

Tobacco use, exposure to second-hand smoke among pregnant women and their association with birth weight: A retrospective cohort study

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ABSTRACT

Background: There is paucity of studies on prevalence of SHS among pregnant women and its association with low birth weight (LBW). **Objectives:** The study was designed to determine the proportion of tobacco use, exposure to second hand smoke among pregnant women and their association with LBW. **Materials and Methods:** A Retrospective cohort study was conducted from March-June 2017 among 1043 pregnant women admitted for delivery in the Department of Obstetrics and Gynecology, JIPMER. Socio-demographic and obstetric characteristics, tobacco use and exposure to SHS during pregnancy were assessed by interviews. Birth weight of the baby was also extracted. Data was analysed using STATA v12. Univariate analysis was used to assess the association of socio-demographic, obstetric characteristics and exposure to SHS with LBW. **Results:** Out of 1043 pregnant women, the mean age was 25 (± 3.9) years. More than half (57.4%) of women were primigravida. The proportion of women exposed to SHS during pregnancy was 69.9% (95% CI: 67.0-72.6) among which 24% of the women belonged to family, where family members were smokers. Only four had ever used tobacco in the past. However, none used any form of tobacco during pregnancy. LBW was present in 21.4% of the babies. There was no association between exposure to SHS and LBW [PR:0.98 (95% CI:0.71-1.35)]. **Conclusion:** The study shows that there was no significant association between the SHS exposure of pregnant women and low birth weight.

Keywords: Low birth weight, retrospective cohort, second-hand smoke

Introduction

The World Health Organization (WHO) estimates that tobacco use is responsible for almost six million deaths each year – one death every 6 s and is projected to rise to eight million deaths per year by 2030.^[1] Tobacco comes in smoked and smokeless forms, both of which have been shown to cause adverse outcomes in pregnant women and their fetuses. The harms of tobacco

use in pregnancy are not limited to smoked tobacco products only. Evidence suggests that infants born to women who use smokeless tobacco in pregnancy have a higher risk of several adverse outcomes such as stillbirth, preterm birth, and low birth weight.^[2-4] In addition, maternal exposure to second-hand smoke (SHS) in pregnancy has also been associated with a modest reduction in birth weight and can increase the risk of low birth weight (<2500 g) by 22%.^[5]

The WHO in its “Recommendations for the prevention and management of tobacco use and SHS exposure in pregnancy”

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emphasizes the need for effective screening by health-care providers for tobacco use among pregnant women during routine antenatal visits.^[6] The WHO recommendations released in the year 2013 also highlighted the paucity of studies on the prevalence (burden) and interventions for tobacco and second and smoke in low- and middle-income countries. The third round of the National Family Health Survey 3 conducted during 2005–2006 reported 8.5% of pregnant women use any form of tobacco (smoke or smokeless) during pregnancy, as high as 13% in Jharkhand.^[7,8] These estimates are community-based and a decade old; current assessment of burden among pregnant women attending hospitals is required to plan for interventions during their hospital visits. Hence, this study was conducted among pregnant women with period of gestation (POG) more than 28 weeks to determine the burden of tobacco use and exposure to SHS at home or workplace and to assess whether tobacco use and exposure to SHS are associated with low birth weight in a tertiary care setting.

Materials and Methods

A retrospective cohort study was conducted among women who attended for Postnatal visit in the Department of Obstetrics and Gynecology, JIPMER, in the months of May and June 2017. Women who delivered with POG more than 28 weeks and admitted for delivery were included. Pregnant women with multiple pregnancies were included in the study for determining the proportion reporting tobacco use anytime during the antenatal period and to determine the proportion exposed to SHS at home or workplace but was excluded from the association with low birth weight.

Sample size and sampling technique

Based on the proportion of pregnant women exposed to SHS as 10.5%, assuming alpha error of 5%, absolute precision of 2%, a total of 900 pregnant women were required for the study. Since the study included follow-up after delivery, a sample size of about 1000 was decided considering 10% loss to follow-up/nonresponse. All the eligible pregnant women were included in the study.

Study procedure

After approval by scientific and ethics committees, women attending the Postnatal visit in the Department of Obstetrics and Gynecology were interviewed by the trained interviewer. The senior professor supervised the sanctity of the data collection. Sociodemographic and obstetric characteristics such as age, education of the pregnant women, education of husband, and employment status of pregnant women during antenatal period, parity, previous abortions, and family income were obtained using pretested, structured pro forma, which was prepared by the researcher. Information on tobacco use and exposure to SHS and their frequency was also obtained. Information on medical disorders during pregnancy, hemoglobin levels, and birth weight was obtained from the individual patient case records after delivery. Apart from birth weight, information on preterm birth and stillbirth was also extracted.

Tobacco use was defined as reporting of any tobacco use (smoke or smokeless form) anytime during antenatal period. Exposure to SHS was defined as positive response to the question “Were you ever exposed to passive smoking during your pregnancy?”

