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Original Research Article

Awareness regarding the effect of passive smoking among adults: a cross-sectional study

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ABSTRACT

Background: Passive smoking is a major public health concern that contributes significantly to morbidity and mortality among non-smokers. Despite increasing awareness campaigns, adults often underestimate the health risks of passive smoke exposure. This study aimed to assess the level of awareness regarding the effects of passive smoking among adults, to examine the association between awareness and selected demographic variables, and to develop and distribute an educational leaflet to enhance awareness.
Methods: A descriptive cross-sectional study was conducted among 120 adults attending the Outpatient Department of a selected hospital in Thalassery. Participants were selected using a convenience sampling technique, and informed consent was obtained prior to the data collection. Data were collected using a structured self-administered questionnaire consisting of two sections: demographic variables and awareness-related items. The collected data were analyzed using descriptive and inferential statistics to assess the level of awareness and to determine its association with selected variables.
Results: Findings revealed that the level of awareness regarding the health hazards of passive smoking varied among participants. A statistically significant association was observed between the level of awareness and educational status as well as previous exposure to educational programs on smoking-related health risks.
Conclusions: The findings of this cross-sectional study highlight the need for sustained public health education to enhance adult awareness of the harmful effects of passive smoking. Despite existing knowledge, gaps remain, necessitating targeted educational interventions. Integrating structured health education strategies into routine public health programs may promote preventive behaviours, reduce exposure to passive smoking, and ultimately improve overall community health outcomes.

Keywords: Passive smoking, Awareness, Adults

INTRODUCTION

Exposure to passive smoking, also known as second-hand smoke (SHS) or environmental tobacco smoke (ETS), remains a major global public health concern, as there is no safe level of exposure and even brief contact can result in harmful health effects among non-smokers. SHS is composed of smoke exhaled by smokers and smoke emitted from the burning end of tobacco products, exposing individuals involuntarily to thousands of toxic chemicals, including known carcinogens.[1,2] The United States environmental protection agency has classified ETS as a group A carcinogen, confirming its potential to cause cancer in humans.[3]

Globally, SHS exposure contributes substantially to morbidity and mortality. It is estimated that SHS accounts for approximately 1.3 million deaths and 37 million disability-adjusted life years (DALYs) annually, underscoring its significant burden on population health.[4] The international agency for research on cancer has established strong causal associations between SHS exposure and lung cancer, coronary heart disease, stroke, and respiratory illnesses.[5] A meta-analysis by He et al further demonstrated a 23% increased risk of lung cancer among non-smokers exposed to SHS.[6]

Scientific evidence indicates that SHS contains more than 4,000 chemical substances, including carbon monoxide, benzene, ammonia, formaldehyde, and nicotine, of which at least 69 are proven carcinogens.[7] Acute exposure to SHS has been shown to cause endothelial dysfunction, platelet activation, and oxidative stress, leading to adverse cardiovascular effects.[8] U. S. surgeon general has concluded that even short-term exposure can impair vascular function and result in harmful respiratory consequences.[9]

Children are particularly vulnerable to the effects of SHS exposure. A substantial body of evidence links SHS to sudden infant death syndrome (SIDS), recurrent otitis media, asthma exacerbations, reduced lung function, and increased risk of lower respiratory tract infections.[10,11] Studies have shown that children exposed to parental smoking have a significantly higher risk of asthma-related hospitalization, while infants exposed to SHS postnatally have nearly double the risk of SIDS compared to unexposed infants.[12,13]

Adults exposed to SHS also face considerable health risks. Prospective cohort studies indicate that SHS exposure increases risk of ischemic heart disease by 25-30% and stroke by 20-30%.[14,15] Additionally, higher all-cause mortality has been reported among non-smokers cohabiting with smokers compared to those not exposed.[16]

In India, SHS exposure remains highly prevalent despite the implementation of tobacco control policies. Global adult tobacco survey (GATS-2, 2016-17) reported that 38% of adults were exposed to SHS at home and nearly 30% in public places.[17] The world health organization has also highlighted persistently high household exposure rates, emphasizing the continued vulnerability of non-smokers to tobacco smoke hazards.[18] Passive smoking is estimated to cause over 90,000 deaths annually in India.[19]

Evidence from Indian studies suggests that awareness regarding the harmful effects of SHS varies widely across sociodemographic groups, with lower levels of awareness often associated with lower educational attainment.[20] Studies conducted in different regions of India have demonstrated reduced pulmonary function among non-smokers exposed to SHS, increased respiratory morbidity among women exposed at home, and adverse birth outcomes such as low birth weight among infants exposed in utero or postnatally.[21-23]

Awareness of the health risks associated with passive smoking plays a crucial role in shaping attitudes, preventive behaviours, and public support for smoke-free environments. However, significant gaps in knowledge persist in many populations, potentially limiting the effectiveness of tobacco control measures aimed at protecting non-smokers.[24] Limited awareness may hinder behavioural change and reduce adherence to smoke-free practices in both public and private settings. Therefore, assessing awareness regarding the harmful effects of passive smoking among adults is essential to inform targeted health education strategies and strengthen public health interventions aimed at reducing SHS exposure and its associated health consequences.

