



## An online survey on knowledge, attitude and practice among primary healthcare providers towards smoking cessation in Selangor, Malaysia

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### ABSTRACT

**Objective:** We assessed knowledge about the health effects of smoking, attitude, and intention to practice smoking cessation advice.

**Methods:** A cross-sectional online survey was done among 524 healthcare providers in 30 primary care clinics in Selangor State, Malaysia. Association of HCPs' smoking cessation practices with demographics, service-related and smoking-related factors were tested by Poisson regression.

**Results:** Overall current smoking prevalence was 3.1 (95%CI 1.6, 4.5), significantly higher among males (14.4 vs 0.2,  $p < 0.001$ ). Knowledge score was higher (mean 10.8, SD 1.5, maximum 13) than attitude (mean 43.5, SD 13.2, maximum 65) and practice (mean 33.0, SD 9.2, maximum 45) towards smoking cessation. Practice score was associated with female sex [Incidence Rate Ratio (IRR) 1.1, 95%CI 1.09, 1.2], being a nurse (IRR 1.08, 95%CI 1.04, 1.12), knowledge (IRR 1.02, 95%CI 1.01, 1.03), attitude (IRR 0.997, 95%CI 0.99–1.00) and smoke-free homes (IRR 0.89, 95%CI 0.85, 0.94).

**Conclusion:** Involvement of female HCPs (nurses) could improve cessation practices in primary care.

### What we already know

Primary healthcare providers have the potential to promote smoking cessation in the population; being role models themselves and advising smokers to quit.

Existing literature reports healthcare providers' knowledge on health effects and/or practices towards smoking cessation among their patients only.

Few studies have explored knowledge, attitudes, and intentions to provide smoking cessation advice for family, friends, and patients among all cadres of HCPs in primary care settings.

### What this article adds

Our results suggest that the low prevalence of smoking and good knowledge about the health effects of smoking did not translate into positive attitudes or intention to advise smoking cessation.

Being a female healthcare provider, nurse, and smoke-free environments at home and in healthcare settings were associated with the intention to advise smoking cessation.

Results suggest that nurses have a potential role in practicing smoking cessation and smoke-free policies are more conducive to providing cessation advice.

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## 1. Introduction

Tobacco kills more than eight million people globally and 20,000 deaths among Malaysians annually are attributable to tobacco use including second-hand smoke exposure.<sup>1</sup> Prevalence of current smokers in Malaysia was 21.3% and the prevalence of exposure to second-hand smoke at home was 31%.<sup>2</sup> Health professionals' role in tobacco control is vital, as they can inform their patients about the health effects of smoking and provide them with smoking cessation advice.<sup>3</sup> Instead of being role models to their patients and community, an estimated 18% of healthcare providers (HCPs) are smokers.<sup>4</sup> HCPs smoking behavior may negatively affect their intentions to provide cessation advice to their smoking patients.<sup>5</sup> Conversely, non-smoking HCPs are more likely to offer smoking cessation advice.<sup>6</sup>

In Malaysia, smoking cessation services are provided mainly at government-run primary care clinics. Research has shown that even a brief smoking cessation advice by HCPs can improve cessation rates and modify health behavior to improve long-term success.<sup>7</sup> A brief intervention from a general practitioner may be as effective as many behavioral support sessions by a trained nurse.<sup>8</sup>

Studies about knowledge about the health effects of smoking, attitude towards, and practice of smoking cessation among HCPs are important to understand their involvement in smoking cessation programs. Studies from Malaysia have shown that non-smoking medical students had better knowledge about tobacco use and had positive attitudes towards smoking cessation advice. However, only 50% of the medical students agreed that doctors have a professional duty to provide cessation advice to their smoking patients.<sup>9,10</sup> Encouragingly, 97% of Italian public health professionals affirmed their role in providing smoking cessation advice.<sup>11</sup>

