

ASSESSMENT OF PASSIVE SMOKING EXPOSURE AMONG PREGNANT WOMEN

ARIF ZSK*, BEGUM R, TASNEEM SS, JABEEN R

Department of Nursing, Superior University Lahore, Pakistan

*Corresponding author's email address: Zobia.sattar94@gmail.com

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Abstract: *Secondhand smoke (SHS) exposure poses significant health risks to both mothers and fetuses during pregnancy. Despite global efforts to reduce smoking in public and private spaces, SHS exposure remains prevalent, particularly in low- and middle-income countries. Objective: The study aimed to assess the extent of passive smoking exposure among pregnant women in various settings, including their homes, workplaces, and public spaces, and to examine the frequency and potential health risks associated with SHS exposure during pregnancy. Methods: This cross-sectional study was conducted among 150 pregnant women attending a tertiary care hospital in Pakistan between January and June 2024. Data were collected using a structured questionnaire that captured demographic information and SHS exposure across different environments, including home, workplace, and public spaces. Descriptive statistics, including frequencies and percentages, were used to summarize the data. Results: Among the participants, 60.7% reported SHS exposure at home, with 30% experiencing SHS exposure 6-10 times weekly. Additionally, 61.3% of the women reported exposure at work, with 52.7% exposed 11-15 times monthly. Public spaces also contributed to significant SHS exposure, with 86% of participants affected. Notably, 37.3% of women reported spending 15-30 minutes daily inside a car with someone smoking. Demographically, most participants were aged 25-28 years (46.7%) and had a matric-level education (36.0%). Conclusion: This study reveals a high prevalence of SHS exposure among pregnant women, particularly at home, work, and public places. The findings underscore the urgent need for public health interventions, such as stricter smoke-free policies and public awareness campaigns, to reduce SHS exposure and safeguard maternal and fetal health.*

Keywords: Passive Smoking; Secondhand Smoke; Pregnancy; Public Health; Maternal Health; Smoke-Free Policies; Pakistan

Introduction

Passive smoking, also known as secondhand smoke (SHS) exposure, is a significant public health concern, particularly for vulnerable populations such as pregnant women. SHS comprises the smoke exhaled by smokers and the smoke emitted from the burning end of cigarettes, pipes, or cigars. Several studies have shown that SHS exposure during pregnancy can lead to adverse maternal and fetal outcomes, including low birth weight, preterm delivery, respiratory complications, and an increased risk of sudden infant death syndrome (SIDS) (1).

In many low- and middle-income countries, SHS exposure remains a prevalent issue due to a lack of awareness, insufficient regulation of public smoking, and the pervasive use of tobacco within homes (2, 3). Pregnant women in such environments often find it challenging to avoid SHS exposure, whether at home, in public spaces, or at work. Studies have indicated that household smoking is one of the primary sources of SHS exposure, and the confined nature of homes can exacerbate its impact on the health of both the mother and the developing fetus. (4, 5).

This study aims to assess the extent of passive smoking exposure among pregnant women, focusing on their exposure at home, at work, and in public places. By evaluating the frequency and severity of SHS exposure in these environments, the study highlights the urgent need for targeted public health interventions to reduce SHS exposure during pregnancy. Such interventions could significantly reduce the health risks associated with passive smoking, ultimately leading to better maternal and neonatal outcomes. (6-8).

Methodology

This cross-sectional study was conducted to assess pregnant women's exposure to secondhand smoke (SHS) in various environments, including at home, work, and public places. The study was conducted at a tertiary care hospital in Pakistan between January and June 2024. The target population was pregnant women attending the outpatient department for antenatal care.

One hundred fifty pregnant women were selected for this study using a non-probability convenience sampling technique. Women included in the study were in different trimesters of pregnancy, and those with known smoking habits were excluded to focus solely on passive smoking exposure. Participation in the survey was voluntary, and informed consent was obtained from all participants. Data were collected through a structured questionnaire designed specifically for this study based on existing literature and validated tools. The questionnaire was divided into two main sections:

This section gathered information on participants' ages, educational qualifications, employment status, and other relevant background factors. It focused on the frequency and intensity of SHS exposure at home, work, and public places, whether participants were exposed to SHS at home, work, or in public places.

