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ORIGINAL ARTICLE

Effect of Passive Smoking during Pregnancy on Birth Weight of Neonates

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ABSTRACT

Background: Passive smoking during pregnancy is a risk factor for adverse pregnancy outcomes among neonates. Data on the correlation between passive smoking during pregnancy and birth weight of neonates remain limited and exposure to passive smoke during pregnancy is less clear, especially among Pakistani women.

Objective: The aim was to determine the effect of passive smoking during pregnancy on birth weight of neonates.

Methodology: This cross-sectional study was comprised of 320 mothers. The birth weight of neonates were compared among exposed and unexposed groups of passive smoking. A pre-designed structured questionnaire was used to record the details of exposure to passive smoking during pregenacy.The study was conducted in four tertiary care hospitals of Lahore Pakistan. Non-Probability Convenient sampling technique was used.

Results: Results showed that from 320 women, 160 (50%) women were exposed to passive smoking and 160 (50%) women were unexposed to passive smoking. The exposed group 55(34.3%) had weight of neonate less than 2500 gram whereas 105 (65.6%) had normal birth weight of neonate and 10 (6.25%) of unexposed group had weight of neonate less than 2500 gram whereas 150 (93.7%) had normal birth weight of neonate. Though the incidence of low birth weight was more in the group exposed to passive smoking as compared to the unexposed group (34.3% vs. 6.25%).The differences were significant as p-value was <0.001.

Conclusion: Exposure to passive smoking during pregnancy has a significant relationship with low birth weight of neonates.

Key Words: Passive smoking, Pregnancy, Low birth weight, Neonate

INTRODUCTION

According to the second edition of the World Health Organization's (WHO) Global Report on Trends in Tobacco Prevalence, the global prevalence of smokers was 20.2 percent in 2015, down 6.7 percent from 2000. (WHO, 2018). The proportion of smokers is predicted to fall to 17.3 percent by 2025. Males use tobacco at a higher rate (34.1 percent) than females (6.4 percent).

Tobacco kills around 7 million people worldwide, with 6 million deaths resulting from direct tobacco use and 890,000 deaths resulting from passive smoking (Gakidou E et al, .2017). According to the World Health Organization (WHO) (2019), passive smoking in adults is linked to cardiovascular disease, significant respiratory disease, coronary disease, and lung cancer. Passive smoking can cause sudden mortality and respiratory problems in young children (Coelho SA et al, .2018).

Passive smoking is as toxic as active smoking. It not only leads to carcinogenic effects due to inhalation of tobacco smoke but also causes cardiovascular disease, asthma, and chronic obstructive pulmonary disease (COPD) (Jaakkola and Jaakkola, 2012). It is also observed that it can also exacerbate many other diseases. Researchers have shown an association of pulmonary and breast cancer with passive smoking (Tang et al., 2013). In pregnant women smoking not only poses a danger to their life but also affects the health of fetus resulting in increased fetal mortality, premature birth, low birth weight, and other physical and physiological dysfunctions in neonates (Leonardi-Bee, 2021).

Smoking during pregnancy is dangerous to the developing fetus. When a pregnant woman is exposed to tobacco smoke, dangerous substances are absorbed into the mother's circulation which can cross the placenta and affects her fetus. The placenta does not filter out many injurious elements in tobacco smoke. Smoking in pregnancy also diminishes blood flow through the placenta, which can lessen the amount of oxygen and nutrients to the babies (West mead, 2018).

In Pakistan there is no available published data regarding passive smoking during pregnancy and its effect on neonate. Therefore the aim of present study was to determine the effect of passive smoking during pregnancy on birth weight f neonate.

Objective: To determine the effect of passive smoking during pregnancy on birth weight of neonates.

METHODOLOGY

Study Design: A Cross-sectional study design was used.

Study Setting: The study was conducted in four tertiary care hospitals in Lahore city, Lady Willington Hospital, Lady Aitcheson Hospital, Sir Ganga Ram Hospital and Services Hospital Lahore.

