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Factors associated with practice of smoking cessation guidelines among primary care doctors in northern Malaysia: a cross sectional study

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Received: 5 August 2024 / Accepted: 4 February 2025
Published online: 13 February 2025

Abstract

Introduction Smoking prevalence is high in Malaysia, particularly in the state of Kedah, according to the National Health Morbidity Survey 2019. Strengthening primary care smoking cessation services is crucial. This study aimed to identify factors associated with adherence to the Malaysian Clinical Practice Guideline on the Treatment of Tobacco Use Disorder among government primary care doctors in Kedah.

Methods A cross-sectional survey was conducted among 163 public primary care doctors in the Kulim and Kuala Muda districts of Kedah. Knowledge, attitude, and practice related to smoking cessation guidelines were assessed using a validated questionnaire. Scores were categorized as good or poor. Good knowledge and practice required full marks, while good attitude was defined as scoring five or more out of ten. Associations between knowledge, attitude, sociodemographic, and practice were analysed.

Results The majority of respondents were female (67.5%), Malay (65%), with a mean age of 35.4 ± 5.23 years. Most demonstrated good attitude (69.9%) but had poor knowledge (80.4%) and practice (86.5%) scores. Poor knowledge was significantly associated with poor practice (AOR = 3.331, p = 0.017).

Conclusion Primary care doctors in the Kedah state demonstrated a positive attitude toward smoking cessation but exhibited gaps in knowledge and practice, with lower knowledge scores linked to poor practice. Targeted interventions, including guideline-focused training for non-specialists, new medical officers, and those without prior training, are recommended to enhance smoking cessation management.

Keywords Knowledge · Attitude · Practice · Smoking cessation · Doctors · Primary healthcare

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1 Introduction

Smoking is a significant public health issue worldwide, affecting both smokers and individuals exposed to second-hand smoke. It causes a range of chronic diseases and cancers, depending on the duration and level of exposure. Tobacco smoke toxins are absorbed into the bloodstream from the lungs and transported throughout the body, leading to smoking-related cancers, cardiovascular diseases, pulmonary diseases, and reproductive health effects. [1, 2].

Globally, tobacco use claims over eight million lives annually, with more than seven million deaths attributed to direct tobacco use and 1.2 million to second-hand smoke exposure. According to the WHO Global Report on Trends in Tobacco Smoking (2000–2025), only a 14% reduction in smoking prevalence was achieved by 2025 among individuals aged 15 years and older, falling short of the 30% target set under the WHO Framework Convention on Tobacco Control [1].

In Malaysia, smoking remains a pressing issue, with 10,000 deaths annually attributed to tobacco use, according to the National Health and Morbidity Survey (NHMS) 2019 [3]. Smoking-related illnesses are a leading cause of disability-adjusted life years lost in the population [4]. The prevalence of smoking is 21.3%, with male smokers (40.5%) significantly outnumbering females (1.2%). Kedah state has the highest prevalence (27.6%), followed by Sabah (25.3%) and Terengganu (23.9%), while WP Putrajaya records the lowest (12.2%) [3]. Despite the availability of smoking cessation services [4], the prevalence in Kedah remains high.

Primary care doctors play a pivotal role in smoking cessation by serving as role models and implementing evidence-based guidelines. The WHO recommends that health professionals adopt the "5As" (Ask, Advise, Assess, Assist, Arrange) and "5Rs" (Relevance, Risks, Rewards, Roadblocks, Repetition) strategies for smoking cessation interventions [5, 6]. The Malaysian Clinical Practice Guidelines (CPG) on Treatment of Tobacco Use Disorder emphasize these approaches to enhance effectiveness [7].

However, limited studies have explored the adherence of primary care doctors in Northern Malaysia to these guidelines, despite the region's high smoking prevalence. This study aimed to assess factors influencing the practice of primary care doctors in Kedah in implementing the 2016 Malaysian CPG on Treatment of Tobacco Use Disorder using a validated 22-item questionnaire.