METHODS

A quantitative, non-experimental descriptive cross-sectional study was conducted among adults attending the outpatient department (OPD) of a selected tertiary care hospital in Thalassery, Kerala. The hospital caters to a large and diverse population from both urban and rural areas, making it an appropriate setting to obtain a heterogeneous sample. Ethical clearance was obtained from the institutional review board prior to the initiation of the study, and administrative permission was secured from the general manager of the selected hospital.

A total sample of 120 adults was selected using a convenience sampling technique. The study population comprised adults aged 18 years and above who accompanied patients to the OPD during the data collection period. Participants who were willing to provide written informed consent and who were able to read and write Malayalam were included in the study. The sample size was determined using Cochran's formula and was considered adequate for a descriptive survey conducted in a single-center setting.

Data collection was carried out over a period of ten days (20-11-2023 to 30-11-2023) in the OPD waiting area. Eligible participants were identified while accompanying patients and were approached individually by the investigator. The purpose and objectives of the study were explained clearly in the local language (Malayalam), and participants were informed about the voluntary nature of participation, their right to withdraw from the study at any time without any penalty, and the confidentiality of the information provided. Written informed consent was obtained from each participant prior to data collection.

A structured, self-administered questionnaire developed by the investigators was used as the data collection tool. The questionnaire consisted of two sections: Section A included sociodemographic and personal variables such as age, gender, religion, education, occupation, type of family, smoking status, presence of smokers in the

family, and previous exposure to educational programs related to smoking hazards; section B comprised items assessing the level of awareness regarding the effects of passive smoking. The tool was validated by a panel of experts in nursing and public health, and necessary modifications were made based on their suggestions to ensure content clarity and relevance. Reliability of the tool was established through pilot testing conducted among 15 adults, which yielded satisfactory internal consistency with a Cronbach's alpha value of 0.81.

The questionnaire was administered using a self-report method, allowing participants to complete it at their own pace under the supervision of the investigator, who was available to clarify doubts when required. On average, each participant required 15-20 minutes to complete the questionnaire. Adequate privacy was maintained during data collection. At the end of the data collection session, participants were provided with an informational leaflet outlining the harmful effects of passive smoking and simple preventive measures, thereby ensuring an educational benefit from participation.

The collected data were checked daily for completeness and accuracy, coded and tabulated for analysis. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize sociodemographic characteristics and levels of awareness. Inferential statistics, specifically chi-square test applied to determine association between level of awareness and selected variables such as age, gender, education and smoking exposure. $P<0.05$ considered statistically significant. Throughout study, strict confidentiality of participants' information was maintained.

Ethical approval

Ethical approval for the study was obtained from the institutional review board (IRB), and formal administrative permission was secured from the general manager of the selected hospital in Thalassery. All participants were clearly informed about the purpose, objectives, and procedures of the study in their local language (Malayalam) to ensure adequate understanding. Participants were assured of confidentiality and anonymity of the data, as well as their right to withdraw from the study at any time without any consequences. Written informed consent was obtained from each participant prior to data collection.

RESULTS

Section 1: Description of socio demographic variables of sample

A total of 120 adults participated in the study. The largest proportion of participants fell within the 31-40 years age group (n=30, 25%). More than half of the sample were females (n=65, 54.16%). With respect to religion, the majority identified as Hindu (n=79, 65.83%). Regarding educational attainment, the highest proportion had completed high school education (n=32, 26.66%), followed by those with higher secondary and degree-level qualifications. In terms of occupation, 38 participants (31.66%) were engaged in professional employment. A considerable majority of respondents belonged to nuclear families (n=93, 77.5%). Most participants were non-smokers (n=116, 96.67%), and 106 (88.34%) reported that there were no smokers within their households. Furthermore, 79 participants (65.84%) indicated that they had never attended any educational programme related to the health hazards of smoking (Table 1).

Table 1: Frequency and percentage distribution of socio demographic variables, (n=120).