Duration: The study was completed within six months after approval of the synopsis.

Study Population: The population in this study refers to the post-natal women with their babies, who meet the inclusion criteria.

Sample Size: In total 320 non-smoking women delivering a single live baby, immediately after delivery were selected.

Sampling Technique: Non-Probability Convenient sampling technique was used.

Inclusion Criteria:

- Registered pregnant women, immediately after delivery with their new born baby in labor rooms of selected hospitals of Lahore mentioned above.
- Women with singleton baby.
- Women having at least three antenatal visits.
- Age 15-45 years.

Exclusion Criteria:

- Mothers having malnutrition.(BMI<18.5)
- High birth order.
- Any co- morbidity prior to pregnancy e.g. Diabetes Mellitus, Hypertension and chronic liver disease.
- Chronic infection such as Tuberculosis.
- Mothers having neonates with congenital malformations.

Data Collection Tools:

- Demographics questionnaire was used to collect data regarding mother and information regarding preterm birth and birth weight was collected through medical records. The mothers answered a self-applied questionnaire on passive smoking.

Data Collection Method: After the research protocol approval by the IRB, UHS, Lahore an administrative permission was obtained from the four tertiary care hospitals of Lahore (Lady Willington Hospital, Lady Atchison Hospital, Sir Ganga Ram Hospital and Services Hospital). The subjects were then selected according to the inclusion and exclusion criteria by using non-probability convenient sampling technique. The purpose of the study was explained to the participants and written informed consent was obtained from the participants. An interview was conducted to elicit the demographic data. Medical record was used for medical history

and neonatal birth weight assessment. Participants were asked questions to obtain the history about passive smoking. This was done after delivery of the women in labor rooms of the selected hospital of Lahore.

Data Analysis: The data was entered on statistical package for social sciences (SPSS) version 20.0.Descriptive statistics was used to compute frequencies, percentages. Chi square was used for association of passive smoking with weight of neonate. A p-value of <0.05 was considered as statistically significant.

RESULTS

Section 1: Demographic characteristics

Table 1: Participants' Demographic Profile (n=320)

Variable	Exposed group n=160	Unexposed group n=160	P-Value
Age:			
<20 years	17(10.6%)	26(16.3%)	
21-30 years	128(80.0%)	122(76.3%)	0.310
>30 years	15(9.4%)	12(7.5%)	
Education			
Illiterate	20(12.5%)	16(10%)	
School	110(68.75%)	102(63.75%)	<0.001
College	20(12.5%)	19(11.8%)	
University	10(6.25%)	23(14.3%)	
Occupation			
Employed	53(33.1%)	40(25%)	0.007
Not employed	107(66.8%)	120(75%)	
Body Mass indexes (BMI)			
Normal	12(7.5%)	13(8.1%)	
Overweight	103(64.5%)	97(60.6%)	0.669
Obese	45(28.1%)	50(31.3%)	
Preterm	4(2.5%)	7(4.4%)	
Term births	156(97.5%)	153(95.6%)	0.011

Table 1 showed that there was no statistically significant association between exposed and unexposed group according to age group (p-value 0.310). There was statistically significant association between exposed and unexposed group according to education as p-value <0.001. There was no statistically significant association between exposed and unexposed group according to occupation (p-value 0.007). There was no statistically significant association between exposed and unexposed group according to BMI as p-value 0.669. There was no statistically significant association between exposed and unexposed group according to preterm and term birth as as p-value 0.011.

Table 2: Comparison of birth weight among groups (n=320)

Variable Birth Weight	Exposed group	Unexposed group	P value
Normal Birth weight	105(65.6%)	150(93.7%)	<.001
Low birth weight	55(34.3%)	10 (6.25%)	<.001

Table 2 showed that the exposed group 55(34.3%) had weight of neonate less than 2500 gram whereas 105 (65.6%) had normal birth weight of neonate and 10 (6.25%) of unexposed group had weight of neonate less than 2500 gram whereas 150 (93.7%) had normal birth weight of neonate. Though the incidence of low birth weight was more in the group exposed to passive smoking as compared to the unexposed group (34.3% vs. 6.25%).The differences were significant as p-value was <0.001.

