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Original Article

Knowledge, attitudes and perceptions of workers in indoor bars, beer halls and discotheques towards exposure to second-hand smoking in the two cities in Swaziland

Sabelo V Dlamini[1*], Musa C Dlamini[1], Londiwe D Hlope[1], Jameson S Siphepho[2], Sakhile S Masuku[2], Alfred F Murye[1], Vusie Lokotfwako[3]

[1]*Department of Environmental Health Sciences, Faculty of Health Sciences, University of Swaziland, Swaziland*

[2]*Department of Community Health Science, Faculty of Health Sciences, University of Swaziland, Swaziland*

[3]*Epidemiology and Disease Control Unit, Ministry of Health, Swaziland*

Correspondence

Sabelo V. Dlamini

Faculty of Health Sciences, University of Swaziland, Hospital Hill Road, Mbabane H100, Swaziland

E-mail: dlaminisv@uniswa.sz
Tel: +268-25170718

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Abstract

Second-hand smoking is a serious health hazard causing approximately 41000 deaths from lung cancer, respiratory infections, asthma, coronary heart disease and stroke globally each year. Evidence suggests that workers in bars, beer halls and discotheques are more exposed to second- hand smoking compared to other workers in general. Protection of these workers through enactment of smoke-free legislation and attitudes of these workers towards such legislation are key variables of compliance. This study aimed to describe the knowledge of the adverse effects of second-hand smoking, attitudes and perceptions of workers towards the practice. The results suggest that most workers knew what second-hand smoking was and that it could cause lung cancer, coronary heart disease and asthma but undermined the fact that continued exposure or exposure to low levels could lead to severe disease or death. Fifty-four percent of the respondents showed good knowledge and 36% showed fair knowledge of the adverse effects of exposure to second-hand smoke. Respondents mentioned lung cancer (100%), increased coughing (90%), asthma (60%) and heart disease (30%) as possible adverse effects. The knowledge was not different among workers who smoked and those who did not smoke (never smoked or ex- smokers) ($p=0.1041$). However, both smokers and non-smokers did not believe that exposure to second-hand smoke could lead to early death ($p=0.8864$). The suggestions that smoking should be banned in all indoor workplaces was accepted by non-smokers but rejected by smokers ($p=0.0001$). So was the suggestion of increasing tax on cigarettes ($p<0.0001$). Legislation banning smoking in indoor workplaces is contained in the Swaziland Tobacco Products Control Act (2013) that is still waiting to be enforced and as such, indoor smoking is not banned in the country. Sixty-seven per cent of the participants were not aware of the existence of legislation aimed at protecting them against exposure to second-hand smoke in indoor workplaces. It is suggested that the enforcement of the Swaziland Tobacco Control Act (2013), which purports to impose a comprehensive ban of indoor smoking be speeded up so that indoor air quality could improve. Mechanisms to monitor adherence to the complete ban are likely to speed up improvement of the health of many indoor workers in bars, beer halls and discotheques that are exposed for lengthy periods. Enforcement of the Act should include creation of programmes to create awareness of the risks faced by the workers.

Introduction

Tobacco use causes significant morbidity and mortality despite it being a preventable occurrence among individuals and societies. Although Africa had the lowest smoking prevalence (12%) compared with other world regions [1], it has increased by 57% between 1990 and 2009 [2]. Exposure to tobacco is the single leading risk factor for cancer mortality and 71% of global lung cancer deaths are attributable to smoking [3,4]. Previous studies have underestimated lung cancer mortality among Sub-Saharan African countries and have suggested that Sub-Saharan Africa could be making a significant contribution to the global burden [5]. Projections indicate substantial increases in lung cancer deaths that are mostly triggered by changes in age-structure in African countries [5]. The study by Winkler and colleagues [5], further suggested that countries previously indicated as having relatively low lung cancer mortality actually suffer from higher mortality burden when their smoking pattern is taken into consideration. Estimations of the burden in the study by Winkler and colleagues are strengthened by that the researchers took into consideration factors known to influence lung cancer risk including age-specific prevalence, dosage and duration of smoking [5]. Mortality estimation and reporting in low resource settings including Swaziland is affected by limited data availability and quality.