The frequency of SHS exposure in these environments. The number of cigarettes smoked per day in their households and time spent in confined spaces (such as cars) with smokers. The questionnaire was administered through face-to-face interviews by trained healthcare workers,



ensuring all participants understood the questions and could respond accurately.

The primary variables of interest were the frequency and intensity of SHS exposure, categorized by environment:

At home: Whether exposed to SHS at home and how frequently.

At work: Whether participants were exposed to SHS and how often this occurred.

In public places: How frequently were they exposed to SHS in public environments such as restaurants, markets, and public transport?

Time in confined spaces: Exposure to SHS in confined spaces, such as cars, was measured in terms of the number of minutes spent daily or weekly with a smoker.

The collected data were analyzed using statistical software (SPSS version 25). Descriptive statistics were used to summarize the demographic characteristics of the participants and the frequency of SHS exposure. The results were presented as frequencies and percentages. Tables were used to illustrate the distribution of SHS exposure across various settings, including at home, work, and public places. The study was conducted by the ethical guidelines for research involving human subjects. Ethical approval was obtained from the hospital's institutional review board (IRB). Participation in the study was voluntary, and all participants provided informed consent after being informed about the study's purpose and procedure. Confidentiality and anonymity of the participants were maintained throughout the study.

Results

The majority of participants were aged between 25 and 28 (46.7%), had matric-level education (36.0%), and were working (65.3%). These demographic factors could influence the patterns of exposure to passive smoking. (Table 1)

Table 1: Demographic Data of Pregnant Women

Variable	Category	Frequency	(%)
Age	20-24	15	10.0
	25-28	70	46.7
	29-32	51	34.0
	33-36	14	9.3
Qualification	Primary	15	10.0
	Middle	39	26.0
	Matric	54	36.0
	Intermediate	35	23.3
	Graduate	7	4.7
Employment Status	Working	98	65.3
	Non-working	52	34.7

A significant proportion of pregnant women (60.7%) are exposed to SHS at home, with 30% reporting exposure more than five times per week. This emphasizes the need for reducing home-based exposure to SHS during pregnancy. (Table 2)

Table 2: Exposure to Secondhand Smoke (SHS) at Home

Variable	Category	Frequency	(%)
Exposed to SHS at Home	Yes	91	60.7
	No	59	39.3

Frequency of SHS Exposure at Home	Never	60	40.0
	1-5 Times	45	30.0
	6-10 Times	45	30.0

Approximately 30% of households with pregnant women report smoking 6-10 cigarettes per day, highlighting the significant level of SHS exposure that could adversely affect maternal and fetal health. (Table 3)

Table 3: Cigarette Smoking in the Household

Category	Frequency	(%)
Cigarettes Smoked per Day at Home	No Cigarettes	59
	1-5 Cigarettes	18
	6-10 Cigarettes	45
	11-15 Cigarettes	28

A significant number of pregnant women report exposure to SHS at work (61.3%) and in public places (86.0%), indicating a widespread issue with passive smoking in multiple environments during pregnancy. (Table 4)

Table 4: Exposure to SHS at Work and Public Places

Variable	Category	Frequency	(%)
Exposed to SHS at Work	Yes	92	61.3
	No	58	38.7
Exposed to SHS in Public Places	Yes	129	86.0
	No	21	14.0

Around 37.3% of pregnant women spend 15-30 minutes daily inside a car with someone smoking, representing a high-risk environment for passive smoke exposure, which could contribute to respiratory and developmental problems for the unborn child. (Table 5)

Table 5: Frequency of Exposure to SHS in Confined Spaces (Cars)