Research shows that training HCPs on smoking cessation improves their practice in smoking cessation counseling.<sup>3</sup> However, training on smoking cessation is not optimal. A Malaysian study found that only 69.7% of 140 primary care doctors were trained in smoking cessation.<sup>12</sup> In Jordan, the proportion of HCPs who had received training was only 25.5%.<sup>13</sup>

Current literature on HCPs' practice on smoking cessation advice among the patients are limited to doctors and nurses. However, all cadres of HCPs have a collective role in providing a conducive environment to practice smoking cessation advice. HCPs have a potential role to play in providing cessation advice among their friends and family as well. Data on smoking behaviors among Malaysian primary care HCPs and their knowledge, attitude, and practice towards smoking cessation is limited to the practice of doctors' advice to their patients on smoking cessation. Such information is important to assess the impact of existing cessation training programs and influence training approaches in smoking cessation for HCPs and medical students.<sup>14</sup> To fill this critical gap, we aimed to assess the knowledge of HCPs about the health effects of smoking and their attitude towards and intention to practice smoking cessation advice among patients, family, and friends. We also determined the association of smoking cessation practice with demographic factors, tobacco-use behaviors, knowledge, and attitude.

## 2. Methods

### 2.1. Study design, setting, and participants

We conducted a cross-sectional online questionnaire survey in March 2021 in 30 primary health clinics in three of the nine districts (Hulu Langat, Petaling, Gombak) in Selangor State, Malaysia. Selangor is the most populous state in Malaysia having a total population of 6.53 million. All HCPs who were currently in service in all 30 primary healthcare clinics (also known as Klinik Kesihatan) were eligible to participate.

### 2.2. Sample size and sampling

We determined the sample for estimation of correct knowledge about the health effects of smoking on a finite sample of about 3000 HCPs. We used <https://www.openepi.com/SampleSize/SSPropor.htm> for sample size calculation for sample size determination. = 3000, P = 80% proportion who had correct knowledge smoking causes lung cancer Otmowo et al., in 2016,<sup>15</sup> precision = 0.03, C = 1.96 for 95% Confidence, hence the determined sample size was 557. To account for online survey methods and the anticipated non-response rate of 25%, a final sample of 700 was arrived at.

Three districts of the nine were purposively selected. A list of HCPs' e-mail or a list of chat messenger was gathered from the primary care clinics. A simple random sampling i.e., a lottery method was used to select 700 HCPs from the list of e-mails and chat messenger phone numbers.

### 2.3. Study instrument

A bilingual (English and Malay, national language of Malaysia) questionnaire consisting of five sections was used. Each section is briefly described below, for details refer to (online supplement 1). Section one covered demographic and work-related information, while section two covered questions related to tobacco use adapted from the Global Adult Tobacco Survey (GATS).<sup>16</sup> Sections three to five were self-developed by the researchers and a brief description of the items and scales used is provided below.

Section three assessed HCPs knowledge on the health effects of smoking and second-hand smoke exposure. For example, questions asked included if smoking is an addiction, increases the risk of heart disease, stroke, and cancer, and if second-hand smoke can cause serious health effects to non-smokers. The response options 'yes', 'no' and 'don't know'.

Section four assessed HCPs attitude and their perceived role in providing smoking cessation advice to their patients, family members and friends. Participants were asked if they saw themselves as a role models to their patients, family, and friends, and if smokers were more likely to quit smoking if they were advised to do so by a HCP. Attitude was measured in a five-point Likert scale (1–5) from 'strongly disagree', to 'strongly agree'.

Section five surveyed HCPs intentions to provide smoking cessation advice to their patients, family members and friends. Questions included if they ask patients about their smoking status, advise them on the negative health effects of smoking and if they would encourage them to stop smoking. Practice intention was measured on a 3-point scale (1–3) of never, sometimes, and always. We estimated Cronbach's alpha as a measure of internal consistency of our questionnaires about knowledge, attitude, and practices. Overall Cronbach's alpha was 0.85. For individual subscales Cronbach's alpha was 0.65, 0.92, and 0.92 for items related to knowledge, attitudes, and practice respectively.