Information on factors known to contribute to lung cancer including contents and types

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of tobacco products, as well as interactions between tobacco, environmental hazards (e.g. air pollution) and infections (e.g. tuberculosis) is very limited. The ubiquity of tobacco smoke in private establishments including homes, workplaces and public areas poses several challenges to policymakers and society to reduce exposure to second-hand smoking [6]. Workers in enclosed establishments are subjected to smoke from the end of a cigarette and the smoke breathed out by smokers. Second-hand smoke contains about 7000 different chemicals, of which hundreds are toxic and 70 can cause cancer [7]. Exposure to second-hand smoke also causes immediate adverse effects on the cardiovascular system leading to coronary heart disease [8]. Several studies have also confirmed severe adverse effects caused by second-hand smoking [9]. Breathing second-hand smoke interferes with the normal functioning of the heart, blood and vascular systems in ways that increase the risk of having a heart attack. Several epidemiological studies conducted among passive smokers have confirmed the presence and carcinogenicity of tobacco-specific carcinogens [10,11].

Mortality and DALYs

In 2004, 603 000 premature deaths and the loss of 10.9 million DALYs, equivalent to 1.0% of global mortality, based on data from 192 countries were attributed to exposure to environmental tobacco smoke [12]. Passive smoking has also been associated with death, disease and disability among children [12,13]. Reports from recently conducted studies suggest that 40% of children, 33% of male non-smokers, and 35% of female non-smokers were exposed to second-hand smoke globally [12]. There is no risk-free level of exposure to second-hand smoke. Even brief exposure to second-hand smoke can damage the lining of blood vessels and cause blood platelets to become stickier, all increasing the risk of deadly heart attacks.

Policies and the WHO FCTC

Swaziland is one of the 171 countries that are party to the WHO Framework Convention on Tobacco Control [14], a global response to the globalisation of the tobacco epidemic. The WHO Framework Convention on Tobacco Control requires state Parties to adopt and implement tobacco control measures including but not limited to the following: packaging and health and health warning labels on tobacco products; bans on tobacco advertising, promotion and sponsorship; measures to protect people from tobacco smoke; tobacco tax and price increases; regulation of the contents of tobacco products; regulation of tobacco product disclosure; support for economically viable alternatives; measures to curb illicit trade in tobacco products; liability provisions and others. Article 8 of the Convention recognises that there are no safe levels of exposure to tobacco smoke and recommend implementation of effective measures to provide protection from exposure to tobacco smoke. The guidelines for implementation of Article 8 stipulate that smoking and tobacco smoke be totally eliminated in all indoor workplaces, indoor public areas and other public areas. In line with this recommendation, WHO member states have implemented smoke-free regulations to reduce environmental tobacco smoke in indoor public spaces and workplaces. While Swaziland is signatory to this global Convention, legislation that bans smoking in indoor areas has not been enforced. The Swaziland Tobacco Products Control Act (2013) contains parts aimed at implementing this ban. However, progress towards enforcement of this Act is very slow, hence the absence of any actions banning smoking inside bars, beer halls and discotheques. The call to enforce the necessary legislation largely depends on the knowledge and perception of the ill-effects of second-hand smoke among members of the public who drive the desire to act towards speeding up the implementation of the legislation. The harmful effects of second-hand smoke have been recorded since 1928 [15] but the global efforts to recognise and reduce this burden have taken almost a whole century and, to consider that some countries are still working towards enforcement of appropriate legislations to reduce the burden is unacceptable.

No study has been conducted in Swaziland to determine the level of knowledge and the perception of indoor workers on the impact of exposure to second-hand smoke on mortality and morbidity. Therefore, the main aim of this study was to determine the level of knowledge and perceptions of indoor workers in bars, beer halls and discotheques.

Methods

Description of the study area

The study was conducted in the two cities of the country, Manzini and Mbabane. The two cities by far have the largest number of bars, beer halls and discotheques (sometimes referred to as 'club houses') in the country. Manzini had a population of 115000 while Mbabane had 90000 habitants (2007 Swaziland National Population Census). The total number of bars, beer halls and discotheques in Mbabane and Manzini were 80 and 92 respectively.

