

## ORIGINAL ARTICLE

**Frequency of Preterm Birth in Pregnant Female Residents and Impact of Working Hours on Preterm Birth**

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*Department of Obstetrics and Gynaecology, Jinnah Hospital, Lahore-Pakistan**Correspondence to Dr Madiha Fatima, E-mail: madeehafatima@live.com\_Tel+92-309-2088462***ABSTRACT****Background:** Varying work schedules are suspected of increasing risks to pregnant women and fetal wellbeing.**Aim:** To compare mean working hours in females residents with preterm birth and full term birth.**Methodology:** It was a descriptive cross sectional study. Female residents (n=163) were enrolled through non-probability consecutive sampling. All pregnant female residents meeting inclusion criteria were enrolled after informed consent. Their basic information like age, parity; gestational age at delivery was recorded. Their working hours per week were noted. They all were followed till their delivery. Data was evaluated by using SPSS v.24. Chi square was applied with P-value of <0.05 was considered as significant. Quantitative variables were presented as mean±SD while categorical data was presented as percentage.**Results:** Mean age of female doctors was 29.22±1.81 years. A total of 28(17.18%) females had preterm birth while 135(82.82%) had term deliveries. The mean working hours were statistically higher in doctors having preterm birth i.e. 67.11±1.97 hours / week with p-value < 0.05.**Practical Implication:** As there is a high incidence of preterm births among our pregnant females residents and there is lack of local data that specifically addresses this health issue thus current study was planned. This study highlighted relationship of duty hours and adverse birth events during pregnancy like preterm birth, pre-maturity thus established the significance of duty stress because of long duty hours as a poor prognostic indicator for pregnancy outcome. **Conclusion:** It was concluded that frequency of preterm birth in female residents having long duty hours was considerably high i.e. 17.18%. Hence pregnant doctors must be given relaxation in their duty hours especially in their 3<sup>rd</sup> trimester to minimize the risk of poor fetal and maternal outcome.**Keywords:** Preterm Births, Duty Hours, Pregnant Residents and Parity.**INTRODUCTION**

Child bearing is an important concern for most of professional women. Women in medical sciences face many challenges to cope during their pregnancy.<sup>1</sup> Literature review revealed that variation in work schedules impose increased risks for both pregnant lady and her fetus. Pathologically, in majority of cases, there happens a disturbance in maternal hormones due to sleep deprivation or circadian rhythm disruption. This results in impair fetal growth along with other complications of pregnancy.<sup>2</sup> According to many studies, it has been demonstrated that there is a drastic increase in proportion of female students in comparison to males in medical field. There are many reasons that count for this drastic change.<sup>3</sup> Many pregnant doctors are primarily entrusted with organizational and administrative tasks instead of specialist medical interventions once their pregnancy is announced<sup>4</sup>.

According to literature review, it is reported that residency training is a hectic job that demands physical activity, presence, energy and brings stress in life. However, it becomes even more difficult if the female resident is pregnant. Their duty is more in comparison to simple medical officers in Pakistan and roughly they work around 80 hours per week during residency years<sup>5</sup>. Above mentioned factors like long and hectic duty hours, lack of sleep, work stress, night duties produce negative effect on pregnancy and produce worse pregnancy outcomes as defined by literature review<sup>6,7</sup>.

Prolonged standing is by far the most investigated occupational activity regarding preterm birth. A study reported that out of 939 physicians with first pregnancy, 12% experienced PTB. Those had longer working hours during pregnancy than did women without complications (mean 62 h vs. 50h, p=< 0.0001)<sup>6</sup>. According to literature review, there is a high incidence of preterm birth (15 million/year)<sup>7</sup>. Similarly, in the United States, 10% newborns deliver as preterm<sup>7</sup>. As the leading cause of neonatal morbidity and mortality, prematurity is not only an emotional burden for families but cause burden economically. As no local data is available and global data is also lacking, this study is very imperative to be done

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as pregnancy during residency is a global health issue for females. This study is designed to see impact of long working hours on pregnancy outcome in pregnant female residents. If we find higher PTB rate in these residents and if we find that it is related to long working hours per week then, the next step will be to plan and redesign their working hours and preventive strategies can be adopted to reduce risk of PTB.

The objective of the study was to compare mean working hours in female residents with preterm birth and full term birth.

