

RESEARCH ARTICLE

Support for a Campus Tobacco-Free Policy among Non-Smokers: Findings from a Developing Country

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Abstract

Background: A tobacco-free workplace policy is identified as an effective means to reduce tobacco use and protect people from second-hand smoke; however, the number of tobacco-free policies (TFP) remains very low in workplaces in Malaysia. This study explored the factors affecting support for a tobacco-free policy on two healthcare campuses in Malaysia, prior to the implementation of TFP. **Materials and Methods:** This cross-sectional study was conducted among 286 non-smokers from two healthcare training centres and two nearby colleges in Malaysia from January 2015 to April 2015. A standardized questionnaire was administered via staff and student emails. The questionnaire collected information on sociodemographic characteristics, support for a tobacco-free policy and perceived respiratory and sensory symptoms due to tobacco exposure. Bivariate and multivariate logistic regression analyses were performed to estimate the independent effects of supporting a tobacco-free campus. **Results:** The percentage of individuals supporting completely tobacco-free facilities was 83.2% (N=238), as opposed to 16.7% (N=48) in support of partially tobacco-free facilities. Compared to the supporters of partially tobacco-free facilities, non-smokers who supported completely tobacco-free health facilities were more likely to be female, have higher education levels, to be very concerned about the effects of other people smoking on their health and to perceive a tobacco-free policy as very important. In addition, they perceived that tobacco smoke bothered them at work by causing headaches and coughs and, in the past 4 weeks, had experienced difficulty breathing. In the multivariate model, after adjusting for sociodemographic characteristics and other factors, only experiencing coughs and headaches increased the odds of supporting a completely tobacco-free campus, up to 2.5- and 1.9-fold, respectively. **Conclusions:** Coughs and headaches due to other people smoking at work enhances support for a completely tobacco-free campus among non-smokers.

Keywords: Tobacco policy - support - workplace - campus - non-smokers - Malaysia

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Introduction

The prevalence of smoking in Malaysia is 22.5% among adults aged 15 years and older and as high as 46.5% among the male population, peaking among males ages 21 to 40 years of age. This rate is only 3% lower than the prevalence 10 years ago (Lim et al., 2013). Among smokers, only 9.5% have previously quit and the World Health Organization recommends a 30% reduction in the smoking rate of males over 15 years of age (Organization, 2013).

Although the effects of smoking on primary smokers are tremendous (Jha and Peto, 2014), there is growing concern about the effects of exposure to second-hand smoke (Barnoya and Glantz, 2005). Environmental tobacco smoke (ETS) or second hand smoke (SHS) is a pollutant

comprising a mixture of chemicals, of which many are carcinogenic. Exposure to ETS causes many adverse health effects, including heart disease and lung cancer in adults and lower respiratory illnesses, and the exacerbation of asthma in infants and children (Sopori, 2002; Braun et al., 2006). In the United States, almost 2.5 million non-smokers died from lung cancer and heart disease due to SHS exposure, and the estimated productivity loss due to second-hand smoke is approximately USD 5.6 billion per year (Health and Services, 2014). In Malaysia, surveys showed that 39.8% of adults who work indoors are exposed to second-hand smoke, which include 84.9% of employees in cafes/coffee shops, 28.2% of employees in indoor government buildings and 8.7% of employees in healthcare facilities (Lim et al., 2009).

There are many interventions used to combat smoking

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and the hazards of second-hand smoke. One important approach is the creation of a tobacco-free environment. Smoke-free legislation is by far the most effective method for reducing exposure to SHS. The direct effects of such a ban should result in decreased levels of passive smoking (Azagba, 2015). In addition, smoke-free bans have been shown to reduce respiratory symptoms among workers following a complete ban (Fernandez et al., 2009). Smoking prohibition may also reduce the exposure of non-smokers to SHS and creates an environment that may assist smokers in quitting. Creating a smoke-free environment is an effective intervention because it is easier to encourage smokers to quit in an environment that is supportive of quitting and discourages new cigarette intake (Frieden, 2014).