Study design

A descriptive cross-sectional study was conducted among 49 employees of bars, beer halls and discotheques in the two cities of Swaziland. A pilot study was conducted at one bar, one beer hall and one discotheque in Matsapha – about 10km from Manzini and 30km from Mbabane. Though Matsapha is close to Manzini, centres located in this area were not included in the study as it falls outside the city of Manzini. The responses from the pilot study were critically reviewed by the PI and co-PI and the data collection instrument was then adjusted appropriately to ensure validity. The data collection instrument was then translated into Siswati to facilitate easy comprehension by all workers since the pilot study suggested that most of employees of such facilities had attained a low level of education. All bars, beer halls and discotheques that were located in the two cities were included in the study. Only workers that were themselves non- smokers were included among participants of the study. Only workers that worked 5 or more days a week for 8 hours or more were included among participants.

Sampling and sample size

A multi-stage sampling design was used to select facilities and participants. Two lists kindly provided by the municipalities of the two cities consisting of all outlets qualifying for the study was used to randomly select facilities to be requested to participate. The two lists identified 57 outlets in Manzini and 49 outlets in Mbabane. Twenty-nine and 25 outlets were randomly selected to participate in the study. Purposive convenience sampling was used to select 49 participants (26 from Manzini and 23 from Mbabane) by recruiting participants among those found on duty during the survey. Five outlets were found closed during the survey; hence one participant was recruited from each of the 49 outlets.

Data collection

Data was collected using a questionnaire designed by the principal and co-principal investigators. Items in the questionnaire included demographic characteristics of the participants, the knowledge level and attitudes of respondents about the effects of second-hand smoking. Face-to-face interviews were conducted with 49 participants who ensured that all parts of the questionnaire were comprehensively completed. Interviews with each participant were held inside the work area, which ensured that no consultations took place among workers already interviewed and those still to be interviewed.

Data analysis

A univariate analysis was performed for the demographic variables and the variables of interest used to determine knowledge, attitudes and perceptions. A bivariate analysis was performed to determine the association of each variable of interest among smokers and non-smokers (never smoked and ex-smokers) and the outcome of interest. Quantitative analysis was performed using STATA version 14.0 (STATA Corp., Texas USA). To identify statistical significant variables, a Fisher's exact test was employed with $p<0.05$ considered to constitute a statistical significant association between compared variables. Individual responses to specific qualitative items were inscribed and emerging themes were identified.

Ethical considerations

The study was ethically cleared by Scientific and Ethics Committee (SEC) of the Ministry of Health in Swaziland (REF:MH599C/FWA 000 15267/ IRB 000 9688). Permission to conduct the study was obtained from authorities of the two municipal councils and from the management of the establishments. All participants signed a consent form agreeing to participate in the study.

Results

The results consist of responses from 49 respondents, 21 males and 28 females that took part in the face-to-face interviews and signed consent. The rest of the socio-demographic characteristics of the participants are shown on Table 1.The number of respondents that claimed that they were current smokers were 13 (26%), most of which were male (77%), and only 3 (23%) were female. Being male was associated with a significantly higher chance of being a smoker than being a female (OR=7.57 p=0.0038).

Table 1. *Socio-demographic characteristics of the participants*

Characteristic	Number of participants	%
Gender		
Males	21	43
Females	28	57
Age (yrs)		
< 24	6	12
25 – 34	37	76
35 – 44	6	12
Marital status		
Single	30	61
Married	19	39
Highest education level		
Primary	34	69
Secondary school	13	27
Tertiary	2	4
Length of employment		
< 2 years	32	66
2 – 5 years	17	34
Type of facility		
Bar	30	61
Beer hall	17	35
Discotheque	2	4
Average work hours per day		
4 – 8	33	67
9 – 12	10	20
13 – 16	6	12

Approximately 46% of the participants reported to have been exposed to second-hand smoke for 5 days or more and over 8 to 12 hours per day. The workers started work around 10am until 10pm or later depending on how busy their places of employment were. On month ends some reported to work until 12 midnight during which time they would be exposed to second-hand smoke. As with active smoking, the longer the duration and the higher the level of exposure to second-hand smoke, the greater the risk of developing adverse effects including lung cancer. The level of smoking inside bars, beer halls, and discotheques is often very high.