**METHODOLOGY**

It was a descriptive cross sectional study conducted at Jinnah Hospital-Lahore. Study population was female residents (n=163) through non-probability consecutive sampling. All pregnant female residents meeting inclusion criteria were enrolled after informed consent. All data was collected on preformed proforma. Their basic information like age, parity; gestational age at delivery was recorded. Their working hours per week were noted. They all were followed till their delivery. Included participants were aged 25-44 with any parity, gestational age > 28 weeks and training for > 6 months while unwilling participants and those who had maternity leave were excluded. Informed consent was taken. Baseline investigations were done at start of study.

**Statistical analysis:** Data was evaluated by using SPSS v.24. Chi square was applied with P-value of <0.05 was considered as significant. Quantitative variables were presented as mean ± SD while categorical data was presented as percentage.

**RESULTS**

Mean age of participants was 29.22±1.81 years while mean gestational age was 37.55±2.36 weeks. There were 67(41.10%) subjects who were 25-28 years of age and 96(58.9%) subjects were 29-32 years old. There were 61 patients (38.1%) with parity ≤ 2 and 99 patients (61.9%) with parity >2 as summarized in table-1. A total of 28(17.18%) females had preterm birth while 135(82.82%) of the females had term deliveries (Fig. 1).

There were 85(52.15%) doctors who were working in surgery department and 78(47.85%) females were working at Obs and Gyne department as shown in figure-2.

Table-1: Demographic Parameter of Enrolled Participants

Parameters	Categories	Number (%)
Age (years)	25-28	67 (41.10)
	29-32	96 (58.9)
Parity	< 3	118 (72.39)
	3-4	45 (27.61)
Residency duration (years)	≤2	93 (56.06)
	>2	70 (42.94)
Working hours	Mean ± SD	52.85±10.02

Figure-1: Pre-term birth distribution

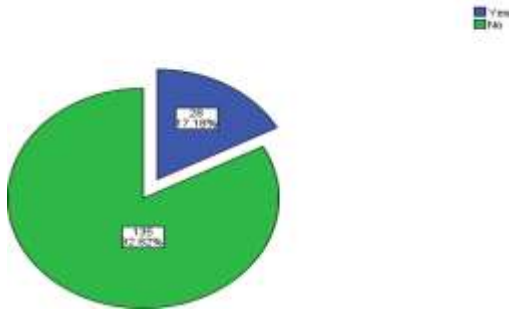
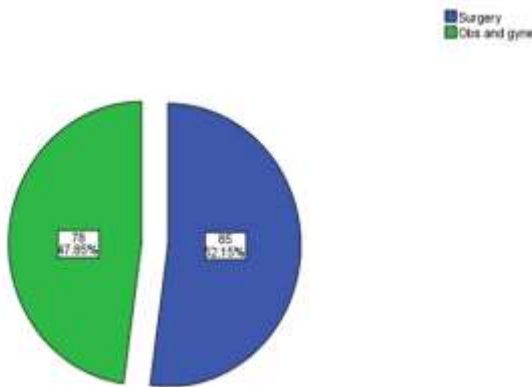


Figure-2: Distribution of Departments



The mean working hours were statistically higher in doctors having preterm birth i.e. 67.11±1.97 hours / week as compared to females having term delivery i.e. 49.90±8.33 / week, p-value < 0.05 as shown in table-2.

Table 2:

Working hours	Preterm birth	Mean ± SD	P-value
Yes	Yes	67.11±1.97	0.01*
	No	49.90±8.33	

\*Statistically significant

When data was stratified for age and parity, no association was found between these effect modifiers & preterm birth, p-value >0.05 as shown by table-3.

Table-3: Comparison of Preterm birth with respect to age and parity

		Preterm birth		P-value
		Yes	No	
Age groups (years)	25-28	11(16.4%)	56(83.6%)	0.830
	29-32	17(17.7%)	79(82.3%)	
Parity	<3	18(15.3%)	100(84.7%)	.29
	3-4	10(22.2%)	35(77.8%)	

Mean working hours were statistically higher in doctors having preterm birth as compared to females having term delivery when data was stratified for age and parity, p-value < 0.05 as shown by table-4.