Since Malaysia became a signatory of the WHO's Framework Convention on Tobacco Control (FCTC) in 2005, laws at the national level ban smoking in public indoor places and workplaces. In recognition of Article 8 of the FCTC, Malaysia is obligated to protect the public from SHS exposure by instituting a full smoking ban (100% smoke-free) covering public places, including indoor government offices, medical facilities, schools, cultural venues (including theatres, concert halls, public libraries, museums, galleries and other places), public transportation vehicles, stadiums, and commercial venues. The partial smoking ban (with smoking rooms) covers nightclubs/bars, cafes/restaurants, hotels and government workplaces. However, research reveals that employees who work in workplaces with designated smoking areas have a 2.9 times higher risk of exposure to SHS than those working in areas with a complete ban (Skeer et al., 2005). The partial ban has also not been effective in public places such as restaurants and pubs (Abidin et al., 2013). Moreover, according to MPOWER, a technical package of the WHO to support tobacco control measures, at least 90% of public places should be covered by complete smoke-free legislation (Frieden, 2014).

Despite the benefits of tobacco-free policies, research on smoking bans among college and healthcare workers is scarce and few studies have examined the acceptance of total or partial bans prior to policy implementation. In psychiatric healthcare facilities, for instance, 87% rejected the idea of total smoking bans (Etter and Etter, 2007). Similarly, in Germany, a partial smoking ban was preferred (Reuband, 2014) in hospitals, and colleges without healthcare facilities had similar preferences (Mamudu et al., 2015). Nonetheless, little data are available in developing countries where the smoking prevalence is still high, and no data are currently available from medical colleges with healthcare facilities.

Recently, one of Malaysia's largest college chains, comprising over 20 branches across the country, started implementing a total tobacco-free policy in stages. This policy bans smoking on campus and in health facilities in addition to banning any form of tobacco product including shisha and e-cigarettes. The policy also bans the sale, sponsorship, and indirect advertisement of these products. Before implementing this policy, to ensure good compliance, a preliminary survey was conducted to assess the level of support for either total tobacco-free or partial

tobacco-free policies among non-smokers and to assess the reasons for support. Understanding these factors may ensure that proper measures are incorporated prior to or during the implementation of the total tobacco-free policy. In this article, we examine the association between support of a total tobacco ban vs. support of a partial tobacco ban with regards to i) sociodemographic characteristics and ii) perceived self-reported changes in symptoms and illnesses.

Materials and Methods

This is a cross-sectional study conducted in two teaching medical colleges with healthcare facilities. The healthcare facilities are able to accommodate approximately 100 beds and comprise various medical specialties and subspecialties. The number of non-smokers on campus was estimated to be approximately 700 individuals. The data were collected via email from staff and students from the 1st of March 2015 to the 30th of April 2015. A few reminders were sent and email responses were enforced by upper management. The survey was built using a customized online survey. Participants who did not complete the full questionnaire were excluded from the survey.

The inclusion criteria were all staff and students who stayed or worked on campus and in the health care facilities, aged 18 years and older and who were able to read and understand the Malay language. Individuals who smoked at least one cigarette per day were excluded from the survey. The participants provided informed consent, and the survey was approved by the university's ethical review board. We calculated the sample size for this study using the Open Epi sample size calculation software, based on the support for policy from another study (Abidin et al., 2013). The sample size required to achieve 80% power was 265 participants.

Measures

Healthcare workers and students provided information regarding i) sociodemographic and policy support, ii) concerns about second-hand smokes and iii) the existence of symptoms following in the last 4 months. Policy support was evaluated by asking the respondents whether they support a) totally tobacco-free or b) partially tobacco-free environment. Concerns about health were evaluated by asking the respondents the degree to which tobacco smoke bothered them at work. The symptoms assessed included worrying about the long term health effects, asthmatic episodes, allergic reactions, breathing difficulty, eye irritation, cough, the smell, and a loss of concentration. The symptoms experienced by the respondents within the last four weeks were evaluated by a questionnaire adapted from previous studies (Farrelly et al., 2005). The questionnaire was translated into the Malay language and pretested for face validity and reliability among 30 faculty members. Five upper respiratory symptoms were surveyed, including dyspnoea, wheezing, cough in the morning, cough during the day or at night and mucus production. The other three sensory symptoms surveyed were eye irritation, sneezing or a runny nose, and sore

throat.