2 Methods

2.1 Study design and population

A cross-sectional study was conducted among government primary healthcare doctors from all 14 government primary healthcare clinics in the Kulim and Kuala Muda districts of Kedah. A total of 199 doctors were eligible to participate in the study, which was conducted between December 2022 and June 2023.

The study included family physicians, postgraduate family medicine trainees, and medical officers practicing in government primary healthcare clinics in Kulim and Kuala Muda. Family physicians were defined as doctors who had completed postgraduate training in family medicine and were registered under the National Specialist Register. Postgraduate family medicine trainees were doctors undergoing specialty training in family medicine while attached to health clinics, and medical officers were doctors who had completed two years of internship and were involved in clinical management at primary healthcare clinics. Doctors on extended leave (more than one month) during the study period were excluded.

Ethical approval for the study was obtained from the Kedah State Health Department and the District Health Offices of Kuala Muda and Kulim. Following approval, the researchers obtained the email addresses of all eligible doctors from the respective clinic coordinators. The online questionnaire was then distributed to the doctors via email.

2.2 Sample size

Universal sampling was employed for this study. All 199 primary care doctors registered in the Kuala Muda and Kulim districts were invited to participate via email.

2.3 Study procedure

The survey utilized a validated online questionnaire based on the Stop Smoking Cessation Guidelines [5]. Participants' email addresses were obtained from the respective Health District Offices. To maximize response rates, reminder emails were sent three times during the study period.

Data were collected anonymously to ensure confidentiality and minimize response bias. All participants received a written explanation of the study's purpose and methodology. They were assured of the confidentiality of their responses and informed that participation was entirely voluntary. Before completing the questionnaire, participants were required to provide informed consent through an online consent form.

The collected data were securely stored in a password-protected folder accessible only to the research team, ensuring strict data privacy and limited accessibility.

2.4 Study instruments

The questionnaire used in this study consisted of two sections. The first section collected socio-demographic information, while the second section assessed knowledge, attitude, and practice regarding smoking cessation.

This validated questionnaire was adapted from a previously published study, with established validity and reliability. The scoring system followed the criteria established by the original authors [5]:

- **Knowledge**: A total score of five (out of five) indicates good knowledge.
- **Attitude**: A total score of five (out of ten) reflects a good attitude.
- **Practice**: A full score of 24 (out of 24) signifies good practice.

The 22-item questionnaire included true/false questions and Likert scale responses, based on the domains of the "5A's" (Ask, Assess, Advise, Assist, Arrange) and "5R's"(Relevance, Risks, Rewards, Roadblocks, Repetition) from the national stop-smoking guideline.

The knowledge component focused on the "5A's" and "5R's" domains. It utilized a dichotomous scale with "True" or "False" options. Correct answers were scored as 1, and incorrect answers as 0. A total score of five (out of five) was considered a good knowledge score.

The attitude component assessed doctors' perceptions of the relevance of clinical practice guidelines in improving smoking cessation. A Likert scale was used with the following options: "Strongly Agree," "Agree," "Don't Know," "Disagree," and "Strongly Disagree." Responses were scored as follows: "Disagree" (1 mark), "Strongly Disagree" (2 marks), and other responses were scored as zero. A total score of five (out of ten) indicated a good attitude.

The practice component assessed stages of change, specifically the precontemplation and contemplation phases, based on the "5A's" and "5R's" domains. Responses were evaluated using a four-point Likert scale: "Always" (2 marks), "Frequently" (1 mark), and "Seldom" or "Never" (0 marks). The cumulative scores categorized participants into good or poor practice levels, with a full score of 24 indicating good practice.

3 Results

The study achieved a response rate of 81.9% (163 out of 199 participants). The majority of respondents were female (67.5%) and of Malay ethnicity (65%). Slightly over half (57.7%) were younger than 35 years, with a mean age of 35.4 ± 5.2 years.

