



FETOMATERNAL OUTCOMES AMONG WORKING WOMEN PRESENTING AT TERTIARY CARE HOSPITAL

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Abstract: Objective: To measure the fetomaternal outcomes in working women who were hospitalized to deliver at a tertiary care hospital. **Study Design and Setting:** It was a cross-sectional study that was done in ward 8 JPMC (Jinnah post graduate medical centre) and involved 119 working women who were involved in delivery.

Methodology: The structured proforma was used to collect the data on the socio-demographic characteristics, obstetric profile, occupational details, and outcomes of the fetus and mothers. Maternal outcomes included postpartum bleeding, anemia, preterm birth, operative vaginal delivery, caesarean section, and ICU. Outcomes of fetuses included fetal growth restriction, low birth weight, low APGAR score, fetal distress, NICU admission, and neonatal death. SPSS was used to analyze the data and stratification to evaluate relationships between adverse outcomes and the chosen maternal and occupational factors.

Results: Out of 119 working pregnant women, almost half reported one or more negative fetomaternal outcome. The most common neonatal complications were the low birth weight, preterm birth, fetal distress and the NICU admission, whereas the most common maternal outcomes were anemia and cesarean delivery. Increased fetal maternal risk was also strongly related to longer working hours and physically demanding work. **Conclusion:** Adverse fetomaternal outcomes were seen in a significant proportion of working women, of which maternal and occupational factors played a significant role. Enhancing antenatal services and encouraging workplace accommodations and interventions for working women at risk can help improve fetal-maternal health outcomes.

Keywords: Occupation, Working Women, Fetal Maternal Outcomes, Pregnancy, FGR

INTRODUCTION

Maternity health is one of the determinants of maternal and neonatal health.[1] Pregnancy is a complicated physiological condition that should be closely monitored, and the lifestyle of the mother can have a serious impact on both the mother and fetus.[2] Over the last few decades, the number of women involved in the labor force has grown all around the

world, changing the old model of family relationships and the role of a mother.[2] Although employment can enable women to be empowered economically and socially, it can also cause them to be exposed to occupational stress, longstanding positions, and shift work, which can affect the outcome of pregnancies.[3, 4]

Some researchers have reported that pregnant women working can experience special difficulties, such as increased incidence of gestational hypertension, premature labor, low birth weight, and fetal growth retardation.[4-6] Indicatively, a survey of occupational risks during pregnancy revealed that women in jobs that required physically demanding efforts were at an increased risk of premature delivery by 44%-63% than non-working pregnant women.[7] Similarly, long working hours and night shifts have also been linked to high rates of gestational diabetes and maternal fatigue, which may impact maternal and fetal health.[8]

Worldwide, the statistics display the increasing number of working women of reproductive age. In the report by the International Labour Organization (ILO, 2023), it is stated that more than 48% of working-aged women aged 20-49 years of age are working, among them, a significant number of women work even when pregnant.[9] In Pakistan, the participation of women in the workforce is still at a lower level of approximately 22%, but urban working women usually combine working and childcare with household work, thus creating a huge amount of physical and psychological pressure during pregnancy.[9] There is a growing number of adverse fetomaternal outcomes that are reported in this population, which includes cesarean births, anemia, and neonatal intensive care hospitalization, UTI, post partum depression, anxiety, HTN and abruptio.[10]

Irrespective of this increase in trend, few local studies are available to determine the specific fetomaternal risks experienced by working women in Pakistan. It is important to consider the interaction between occupational factors, maternal health, and fetal outcomes to establish specific interventions and policies that guarantee the safety and health of the mother and child. The present study is thus aimed at offering an in-depth understanding of the fetomaternal outcomes of working mothers to fill a major research gap on the local maternal health aspect and highlighting the importance of pregnancy-friendly policies in the workplace. The current study was to assess the fetomaternal outcome of working women admitted to deliver at the Tertiary Care Hospital.

Methodology

The proposed research involved a descriptive study in the department of obstetrics and gynaecology, Jinnah postgraduate medical centre during a period of six months between June 2025 and November 2025. The Institutional Review Board of (Approval No: F.2-81/2025-GENL/238JPMC), dated: (01-03-2025) gave ethical approval.

The sample size has been determined with the help of

the WHO sample size calculator, which relies on the reported preterm birth frequency among working women (5.2%),[11] a variation of 4%, and a 95% confidence interval. The determined sample size was $n = 119$. Participants were enrolled using a non-probability consecutive sampling method.