Data analysis

The research team entered and cleaned the data using SPSS version 22.0. The sociodemographic characteristics were analysed by the Chi-squared test for categorical variables and the t test and Anova for continuous variables. We used multivariate logistic regression (using backward methods) to investigate the association between support for either the total or partial policy, sociodemographic characteristics and respiratory symptoms. The results are presented as numbers, percentages and odds ratios.

Results

Approximately 35% of the eligible non-smokers responded to the survey. Over 50 surveys were incomplete and automatically excluded by the online survey software. The survey participants' mean age was 26.07 years (SD=8.12). More than half of the respondents (69%) were female, and the majority had either post high school qualifications or postgraduate qualifications (80%). Medical students comprised the majority of the respondents (74%), followed by medical specialists/lecturers (13.2%) and nurses and other administrative staff (9%). (Table 1)

Support for tobacco-free policies was compared to the participants' sociodemographic characteristics using bivariate analysis. Compared to those who supported a partial tobacco-free policy, non-smokers who support completely tobacco-free health facilities were more likely to be female ($P=0.03$) and to have higher levels of education ($P=0.04$). Similarly, feeling very concerned about the effects of other people's smoking on your own health and the perception that a tobacco-free policy is 'very important' were positively associated with supporting a total tobacco-free policy ($P < 0.05$). However, we found no significant association between different occupations or ethnicity groups and policy support.

The majority of the respondents were worried about the long term effects of other people's smoking on their own health (97%). More than half of the participants worried about breathing difficulties, headaches, a loss of concentration and the smell of tobacco on their clothes and hair. The highest symptom reported in the last four weeks was wheezing, as shown in Table 2. A crude analysis was used to examine the association between support for total or partial tobacco-free policies. The odds ratios (ORs) shown in Tables 2 and 3 represent the odds of supporting a totally tobacco-free policy.

As shown in Table 3, potential confounders were adjusted for to identify the independent relationship with supporting a totally tobacco-free policy. Those who supported a totally tobacco-free policy were significantly more likely to perceive that tobacco smoke bothered them at work by causing headaches and coughs and to have experienced difficulty breathing the past 4 weeks. In the multivariate model shown in Table 3, only experiencing coughs and headaches increased the odds of supporting a completely tobacco-free campus, up to 2.5- and 1.9-fold, respectively.