### 2.4. Variables

The intention of HCPs to provide smoking cessation advice to their patients, family, and friends was analyzed using their knowledge, attitude, and practice scores. For the knowledge score, the response 'yes' was scored as 1, and 'no' or 'don't know' was scored as 0. On summing the responses to 13 items, the maximum score was 13. The Likert scale used in the attitude section was scored from 1 to 5 i.e., strongly disagree to strongly agree. The maximum score for the 13 items on attitude towards smoking cessation was 65. Scores of 1–3, were given in the practice section with 3 being the score for always asking, advising, and assisting in smoking (3As). The maximum score for practicing smoking cessation advice was 45 points. We also created sub scores of practices of HCPs towards their family members, friends, and patients. The maximum score for each of these practice subscales was 15.

Explanatory factors used to analyse the difference between scores were demographics such as age, sex, and marital status, service factors i. e., years in service, HCPs cadre and quit smoking training, tobacco-related factors such as smoking status, smoking among family members, smoking rules at home and smoking policy at the workplace.

### 2.5. Data collection method

Researchers obtained permission from the administrative head of each clinic and was requested to provide the list of e-mails, 'WhatsApp' and/or 'telegram' messenger groups. The clinic head informed the HCPs working at the clinic about the survey and requested their participation. The google survey link developed contained participant information sheet and an informed consent on the first page. Subsequent sheets contained the survey questionnaire. The survey link was sent to randomly selected participants. To improve the response rates, two reminders were sent, and the survey link was made available for two weeks for respond at their convenient time, to reflect on and confirm the responses.

### 2.6. Data analysis

Data analyses was done using Stata MP (version 11.2). Descriptive statistics were computed as proportions, mean and standard deviation for nominal and continuous variables, respectively. The distribution of the main outcome variables on a continuous scale were tested by visual plots and Kolmogorov-Smirnov test for normality. Bivariate comparisons were made between demographic, service-related and tobacco use factors and scores for knowledge, attitude, and practice. Non-parametric tests (Mann-Whitney Test and Kruskal-Wallis Test) were used. We assessed determinants of practice score using Poisson regression analyses. Cessation practice (overall) score and sub scales (cessation practice score toward patients, family members and friends) were dependent variables. Demographics, service-related and tobacco-related factors were independent variables. At first, a full model was developed using overall practice score as dependent variable and including all factors as dependent variables. In the final model, factors that were significant ( $p < 0.025$ ) in full model were included as independent variables. In final model, we used four dependent outcomes namely, overall practice score, practice score on smoking cessation advice for patients, family, and friends.

## 3. Results

A total of 700 HCPs were invited in all 30 primary care clinics of whom 524 completed the survey. The response rate was 74.9%. The sociodemographic factors of respondents are shown in [supplementary table 1](#). Most HCPs were females (80.2%, 420/524), 77.7% were currently married and their mean age was 53 years (SD 5.8). Respondents' cadre was mainly nurses (36.1%) and medical doctors (30.7) and most of them were never smokers (92.9%) and were aware (85.5%) of m-Quit services provided by the Ministry of Health, Malaysia. However, only 14.1% of them had undergone smoking cessation training. The overall prevalence of current smoking (daily and non-daily) was 3.1 (95% CI 1.6, 4.5) and sex-wise prevalence was significantly higher among male than female HCPs (14.4 vs 0.2,  $p < 0.001$ ).