Variables	N	Percent (%)
Age (in years)		
20-30	24	20
31-40	30	25
41-50	27	22.54
51-60	17	14.16
61-70	14	11.66
71-80	08	06.64
Gender		
Male	55	45.84
Female	65	54.16
Transgender	0	0
Religion		
Hindu	79	65.83
Christian	27	22.51
Muslim	14	11.66
Education		
Illiterate	0	0
Primary education	23	19.16
Highschool	32	26.66
Higher secondary	19	15.84
Graduation	31	25.84
Post-graduation	10	08.34
Post-graduation and above	05	04.16
Occupation		
Homemaker	30	25
Skilled worker	11	09.16
Unskilled worker	10	08.33
Professional job	38	31.66
Nil	31	25.85
Type of family		
Nuclear family	93	77.5
Joint family	27	22.5
Smoker or not		
Yes	04	03.33
No	116	96.67
Smoker in the family		
Yes	14	11.66
No	106	88.34
Previous exposure to educational programme		
Yes	41	34.16
No	79	65.84

Section 2: The level of awareness regarding passive smoking

The level of awareness regarding the health hazards of passive smoking are presented in Figure 1. The data showed that 47 (39.16%) of participants had a poor level of awareness, 64 (53.33%) had an average level of awareness, and 9 (7.51%) demonstrated a good level of awareness. Overall, the findings highlight that the majority of adults in the study population had only average or poor awareness, with very few demonstrating a good understanding of the health risks of passive smoking.

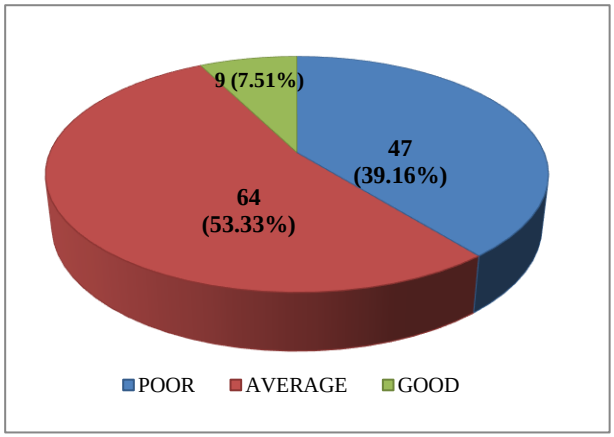

Figure 1: Frequency and percentage distribution of sample based on the level of awareness regarding the effect of passive smoking among adults.

Section 3: Association between awareness and socio-demographic variables

The study revealed a significant association between the level of awareness and selected socio-demographic variables was examined using the chi-square test. The findings are summarized as follows: Education level: Chi-square value=27.793; critical table value=21.03, previous exposure to educational programmes on smoking hazards: Chi-square value=10.034; critical table value=5.99.

These findings underscore the pivotal role of education and health education interventions in enhancing awareness regarding the harmful effects of passive smoking.

DISCUSSION

The present study examined the demographic profile of adults attending a selected hospital in Thalassery and their awareness regarding the effect of passive smoking. The findings revealed that the majority of participants belonged to the age group of 31-40 years (25%). This indicates that a significant proportion of the sample were middle-aged adults, who are often more exposed to workplace and family-related stress, which in turn may increase their vulnerability to tobacco-related environments. Previous studies have shown that awareness of passive smoking tends to be higher in younger populations, while middle-aged adults may underestimate the risks, perceiving smoking as a personal choice rather than a public health hazard.[25,26]

In terms of gender distribution, more than half of the participants were females (54.16%). This is significant, as women are often disproportionately affected by SHS due to cultural roles that keep them in domestic environments where male family members may smoke. Evidence suggests that women and children constitute the most common victims of SHS exposure in households.[27,28] A study conducted in India reported that nearly 50% of women are exposed to passive smoking within their homes, even if they themselves are non-smokers.[29]

Religion-wise, Hindus constituted the majority (65.83%) of the sample. While religion does not directly influence exposure, cultural practices and social gatherings often shape tobacco use patterns within communities. Similar findings were reported in other Indian epidemiological surveys, where social and cultural contexts were seen to mediate tobacco exposure patterns.[30]

Educational background also played a key role: 26.66% of participants had only completed high school education. This reflects a moderate level of literacy, which may influence awareness levels and access to health information. Studies have consistently demonstrated that higher education is positively correlated with better awareness of the health hazards of smoking and passive smoking.[31,32] Conversely, individuals with lower education are more vulnerable to tobacco-related misinformation and less likely to access preventive health programs.