The inclusion criteria were all the pregnant women who had been employed before pregnancy, aged between 18 and 49 years, and whose gestational age was above 28 weeks. This included both primipara and multipara women and also primigravida and multigravida women. Women who had pre-eclampsia or eclampsia, multiple gestation, gestational diabetes, or pregnancy-induced hypertension were not included in the study.

The data were collected with the consent of the hospital's ethical committee. All women who reported to the labor room to deliver and who met the inclusion criteria were included in the study. Each of the participants gave written informed consent, or their attendants did it after understanding the risks and benefits of the study. At the time of enrollment, baseline demographic information and clinical history were taken. Clinical follow-up of patients during labor was done, and patients were followed up till they were discharged by the hospital with both the mother and the neonate.

The Apgar score was used to measure fetal well-being at 1 and 5 minutes after delivery. Low birth weight, low Apgar score, fetal distress, small-gestation-age, NICU admission, neonatal mortality, postpartum hemorrhage, preterm birth, anemia, operative delivery, cesarean section, mode of delivery, and ICU admission were considered as outcome variables. Maternal variables, such as age, place of residence, gestation period, parity, gravidity, booking status, education, height (measured in a wall-mounted scale), weight (measured in a digital scale), and BMI (weight in kg/height in m^2), working hours, and mode of employment, were noted in a predesigned proforma. Working women were characterized as individuals who were working outside the home who are involved in the labor workforce in diverse occupations. According to the International Standard Classification of Occupations (ISCO, 2008), the nature and type of work were grouped into five main categories, including health professionals, teaching professionals, clerical workers, elementary occupations, and technicians.[12] All participants were asked to provide data on the kind of occupation, hours of work, and physical demands of their work to determine whether it is related to maternal and fetal outcomes.

OPERATIONAL DEFINITIONS:

- PPH: The definition of postpartum hemorrhage was bleeding of 500 ml or above of the genital

tract in 24 hours after birth, expressed as the weight of soaked sanitary pads minus the weight of dry pads (1 g = 1 ml).

- Preterm: infant birth was regarded as the birth of a live infant before completion of 37 weeks of gestation, which is ascertained through ultrasound.
- ANEMIA : Anemia was denoted when hemoglobin was low, less than 11 g/dl.
- Operative delivery involved assisted vaginal delivery with the aid of vacuum or forceps, and cesarean section involved delivery by abdominal and uterine incision. The mode of delivery was divided into vaginal and cesarean, and ICU admission was mentioned when the mother needed intensive care after delivery.
- Outcomes of fetuses were low birth weight (less than 2,500 g), low Apgar (less than 7 at 1 and 5 minutes), fetal distress (HR>160 or Hr =110 beats/min on fetal monitoring), small for gestational age (less than 10th percentile or less than 2,500 g), NICU admission during the first 28

days, and neonatal death within 28 days of birth. The measurements were all made by standardized methods, and the results were systematically recorded to be analyzed.

The analysis of data was performed in SPSS 25. The maternal age, height, weight, BMI, gestational age, working hours, birth weight, and Apgar score are quantitative variables, which were reported as mean $\pm$ standard deviation or median (IQR) based on the normality. The frequencies and percentages of qualitative variables, such as place of residence, booking status, maternal education, parity, gravidity, type of employment, and fetomaternal outcomes, were presented in frequencies and percentages. Stratification was used to control the effect modifiers, which included maternal age, gestational age, residence, booking status, education, BMI, parity, gravidity, working hours, and the nature of employment. Chi-square tests were performed to compare the two groups after stratification, and a p-value less than 0.05 was taken as statistically significant.

Results

The demographic features of the working women involved in the study were mainly mature and urban based with diverse obstetric and occupation features. Majority of the participants were above 30 years, urban dwellers who were multigravida and multiparous. Quite a large number wereregistered in the antenatal clinics and were at least to secondary level. Over half of the women were in the overweight category of BMI and many of them reported to work more than eight hours a day, which may indicate occupational exposure during pregnancy (Table 1).