Overall HCPs had good knowledge about tobacco use with a mean score of 10.8 (SD 1.5) from a maximum score of 13. HCPs mean attitude score was 43.5 (SD 13.2) from a maximum of 65 and the mean overall practice score was 33.0 (SD 9.2) towards smoking cessation from a maximum of 45. Bivariate comparisons of the scores on knowledge about tobacco use, attitude, and practices towards smoking cessation are shown in [Table 1](#). The knowledge score was significantly different by HCPs' age. HCPs aged over 41 scored the highest compared to those aged <30 years (10.4 vs. 10.9,  $p = 0.017$ ); HCPs who attended a quit smoking training (11.2 vs. 10.7,  $p = 0.001$ ) score higher than those who

**Table 1**

Bivariate comparisons of demographic, service-related and tobacco smoking-related factors with knowledge, attitude, and practice scores.

Factor	Knowledge about smoking		Attitude towards smoking cessation		Practice towards smoking cessation	
	mean	SD	mean	SD	mean	SD
Overall score	10.8	1.5	43.5	13.2	33.0	9.2
<b>Demographic Factors</b>						
<b>Age</b>						
<30	10.4	1.6	41.9	13.4	33.1	9.4
31-35	10.8	1.6	44.1	12.1	32.8	9.2
36-40	10.8	1.5	42.5	14.5	33.3	9.3
>41	10.9	1.4*	46.3	12.8	32.8	9.1
<b>Sex</b>						
Male	10.5	1.8	43.0	13.7	28.4	9.7
Female	10.8	1.5	43.6	13.1	34.1	8.78**
<b>Marital status</b>						
Currently married	10.7	1.6	44.1	13.3	33.4	9.0
Currently single	10.7	1.5	41.4	12.6*	31.5	9.8*
<b>Service factors</b>						
<b>Years of service</b>						
≤5	10.5	1.7	42.2	12.9	32.2	9.4
6-10	10.8	1.5	43.3	13.1	33.3	9.2
11-15	10.9	1.4	42.9	13.7	32.9	9.6
≥16	10.7	1.6	46.4	13.0	33.4	8.8
<b>Type of healthcare provider</b>						
Medical Doctor	11.4	0.9	43.4	12.9	33.5	8.8
Nurse	10.6	1.4	44.3	13.0	35.6	8.7
Medical assistant	10.4	1.7	40.6	14.9	31.0	10.9
Pharmacist	10.5	1.5	41.2	10.3	30.5	7.0
Others	10.1	2.0	44.3	13.8	29.0	8.9
<b>Quit smoking training</b>						
Yes	11.2	1.4	43.1	13.1	43.1	13.1
No	10.7	1.5**	43.6	13.2	43.6	13.2
<b>Tobacco-related factors</b>						
<b>Smoking status</b>						
Non-smoker	10.8	1.5	43.7	13.0	33.4	9.0
Current smokers	9.4	2.2	41.3	16.8	25.4	8.7
Former smokers	11.0	1.7*	41.8	14.0*	30.8	10.5*
<b>Number of family members who smoke</b>						
None	10.9	1.5	43.8	13.1	32.4	9.1
One or more	10.6	1.5*	43.0	13.4	34.0	9.4*
<b>Smoking rules at home</b>						
Never allowed	10.8	1.6	43.2	13.0	33.7	9.1
Allowed no rules	11.0	1.5	44.0	14.2	30.6	9.1
Allowed with restriction	10.4	1.4*	45.2	14.0	30.9	9.8*
<b>Smoking rules at work</b>						
Not allowed in any place	10.8	1.4	43.4	12.9	33.3	9.1
Allowed anywhere/no policy	10.6	2.1	46.4	16.5	33.5	10.4
Only in limited places	10.3	1.8*	43.9	14.2	31.9	9.8

\*P value < 0.05; \*\*P value < 0.001.

did not. Similarly, never, and former smokers, those who reported smoke-free families (no smoking members, smoking inside the home was strictly not allowed), and smoking restrictions at the workplace had significantly higher knowledge scores.