In terms of work experience, just over half of the participants (50.9%) reported having less than 10 years of service, with an average service duration of 10.0 ± 5.0 years. Most respondents were medical officers (87.7%), and the overwhelming majority had never smoked (98.8%). Additionally, just above half (57.7%) of the participants had received their training from local universities. Refer to Table 1 for a detailed breakdown of demographic and professional characteristics.

Overall, only 19.6% of doctors achieved good knowledge scores, defined as a total score of five. A majority of 69.9% demonstrated a good attitude towards smoking cessation. However, when it came to the practice of smoking cessation management, only 13.5% of doctors met the criteria for good practice as per the Stop Smoking Cessation Guidelines Questionnaire.

The median scores for knowledge, attitude, and practice were 4.0 (IQR 1.0), 6.0 (IQR 4.0), and 17.0 (IQR 10.0), respectively. Refer to Table 2 for further details on the distribution of scores.

Table 3 outlines the factors associated with the practice of smoking cessation management among respondents. Two factors were found to be significantly associated with practice, which were knowledge and attitude.

Primary care doctors with poor knowledge were 3.331 times more likely to exhibit poor practice compared to those with good knowledge (AOR 3.331, 95% CI: 1.236–8.976, $p = 0.017$). For additional details, refer to Table 3.

Table 1 Socio-demographic characteristics of respondents (N = 163)

Variables	n (%)
Gender	
Female	110 (67.5)
Male	53 (32.5)
Age, years (mean ± sd)	35.5 ± 5.2
< 35 years	94(57.7)
≥ 35 years	69(42.3)
Ethnicity	
Malay	106 (65.0)
Indian	39 (23.9)
Chinese	15 (9.2)
Others	3 (1.8)
Undergraduate training	
Local Government Universities	56 (34.4)
Local Private Universities	38 (23.3)
Non Local Universities	69 (42.3)
Smoking status	
Smoker	0
Ex-smoker	2 (1.2)
Non-smoker	161 (98.8)
Years of practice as medical officer	10.0 ± 5.0
< 10	83 (50.9)
> 10	80 (49.1)
Professional status	
Doctors in special training	15 (9.2)
Family medicine specialist	5 (3.1)
Medical officer	143 (87.7)
Training in smoking cessation	
No	136 (83.4)
Yes	27 (16.6)
In charge of quit smoking clinic	
No	150 (92.0)
Yes	13 (8.0)

Table 2 The proportion of knowledge, attitude and practice among respondents

Variables	n (%)	Median (IQR)
Level of knowledge range score: 0–5		4.0 (1.0)
Poor knowledge (score < 5)	131 (80.4)	
Good knowledge (score = 5)	32 (19.6)	
Level of attitude range score:0–10		6.0 (4.0)
Poor attitude (score < 5)	49 (30.1)	
Good attitude (score ≥ 5)	114 (69.9)	
Level of practice range score: 0–24		17.0 (10.0)
Poor practice (score < 24)	141 (86.5)	
Good practice (score = 24)	22 (13.5)	

Table 3 Factors associated with poor practice of smoking cessation management among respondents