Low birth weight was defined by the WHO as weight at birth of <2500 g.

Parameters studied

Sociodemographic and obstetric characteristics

The sociodemographic and obstetric characteristics were age, education of the pregnant women, education of husband, and employment status of pregnant women during antenatal period, parity, previous abortions (yes/no), high-risk pregnancy/comorbidity (yes/no), and per capita income.

Outcome variables

The outcome variables were tobacco use (yes/no), exposure to SHS (yes/no), place of exposure to SHS (home/workplace), frequency of tobacco use/exposure to SHS, duration of exposure, and low birth weight (defined as birth weight <2.5 kg).

Confounding variables

The confounding variables were age, parity, education of pregnant women and husband, hemoglobin levels, and weight of the pregnant women in the third trimester (crude proxy measures for dietary intake).

Statistical analysis

Data were single entered in EpiData Manager Software version 2.0.10.59 (EpiData Association, Odense, Denmark). Sociodemographic and demographic characteristics are expressed as percentages. Exposure to SHS is expressed as proportions with 95% confidence intervals (CIs). Birth weight is expressed as mean (standard deviation), and it is categorized as low birth weight (<2500 g) and normal birth weight (\geq 2500 g) for univariate analysis. To assess the association of tobacco use and exposure to SHS with low birth weight, unadjusted prevalence ratio (PR) was calculated along with 95% CI and *P* value. *P* < 0.05 was considered as statistically significant. Analysis was done using Stata software version 12.0 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP) by a professional trained in the corresponding software.

Ethical considerations

Institute Ethical committee approval was obtained before the starting the study. Informed consent was obtained from the study participants. After the interviews, the adverse health effects of tobacco and SHS were explained to the study participants.

Results

Sociodemographic characteristics of the participants

A total of 1043 pregnant women who were more than 28 weeks of gestation and admitted for delivery were included in the

were also inconsistent. This study is a preliminary step toward understanding the extent the problem in this part of the country.

The proportion of women exposed to SHS at home or workplace was 69.9%, which was very high when compared to studies by Goel *et al.*^[9] in Northwestern India and Gupta *et al.*^[10] in Uttar Pradesh which were about 24.4% and 26.0%, respectively. Similarly, lower prevalence was reported in other parts of the world^[11-14] which contradicts our study findings. The higher prevalence may be attributed to the fact that the smoking is highly prevalent in public places and in workplace in this part of the country and there are no strict laws prohibiting the use of smoke products at the public places. These marked International variations regarding the prevalence rates may also be attributed to the fact that exposure to SHS was measured subjectively by self-reported exposure, and there is no validated instrument for measuring the exposure to SHS objectively, which might underestimate or overestimate the study findings. Moreover, 23.68% of the women belonged to family, where family members were smokers. This further shows the higher risk of exposure to SHS.

A review by Wickström^[15] showed that 15%–25% of women use tobacco during their pregnancy across the globe which is contrasting to our study findings which shows that only four^[4] had ever used tobacco in the past (3 smoke form and 1 smokeless form). However, no woman used any form of tobacco during pregnancy. This might be due to cultural difference in our country when compared to other parts of the world.

Our study findings failed to show any association between exposure to SHS during pregnancy and low birth weight of the infants. Similarly, there was no significant difference in birth weight among the mothers who were exposed to family members who were smokers either inside or outside the house. The results of previous studies were also inconsistent. A study by Gupta *et al.*^[10] showed that women who are exposed to SHS during pregnancy had higher chance of delivering babies of low birth weight, whereas a study by Goel *et al.*^[9] reported that there was no significant reduction in birth weight although there was higher chance of preterm deliveries among exposed women. Internationally, studies by Norsa'adah and Salinah *et al.*^[11] in Malaysia and Mojibyan *et al.*^[13] failed to show any association between maternal exposure to SHS and low birth weight, whereas studies by Khader *et al.*^[12] in Jordan and Wahabi *et al.*^[14] in KSA showed significant association between the two.

The strength of the present study is that it is one among the few studies conducted to determine the association of maternal exposure to SHS and low birth weight. Since the study was conducted among larger representative sample, it is upheld that the potential introduction of a selection bias was deterred. Since the study measures the self-reported exposure to SHS, the results could be underestimation or overestimation. Furthermore, estimation of the length of exposure was also difficult which was major limitations of our study.

Conclusion and Recommendations

Maternal exposure to SHS was found to be high in this part of the country with more than two-thirds of the pregnant women exposed to SHS during their pregnancy. However, there was no association with the low birth of the newborns. Since there are no strict laws prohibiting tobacco smoking in public places and at homes in our country, the SHS exposure is high as expected. With the scarcity of literature about the maternal second-hand exposure and low birth weight in our country, this study could be a preliminary step in understanding the extent of the problem. However, further studies using biomarkers are recommended to quantify SHS exposure objectively.

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Conflicts of interest

There are no conflicts of interest.

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