European Journal of Clinical Pharmacy

Print ISSN: 2385-409X **Online ISSN**: 3105-0409
Website: https://farmclin.com/

Original Research Article

Association of Intrauterine Growth Restriction with Working Status of Pregnant Females

Article History:

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Received: 19-11-2025
Revised: 14-12-2025
Accepted: 25-12-2025
Published: 30-12-2025

Abstract: ***Objectives:*** To determine the association of intrauterine growth restriction (IUGR) with working status of pregnant females. ***Study Design:*** Descriptive, cross-sectional study. ***Settings:*** Department of Obstetrics & Gynecology, Sharif Medical City Hospital, Lahore. Duration of study: 2 August 2025 to 17 November 2025. ***Methodology***: Total 150 women aged 18 to 40 years, with a parity of less than five, a singleton pregnancy, and a gestational age beyond 37 weeks, were included. Oligohydramnios, Polyhydramnios, Preeclampsia, Eclampsia, cardiovascular diseases, chronic or gestational diabetes, and multiple pregnancy, fetal anomaly, or intrauterine fetal death were excluded. Then, women had ultrasounds done on them to check the weight of the fetus. If measurements of belly circumference fell below the 10th percentile of a standard growth curve, IUGR was diagnosed according to the operational definition. The hospital's regular procedures were used to take care of fetuses with IUGR. ***Results***: The study's participants ranged in age from 18 to 40 years, with a mean age of 28.54 ± 5.93 years. Mean gestational age was 38.43 ± 1.52 weeks. Mean BMI was 29.43 ± 4.51 kg/m2. In our study, 59 (39.33%) working women had intrauterine growth restriction. ***Conclusion:*** Physically demanding job, particularly manual labor with moderate to heavy effort, is linked to an increased risk of having a growth-restricted fetus, but employment itself is not a significant direct risk factor for IUGR.

Keywords: pregnancy, IUGR, working status.

INTRODUCTION

After preterm, intrauterine growth retardation (IUGR) is the second most common cause of perinatal morbidity and mortality in non-anomalous fetuses. A fetus whose birth weight is less than the 10th centile for gestational age is referred to as IUGR. The Asian continent is responsible for over 75% of IUGR neonates.[1] In Pakistan, the incidence of IUGR is over

25%, more than the WHO criterion for prompting a public health intervention. It is mostly caused by a pathologic slowdown in the rate of prenatal growth, which leaves the fetus unable to develop to its full potential. For obstetricians and perinatologists, screening for neonatal unfavorable delivery outcomes, such as IUGR, is crucial. because it has been linked to birth hypoxia, perinatal morbidity and mortality, poor neurodevelopment, and an adult manifestation of the metabolic syndrome.[2] IUGR still remains the subject of discussion starting with the terminology, various etiological variables, diagnostic criteria, the problematic sources for growth charts, management, and time of delivery of IUGR fetus.[3]

The term "working status" refers to any woman who earns money through professional employment; it excludes women who perform regular household tasks. It does include women who perform household duties for others in order to make money.it also includes women who are performing job from home, professional women like doctors, nurses, lawyers, makeup-artist etc.

Working place stress, physical exertion, may disrupt pregnancy which can leads to IUGR, low birth weight (LBW), small-for-gestational age (SGA) and pre-term delivery

It has been reported in a study that the percentage of IUGR was noted doubling (12%) in working women as compared to non-working woman (6%).[4] One study indicated that there is no impact of occupation of female on IUGR and IUGR was diagnosed in 48.7% working woman as well as 33.3% in non-working woman ($p>0.05$).[5]

This study intends to examine the association of intrauterine growth restriction with working status of pregnant females. The literature revealed conflicting findings about the relationship between the mother's occupation and IUGR. No local study has been done before in this regard. Therefore, we aim to perform this study to gather evidence for local population and implement outcomes of this study in local environment. This will assist to improve our knowledge and practice.

METHODOLOGY:

After approval from ethical review committee, from 2 August 2025 to 17 November 2025, 150 women took part in this descriptive cross-sectional study was done. Using the WHO calculator, we found that the sample size of 150 working women had a 95% confidence interval and an absolute precision of 0.08. This means that 48.7% of working women were included.[5] Women aged 18 to 40 years, with a parity of less than five, a singleton pregnancy, and a gestational age beyond 37 weeks as established by an early dating ultrasound, were included. Oligohydramnios (AFI<5 cm), Polyhydramnios (AFI>21 cm on ultrasound), Preeclampsia (BP≥140/90mmHg with proteinuria >+1 on dipstick method), Eclampsia (BP≥140/90mHg with convulsions), cardiovascular diseases, chronic or gestational diabetes (OGTT>186 mg/dl), and multiple pregnancy, fetal anomaly, or intrauterine fetal death were excluded.