Attitude score was also significantly different by HCP's age. HCPs aged more than 41 years scored higher than those aged 31–35 years and <30 years (46.3 vs. 44.1 vs. 41.9). Married HCPs had higher attitude score than single ones (13.3 vs 12.6). Doctors and nurses and HCPs having >10 years of service had significantly higher attitude score. Overall practice score towards providing quit smoking advice among HCPs was significantly different by HCPs age, and sex. Female HCPs scored significantly higher (34.1 vs 28.4) than male HCPs. Married HCPs (33.4 vs 31.5) scored higher than single.

Factors associated with overall cessation practice score by multivariate analyses (Poisson regression) are shown in [Table 2](#). After adjustment for demographic, service-related, and tobacco use-related factors, sex, HCP cadre, HCPs knowledge, and attitude scores were significantly associated with overall practice score towards smoking

**Table 2**  
Factors associated with overall smoking cessation practice score.

	Full model		Final model	
	IRR	95% CI	IRR	95% CI
<b>Demographic factors</b>				
<b>Age</b>				
<30	Ref.			
31-35	0.98	0.90–1.07		
36-40	0.98	0.88–1.09		
41>	0.95	0.81–1.11		
<b>Sex</b>				
Male	Ref.		Ref.	
Female **	1.16	1.06–1.26	1.1	1.09–1.20
<b>Marital status</b>				
Currently single	Ref.			
Currently married	0.97	0.90–1.03		
<b>Service factors</b>				
<b>Years of service</b>				
6–10 years	0.99	0.91–1.08		
11–15 years	1.06	0.95–1.19		
>16 years	1.06	0.91–1.24		
<b>Type of healthcare provider</b>				
Doctor				
Nurse **	0.91	0.85–0.98	1.08	1.04–1.12
Medical assistant & Pharmacist	0.94	0.85–1.04	0.99	0.94–1.04
Allied Health Professionals **	0.81	0.74–0.88	0.92	0.88–0.97
<b>Quit smoking training</b>				
No	Ref.			
Yes	1.03	0.95–1.11		
<b>Tobacco use-related factors</b>				
<b>Smoking status</b>				
Non-smoker	Ref.			
Smokers	1.03	0.92–1.15		
<b>Number of family members who smoke</b>				
None	Ref.			
At least one	1.0	0.94–1.05		
<b>Smoking rules at home</b>				
Never allowed	Ref.		Ref.	
Allowed no rules **	0.93	0.85–1.02	0.89	0.85–0.94
Allowed with exceptions	0.93	0.86–1.01	0.95	0.91–0.99
<b>Smoking rules at work</b>				
Not allowed in any area	Ref.		Ref.	
Allowed anywhere/limited places/ no policy	0.96	0.90–1.03		
<b>Knowledge score *</b>	1.02	1.00–1.04	1.02	1.01–1.03
<b>Attitude score **</b>	1.00	0.995–0.999	0.99	0.996–0.998

\*P value < 0.05; \*\*P value < 0.001.

cessation. Keeping other factors constant, female HCPs compared to male HCPs had 1.1 (95% CI 1.09, 1.2) times greater practice score. Similarly, nurses had a 1.08 (95% CI 1.04, 1.12) times greater overall practice score as compared to doctors. HCPs who reported that smoking at their home is allowed or with restrictions had 0.89 and 0.95 (95% 0.85,0.94; 0.91,0.99) times lower practice scores as compared to HCPs who reported that smoking was strictly not allowed. If the HCPs knowledge score increased by one point, his/her rate ratio for practice score was expected to increase by a factor of 1.02 (95% CI 1.01,1.03) and if the HCPs attitude score increased by one point the rate ratio for practice score was expected to decrease by a factor of 0.997 (95% CI 0.99–1.00)

HCPs practice toward smoking cessation among patients, family and friends were separately analyzed for association with demographic, tobacco-related, and service-related factors (Table 3). The results were comparable to those of the overall practice score both in terms of effect size as well as the direction of the association. However, knowledge score and smoking rules at home were not associated with practice toward patients and family, respectively. Family members' smoking was associated with smoking cessation practices towards friends. HCPs who reported having at least one family member smoke had 0.89 (95% CI 0.84–0.94) times lower practice score toward smoking cessation among friends.