Overall, the respondents showed a good (54%) or fair (36%) knowledge that second-hand smoke could cause adverse effects in their health. Adverse conditions mentioned by the respondents included: lung cancer (100%), increased coughing (90%), asthma (60%), heart disease (30%) and nasal sinus cancer. However, less (39%) had good knowledge that exposure, even to low levels, could lead to severe disease or death. Table 2 outlines the knowledge level of the participants. This suggests that workers in bars, beer halls and discotheques in Swaziland were not necessarily likely to be smokers. The high non-availability of employment options in the country probably forces non-smokers to also seek employment in such outlets.

Responses on attitudes were stratified by smoking habits (i.e. never smoked, current or ex- smoker) and a bivariate analysis was calculated. Table 3 shows the findings stratified by smoking habits. A majority of the respondents believed that exposure to second-hand smoke lead the development of adverse side effects (93%). This belief was not significantly different between smokers and non-smokers (p=0.1041). However, when respondents were asked if exposure to second-hand smoke could lead to early death, only 29% agreed, 53% did not agree and 14% were undecided. This lack of knowledge of the possibility of developing severe disease or dying from exposure to second-hand smoke was not significantly different among smokers and non-smokers (p=0.8187). A majority of the respondents agreed that smoking should be banned from indoor workplaces (85%). However, when this assertion was stratified by smoking habits a good proportion of the smokers (46%) that agreed were significantly different among smokers than among non-smokers (p=0.0001). When respondents were asked if taxes on cigarettes should be increased to reduce smoking habits, most of the non-smokers (94%) agreed but a majority of the smokers did not agree (77%). As a result those who agreed that taxes on cigarettes should be increased significantly differed among smokers and non-smokers (p<0.0001). A majority of the participants agreed that enclosed areas for smoking should be created in all public workplaces (96%). Both smokers and non-smokers were in agreement about this suggestion (p=0.4427).

Table 2. *Knowledge level of adverse effects of exposure to second-hand smoke among participants*

Variable	Number (%)
Knowledge about Adverse effects of Exposure to Second-Hand Smoke	
Good Knowledge level	26 (54)
Fair Knowledge level	18 (36)
Poor Knowledge level	5 (10)
Exposure to Second-hand Smoke Leads to Early Death	
Good knowledge level	19 (39)
Fair Knowledge level	23 (47)
Poor Knowledge level	7 (14)

***Table 3**. Respondent's Attitude Towards Second-Hand Smoke*

Respondents (N=49)	Smokers (%)	Non-smokers (%)	p-value
SHS leads to adverse effects			
Agree	11 (22)	35 (71)	1
Do not agree	2 (4)	1 (2)	0.1041
Undecided	0 (0)	0 (0)	
Exposure to SHS leads to early death			
Agree	3 (6)	12 (24)	1
Do not agree	6 (12)	20 (41)	0.8664
Undecided	4 (8)	3 (6)	0.0815
Smoking should be banned from indoor work places			
Agree	7 (14)	35 (71)	1
Do not agree	6 (12)	1 (2)	0.0001
Undecided	0 (0)	0 (0)	
Increase of tax on cigarettes			
Agree	2 (4)	34 (69)	1
Do not agree	10 (20)	2 (4)	<0.0001
Undecided	1 (2)	0 (0)	
Provision of enclosed smoking areas			
Agree	12 (24)	35 (71)	1
Do not agree	1 (2)	1 (2)	0.4427
Undecided	0 (0)	0 (0)	

Only 10 (20%) of the respondents reported to have received information about the adverse effects of tobacco on human health from their employers. However, this information was not about exposure to second-hand smoke but about possible adverse effects of smoking. Nonetheless, the 80% who reported not to have been privy to any information on the risks associated with exposure to tobacco products is unacceptably high. Employers should be forced by appropriate clauses in the legislation to routinely provide adequate information on exposure to tobacco products including second-hand smoke to employees. All non-smoking respondents were in favour of a ban on smoking in indoor workplaces (100%). Among employees that smoked, 30% were in favour. When asked if respondents supported increase of tax on cigarettes, 80% of the non-smokers were for the increase while only 5% of the smokers supported it.