Variables	Practice		Simple logistics regression				Multiple logistics regression			
	Poor	Good	Unadjusted OR	Standard error	(95%, CI)	*p*-value	Adjusted OR	Standard error	(95%, CI)	*p*-value
	n (%)	*n* (%)								
Knowledge										
Poor knowledge	118 (90.1)	13(9.9)	3.552	0.490	1.360–9.278	**0.010**	3.331	0.066	1.236- 8.976	**0.017**
Good knowledge	23 (71.9)	9 (28.1)	1.00 (ref)							
Attitude										
Poor attitude	47 (95.9)	2 (4.1)	5.00	0.763	1.121–22.299	**0.035**	4.456	0.057	0.975 – 20.355	0.05
Good attitude	94 (82.5)	20 (17.5)	1.00 (ref)							
Gender										
Female	99 (90.0)	11(10.0)	2.357	0.464	0.948 –5.858	0.065				
Male	42 (79.2)	11 (20.8)	1.00 (ref.)							
Age										
< 35 years	81 (86.2)	13 (13.8)	1.00 (ref.)	0.466	0.429 –2.666	0.885				
> 35 years	60 (87.0)	9 (13.0)	1.070							
Ethnicity										
Malay	92 (86.8)	14 (13.2)	1.073	0.477	0.421–2.734	0.883				
Non-Malay	49 (86.0)	8 (14.0)	1.00 (ref.)							
Undergraduate training										
Local Universities	82 (87.2)	12 (12.8)	1.158	0.461	0.469–2.859	0.750				
Non local universities	59 (85.5)	10 (14.5)	1.00 (ref.)							
Smoking status										
Smoker	0	0	NA	NA	NA	NA				
Ex-smoker	2 (100.0)	0								
Non-smoker	139 (86.3)	22 (13.7)								
Years of practice as medical officer										
< 10	71 (85.5)	12 (14.5)	1.00 (ref.)	0.460	0.480–2.915	0.715				
≥ 10	70 (87.5)	10 (12.5)	1.183							
Professional status										
Medical officer	124 (86.7)	19 (13.3)	1.152	0.673	0.308–4.307	0.834				
Family medicine specialist/ trainee	17 (85.0)	3 (15.0)	1.00 (ref.)							
Training in smoking cessation										
No	119 (87.5)	17 (12.5)	1.591	0.559	0.532–4.760	0.406				
Yes	22 (81.5)	5 (18.5)	1.00 (ref.)							
In charge of quit smoking clinic										
No	131 (87.3)	19 (12.7)	2.068	0.703	0.522–8.197	0.301				
Yes	10 (76.9)	3 (23.1)	1.00 (ref.)							

Bold means $p < 0.05$

4 Discussion

Our study reports that the majority of public primary care doctors in Kedah demonstrated good attitude scores but poor knowledge and practice scores. Good knowledge, attitude, and practice among doctors are essential to effectively assist smokers in quitting smoking. However, two of these components—knowledge and practice—were suboptimal in our findings.

Our respondents shared socio-demographic characteristics, working conditions, and experiences similar to other studies conducted in the Malaysian states of Selangor and Pahang [5, 8]. Most respondents were female, Malay, medical officers, and non-smokers, aligning with the demographics of primary care doctors reported in other districts of Malaysia, where they were predominantly female medical doctors in the middle age group with at least two years of working experience [5, 8]. However, our study highlights a much lower proportion of doctors trained in smoking cessation (16.6%) compared to Selangor (87.2%) and Pahang (34.5%) [5, 8].

A significant finding of our study is the poor knowledge scores, with 80.4% of respondents classified as having poor knowledge. This aligns with the local study conducted among medical officers in Selangor, where 62.4% of participants had poor knowledge scores [8]. In contrast, studies conducted in the Middle East reported better knowledge, with only 25.8%–54.7% of healthcare workers obtaining poor knowledge scores [9–11]. The disparity may stem from limited training opportunities in Malaysia; only 16.6% of our participants reported having undergone smoking cessation training. The type of knowledge assessment could also influence the findings, as different studies used varying questionnaires. For example, the Middle Eastern studies employed the WHO Global Health Professionals Survey (GHPS), which assesses a broad range of factors, including demographics, tobacco use prevalence, knowledge, attitudes, second-hand smoke exposure, smoking cessation desire, and training in patient counselling on smoking cessation techniques [9–11]. In contrast, our study used a questionnaire specifically based on the Malaysian clinical practice guidelines for tobacco use disorder, which may require a more specialized knowledge base.