Table 3: Comparison of mother's BMI with abortions among groups (n=320)

Mother's BMI		Abortion			Total	p-Value
		No	One	Two		
	Normal	24	0	1	25	0.026
		96.0%	.0%	4.0%	100.0%	
	Over Weight	177	21	2	200	
		88.5%	10.5%	1.0%	100.0%	
	Obese	78	17	0	95	
		82.1%	17.9%	.0%	100.0%	
Total		279	38	3	320	
		87.2%	11.9%	.9%	100.0%	

Table 3 revealed that abortion had significant association with mothers BMI as p-value 0.026.

DISCUSSION

Maternal passive exposure to tobacco smoke has long been known to affect the birth outcome and the condition of newborns at birth (Chan et al,.2001). (Martin et al,. 1986) found that exposure to passive smoking during pregnancy was significantly associated with lower birth weight among the children of nonsmoking women. In contrast to many previous research studies many surprising results have been observed in this study. This study reveals that in the population studied, no association between passive smoking and low birth weight could be documented.

With respect to maternal exposure to passive smoking during pregnancy among mothers who never smoked during pregnancy, the current results are consistent with those of some previous studies that showed no relationship between passive maternal smoking during pregnancy and birth outcomes. Similar results have been given by a Japanese study that showed that maternal passive smoking exposure at home or work was not significantly associated with any birth outcomes.(Miyake et al., 2013).

Another study was conducted by (Steyn et al., 2006).in Johannesburg & Soweto. A cohort of 1593 women with singleton live births gave information about their exposure to passive smoking during pregnancy by completing a questionnaire. This study results were also similar to our study and showed that passive smoking did not affect birth weight in study population.

According to the demographic characteristics the age of the exposed and non- exposed group was similar. There was no statistically significant association between exposed and unexposed group according to age group (p-value 0.310). There was statistically significant association between exposed and unexposed group according to education as p-value <0.001. There was no statistically significant association between exposed and unexposed group according to occupation (p-value 0.007). There was no statistically significant association between exposed and unexposed group according to BMI as p-value 0.669. There was no statistically significant association between exposed and unexposed group according to preterm and term birth as p-value 0.011.A retrospective study using interview data from women of 18,297 children born in 2000/2001 in UK about exposure of passive or external tobacco smoke was done by (Ward et al).

Results showed that from 320 women, 160 (50%) women were exposed to passive smoking and 160 (50%) women were unexposed to passive smoking. The exposed group 55(34.3%) had weight of neonate less than 2500 gram whereas 105 (65.6%) had normal birth weight of neonate and 10 (6.25%) of unexposed group had weight of neonate less than 2500 gram whereas 150 (93.7%) had normal birth weight of neonate. Though the incidence of low birth weight was more in the group exposed to passive smoking as compared to the unexposed group (34.3% vs. 6.25%).The differences were significant as p-value was <0.001.These results are similar to the results of study conducted by (Srmenakrstev et al., 2012) who stated that we were able to find an effect for external tobacco smoke/passive smoking exposure alone on birth weight of neonates.

CONCLUSION

Low birth weight is an Exposure to passive smoking during pregnancy has a significant relationship with low birth weight of neonates.

Limitations: Data obtained on exposure to passive smoking is self-reported, that may introduce a recall bias to the study.

Recommendations: Literature about bad effects of smoking both active and passive should be included in the curriculum of nurses, midwives and other health care professionals. Certain health policies should be made to have healthy mothers and healthy neonates by avoiding active as well as passive smoking during

pregnancy. In health care settings Nursing Superintendents can arrange and facilitate the workshops and seminars on bad effects of passive smoking during pregnancy on birth weight of neonates.

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