Table-4: Working hours in Preterm birth with respect to Age and parity

Age groups (years)	Preterm birth	Working hours			
		Mean	S.D	t-test	p-value
25-30	Yes	67.00	2.24	6.330	<0.001**
	No	50.23	8.68		
30-32	Yes	67.18	1.85	8.820	<0.001**
	No	49.66	8.11		
Parity< 3	Yes	67.06	2.07	8.655	<0.001**
	No	50.38	8.10		
Parity3-4	Yes	67.20	1.87	6.535	<0.001**
	No	48.51	8.92		

\*Statistically significant

## DISCUSSION

Globally, women work during pregnancy till end of third trimester but this increases risk and burden on health of mother and fetus as reported by many previous studies. Adverse outcomes of pregnancy, such as preterm delivery (PTD) or low birth weight are common health issues among working ladies. Giving a birth to a living fetus before 37 completed weeks of gestation constitutes preterm delivery but impose increased perinatal morbidity and mortality in the developing world<sup>9-10</sup>.

Literature showed variable incidence of PTD ranging from 5-9% in developed countries, however, the rate of preterm birth has increased due to many reasons recently. Factors like work stress and artificially conceived multiple pregnancies has caused sudden rise in preterm deliveries<sup>9,11</sup>.

Various studies have shown that physicians are exposed to numerous unhealthy risks due to occupational hazards like such as anesthetic gases, prolonged standing, psychological stress, and long duty hours including ward calls. According to a study, long duty hours (80 hrs/week) were associated with increased risk of automobile accidents and needle-stick injuries among residents due to lack of sleep and tiredness<sup>10</sup>.

There are less duty hours in different countries as reported previously. Working hours for a resident trainee in Japan is 40 hrs while in US and UK, there is 48 hrs/week<sup>11</sup>. Although several studies have investigated relationship between working hours and pregnancy complications and reported high incidence of preterm deliveries due to many reasons.<sup>12</sup> Their results were similar to our findings.

In current study the mean age of female doctors was 29.22±1.81 years with minimum and maximum age as 25 and 32 years. A total of 28(17.18%) females had preterm birth while 135(82.82%) of the females had term deliveries. The mean working hours were statistically higher in doctors having preterm birth i.e. 67.11±1.97 hours/week as compared to females having term delivery i.e. 49.90±8.33 / week, p-value < 0.05.

Previous studies showed 15% experienced threatened abortions and 12% experienced preterm births among female residents<sup>12,13</sup>. This result was similar to our findings and constituted high preterm births among resident pregnant females. In their study, issue was long duty hours among women who experienced TA (mean weekly working hours: 62 h vs. 50 h, P < .0001) or PTB (62 h vs. 50 h, P < .0001) Thus, it can be concluded that working long hours during the first trimester of pregnancy is associated with TA and PTB<sup>13</sup>. In current we also found higher frequency of preterm birth and in these females residents working hours were higher.

According to one study who interviewed five pregnant trainees. Their study showed one pregnancy ended in preterm delivery, other ended in low birth weight baby and two ended in miscarriages while one delivery was normal. Thus this showed that hectic routine during pregnancy has adverse effects and poor pregnancy outcomes<sup>14</sup>. Their results were in line with our results that showed poor outcome of pregnancy during training among female doctors. The most significant postpartum stress indicator was the matter of child care, especially as it related to finding adequate coverage for on-call periods ranging from 3 to 14 days per month. Maintaining breastfeeding was an additional concern in the postpartum period. Pregnancy during surgical

residency is a significant source of conflict for the pregnant resident and her colleagues. So, this study illustrated how program directors can preemptively address challenges this event presents. When policies on maternity leave, call issues during pregnancy, and flexible rotation schedules are in place before pregnancy occurs, the process may be smoother and more rewarding for all involved<sup>15</sup>.

One previous study found extensive and generally consistent associations between preterm delivery and exposures such as prolonged working hours, shift work, lifting, standing and heavy physical workload<sup>16</sup>. Our study showed similar association between workload and complicated pregnancy (preterm delivery).

**Limitations of study:** Financial constrains and limited resources with no genetic workup and long follow-ups added to limitations. It was a single centre study.

## CONCLUSIONS

It was concluded that frequency of preterm birth in female residents having long duty hours was considerably high i.e. 17.18%. Hence pregnant doctors must be given relaxation in their duty hours especially in their 3<sup>rd</sup> trimester to minimize the risk of poor fetal and maternal outcome.

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**Conflict of interest:** None

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