It is worth noting that our study categorized good knowledge conservatively, with only those scoring the maximum five out of five marks being classified as having good knowledge. Consequently, while only 19.6% of respondents met this threshold, the median knowledge score of four indicates that most respondents were not far from achieving good knowledge. The knowledge questions predominantly focused on the 5A's (Ask, Assess, Advise, Assist, Arrange) and 5R's (Relevance, Risks, Rewards, Roadblocks, Repetition) components of the smoking cessation guidelines.

To address the knowledge gap, targeted interventions are crucial. These include developing a comprehensive training program emphasizing the 5A's and 5R's and identifying specific training needs and challenges faced by medical officers in the region. Such efforts could significantly enhance healthcare delivery and improve patient outcomes.

Regarding attitude, just under 70% of doctors in our study demonstrated a good attitude toward the smoking cessation guidelines. This is lower than the attitude scores reported in Qatar (71.8%), Saudi Arabia (76.3%), and Egypt (93.3%) [9–11]. While these countries reported higher scores, the variations could be attributed to differences in healthcare systems, cultural attitudes toward smoking cessation, and exposure to training programs. However, locally, in the state of Selangor, only 42% of doctors reported having a good attitude towards the smoking cessation guidelines [8]. There are many factors that influence attitudes toward smoking cessation and the guidelines, which may explain the differences between our study in Kedah and the study in Selangor. The study in Saudi Arabia suggests that older age groups and those working in rural areas tend to have more negative attitudes toward smoking cessation [9]. Compared to the study in Selangor, our population was slightly younger, but our study was conducted in a more rural setting, highlighting the complexity of attitudes and behaviours in this field.

Our study reports that 86.5% of doctors had poor practice of the smoking cessation guideline. In contrast, a study conducted in Selangor found that 50.9% of doctors had poor practice in the precontemplation phase and 75.5% in the contemplation phase, which indicates a lower percentage of poor practice [8]. Similarly, studies from Africa and the Middle East reported less than 56% of poor practice [9–12]. The discrepancies observed in the poorer levels of attitude and practice in local studies compared to international studies may be influenced by differences in working cultures and environments. However, this could also be attributed to differences in the tools used, as mentioned earlier. In this study, the level of "good practice" is defined by a full score, and only those with perfect scores were classified as having good practice. The questions on practice were based on both the 5A's and 5R's components, so the low results for poor practice reflect the need for increased efforts in addressing this issue. As reiterated earlier, interventions such as implementing a more effective training course covering the 5A's and 5R's, as well as investigating the specific training needs and challenges faced by medical officers in the region, could help address this gap.

Our study found that poor knowledge was a significant factor associated with poor practice. Doctors with poor knowledge had significantly poorer practice scores compared to those with good knowledge. This finding is consistent with studies conducted both locally and internationally [8, 11, 12]. Smoking cessation training is associated with better knowledge, [11, 13] and having good knowledge and training were the strongest factors positively associated with tobacco cessation practices [11]. For instance, a study in Pahang found that higher knowledge, attitude, and practice scores were statistically associated with having attended training programs and being in charge of quit-smoking clinics [13].

Our study also demonstrated no significant association between attitude and practice regarding smoking cessation guidelines, which aligns with a study conducted in Qatar among medical officers and allied health staff [11]. However, a local study in Selangor by Ngee et al. reported a significant association between poor attitude and poor practice among medical officers [8]. Similarly, another study in Kenya by Gichuki JW et al. found a significant association between a positive attitude and above-average practice scores for smoking cessation [12]. Although attitude is generally believed to influence behaviour and improve practice, our study found that doctors with good attitudes toward smoking cessation did not consistently translate this into better practice. This gap between attitude and practice could be affected by several factors. Previous studies identified barriers to smoking cessation practices, including inadequate training, time constraints, lack of nicotine replacement therapy (NRT), and promotional materials [8, 10]. Patient-related factors, such as low motivation, cultural pressures, relapse, withdrawal symptoms, and poor follow-up, may also contribute. Our study's population had a majority of doctors with less experience and training, and we did not investigate the availability of NRT, promotional materials, or patient factors, which could help explain the lack of significant association between attitude and practice.