Sixty-seven percent of the respondents were not aware of the presence of legislation that protected them from exposure to second-hand smoking at their workplaces and some reported that such did not exist in Swaziland.

"Nobody has ever talked about such legislation and I doubt that even the officials of the Ministry of Health know it exists. Maybe it was enacted by some officials who died before implementation and it's now gathering dust somewhere. I've never even heard of anyone being arrested for breaking any ban on indoor smoking", one respondent replied.

This assertion suggests that respondents were not involved during the drafting process of the Swaziland Tobacco Products Bill (2013) which was passed into law during the same year. Indoor workers are major stakeholders in the development of such legislation because it is meant to protect them.

Discussion

Current trends suggest that smoking rates were increasing in the Africa Region while decreases of up to 26% have been reported among some of the highest smoking prevalence in Western Europe [2]. The problem is further compounded by the fact that a majority of the smoking population in Africa are the youth, among which smoking rates matches other regions [16]. The lower rates of tobacco taxation, weaker smoke-free policies and fewer restrictions on tobacco advertising in Africa compared with high-income countries are key factors driving the tobacco epidemic on the continent [17]. Shortcomings in these interventions have enabled the tobacco industry to expand its markets on the continent by capitalising on economic growth, changing social norms and population demographics [18]. Strong tobacco control policies, which are among the most effective population-based strategies for NCD prevention, are needed; otherwise the widespread uptake of tobacco use will be a threat not only to human health but also to sustainable human development in Africa.

The demographic data in our study revealed that 43% and 57% of the participants were males and females, respectively. This suggests that a high number of women are exposed to second- hand smoking in bars, beer halls and discotheques in Swaziland compared to men. Recently, a population based study conducted in China suggested a strong association between second-hand smoking and major depressive disorder in perimenopausal women [19]. Breast cancer (BC) is the most common cancer affecting women worldwide and has been associated with active tobacco smoking. Low levels of nicotine (Nic) and 4-(methylnitrosamino)-1-(3- pyridyl)-1-butanone (NNK), have been detected in cases of second-hand smoke (SHS) [20]. The study by Fararieh and colleagues showed that

long term exposure of women to extremely low-doses of nicotine and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) induce non-malignant breast epithelial cell transformation through activation of the a9-nicotinic acetylcholine receptor-mediated signalling pathway [20]. Women have also been reported to have a greater burden of deaths of the total attributable to second-hand smoke than men [12]. The study by Öberg and colleagues [12] also suggested that women had the higher DALYs compared to men. However, due to lack of employment opportunities in Swaziland, many women end up accepting jobs that they know has a heavy burden on their health. Eighty-eight per cent of the participants in this study were of ages less than 34 years and if they continue working in environments that exposed them to second-hand smoke, would definitely develop one or more of the outcomes (lung cancer, ischaemic heart disease) because of the length of time they might be exposed.

Putting together those with good knowledge (54%) and fair knowledge (36%) of the adverse effects of exposure to second-hand smoke among respondents in the study suggests higher knowledge among these indoor workers in Swaziland than that reported from a study conducted in the state of Osun in Nigeria [21], which reported 70.2%. This is probably because smoking is generally despised by many citizens in Swaziland and generally fewer members of the public smoke compared to proportions that smoke in other countries. Generally, a shift following a change from the political system in the post-apartheid era to a government that had a political will to advance tobacco control has been witnessed. Many families emphasize non-smoking habits to their children from very tender ages and the adverse effects are emphasized. This knowledge is supposed to translate to actions leading to employees reacting or quitting their jobs. The fact that they continue to expose themselves suggests that the employees undermine the risk or they are desperate to keep their jobs regardless of the associated risks.