Table 1. Socio Demographic and Opinion on Tobacco Policy

Factors	Total free, (N=238) N (%)	Partial/Permitted (N=48), N (%)	Total (N=286), N (%)
Gender:			
Male	62 (35.2)	20 (41.7)	82 (28.7)
Female	176 (64.8)	28 (58.3)	204 (71.3)
Educational level:			
Secondary	43 (18.1)	4 (8.3)	47 (16.4)
Degree	106 (44.5)	18 (37.5)	124 (43.4)
Postgraduate	89 (37.4)	26 (54.2)	115 (40.2)
Nationality:			
Malaysian	236 (99.1)	48 (100)	284 (99.3)
Non Malaysian	2 (0.9)	0 (0)	2 (0.7)
Race:			
Malay	228 (95.8)	45 (93.8)	273 (95.5)
Non Malay	8 (4.2)	3 (6.2)	11 (4.5)
Household income:			
< RM2,000	147 (61.8)	30 (62.5)	177 (62.0)
RM2,000- RM5,000	48 (20.1)	9 (18.8)	57 (20.0)
RM5,000-RM10,000	22 (9.3)	4 (8.3)	26 (9.0)
>RM10,000	21 (8.8)	5 (10.4)	26 (9.0)
Medical doctor:			
Yes	13 (5.5)	2 (4.2)	15 (5.2)
No	225 (94.5)	46 (95.8)	271 (94.8)
Describe your work area:			
Individual room	65 (27.3)	13 (27.1)	78 (27.3)
Shared room	72 (30.3)	20 (41.7)	92 (32.2)
Shared area	56 (23.5)	8 (16.7)	64 (22.4)
Laboratory	9 (3.8)	2 (4.2)	11 (3.85)
Outside	9 (3.8)	3 (6.1)	12 (4.2)
Others	27 (11.3)	2 (4.2)	29 (10.1)
Are you bothered about tobacco smoke at work			
Yes	225 (94.5)	43 (89.6)	268 (93.7)
No	13 (5.5)	5 (10.4)	18 (6.3)
Did anyone smoke in the areas where you work?			
Yes	130 (54.6)	30 (62.5)	160 (55.9)
No	66 (27.7)	10 (20.8)	76 (26.6)
Dont know	42 (17.7)	8 (16.7)	50 (17.5)
How often do you see anyone smoking in the campus in the last 30 days:			
Daily	36 (15.1)	6 (12.5)	42 (14.7)
Often / weekly	44 (18.5)	14 (29.2)	58 (20.3)
Rarely	96 (40.3)	20 (41.7)	116 (40.6)
Never	62 (26.1)	8 (16.6)	70 (24.5)
How concerned about the effect of other people smoking to your health			
Very concerned	183 (76.9)	28 (58.3)	211 (73.8)
Moderately concerned	39 (16.4)	12 (25.0)	51 (17.8)
Little concerned	14 (5.9)	7 (14.6)	21 (7.3)
Not at all concerned	2 (0.8)	1 (2.1)	3 (1.0)
You wanted to move away from the area in which you were working because other people smoking			
Frequently	117 (49.2)	19 (39.6)	136 (47.6)
Occasionally	61 (25.6)	14 (29.2)	75 (26.2)
Never	60 (25.2)	15 (31.2)	75 (26.2)
Ever taken time off work because other people smoking in your workplace			
Yes	11 (4.6)	3 (6.3)	14 (4.9)
No	227 (95.4)	45 (93.7)	272 (95.1)
How important is it you to have a smokefree campus			
Very important	218 (91.6)	32 (66.7)	250 (87.4)
Important	18 (7.6)	13 (27.1)	31 (10.8)
Little important	2 (0.8)	2 (5.3)	4 (1.4)
Not at all important	0 (0.0)	1 (0.9)	1 (0.3)