Table 1. Baseline Characteristics of Working Women (n = 119)

Variable	Category	n (%)
Age (years)	≤30	50 (42.0)
	>30	69 (58.0)
Residence	Urban	74 (62.2)
	Rural	45 (37.8)
Gravidity	Primigravida	51 (42.9)
	Multigravida	68 (57.1)
Parity	Primipara	56 (47.1)
	Multipara	63 (52.9)
Booking Status	Booked	80 (67.2)
	Un-booked	39 (32.8)
Education	≤ Secondary	77 (64.7)
	> Secondary	42 (35.3)
BMI (kg/m ²)	<25	44 (37.0)
	≥25	75 (63.0)
Working Hours/day	≤8	71 (59.7)
	>8	48 (40.3)

In terms of fetomaternal outcomes, there was a significant percentage of participants with negative neonatal and maternal events. The usual neonatal outcomes observed were low birth weight, fetal distress, NICU hospitalization, and preterm birth, and the maternal complications were anemia, postpartum hemorrhage, and operative delivery. Even though neonatal death and ICU admission were fairly rare, still, their existence serves as a reminder of the clinical importance of occupational and maternal aspects in pregnant working women (Table 2).

Table 2. Frequency of Individual Fetomaternal Outcomes (n = 119)

Outcome	Yes n (%)	No n (%)
Low birth weight	32 (26.9)	87 (73.1)
Low APGAR score	23 (19.3)	96 (80.7)
Fetal distress	26 (21.8)	93 (78.2)
Small for gestational age	20 (16.8)	99 (83.2)
NICU admission	29 (24.4)	90 (75.6)
Neonatal death	5 (4.2)	114 (95.8)
Postpartum hemorrhage	17 (14.3)	102 (85.7)
Preterm birth	24 (20.2)	95 (79.8)
Anemia	34 (28.6)	85 (71.4)
Operative delivery	21 (17.6)	98 (82.4)
Cesarean section	37 (31.1)	82 (68.9)
ICU admission	7 (5.9)	112 (94.1)

In cases where the analysis of outcomes was done jointly, approximately half of the population of the study had at least one adverse fetomaternal outcome. This composite measure gives the general view of the risks related to pregnancy among working women and highlights the fact that negative outcomes are more commonly comorbid than single (Table 3).

Table 3. Overall Adverse Fetomaternal Outcome (Composite) (n = 119)

Outcome Status	Frequency	Percentage
Yes	53	44.5
No	66	55.5
Total	119	100

Stratified analysis showed that there were significant relationships between adverse fetomaternal outcomes and various maternal and occupational factors. The maternal age at conception, rural status, multigravida, multiparity, preterm birth, no booking, low educational level, excessive weight, increased working hours and occupation in physically exerting jobs were all significantly associated with the poor outcome. The results indicate a synergistic effect of biological vulnerability and work-related stressors in the cause of unfavorable pregnancy outcomes in working women (Table 4).

Table 4. Stratification of Adverse Fetomaternal Outcomes by Selected Maternal and Occupational Factors (n = 119)

Variable	Category	Adverse Outcome		p-value*
		Yes n (%)	No n (%)	
Maternal Age (years)	<30	24 (33.8)	47 (66.2)	0.039
	≥30	29 (60.4)	19 (39.6)	
Residence	Urban	28 (37.8)	46 (62.2)	0.046
	Rural	25 (55.6)	20 (44.4)	
Gravidity	Primigravida	18 (35.3)	33 (64.7)	0.037
	Multigravida	35 (51.5)	33 (48.5)	
Parity	Primipara	18 (32.1)	38 (67.9)	0.019
	Multipara	35 (55.6)	28 (44.4)	
Gestational Age	<37 weeks	21 (65.6)	11 (34.4)	<0.001
	≥37 weeks	32 (36.8)	55 (63.2)	
Booking Status	Booked	24 (30.0)	56 (70.0)	<0.001
	Un-booked	29 (74.4)	10 (25.6)	
Education	≤ Matric	34 (52.3)	31 (47.7)	0.002
	≥ Intermediate	19 (35.2)	35 (64.8)	
BMI (kg/m ²)	<25	12 (27.3)	32 (72.7)	0.001
	≥25	41 (54.7)	34 (45.3)	
Working Hours	≤8 hrs	19 (26.8)	52 (73.2)	0.002
	>8 hrs	34 (70.8)	14 (29.2)	
Type of Employment	Professional/Clerical	18 (28.1)	46 (71.9)	0.001
	Elementary/Technician	35 (63.6)	20 (36.4)	

*Chi-square test applied; $p \leq 0.05$ considered statistically significant.



DISCUSSION

The current research assessed the fetomaternal outcomes of working women who were admitted to deliver at a tertiary care hospital and showed that the rate of poor outcomes is high in the population. In general, almost half of the sample reported at least one adverse fetomaternal outcome, which is why maternal employment could be linked to higher risks of pregnancy. The frequent adverse effects were anemia, cesarean section, low birth weight, NICU admission, preterm birth, and fetal distress. Stratified analysis also found that several maternal and occupational factors were significantly associated with adverse outcomes, such as advanced age of the mother, rurality, greater gravidity and parity, preterm birth, un-booked antenatal status, low education level, high body mass index, more hours worked, and physically demanding or elementary jobs. These results indicate that there is an interaction between biological and work-related factors to affect the health of the fetus and mothers in working women.

