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Journal of Substance Abuse & Alcoholism

Research Article

Understanding Secondhand Smoke Exposure and Smoking Policy Awareness in Saudi Arabia

Tareq Alotaibi*

Department of Respiratory Therapy, College of Applied Medical Sciences, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

***Corresponding author**

Tareq Alotaibi, Department of Respiratory Therapy, College of Applied Medical Sciences, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia; Tel: 00966560600067

Submitted: 10 August 2025

Accepted: 23 September 2025

Published: 25 September 2025

ISSN: 2373-9363

Keywords

• Secondhand Smoke; Smoking Policy; Smoking Awareness; Smoking Risks; Tobacco-Free Policies

Abstract

Introduction: Secondhand Smoking (SHS) exposes nonsmokers to tobacco smoke, increasing the risk of undesirable health outcomes. This exposure also leads to discomfort in public spaces. This study assesses whether SHS influences seating preferences in indoor versus outdoor areas of restaurants and cafés and evaluates public awareness of SHS risks.

Methods: A cross-sectional survey was conducted using an electronic questionnaire administered in various restaurants and cafés throughout Saudi Arabia. Data were entered into Microsoft Excel and analyzed using SPSS. Continuous variables were summarized using means and standard deviations, while categorical variables were reported as frequencies and percentages.

Results: Of the 497 respondents, 68.4% were female, with the majority aged 19–30 years and residing in Saudi Arabia's central region. About 35% preferred indoor seating to avoid smokers. Additionally, 62.4% reported that smoking affected their seating choice, and 71.4% changed their seating location due to cigarette smoke exposure while outdoors.

Conclusion: The findings highlight SHS's considerable impact on public place usage, particularly in cafés and restaurants in Saudi Arabia. The majority of the population finds cigarette smoke bothersome, supporting the need for stricter enforcement of tobacco-free policies in public areas to mitigate discomfort and prevent health risks.

INTRODUCTION

Smoking profoundly impacts human health, with numerous studies highlighting its detrimental effects, particularly on the cardiovascular and respiratory systems [1]. The adverse impacts of Secondhand Smoke (SHS) are equally significant, emphasizing the need for concerted efforts from medical institutions to mitigate SHS exposure and prevent smoking-related diseases [2]. SHS is defined as the unintentional inhalation of tobacco smoke, which includes smoke from burning cigarettes and exhaled smoke from smokers [3,4]. In fact, exposure can occur in diverse settings such as homes, public areas, vehicles, and workplaces, contributing to serious health issues like lung cancer, asthma attacks, Chronic Obstructive Lung Disease (COPD), and respiratory infections in children [3-5].

In Saudi Arabia, studies indicate an increasing prevalence of SHS exposure, with significant exposure rates in workplaces, households, and public venues such as cafés and coffee shops [6]. Further, a 2019 cross-sectional study in the central region of Saudi Arabia revealed that exposure also frequently occurs through parental smoking or among friends who smoke [7]. In response, the Saudi government has implemented several measures aligned with the World Health Organization's Framework Convention on Tobacco Control (FCTC), including increasing tobacco taxes, enforcing smoking bans in public places, mandating designated smoking areas, and placing warning labels on tobacco packaging [8]. Collectively, these policies aim to not only encourage quitting among smokers and foster a healthier environment but also shield nonsmokers from the harms of SHS [8].

Despite the rising prevalence of smoking and its known repercussions, there is a notable gap in knowledge regarding Secondhand Smoke (SHS) among the adult population in Saudi Arabia. This study seeks to determine how this lack of awareness affects individuals' seating preferences—indoor versus outdoor—in restaurants and cafés. Additionally, it will evaluate the effectiveness of existing smoking policies and awareness initiatives across

the country. The findings are intended to assist regulators and decision-makers in crafting more effective behavioral strategies to reduce SHS exposure, strengthen anti-smoking policies, and enhance public awareness about the risks associated with SHS.

Method

This descriptive cross-sectional study was carried out from April 2023 to June 2024 in various restaurants and cafés across Saudi Arabia. To recruit participants, surveys were distributed both as hard copies and online facilitating participation from diverse regions of Saudi Arabia. The study population included people aged 18 years or older, who provided informed consent before participating. Smokers and ex-smokers were excluded from the sample. The necessary sample size was determined using Raosoft, an online calculator, which recommended a minimum of 385 participants to ensure a 95% confidence level and a 5% margin of error. We employed nonprobability sampling to focus on collecting data about the annoyance and irritation caused by Secondhand Smoke (SHS) in the selected venues. Ethical approval for the study was granted by the Institutional Review Board (IRB) at King Abdullah International Medical Research Centre (Approval No. IRB/1821/23).