#### 4. Discussion

Our survey among primary HCPs estimated a lower smoking prevalence than among the general population. Knowledge about the health effects of smoking was high, but the attitude and practice scores were relatively lower. Female HCPs, nurses, and those having good knowledge about the health effects of smoking were positively associated with the intention to provide smoking cessation advice. HCPs from allied health professions, and those from smoking permissible homes were unfavorable towards cessation practice.

Current smoking prevalence among HCPs in Selangor primary care clinics was 7.1% which is lower than the general Malaysian population (21.3%)<sup>2</sup> Smoking prevalence among HCPs in our study was comparable to a study from Nigeria 6.5%<sup>15</sup> and was much lower than the prevalence reported from Spain (15.5%),<sup>17</sup> Saudi Arabia (18.7%)<sup>18</sup> and China (26%).<sup>19</sup> HCPs had good knowledge health effects of smoking but scored relatively lower on attitudes and practice toward smoking cessation. Similar results were reported from Saudi Arabia<sup>18</sup> and Egypt.<sup>20</sup> On the

**Table 3**  
Factors associated with smoking cessation practice score toward friends, family, and patients.

Factor	Patients		Family		Friends	
	IRR	95% CI	IRR	95% CI	IRR	95% CI
<b>Demographic factors</b>						
<b>Sex</b>						
Male	Ref.		Ref.		Ref.	
Female	1.14	1.06–1.24 *	1.20	1.11–1.30 **	1.07	0.99–1.16
<b>Service factors</b>						
<b>Type of healthcare provider</b>						
Doctors	Ref.		Ref.		Ref.	
Nurse	0.91	0.85–0.97*	1.23	1.15–1.31**	1.13	1.05–1.21*
Medical assistant & Pharmacist	0.93	0.85–1.02	1.11	1.01–1.21	0.92	0.84–1.02
Allied Health Professionals	0.81	0.74–0.88**	1.04	0.96–1.13	0.93	0.86–1.02
<b>Tobacco-related factors</b>						
<b>Number of family members who smoke</b>						
None	Ref.		Ref.		Ref.	
At least one	1.0	0.95–1.06	0.96	0.91–1.01	0.89	0.84–0.94**
<b>Smoking rules at home</b>						
Never allowed	Ref.		Ref.		Ref.	
Allowed no rules	0.93	0.85–1.01	0.91	0.83–0.99	0.84	0.76–0.93**
Allowed with exceptions	0.93	0.85–1.00	0.93	0.86–1.01	0.99	0.91–1.07
<b>Knowledge score</b>	1.02	1.00–1.04*	1.01	0.99–1.03	1.02	1.00–1.03
<b>Attitude score</b>	1.00	1.001–1.001*	1.00	0.996–0.999*	1.00	0.995–0.999*

\*P value < 0.05; \*\*P value < 0.001.