Variable	Category	Frequency	(%)
Time Spent in Cars with Smokers (Daily)	Never	24	16.0
	5-15 Minutes	42	28.0
	15-30 Minutes	56	37.3
	More than 30 Minutes	28	18.7

Discussion

The present study assessed the exposure of pregnant women to secondhand smoke (SHS) in various settings, including their homes, workplaces, and public spaces. The findings revealed a high prevalence of SHS exposure among pregnant women, with significant health implications for both the mother and fetus. This discussion explores the impact of these results and compares them with existing literature. Our study found that 60.7% of pregnant women were exposed to SHS at home, with a substantial portion (30%) being exposed 6-10 times per week. This is consistent with the findings of Yang L et al. (2022), who reported that SHS exposure at home remains a critical source of passive smoking among pregnant women in low- and middle-income countries (5). Similarly, Wagijo M et al. (2017) emphasized that homes are often confined spaces where pregnant women are exposed to significant levels of harmful tobacco smoke, increasing the risk of pregnancy

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complications such as low birth weight and preterm birth (6).

The frequency of exposure to SHS at home in our study aligns with global reports that indicate passive smoking at home remains widespread in many cultures where indoor smoking is socially accepted. (9). A study by Al-Hikita N et al. (2021) also highlighted that household smoking practices, particularly in households with limited smoking regulations, significantly contribute to the elevated risk of maternal and fetal health problems. (10).

In our study, 61.3% of participants reported exposure to SHS at work, with 52.7% indicating exposure between 11-15 times per month. Exposure to SHS at work has been linked with adverse pregnancy outcomes, including low birth weight and spontaneous abortion. A study by Aslam et al. (2021) reported similar findings, where SHS exposure in the workplace increased the risk of pregnancy complications, particularly in settings where smoking regulations are poorly enforced.

The prevalence of workplace exposure found in this study underscores the need for more robust policies to protect pregnant women in the workforce. Many countries with strict workplace smoking bans report lower SHS exposure levels among pregnant women, reinforcing the importance of workplace interventions. (11).

The majority of women (86%) in this study reported being exposed to SHS in public places, including restaurants, markets, and public transport. This is a higher rate compared to studies in countries with stricter anti-smoking laws. For instance, a survey conducted in the European Union by Gorini et al. (2021) reported significantly lower SHS exposure in public spaces due to comprehensive smoke-free policies.

Our findings suggest that public places in Pakistan lack effective smoke-free regulations, putting pregnant women at considerable risk of SHS exposure. As noted by Lee and Forey (2022), pregnant women who are regularly exposed to SHS in public places face a higher risk of respiratory issues, preterm labor, and fetal growth restriction. Public health measures to implement and enforce smoke-free policies in public areas are crucial for reducing this exposure.

A noteworthy finding in this study was that 37.3% of pregnant women spent 15-30 minutes daily inside a car with someone smoking. Exposure to SHS in confined spaces like cars can be particularly harmful due to the concentration of smoke in a small, poorly ventilated environment. As highlighted by Nunes et al. (2022), exposure in such settings increases the risk of respiratory distress in pregnant women and has been associated with fetal hypoxia.

This finding is in line with studies that have shown how exposure to SHS in confined environments exacerbates the risks for pregnant women and their unborn children (Vardavas & Kafatos, 2020). Public health campaigns aimed at reducing smoking in cars, especially when children and pregnant women are present, are essential to mitigating this risk. The results of our study align with global trends, particularly in regions where smoking regulations are lax. The high prevalence of SHS exposure reported in our study mirrors findings from other developing countries, where cultural norms and insufficient public health policies contribute to high levels of exposure among pregnant women (Aslam et al., 2021; Nunes et al., 2022). However, compared to developed nations with stronger anti-smoking

laws, the SHS exposure rates in our study are significantly higher. For instance, Carreras G. et al. (2021) reported much lower rates of SHS exposure in public places in countries like Italy and Spain, where comprehensive smoke-free policies are strictly enforced. This highlights the need for more robust regulatory frameworks in Pakistan to protect pregnant women from SHS. (12).