Measures

Data were collected using three questionnaires. Two pre-existing questionnaires, used with the original authors' permission, were adapted to include questions on awareness, policies, and risks associated with SHS [9,10]. These questionnaires were translated into Arabic and culturally validated by a sample from the target population. The third questionnaire, developed specifically for this study, aimed to address the study's objectives more directly. It was crafted based on relevant literature and validated by a subject matter expert. This instrument focused on location preferences, the impact of SHS on these preferences, responses to SHS exposure in public places, searches for designated smoking areas, and behaviors concerning cigarette smoke, such as mask-wearing. Furthermore, the questionnaires collected demographic data, including age, gender, smoking status, social status, region, city, and occupation. Additionally, they assessed participants' irritation and annoyance due to SHS, awareness of smoking policies, exposure to SHS in various settings, preferences for indoor/outdoor seating, reactions to cigarette smoke, availability of smoking areas, and preventive measures like mask-wearing. Public policy awareness was gauged by querying participants about smoking restrictions in specific areas, prohibitions on cigarette sales to minors, and their support for these laws.

Data analysis

Descriptive statistics were employed to summarize the data. Categorical variables were represented as frequencies and percentages and visually depicted through graphs such as pie charts and bar charts. Numerical variables, on the other hand, were presented using the median and Interquartile Range (IQR) to effectively describe data distributions, especially in cases of non-normal distribution. The primary outcome of interest in this study was the prevalence of annoyance and irritation caused by SHS in public places throughout Saudi Arabia. This psychological impact was assessed through specific questions in the survey and analyzed to gauge the extent of public impact. The Statistical Package for the Social Sciences (SPSS) version 29 was used to run our analysis.

RESULTS

We surveyed 1,503 participants, of which 497 completed the survey and were included in our study. The demographic characteristics of these 497 participants are as follows: the majority (68.4%) were female, with a median age of 22 years (IQR: 19–30). Most participants (83.3%) were from the central region of Saudi Arabia, with 7.4% from the eastern region, 4.2% from the western region, 3.2% from the southern region, and 1.4% from the northern region. Regarding marital status, 69.6% had never been married, while 27.8% were currently married. Additionally, 66.6% were unemployed and unable to work (Table 1).

Table 1: Characteristics and demographics of study participants in Saudi Arabia (n = 497).

Demographic Variables	Frequency N (%)
Sex	
Male	157 (31.6)
Female	340 (68.4)
Median age	22 (IQR: 19,30)
Region in Saudi Arabia	
Central	414 (83.3)
Eastern	37 (7.4)
Southern	16 (3.2)
Western	21 (4.2)
Northern	7 (1.4)
Marital Status	
Single (Never married)	346 (69.6)
Married	138 (27.8)
Divorced	11 (2.2)
Widowed	2 (0.4)
Occupational Status	
Unemployed (Unable to work)	331 (66.6)
Employed	166 (33.4)
Current Smoking Status	
Smoker	35 (7)
Nonsmoker	462 (93)

The study found that participants were exposed to SHS in multiple locations. A majority of the participants (80.9%) reported SHS exposure in outdoor public places. Regarding household exposure, 48.5% of participants reported having family members who smoke. Furthermore, 34.0% of participants reported SHS exposure in enclosed workplace areas, and 58.1% of participants reported SHS exposure in enclosed public places (Table 2).

Our finding revealed that individuals in Saudi Arabia showed awareness of policies regarding smoking in public places. Most participants (43.1%) indicated that their workplace did not allow them to smoke indoors. Moreover, the majority of participants were aware of laws prohibiting smoking in public places and of laws prohibiting the sale of cigarettes to children in Riyadh (59.8% and 79.3%, respectively). Additionally, 93.8% of participants supported laws prohibiting smoking in public places. (Table 3).

The results reveal that a relatively small proportion of participants reported noticing promotional materials for nicotine products and cigarettes. Specifically, 18.9% (94 individuals) observed advertisements or signs promoting cigarettes in stores, indicating a significant level of exposure to in-store cigarette promotions. Other types of promotions were less frequently noticed: only 6% observed free sample promotions, 9.9% noticed sale prices, 4.6% saw coupons, 6.4% were aware of gifts or special offers, 12.3% reported seeing clothes or other items with a brand name or logo, and 5.2% noticed promotions through mail. These findings suggest that while in-store advertisements and branded items catch more attention, other promotional strategies like direct mail, coupons, and free samples are less effective in reaching this sample population (Table 4).