We also found no significant association between socio-demographic factors and practice scores for the smoking cessation guidelines. This is consistent with the findings of Ngee et al. [8] It may be due to the similar study setting and participant characteristics among primary care doctors in public health clinics across Malaysia. However, in other studies conducted in Kenya and Qatar, being male was significantly associated with above-average practice in smoking cessation. Additionally, our study demonstrated no significant association between being a family medicine specialist, having more experience in primary care, having training in smoking cessation, or being in charge of quit-smoking clinics and practice scores [10–13]. This may be due to differences in the tools used, as these studies included participants from allied health fields such as nursing, dental, and community oral health officers. The lack of significant association between smoking cessation training and good practice could be explained by factors that influence the effectiveness of training programs, such as inadequate training content, individual differences in understanding and applying knowledge, or the absence of supportive measures such as resource provision and a support system in practice. Nevertheless, training in smoking cessation remains a key intervention to improve practice. Several courses are organized by the Ministry of Health throughout the year to address smoking cessation, but doctors may face limitations in attending these courses due to time constraints and staff shortages. Online courses could be a feasible alternative, and promoting these courses or integrating them into continuous medical education systems could help increase participation.

4.1 Strength and limitation

This study was conducted among primary care doctors working in government healthcare clinics in Kedah, the state with the highest prevalence of smokers in Malaysia. It was carried out in two large districts that encompass both urban and rural regions, making the findings of this study relevant and applicable to these settings. However, caution must be exercised when generalizing the results to a wider context, as further research is needed to investigate private primary care doctors' practices regarding the implementation of smoking cessation guidelines. There are also other factors that could potentially influence smoking cessation practices, such as the availability of educational materials, medications that support quitting smoking, and patient load. These key variables were not explored in this study and should be considered in future research designs.

This study utilized an adapted, originally developed, and validated questionnaire that is tailored to the local setting. However, the possibility of response bias exists, as respondents may have been inclined to provide more favourable answers, which could affect the reliability of the responses. To mitigate this, confidentiality and anonymity were ensured throughout the study. Nonetheless, this potential bias could lead to over-reporting of positive attitudes and practices among the respondents. Other similar studies have also relied on self-reported questionnaires, which allows for comparisons of findings between this and other studies.

5 Conclusion

Our study found that primary care doctors in Kedah had a good attitude towards smoking cessation, but there were notable gaps in their knowledge and practice. A lower knowledge score was significantly associated with poor practice. This highlights the importance of knowledge as a key factor influencing the quality of smoking cessation management. To improve practice, more focused interventions aimed at enhancing knowledge of the quit smoking guidelines are recommended. Specifically, training should target non-specialists, new medical officers, and those who have not previously undergone smoking cessation training.

Acknowledgements The authors would like to express their sincere gratitude to Professor Mohamad Haniki Nik Mohamed for the validated questionnaire, Dr. Othman Warijo of Kedah State Health Director, Dr. Alias Abdul Aziz of Kulim District Health Office and Dr. Suziana Redzuan of Kuala Muda Health Office for their endless support, Dr Kurubaran A/L Ganasegeran and Mr Fadzly of CRC HSJ for his valuable guidance.We would like to thank the Director General of Health Malaysia for his permission to publish this article

Author contributions Formal Analysis/ Methodology/Project Administration/ Writing-original draft: AAR, NH, PGV, ZZZ, YN, OS, SPL. All authors agreed on the final approval of the report.

Funding This study was self-funded.

Data availability Data generated and analysed during the study are available from the corresponding author upon reasonable request.

Declarations

Ethical approval and consent to participate Ethical approval for this study was obtained from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (NMRR ID-22-01437-BRG).

Competing interests The authors declare no competing interests.

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