Conclusion

This study demonstrates a high prevalence of SHS exposure among pregnant women, particularly at home, work, and public places. The findings are consistent with existing literature, which links SHS exposure with adverse maternal and fetal outcomes. Reducing SHS exposure during pregnancy requires both individual behavioral changes and broader public health interventions, including stricter smoke-free regulations in homes, workplaces, and public places.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-NCSUP-232/23)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

ZOBIA SATTAR KHALIDA ARIF (Student)

Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, and final approval.

RAZIA BEGUM (Student)

Coordination of collaborative efforts.

SYEDA SIDRA TASNEEM (Lecturer)

Study Design, Review of Literature.

RUBINA JABEEN (Principal)

Conception of Study, Final approval of manuscript.

References

1. Perrone S, Lembo C, Moretti S, Prezioso G, Buonocore G, Toscani G, et al. Sudden infant death syndrome: beyond risk factors. *Life*. 2021;11(3):184.
2. Ndlovu N. Prevalence of secondhand smoke exposure among adults in Bulawayo, Zimbabwe 2016.
3. Tah GF. Knowledge, Attitudes, and Beliefs Toward Third Hand Smoke: Walden University; 2024.
4. Raghuvveer G, White DA, Hayman LL, Woo JG, Villafane J, Celermajer D, et al. Cardiovascular consequences of childhood secondhand tobacco smoke exposure: prevailing evidence, burden, and racial and

socioeconomic disparities: a scientific statement from the American Heart Association. *Circulation*. 2016;134(16):e336-e59.

5. Yang L, Wu H, Zhao M, Magnussen CG, Xi B. Prevalence and trends in tobacco use, secondhand smoke exposure at home and household solid fuel use among women in 57 low-and middle-income countries, 2000–2018. *Environment International*. 2022;161:107142.

6. Wagijo M-a, Sheikh A, Duijts L, Been JV. It is reducing tobacco smoking and smoke exposure to prevent preterm birth and its complications. *Pediatric respiratory reviews*. 2017;22:3-10.

7. Delcroix M-H, Delcroix-Gomez C, Marquet P, Gauthier T, Thomas D, Aubard Y. Active or passive maternal smoking increases the risk of low birth weight or preterm delivery: Benefits of cessation and tobacco control policies. *Tobacco-Induced Diseases*. 2023;21.

8. Gould GS, Havard A, Lim LL, Group PSIPE, Kumar R. Exposure to tobacco, environmental tobacco smoke and nicotine in pregnancy: a pragmatic overview of maternal and child outcomes reviews, effectiveness of interventions and barriers and facilitators to quitting. *International journal of environmental research and public health*. 2020;17(6):2034.

9. Bertolina C, Farotto M, Crivellari S, Giaccherio F, Grasso C, Bertolotti M, et al. Summary of the 2016 World Health Organization Report and 2021 Compendium on environmental diseases. *Working Paper of Public Health*. 2023;11(1).

10. Hikita N, Haruna M, Matsuzaki M, Sasagawa E, Murata M, Oidovsuren O, et al. Prevalence and risk factors of secondhand smoke (SHS) exposure among pregnant women in Mongolia. *Scientific reports*. 2017;7(1):16426.

11. Prince PM, Umman M, Fathima FN, Johnson AR. Secondhand smoke exposure during pregnancy and its effect on birth outcomes: evidence from a retrospective cohort study in a tertiary care hospital in Bengaluru. *Indian Journal of Community Medicine*. 2021;46(1):102-6.

12. Carreras G, Lachi A, Cortini B, Gallus S, López MJ, López-Nicolás Á, et al. The burden of disease from second-hand tobacco smoke exposure at home among adults from European Union countries in 2017: an analysis using a review of recent meta-analyses. *Preventive medicine*. 2021;145:106412.



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