variable	Employed	Unemployed	Statistics test	P
Gestational age (week) mean $\pm$ SD	38.53 $\pm$ 2.00	38.86 $\pm$ 1.73	t = -1.709	0.088
Birth weight (g)	3262.5 $\pm$ 506.3	3369.1 $\pm$ 450.8	t = -2.180	0.029*

\*Statistically significant difference; SD: Standard deviation

#### 4. Discussion

This study investigated the effect of employment on pregnancy outcome (according to birth weight and gestational age). Data indicated a significant relationship between mother's employment and birth weight ( $P = 0.027$ ); however, no significant association was observed between mother's employment and gestational age in both groups.

The results of this study indicated that children of employed mothers were born with significantly lower weight compared to housewives. Low birth weight is considered as a threat to infant health and survival. One of the main goals of prenatal care is preventing low birth weight (23). It should be noted that in none of the case and control groups, the low birth weight means infants with weight problems.

Niedhammer et al. conducted a prospective study in Ireland, Dublin hospital to determine the effects of predictive factors in various jobs on pregnancy outcomes (birth weight, preterm birth and small infant for gestational age) in worker women. Sampling was conducted on 1124 women with singleton pregnancies showed a significant relationship between working time of pregnant women and birth weight < 3000 g (24).

Several studies were performed on the effects of employment on pregnancy outcomes (in different occupational groups), emphasizing the effect of variables such as physical workplace, work long hours, hard work, mental and physical stress, and shift work and each study has been more or less showed the effect of maternal employment on adverse pregnancy outcomes (25-27). Although it seems that women's employment has improved their access to health services, their maternal health, nutritional status and quality of prenatal care (11,12), but the nature of the jobs is a very important factor which alone could have adverse effects on pregnancy outcome and can be considered as an important risk factor for serious problems in the mother or fetus and newborn health.

This study had several limitations, the most important of which are: small sample size of employed mothers, and their employment in various occupations.

Obviously, the exposure to different occupational factors have different outcomes and the low sample size is a limiting factor in the generalizability of the results, which its limiting effect can be reduced by conducting more studies in the future and increasing the number of samples.

Finally, according to the findings, it may be concluded that despite improvements in working conditions and legislation in many office jobs, services, and industries, job is still known as an important risk factor in the occurrence of adverse pregnancy outcomes. So it is important to pay more attention to protect the health condition of employees through customization of task features with workforce (with the help of ergonomic interventions), especially in pregnant women which is frequently emphasized by international organizations.

#### Conflict of Interests

The Authors have no conflict of interest.

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