Patients were guaranteed anonymity and provided informed consent prior to the utilization of their data in the study. Next, the following were written down: age, gestational age, number of children, height, weight, BMI, whether or not they had anemia, where they lived (rural or urban), and how much money they made each month (less than 20000, 20000–40000, or 40000). Then, women had ultrasounds done on them to check the weight of the fetus. If measurements of belly circumference fell below the 10th percentile of a standard growth curve, IUGR was diagnosed according to the operational definition. The hospital's regular procedures were used to take care of fetuses with IUGR. All of this information was written down in a proforma.

We used SPSS 25.0 to look at the data. We used the Shapiro-Wilk test to see if the data was normal. We utilized the mean plus or minus the standard deviation or the median (IQR) to describe age, gestational age, and BMI. Frequencies and percentages were employed to delineate anemia (yes/no), residential location (rural/urban), monthly income (<20000/20000-40000/40000), and the incidence of IUGR (yes/no). When dividing the data into groups, we looked at age, gestational age, BMI, whether or not the person had anemia, where they lived (rural or urban), and their monthly income (<20,000/20000-40000/>40,000). We employed the chi square/fisher exact test for post-stratification, and a p-value of less than 0.05 was important.

RESULTS

The study's participants ranged in age from 18 to 40 years, with a mean age of 28.54 ± 5.93 years. According to Table I, the majority of the patients, 87 (53.37%), were between the ages of 18 and 30 years. Mean gestational age was 38.43 ± 1.52 weeks. Mean BMI was 29.43 ± 4.51 kg/m^2. Distribution of patients according to different variables is shown in Table I.

According to Figure I, 59 (39.33%) working women had intrauterine growth restriction. Stratification of low birth weight with respect to effect modifiers is shown in Table II.

Table I: Distribution of patients according to different variables (n=150)

		Frequency	%age
Age (years)	**18-30**	87	58.0
	31-40	63	42.0
Gestational age (weeks)	**37-39**	79	52.67
	40-41	71	47.33
BMI (kg/m^2)	**≤30**	84	56.0
	>30	66	44.0
Anemia	**Yes**	40	26.67
	No	110	73.33
Residence	**Rural**	69	46.0
	Urban	81	54.0
Monthly income	**<20000**	55	36.67
	20000-40000	54	36.0
	>40000	41	27.33

Figure-I: Frequency of intrauterine growth restriction in working women (n=150).

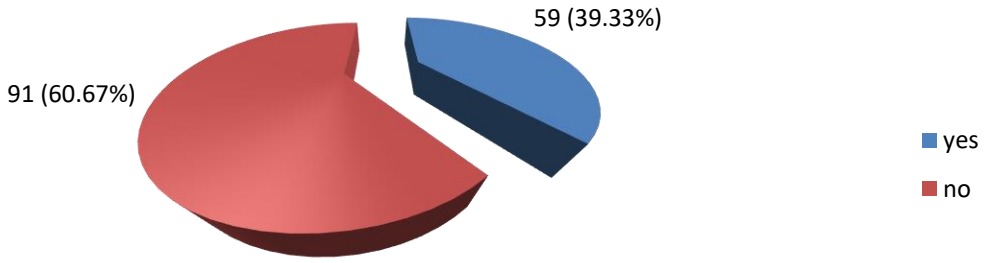

Table II: Stratification of intrauterine growth restriction with respect to effect modifiers.