Table 2. Crude Differences in Worrying about Tobacco Smoke Affecting Health

Factors	Total free, (N=238) N (%)	Partial/Permitted (N=48), N (%)	Total (N=286), N (%)	OR (95% CI)
Worry about affecting long term health				
Yes	229 (84.2)	43 (15.8)	272 (100.0)	2.82 (0.59, 9.17)
No	7 (70.0)	3 (30.0)	10 (100.0)	
Asthmatic attack				
Yes	83 (84.7)	15 (15.3)	98 (100.0)	1.23 (0.63, 2.04)
No	148 (81.8)	33 (18.2)	181 (100.0)	
Allergic reaction				
Yes	82 (81.2)	19 (18.8)	101 (100.0)	0.84 (0.44, 1.60)
No	139 (83.7)	27 (16.3)	166 (100.0)	
Breathing difficulty				
Yes	177 (88.1)	24 (11.9)	201 (100.0)	2.73 (1.40, 5.32)
No	54 (73.0)	20 (27.0)	74 (100.0)	
Eye irritation				
Yes	103 (87.3)	15 (12.7)	118 (100.0)	1.72 (0.86, 3.67)
No	120 (80.0)	30 (20.0)	150 (100.0)	
NoHeadache(n=237) (n=48) (n=285)				
Yes	157 (89.2)	19 (10.8)	176 (100.0)	3.09 (1.62, 5.87)
No	75 (72.8)	28 (27.2)	103 (100.0)	
Coughing				
Yes	180 (88.2)	24 (11.8)	204 (100.0)	3.158 (1.67, 5.99)
No	57 (70.4)	24 (29.6)	81 (100.0)	
Runny nose				
Yes	92 (85.2)	16 (14.8)	108 (100.0)	1.35 (0.70, 2.61)
No	132 (81.0)	31 (19.0)	163 (100.0)	
Loss of concentration				
Yes	182 (85.4)	31 (14.6)	213 (100.0)	-
No	56 (76.7)	17 (23.3)	73 (100.0)	
Clothes and hair smell				
Yes	215 (84.0)	41 (16.0)	256 (100.0)	-
No	23 (80.0)	7 (20.0)	30 (100.0)	
Symptoms experienced in the Past 4 weeks : Wheezing				
Yes	15 (83.3)	39 (16.7)	268 (100.0)	0.99 (0.28, 3.57)
No	223 (83.2)	45 (16.8)	18 (100.0)	
Shortness of breath				
Yes	58 (92.1)	5 (7.9)	63 (100.0)	0.36 (0.14, 0.95)
No	180 (80.7)	43 (19.3)	223 (100.0)	
Usually cough first thing in the morning				
Yes	50 (86.2)	8 (13.8)	58 (100.0)	0.75 (0.33, 1.71)
No	188 (82.5)	40 (17.5)	228 (100.0)	
Cough all the day or night				
Yes	60 (84.5)	11 (15.5)	71 (100.0)	0.88 (0.42, 1.84)
No	178 (82.8)	37 (17.2)	215 (100.0)	
Bring up any phlegm				
Yes	59 (83.1)	12 (16.9)	71 (100.0)	1.01 (0.49, 2.07)
No	179 (83.3)	36 (16.7)	215 (100.0)	
Eye red and irritation				
Yes	50 (86.2)	8 (13.8)	58 (100.0)	0.75 (0.33, 1.71)
No	188 (82.5)	40 (17.5)	228 (100.0)	
Runny nose, wheezing or nose irritation				
Yes	117 (86.0)	19 (14.0)	136 (100.0)	0.68 (0.36, 1.28)
No	121 (80.7)	29 (19.3)	150 (100.0)	
Sore throat				
Yes	100 (84.0)	19 (16.0)	119 (100.0)	0.9 (0.48, 1.70)
No	138 (82.6)	29 (17.4)	167 (100.0)	

Table 3. Logistic Regression for Support of Tobacco Free Policy

	B (SE)	Wald (df)	P	OR (95% CI)
Headache	0.67 (0.38)	3.12 (1)	0.07	1.96 (0.93-4.14)
Coughing	0.92 (0.38)	5.81 (1)	0.016	2.50 (1.19-5.28)

Discussion

The purpose of this study was to identify factors influencing the support for a totally tobacco-free campus and health facilities. Our results showed that support for

a completely tobacco-free campus was 83.2%. This is consistent with previous studies of policy acceptance among non-smokers (Wernz et al., 2009; Voci et al., 2010) and may suggest an awareness of the risks of exposure to second-hand smoke in college and healthcare facilities in developing countries such as Malaysia. Although Malaysia has only recently begun implementing measures of FTCT Article 8, many initiatives, including media dissemination of information to the public about the dangers of second-hand smoke, have been undertaken. This could explain the high level of support for the proposed tobacco-free policy, which is almost comparable to the levels of support in developed countries (Danishevski et al., 2008; Yong et al., 2010).

Although the smoking ban law is in place at all colleges and healthcare facilities in Malaysia, healthcare workers, students and other academic and administrative employees reported that the smoking ban was not observed. More than 33% of respondents observed smoking activities daily/occasionally throughout the campus within the last month. This is consistent with other studies of similar scenarios and concludes that national smoke-free bans are less effective than local tobacco free bans (Giraldi et al., 2013). More comprehensive policies need to be implemented on a smaller scale and should be customized to maximize the potential benefits to workers, employees and patients. We also presumed that this finding could be explained by the fact that no proper tobacco policy was in place at the time of the survey and thus that some administrators did not consider tobacco use to be a significant health issue on campus due to the lack of signage and enforcement of existing laws and no proper information for visitors/college residents. Hence, our findings revealed that over 90% of the respondents supported the implementation of a specific tobacco-free policy at the workplace, and the majority preferred a total ban instead of a partial ban.