Seventy percent of the respondents suggested creation of enclosed areas for smokers. This percentage could possibly be higher if respondents had seen such partitioned areas, but because public areas lack these demarcated areas in Swaziland, the 30% could not make a similar suggestion. Of note is that even the smoking respondents suggested creation of demarcated areas for smoking suggesting that they were also aware of the adverse effects their habits had on other occupants of indoor workplaces. However, Cains et al., [22] concluded that at best only partial protection from second-hand smoke is achieved by designated "no smoking" areas, and that this is in no way comparable to the protection afforded by smoking bans in all indoor workplaces. The study by Cains and colleagues [22] compared indoor and outdoor nicotine means showing that smoking sections caused 86% particle air pollution (PM10) while designated non-smoking areas caused 71% of PM10. These findings suggest that designated smoking areas should not be thought to provide any tangible solution to exposure to second-hand smoke when applied alone. They should always be accompanied by a complete ban of smoking inside workplaces such as bars, beer halls and discotheques. In anyway, designated smoking rooms are in violation of Article 8 of the WHO Framework Convention on Tobacco Control (FCTC) and the Guidelines for Article 8 which requires effective measures of protection from exposure to tobacco smoke.

As envisioned by Article 8 of the WHO FCTC, Paragraph 6 require the total elimination of smoking and tobacco smoke in a particular space or environment in order to create a 100% smoke-free environment. Moreover, Paragraph 14 of the Article 8 Guidelines provides that Article 8 creates an obligation to provide universal protection by ensuring that all indoor public workplaces, all public transport, and appropriate outdoor or quasi-outdoor public places are free from exposure to tobacco smoke. Nonetheless, the respondents of this study might be accepting the creation of designated smoking areas because they might have seen these elsewhere, probably in other countries since 91.3% of the countries at global level, including the smoke-free legislation of Swaziland's economic neighbor, South Africa, violate this total ban by allowing designated smoking rooms [23]. Second-hand smoke exposure among U.S. non- smokers declined from 87.5% to 25.2% during 1988–2014 partly due to enhanced and equitable implementation of comprehensive smoke-free laws and policies for workplaces and public places and smoke-free rules for homes and vehicles [24], further supporting the fact that 100% ban on indoor smoking is the likely decision to lead to positive results.

No intense measures were taken to educate employees that were likely to be exposed to second- hand smoke, hence low knowledge of their rights and the existence of legislation or the contents meant to protect them. Nonetheless, the Swaziland Tobacco Products Act of 2013 is not very old, which explains the poor knowledge of its existence among those it is meant to protect. The respondents should have been involved during the drafting process in order to create ownership and create awareness of the presence of such legislation. However, difficulties in strict compliance with comprehensive bans have been reported in some countries [25], suggesting that such bans are likely to take some time to produce recognisable results. Nonetheless, implementation of stringent smoke-free regulations were reported to result in gradual improvement of indoor air quality in Korea, Greece, the USA and in Scotland and England [25-29], suggesting that speeding up of the enforcement of the Swaziland Tobacco Products Control Act of 2013 towards enforcement of a complete ban of smoking in all indoor workplaces and public areas are likely to produce the same effect in Swaziland. The legislation should also enforce efforts from owners of indoor workplaces to create separate smoke places and to initiate efforts to assist smokers quit their smoking habit. New York City reported that a workplace smoking ban improved air quality in bars and restaurants, decreased worker second-hand smoke dose by 85%, and that both business receipts and employment increased in bars and restaurants [30]. Most bars, beer halls and discotheques sell cigarettes in addition to alcoholic beverages, placing cigarette areas in visible parts of the outlets. The legislation should ensure that cigarettes are hidden because their appearance tends to encourage smoking practices. Implementation of comprehensive bans of exposure to tobacco smoke should be accompanied by the erection of large signs warning occupants of workplaces that smoking is prohibited.

Program implication

The findings of this study suggest that a variety of health conditions might exist among workers in bars or pubs, beer halls and discotheques following exposure of up to 13 hours in the two cities in Swaziland. Unfortunately, our study did not assess the prevalence of conditions such as heart disease, lung cancer, respiratory diseases as well as problems affecting ears, nose and throat among the participants. However, the researchers have reason to believe that, among workers that have been in such establishments for many years, these conditions are likely to exist even if they may not have shown symptoms. Legislation banning indoor smoking in Swaziland is contained in the Tobacco Products Control Act passed on 01 August, 2013. The Act provides a legal framework for the use of tobacco products, including control of exposure to tobacco smoke among other objectives. However, since the passing of the Act four years ago, it has not been enforced.