With respect to occupation, 31.66% of the participants were engaged in professional jobs. Employment status can influence both awareness levels and exposure risk. People in professional jobs may have greater awareness through workplace health initiatives, whereas individuals in informal or labor-intensive occupations are often more exposed to environments with fewer smoking restrictions.[33]

The majority of participants belonged to nuclear families (77.5%). This is noteworthy, as family structure can directly impact exposure. Previous research has highlighted that nuclear families are more likely to encounter SHS if a household member smokes indoors, as the exposure is concentrated in smaller family units.[34]

Interestingly, almost all participants were non-smokers (96.67%), yet 11.66% reported having at least one smoker in the family. This reinforces the paradoxical situation where non-smokers are still exposed to health hazards due to the behaviour of others. According to the global adult tobacco survey (GATS) India 2017, more than 30% of adults reported exposure to passive smoke in homes or

public places despite being non-smokers [35]. Such findings highlight the urgent need for stronger smoke-free policies and educational campaigns.

A concerning finding was that 65.84% of participants had never been exposed to educational programs on the hazards of smoking. This gap indicates a missed opportunity for health promotion. Similar gaps in awareness programs were highlighted in a study conducted in Karnataka, which found that lack of community-based educational interventions contributed to poor knowledge about passive smoking.[36] Educational initiatives, especially in hospital waiting areas and community settings, have been shown to significantly enhance awareness and influence health-seeking behaviour.[37]

Overall, the demographic profile of the present study highlights the importance of targeted interventions. Women, middle-aged adults, and individuals with only high school education emerged as key groups requiring focused educational strategies. Consistent with prior literature, the findings emphasize that even in non-smoker-dominant populations, SHS remains a silent but serious public health challenge. Expanding health education programs, integrating passive smoking awareness into routine hospital health talks, and reinforcing smoke-free home policies could reduce unnecessary exposure and safeguard vulnerable groups.

To improve awareness of the health hazards of passive smoking, it is recommended to implement community and hospital-based educational programs, using culturally appropriate leaflets, posters, and audio-visual materials. Awareness should also be integrated into health education curricula for nurses, medical students, and allied health professionals to emphasize preventive strategies and patient counselling. Additionally, policy and environmental measures, such as enforcing smoke-free zones in public places and promoting smoke-free homes, are essential to protect vulnerable populations, particularly women and children. Targeted interventions for high-risk groups, including individuals with lower education or household exposure to smokers, can further enhance the effectiveness of these initiatives.

The findings of this study have important implications for healthcare practice, public health policy, and future research. In healthcare practice, nurses and other healthcare professionals can play a crucial role in educating patients and families about the health risks of passive smoking, while promoting behavioural changes to reduce exposure. In terms of public health policy, the results underscore the need for strengthened community-based health promotion initiatives, rigorous enforcement of smoke-free regulations, and targeted campaigns to encourage smoke-free homes, particularly to protect women and children. For future research, this study provides baseline data that can inform larger-scale investigations on awareness, attitudes, and behaviours related to passive smoking, and help evaluate the effectiveness of educational and preventive interventions aimed at reducing exposure in both domestic and public settings.

Despite its contributions, this study has certain limitations. Firstly, the use of a convenience sampling method and a relatively small sample of 120 participants may limit the generalizability of the findings to the broader population. Secondly, the study relied on self-reported data through structured questionnaires, which could be affected by social desirability bias or inaccurate recall. Thirdly, the research was conducted in a single hospital setting in Thalassery, which may not accurately represent awareness levels or exposure patterns in other regions with different socio-cultural contexts. Finally, the cross-sectional design captures data at a single point in time, limiting the ability to infer causal relationships between socio-demographic factors and awareness levels.

CONCLUSION

The present study underscores that, despite most participants being non-smokers and living in nuclear families, a significant proportion remained indirectly exposed to passive smoking. Notable gaps in awareness were observed, particularly among middle-aged adults, women, and individuals with only high school education, with more than half of the participants reporting no prior exposure to educational programs on the health hazards of smoking. Given the well-established risks of passive smoking including respiratory illnesses, cardiovascular disease, and increased cancer susceptibility, there is a pressing need to strengthen structured health education initiatives at both community and hospital levels. Implementing educational interventions in outpatient departments, workplaces, and family-centred health promotion activities can help mitigate exposure to SHS. Overall, the findings highlight the critical importance of preventive strategies, enforcement of smoke-free environments, and continuous health education to protect vulnerable populations from the silent yet significant dangers of passive smoking.

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