Regarding annoyance and irritation from exposure to SHS in restaurants and cafés in Saudi Arabia, a significant proportion of participants preferred to sit indoors rather than outdoors (35%), while 16.9% preferred to sit outdoors despite SHS, and 48.1% indicated no preference. Moreover, 62.4% of participants stated that smoking influenced their choice of seating indoors, 21% said it sometimes influenced their choice, and 16.3% reported no effect on their choice. A large proportion of participants (71.4%) changed their seating after smelling cigarette smoke outdoors, while 16.1% did not change their seating, and 12.5% did not notice the smoke. Moreover, 41.4% did not check the availability of private smoking areas in cafés or restaurants before visiting, 32.4% did check, and 26.2% had not considered checking. Furthermore, 35.2% of participants wore a mask due to SHS when visiting cafés and restaurants, 46.7% did not wear a mask, and 18.1% did not remember if they had ever worn one because of SHS (Table 5).

Table 2: SHS exposure in various locations across Saudi Arabia (n = 497).

Variables	Frequency (%)
Smoking in Household	
Yes	240 (48.5)
No	213 (42.9)
Don't know	43 (8.7)
SHS Exposure in Enclosed Areas at Workplace	
Yes	169 (34.0)
No	230 (46.3)
Don't work in a closed area	98 (19.7)
SHS Exposure in Enclosed Public Places	
Yes	289 (58.1)
No	208 (41.9)
SHS Exposure at Outdoor Public Places	
Yes	402 (80.9)
No	95 (19.1)

Table 3: Awareness of smoking policies in public places in Saudi Arabia (n = 497).

Variables	Frequency (%)
Indoor Smoking Policy in the Workplace	
Allowed anywhere	10 (2.0)
Allowed only in some indoor areas	48 (9.7)
Don't know	65 (13.1)
There is no policy	23 (4.6)
Not allowed in any indoor areas	214 (43.1)
Not currently working	137 (27.6)
Aware of Laws Prohibiting Smoking in Public Places in Riyadh	
Yes	297 (59.8)
No	200 (40.2)
Support or Oppose Laws Prohibiting Smoking in Public Places in Riyadh	
Support	466 (93.8)
Oppose	31 (6.2)
Aware of Laws Prohibiting the Sale of Tobacco to/by Minors in Riyadh	
Yes	394 (79.3)
No	103 (20.7)

Table 4: Promotional materials for nicotine products and cigarettes (n = 497).

Variables	Frequency (%)		
Seeing advertisements or signs that promote cigarettes in stores	Yes	No	Do not know
	94 (18.9)	268 (53.9)	135 (27.2)
Noticing Types of Cigarette Promotion			
Free samples	Yes	No	Do not know
	30 (6)	345 (69.4)	122 (24.5)
Sale prices	Yes	No	Do not know
	49 (9.9)	321 (64.6)	127 (25.6)
Coupons	Yes	No	Do not know
	23 (4.6)	339 (68.2)	135 (27.2)
Gifts/special offers	Yes	No	Do not know
	32 (6.4)	331 (66.6)	134 (27)
Clothes/other items have brand name/logo	Yes	No	Do not know
	61 (12.3)	311 (62.6)	125 (25.2)
Mails	Yes	No	Do not know
	26 (5.2)	346 (69.6)	125 (25.2)

Table 5: Secondhand Smoking-Associated Annoyance and Irritation of Participants in Restaurants and Cafés in Saudi Arabia (n = 497).

Variables	Frequency (%)		
Placement preference	Indoor	Outdoor	No preference
	174 (35)	84 (16.9)	239 (48.1)
Effect of SHS on choosing the placement	Affected	Not affected	Sometimes affected
	310 (62.4)	81 (16.3)	106 (21.3)
Changing the place after smelling cigarette smoke	Changed the place	Do not change the place	Never noticed the smoke
	355 (71.4)	80 (16.1)	62 (12.5)
Checking the presence of smoking cabinets in the desired place.	Yes	No	Did not notice
	161 (32.4)	206 (41.4)	130 (26.2)
Wearing a mask in outside cafés and restaurants due to SHS	Wore a mask	Did not wear a mask	Cannot remember
	175 (35.2)	232 (46.7)	90 (18.1)

DISCUSSION

The study highlights significant exposure to Secondhand Smoke (SHS) among participants, primarily in outdoor public places, with less frequent exposure in enclosed work and public areas. There is a notable awareness and support for anti-smoking laws in Saudi Arabia, particularly regarding smoking in public places and the sale of cigarettes to minors. However, promotional materials for nicotine products were less frequently observed, suggesting that traditional advertising and other promotional strategies like direct mail and free samples have limited effectiveness. The impact of SHS also extends to social behaviors, as it influences seating preferences and mask usage in public venues like cafés and restaurants, with many participants adjusting their seating or wearing masks due to smoke exposure.