		Yes (n=59)	No (n=91)	P-value
Age (years)	18-30	34 (39.08%)	53 (60.92%)	**0.941**
	31-40	25 (39.68%)	38 (60.32%)	
Gestational age (weeks)	37-39	31 (39.24%)	48 (69.76%)	**0.980**
	40-41	28 (39.44%)	43 (60.56%)	
BMI (kg/m^2)	≤30	41 (48.81%)	43 (51.19%)	**0.007**
	>30	18 (27.27%)	48 (72.73%)	
Anemia	Yes	26 (65.0%)	14 (35.0%)	**0.0001**
	No	33 (30.0%)	77 (70.0%)	
Residence	Rural	27 (39.13%)	42 (60.87%)	**0.963**
	Urban	32 (39.51%)	49 (60.49%)	
Monthly income	<20000	21 (38.18%)	34 (61.82%)	**0.9622**
	20000-40000	22 (40.74%)	32 (59.26%)	
	>40000	16 (39.02%)	25 (60.98%)	

DISCUSSION

Intrauterine growth limitation was present in 39.33% of working women in this study. Niedhammer et al. found a substantial correlation between physical labor and low birth weight in 1,124 pregnant women6, whereas Vrijkotte et al. found a significant correlation between labor severity and low birth weight in 7,135 pregnant women.7

Spinillo et al. examined the effects of physical activity, extended orthostatic posture, and working hours on fetal weight in 1996 and came to the conclusion that a high level of physical exertion increased the chance of low birth weight.5 A meta-analysis published in 2000 by Mozurkewich et al.8 supported this. Furthermore, Takito et al.9 reported that psychological stress related to work may affect fetal weight. More recently, in 2016, Lee et al revealed that high levels of occupational physical activity were substantially related with small for gestational-age newborns and were also associated with premature birth.10 These researches are consistent with the current findings. However, there is also some evidence pointing in the opposite manner. The lack of correlation between fetuses with FGR and extended orthostatic posture, shift work, or the amount of working hours was reported by Bonzini et al. in 2009.11 Even yet, the same author in 2011, in a comprehensive assessment of the impact of shift work on many obstetric problems, emphasized that this variable may be associated with an increased risk of fetuses with low estimated weight.12

Burdorf et al.13 evaluated the effects of carrying weights of more than 5 kg or more than 25 kg, sitting or standing positions, and exposure to hazardous substances in 2010. They found that exposure to pesticides increased the chance of low birth weight, whereas carrying weights of more than 5 kg decreased the risk. Aminian et al.14 compared employed pregnant women to housekeepers and found that babies of working moms had lower mean birth weights, particularly when work entailed long hours and standing. Birth weight tends to decrease with greater working hours and standing time. While this study did not evaluate IUGR directly, low birth weight and preterm deliveries are closely connected to IUGR outcomes.14

Tartaglia et al.15 conducted a large cohort analysis (12,851 women) to examine the effects on small-for-gestational-age (SGA) outcomes, a proxy for IUGR. Physical exertion, kneeling, and job stress are a few examples of characteristics that have been found to be significant predictors of outcomes such as SGA and birthweight. SGA is utilized when direct IUGR measurements are unavailable; many IUGR investigations use SGA as a substitute.15

In a meta-analysis, Mozurkewich et al.16 incorporated numerous observational studies that examined physical labor exposures such as lifting, standing, and workload. He identified some links with low birth weight and SGA, but overall evidence quality was low and inconsistent for IUGR specifically. This is a review/meta-analysis that gives context on how occupational factors have been researched generally in connection to prenatal growth.16

It is unclear what pathophysiological mechanisms underlie the suggested connections. Prolonged sitting position increases a decrease in cardiac output with subsequent reduction of uteroplacental circulation and embryonic feeding. The de crease in cardiac output can be explained by com pression of inferior vena cava by the gravid uterus in the sitting position.17 The sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) maternal axis are the primary mediators of a decrease in gestational time and fetal weight caused by high levels of stress brought on by exhaustion, physical strain, or psychological stress. Thus, at short term there is stimulation of the maternal sympathetic nervous system which triggers the release of catecholamines.18 At long term, there is activation of the maternal HPA axis and increase of corticotropin releasing hormone (CRH), which leads to the release of oxytocin and prostaglandins F2 and E2 in human placental tissue cultures contributing to the occurrence of premature labor.19 Additionally, CRH elevates glucocorticoid levels, that together with catecholamines, limit uteroplacental blood flow and fetal nutrition.20 Regarding to the effect of shift work on fetal weight, changes in the circadian rhythm and the change in amplitude of serum melatonin are hypothesized mechanisms.21 Moreover, sleep de privation has deleterious consequences on pregnancy through neuroendocrine, immunological, vascular or behavioral mechanisms.22

CONCLUSION:

Physically demanding job, particularly manual labor with moderate to heavy effort, is linked to an increased risk of having a growth-restricted fetus, but employment itself is not a significant direct risk factor for IUGR. IUGR risk is also significantly influenced indirectly by socioeconomic and health factors associated with employment status.

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