The analysis of sociodemographic characteristics showed that supporters of the complete tobacco policy are more likely to be female and to have higher levels of education than supporters of a partially tobacco-free policy. Similar results were found for gender and education levels among the general public (Rashid et al., 2014). Nonetheless, in the multivariate model, none of the sociodemographic factors were positively related to policy support. This lack of relationship is consistent with the research findings among college students reported by Mamudu et al. (2015). Furthermore, we found that non-smokers who are very concerned about their health tended to be more likely to support the total tobacco-free environment policy. This result may show that Malaysian citizens will be more concerned about protecting their health only when the effects of smoke exposure have been demonstrated physically. In other words, the attitudes of Malaysians might differ from those of individuals from developed countries, where promoting good health and disease prevention is a main concern at the individual level. Second, we suspect that this finding may be due to the Malaysian focus on smokers. In Malaysia, smoke-related health promotion activities have always been targeted at smokers, especially regarding the harms of tobacco use. Few health promotion activities have been

conducted to promote comprehensive smoke-free policies and to protect individuals from second-hand smoke. This approach differs from those of developed countries, where protecting individuals from second-hand smoke has become a top priority (Ickes et al., 2013). Hence, future health promotion and education activities should promote tobacco-free policies at smaller scales, with greater enforcement and enhanced activities to increase awareness of the harmful effects of second-hand smoke (Rashid et al., 2014).

Among the symptoms that bothered smokers at work, most respondents worried about headaches and coughs, which resulted in up to a 2.5 and 1.9 times higher support of a full ban over a partial ban. It is interesting to note that no perceived symptoms were significantly associated with support for the total tobacco-free policy. Although no study has looked into the association between symptoms and support for a total tobacco-free policy, other studies on second-hand smoke exposure revealed that there is a direct association between the duration of exposure and the development of symptoms (Radwan et al., 2014). Hence, we assumed that our study could differ from others because few of our respondents were exposed to second-hand smoke. Most respondents worked indoors and avoided going places where smoking is common. Another reason for the difference could be the lack of detailed knowledge among the respondents of the effects of second-hand smoke exposure on both sensory and respiratory symptoms. Similarly, we suggest that although non-smokers acknowledge that smoking is an unacceptable social behaviour, their understanding and acceptance of smokers may vary (Serafin et al., 2014). Further research may need to explore cultural attitudes towards second-hand smoke and the viewpoints of various groups of individuals, including patient perspectives, on how to shift the social norms to create a total tobacco-free environment.

The strength of this study lies in our ability to obtain views towards a completely tobacco-free campus policy prior to its implementation. This pre-implementation survey not only enhances the awareness of college and hospital residents and staff but also enables them to feel that they are included as policy decision makers. We managed to obtain views from healthcare workers, students in clinical and preclinical years, medical specialists, lecturers, administrative staff and support staff. This helped us represent the various groups. Second, the anonymity of the survey was aimed to encourage the respondents to provide honest responses on the questionnaires. The limitations of this study include the use of convenience sampling rather than random selection, which introduced response bias. Although the top management encouraged all staff and students to complete the surveys, the response rate was approximately 50%, possibly because many of the staff did not check their email regularly or disregarded certain emails. As a result, we may not be able to capture non-smokers who are less concerned about the policy. Second, the nature of the email survey, which excluded incomplete answers on any section of the questionnaire, excluded 10% of the respondents. Nonetheless, we achieved a higher than normal response

for a survey (30%) (Hardigan et al., 2012).

In conclusion, smoking remains an unresolved issue in healthcare facilities and among college staff, students and visitors. Despite the existence of smoking bans in hospitals and colleges, a minority of users continue to smoke within the vicinities. One of the most effective methods of ensuring compliance towards the smoking bans is the adoption of tobacco-free policies in colleges. Efforts to ensure compliance require support for such policies at all levels and remain a challenge. This study proves that although support for such policies is good, there are still some areas requiring improvement. First, education about the impact of such policies on second-hand smoke and health should be intensified. Second, smokers should be assisted in quitting when the policy is in place. Third, training and monitoring policy violators should be enforced to create a sustainable and supportive campus environment. Finally, this study suggests that to gain support for such policies while addressing the individual's right to smoke, the priority should be placed on protecting the majority of individuals from second-hand smoke exposure by taking the approach of addressing their common symptoms due to second hand smoke.

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