This study covered and confirmed the presence of significant annoyance and irritation caused by SHS among individuals in Saudi Arabia. A significant proportion of participants were aware of the risks associated with SHS and supported laws prohibiting smoking in public places. The agreement on smoking prohibition laws revealed the public's recognition of the importance of smoke-free environments.

Our findings contribute to the existing body of knowledge on SHS exposure. A previous study examining medical students' knowledge of SHS exposure and related health risks reported similar findings, with a higher prevalence of SHS exposure in public places (79.8%) compared to homes (26.4%) [11]. This suggests that SHS exposure remains a significant concern in public places for various population groups in Saudi Arabia. Moreover, a 2021 study in The Gambia reported a higher prevalence of SHS exposure in outdoor (61.3%) than in indoor places (52.8%) [9]. In addition, another study conducted in the central region of Saudi Arabia reported that most SHS exposure occurred in social clubs (72.98%) and cafés (35.48%) (Sam et al., 2019). Our study assessed SHS exposure in various indoor and outdoor settings and found a higher prevalence of SHS exposure outdoors (80.9%). Notably, SHS exposure in Saudi Arabia is higher than in countries such as The Gambia (61%) and the United States (25%) [9-12]. This disparity could be attributed to cultural differences or lower awareness about the risks of SHS exposure.

Preventing SHS exposure has become an important concern, given the significant observed effects on individuals. Despite a commendable level of awareness, many individuals have yet to take concrete steps to change their behavior to avoid SHS exposure.

In alignment with our findings, another study conducted in the central region of Saudi Arabia also reported substantial knowledge and awareness concerning SHS among its population [7]. Moreover, a study in Switzerland examining subjective annoyance with SHS in restaurants, cafés, and bars revealed that half of the respondents were bothered by SHS [13]. Our research reported similar levels of annoyance and irritation among participants when exposed to SHS in similar settings.

Finally, this study supported previous research findings [7-11]. It demonstrated that smoking in public places causes both psychological and health damage at the individual level. Society must consider these results, and smokers should recognize the harm they cause through SHS exposure

Based on the findings of your study on participant knowledge of Saudi Arabian smoking policies and Secondhand Smoke (SHS) exposure, several strategic recommendations can be made. To effectively reduce SHS exposure in public settings, stricter enforcement of existing smoking restrictions is necessary, along with the potential expansion of these regulations. Additionally, strengthening educational programs to inform the public about laws prohibiting smoking in public places and the sale of cigarettes to minors is essential, as improved understanding can lead to better compliance with these regulations.

Stricter restrictions should be implemented on the marketing and advertising of tobacco products, particularly concerning in-store displays and promotions that are easily visible to participants. Effective smoking cessation support systems should target the significant percentage of participants who are unemployed, offering resources

such as support groups and counseling. Given that most participants are young and from the central region, focused interventions tailored to these demographics could greatly enhance public health outcomes.

Finally, conducting regular follow-up surveys will help track changes in public perceptions and the effectiveness of recently implemented or existing regulations, ensuring that the issue of SHS exposure is adequately addressed.

Our study's limitations include data collection during a single period and using self-reported questionnaires, which may introduce bias or recall issues, and a sample primarily from the central region of Saudi Arabia. Future studies should aim to include a larger sample size and broader geographical coverage. Furthermore, the majority of the sample were female. Future studies can modify this limitation. Moreover, objective measurements, such as the concentration of cigarette smoke particles after SHS exposure, could enhance the validity of future research. Noteworthy, the median age of our study is 22 years because most of the visitors to cafés and restaurants in Saudi Arabia are of this age.

Our findings indicate that a considerable portion of the population finds the smell of cigarettes irritating, often prompting them to change seats or avoid outdoor areas altogether. This behavior underscores the need for comprehensive preventive strategies to protect people from the adverse effects of SHS exposure. Implementing smoke-free regulations in outdoor public spaces and establishing designated smoking areas could effectively mitigate these impacts. By taking such measures, policymakers can enhance the quality of public spaces and promote a healthier environment for all citizens.

Acknowledgments

No Acknowledgement

Funding

None

Disclosure statement

The authors report there are no competing interests to declare.

Data availability statement

Data are available upon reasonable request

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