Quick enforcement of this Act should include efforts to introduce programs aimed at creating awareness of the ill-effects of exposure to second-hand smoke and the rights of indoor workers in order to ensure protection of the health of indoor workers including those that work in bars, beer halls and discotheques in the country. Knowledge of the provisions in the Act is likely to improve attitudes towards exposure to second-hand smoke and increase self-responsibility among workers to ensure that their rights are protected. Studies conducted in California among workers in bars and taverns reported resolution of respiratory symptoms among 77% of those that initially reported such symptoms prior to the ban on indoor smoking thereby improving the respiratory health of the workers [31]. Other studies have reported that smoke- free laws banning smoking in indoor workplaces rapidly reduced numbers of acute coronary events [32,33]. These findings suggest that there is a likely benefit of the enforcement of the Act even among most workers that already show respiratory and coronary symptoms from exposure. Nonetheless, despite delay in enforcing legislation banning smoking in public places, the country has made important advances in the development of an anti-smoking population. For example, tobacco advertising, promotion and sponsorship of any type is not permitted in Swaziland. The Swaziland government also banned smoking in all public vehicles and the ban has received adequate compliance. Some public areas such as the new King Mswati III International airport totally prohibit smoking inside. A majority of these advances have been spearheaded by the Ministry of Health.

Limitations

The key limitations of the study were its failure to investigate prevalence of adverse defects associated with exposure to second-hand smoke among the participants. Determination of the prevalence of adverse effects among employees could have facilitated risk assessment of the different work areas. For example, a risk assessment generalizing the nicotine levels reported by a study conducted by Cains et al., [22] in New South Wales, Australia, estimated that 73 – 97 deaths per year occurred among 40 000 workers in pubs, taverns, bars and clubs for non-smokers and smokers combined. This range was found to be equal to all annual occupational fatalities in New South Wales. Also, our study assumes that the level of exposure of the workers was the same, only differing in the length of exposure yet exposure to second-hand smoke increases with decreasing distance. It is recommended that in-depth studies be conducted in such environments where instruments to measure the level of nicotine around the points where workers spent most of their time could be used. Such studies should also take into account the number of smokers present and their smoking rate as well as the volume of public space in the establishment, and the rate at which second-hand smoke is removed by air handling systems if available. Our study also did not consider the amount of ventilation provided at the working areas. Knowledge of all these factors could provide good estimates of the concentrations of second-hand smoke inside indoor workplaces in order to better understand the risk associated with prolonged exposure.

Conclusion

Employees who work in bars, beer halls and discotheques in Swaziland are aware of the adverse effects of exposure to second-hand smoke. However, they are not aware that exposure could lead to serious illness or early death. Most workers are not aware of the existence of legislation meant to protect indoor workers and efforts to inform them about the adverse effects of exposure to second-hand smoke by employers are minimal. These findings suggest that enforcement of the Swaziland Tobacco Products Act (2013) should be speeded up to benefit indoor workers in bars, beer halls and discotheques through improvement of indoor air quality from a comprehensive ban of indoor smoking. Studies to determine obstacles causing delay of enforcement of the Swaziland Tobacco Products Act (2013) should be conducted in order to resolve identified obstacles and assure a smooth implementation of the WHO Framework Convention on Tobacco Control. In order to ensure that the country's legislation complies with the WHO FCTC and to get the necessary support and protection, it must follow the WHO FCTC implementation guidelines. However, comprehensive ban of smoking inside all workplaces and indoor areas is likely to receive public support in Swaziland due to the public's interest to achieve a smoke-free environment. Continued measures to implement comprehensive smoke-free laws in workplaces and public places, adoption of smoke-free home and vehicle rules, and educational interventions warning about the risks for second-hand smoke exposure can further reduce second-hand smoke exposure in the country.

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Conflict of interest

The researchers would like to report no conflict of interest in this study.

Authors' contributions

SV and MC drafted the concept note and draft protocols; SV and MC conducted the interviews and all data collection; SV, MC, LD and VL were all involved in data analysis and article write- up.

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