In this research, unfavorable fetomaternal outcomes were identified in almost 50% of working women, which underscores the significant weight of poor pregnancy outcomes in working mothers. In line with the international evidence, several studies have underscored the intricate connection between maternal occupational exposures and undesirable pregnancy outcomes. A meta-analysis and systematic review identified physical occupational risk factors, including long working hours and shift work, to be linked with the higher risk of preterm birth, which is consistent with the negative outcomes observed in the present study, which were significantly greater in women who worked more hours per week.[13]

Prospective cohorts of pregnant workers have shown similar patterns with heavy physical work at the workplace being strongly correlated with low birth weight and stillbirth, which supports the argument that occupational exertion is causing poor pregnancy outcomes, especially in low-income environments.[14, 15] A further systematic review of psychosocial stressors and physical stressors in the work environment established that risk factors such as extended standing or heavy workload may negatively influence fetal growth and birth weight, which is in line with high rates of low birth weight and fetal distress among working women reported in this study.[15]

The population-based studies in South Korea have indicated that some occupational fields and

employment status contribute to the occurrence of pregnancy loss and non-live births, and pregnancy, so that the type of employment and maternal involvement in the work could be associated with reproductive outcomes, as was also observed in our study.[16] In addition, research investigating working conditions among women with multiple pregnancies discovered that erratic and strenuous working hours had a significant relationship with preterm deliveries, just as our results indicated with reference to the poor outcomes in women whose working hours were prolonged.[13, 17, 18]

The same contextual evidence of Pakistan also agrees with the current study in which the risk of giving birth to low birth weight babies was considerably higher in occupied women whose physical work exceeded, which also supports the correlation between the occupational activity and poor birth outcomes in our cohort.[14, 19] In addition to this, other cross-sectional studies conducted in comparable populations have indicated that maternal education and socio-economic status (both contained in our stratified analysis) are major determinants of fetomaternal risk, and in many cases, poorer education levels are associated with worse outcomes.[20]

In addition to the occupational factors, more global examinations of maternal determinants of health have found biological and lifestyle determinants (e.g., anemia and gestational complications) to be contributing factors to poor birth outcomes (low birth weight and preterm births) and support the multifactoriality of observed outcomes. The importance of advanced maternal age, as well as gestational age, in the current findings is also reinforced by large cohort studies outside of the employment context, which highlight the importance of demographic and health factors, including age and gestational factors, as determinants of adverse fetal outcomes.

The results of this research paper have significant clinical implications in the maternal healthcare services, especially in the low- and middle-income environment. Healthcare providers can identify working women who are at increased risk at an early stage, including those with extended working hours, physically demanding jobs, poor antenatal care, or high BMI, through this strategy, which will enable them to provide specific counseling, increased antenatal surveillance, and timely interventions. Workplace accommodations, minimizing the number of extra working hours during pregnancy, and

employer-provided maternity benefits can be vital in minimizing cases of poor fetomaternal outcomes. The further enhancement of antenatal booking and education, particularly of less educated and rural working women, may enhance pregnancy outcomes even more.

There are some limitations in this study that must be noted. The study is a single-center study and thus, the results might not be generalizable to other locations. The limitation of the cross-sectional design lies in its inability to determine causal relationships between occupational factors and negative outcomes. Moreover, specific evaluation of the level of occupational stress, the precise intensity of workload, and the exposures to the environment was not conducted, which could have contributed to the identification of the reported results. Even with such shortcomings, the research is very insightful in understanding the fetomaternal risks that working women are exposed to and what future research and interventions should focus on.

CONCLUSION

Employed women who gave birth in a tertiary care hospital bear a significant burden of adverse fetomaternal outcomes. Almost half of the participants experienced at least one of the adverse outcomes, which demonstrates the impact of maternal factors based on employment on pregnancy and neonatal health. Older maternal age, poor antenatal booking, increased working hours, increased body mass index, poor education, and physically demanding jobs had a significant correlation with poor outcomes. These results highlight the importance of risk stratification at an early age, enhanced antenatal services, and on-the-job maternal health care services. Specific policies targeted at better occupational safety, lessening excessive workload throughout pregnancy, and timely antenatal booking can be a key factor in enhancing fetomaternal outcomes in working women.

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