contrary, primary care physicians and nurses in the United Kingdom have demonstrated favorable attitudes and practice toward smoking cessation.<sup>21</sup> Another Malaysian study has reported that physicians were not frequently advising smoking patients about smoking cessation and perceived that their knowledge and skills were inadequate depicting low self-efficacy in providing smoking cessation advice.<sup>12</sup> In another Malaysian study simple smoking cessation interventions such as providing self-help material were effective both stand alone as well as in combination with a brief intervention to improve smoking cessation.<sup>22</sup> However, Malaysian studies did not assess the practice intentions towards friends and family members. Lack of association of being a paramedics and allied health care and smoking cessation practice suggests that this cadre of HCP should also be encouraged to engage in smoking cessation advice by providing self-help material to smoking patients at the primary care clinics. Female HCPs and nurses in Bosnia<sup>23</sup> and midwives in the Netherlands<sup>24</sup> reported that they were well prepared and had strong intentions to implement smoking cessation interventions among their patients. In these studies, HCPs' favorable attitude and role identity were attributed to their sense of job responsibility like in our study results i.e., positive practice demonstrated by nurses towards providing personalized care to their patients. Studies have shown that knowledge about smoking is positively associated with smoking cessation practice.<sup>12,18,25</sup> Studies from Nigeria and Egypt have shown that HCPs smoking status rather than their knowledge about smoking was associated with smoking cessation practice since non-smoking HCPs were more favorable towards providing smoking cessation interventions to their patients.<sup>15,25</sup> In our study HCPs' smoking status was not associated with cessation practice possibly because of the low prevalence of smoking. Work experience either longer or shorter has been shown to be associated with the practice of smoking cessation in studies from Saudi Arabia<sup>26</sup> and the Netherlands.<sup>24</sup> In our study duration of work experience was not associated with smoking cessation practice. Even with a mean work experience of 10 years, only about 15% of them had undergone training in smoking cessation.

Studies around the world have shown that smoking HCPs are less likely to provide cessation interventions to their patients.<sup>6,27,28</sup> On the contrary, HCPs being from a smoking permissible home did not affect their cessation practice towards their patients, but they were less likely to provide cessation interventions to family members and friends. Such contradictory practice could be due to the normalization of smoking culture especially during social events, reflecting the socio-cultural background of the HCPs<sup>28,29</sup> or changing the role of HCPs while in the company of family and friends outside a health institution which is unsuitable for practicing cessation advice. Smoke-free laws should be implemented as they play an important role in enhancing the smoking cessation rate.<sup>30</sup>

Our study was the first to assess the smoking cessation practices among all cadres of HCPs as well as their practices towards their family and friends. HCPs are known to play a pivotal role in promoting positive health behavior in the entire community and studies have shown that even brief advice by an HCP plays an important role in tobacco control efforts.<sup>24,31,32</sup>

Our results should be interpreted considering some limitations. Smoking behaviors among the HCPs are likely underestimated as self-reported health behaviors are subjected to social desirability bias. Social distancing mandates during the ongoing COVID-19 pandemic prevented a more reliable physical survey. Nevertheless, the online survey obtained an acceptable response rate.<sup>23</sup>

This study has an important policy implication, as our results showed that being a female HCP as well as being a nurse was associated with intent to advise smoking cessation. Nurse-led smoking cessation services in primary care clinics may be considered an addition to medical doctors. Promoting smoke-free homes and stricter smoking prohibition in the premises of clinics provides a more conducive ambiance to practice smoking cessation advice, enabling HCPs to provide cessation advice to more smokers in primary care settings. Training to HCPs is lacking and is

needed to enhance their skills and self-efficacy to address the gap between knowledge and practice.

## 5. Conclusion

Prevalence of smoking among primary HCPs was low and their knowledge about the health effects of smoking was good. HCPs' attitudes and intentions to practice smoking cessation were not optimal. Intention to practice smoking cessation was associated with smoke-free environments and being a nurse. Results suggest smoke-free homes and nurse-led smoking cessation programs may improve HCPs' practice of smoking cessation at the primary care level.

## Availability of data and materials

The data collected for this study are available from the corresponding author upon reasonable request.

## Author's contributions

A.M was involved in the conception of the study. A.M and C.S performed the data analysis and interpretation of data. All authors were involved in data collections and contributed to the drafting, editing and revisions of the manuscripts. All authors approved the final version.

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## Ethics approval and consent to participate

Ethical approval was obtained from the Medical Research Ethics Committee of Malaysia (NMRR ID: NMRR-20-1954-54095) and followed current regulations on protection of personal data. Participant information sheet provided assurance about anonymity and confidentiality.

## Declaration of competing interest

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cegh.2022.101058>.

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