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Empowering healthcare providers through smoking cessation training in Malaysia: a preintervention and postintervention evaluation on the improvement of knowledge, attitude and self-efficacy

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ABSTRACT

Objectives Healthcare providers are ideally positioned to advise their patients to quit smoking by providing effective smoking cessation intervention. Thus, we evaluate the effectiveness of a 1-day training programme in changing the knowledge, attitude and self-efficacy of healthcare providers in smoking cessation intervention.

Methods A prepost study design was conducted in 2017. The 8-hour Smoking Cessation Organising, Planning and Execution (SCOPE) training comprised lectures, practical sessions and role-play sessions to 218 healthcare providers. A validated evaluation tool, Providers' Smoking Cessation Training Evaluation, was administered to assess the impact of training on knowledge, attitude and self-efficacy on smoking cessation intervention.

Results After SCOPE training, the knowledge score increased significantly from 7.96±2.34 to 10.35±1.57 (p<0.001). Attitude and self-efficacy in smoking cessation intervention also increased significantly from 34.32±4.12 to 37.04±3.92 (p<0.001) and 40.31±8.61 to 54.67±7.45 (p<0.001) respectively. Pretraining and post-training scores improved significantly for all professions, and each measure, particularly self-efficacy.

Conclusion This study demonstrates that SCOPE training could improve healthcare providers' knowledge, attitude and self-efficacy on smoking cessation intervention. Future training is recommended to equip healthcare providers with current knowledge, positive attitude and high self-efficacy to integrate what they have learned into practice successfully.

Strengths and limitations of this study

► This study is novel given that it is the first study to document the changes in multidisciplinary healthcare providers (doctors, pharmacists, nurses and medical assistants) on knowledge, attitude and self-efficacy to deliver smoking cessation intervention following 8-hour Smoking Cessation Organising, Planning and Execution training comprising lectures, practical sessions and role-play sessions.

► Since all healthcare providers were invited, there was a risk of selection bias, and there are inherent risks for inaccuracies when relying on self-reported data.

► The sample was drawn from 3 out of 14 states in Malaysia; thus, caution should be exercised when generalising the findings to the entire population.

► The nature of the prepost study lacks a control group for the intervention and long-term follow-up to indicate the causal relationship between the impact of the training on the actual healthcare providers' behaviour and smoking cessation outcome.

► This study does not include implementation data and, therefore, no data are available to suggest that changes of knowledge, attitude and self-efficacy translate into practice.

INTRODUCTION

Tobacco use is among the leading preventable causes of death and disease globally. Approximately six million people die from tobacco-related diseases every year, which translates into 1 in 10 deaths among adults worldwide.[1] More than 600 000 people die each year from exposure to secondhand smoke, and it is estimated that by 2030, the annual death toll could rise to eight million.[1] The Surgeon General in 'The Health Consequence of Smoking – 50 Years of Progress' 2014 report concluded that smoking could cause cancer, respiratory disease, cardiovascular disease, reproductive disease, dental disease, inflammatory bowel disease, diabetes and autoimmune disease.[2] Cochrane reviews provide concrete evidence that stopping smoking could reduce smoking-related diseases.[3] More importantly, offering help to quit smoking by healthcare providers has been proven to be

an effective strategy to combat tobacco-related problems. Increasing the amount of behavioural support by healthcare providers is likely to increase the chance of success by about 10%–25%.[4]

Healthcare providers are ideally positioned to advise patients to quit smoking by providing effective brief intervention. Among all the healthcare providers, pharmacists play a significant role in smoking cessation as they are easily accessible by the public[5] and provide counselling without prior appointment and with no additional cost to the patients.[6] They communicate regularly with patients when advising the correct use of nicotine replacement therapy (NRT) products. Family physicians also have a significant opportunity to decrease smoking as they are well suited to offer effective counselling to their patients. First, they already have some knowledge about their patients and the social environment. Second, there is already a good rapport between family doctors and their patients that will contribute to the therapeutic relationship. Third, most patients often come to family doctors believing that doctors can help them improve their condition.[7]

In order to tackle serious health problems arising from smoking, all healthcare providers are encouraged to be actively involved in smoking cessation services. The US Public Health Service has recommended the use of clinical practice guidelines (CPG) for tobacco cessation. The tobacco cessation CPG is a brief intervention known by the acronym '5 A's' (Ask about tobacco use, Ask to quit, Assess willingness to make a quit attempt, Assist in quit attempt, Arrange for follow-up) and has been effective in both research and clinical practice.[8 9] Increasing the implementation of CPG by various healthcare providers is likely to lead to more smokers exposed to evidence-based treatments, more smokers quitting, and reducing the prevalence of smoking and smoking-related disease.[8] Despite evidence that shows the effectiveness of brief interventions even in a busy clinical environment, dissemination is very slow and many healthcare providers still do not follow the CPG.[10] Healthcare providers reported they performed the first two 'A's' which are 'Ask' and 'Advise'.[11] However, limited evidence has been reported on the performance on the three remaining steps, which are 'Assess', 'Assist' and 'Arrange'.[12] According to the National Ambulatory Medical Care Survey, between 2001 and 2004 and 32% of patient charts did not include their smoking status, more than 80% of smokers did not receive assistance and only 0.3% and 1.8% received NRT and bupropion treatments, respectively.[13] Only 19.8% of current smokers received any cessation assistance through counselling, medication or both. Even during preventive care visits, only 28.9% received cessation assistance.[14]

Like many other countries, Malaysia is facing challenges in tobacco control. Based on the 2011 Malaysian National Health and Morbidity Survey, 67.6% of the current smokers who visited healthcare services in the past 12 months were asked about their smoking status, and 52.6% were advised to quit smoking by healthcare providers.[15] In 2015, 75.4% of the current smokers who visited healthcare services in the past 12 months were advised to quit smoking by healthcare providers.[16] Unfortunately, no evidence has been documented on healthcare providers performing the remaining three steps.

Translating this guideline into practice remains a challenge because nicotine dependence is a chronic relapsing condition[8] that requires continuous effort to achieve success by preventing relapse. Although in many countries, more than half of the current smokers want to quit smoking, and a third had made at least three quit attempts, less than half of smokers succeed in quitting smoking before the age of 60 years.[15–19] Several barriers to intervention have been discussed including lack of knowledge, negative healthcare providers' attitude, low self-efficacy, lack of training,[20] competing priorities and believing that counselling was not an appropriate service,[21] barriers of time, manpower and finance, lack of skills, concern for the clinician-patient relationship, and perception of insufficient patient motivation.[22] Smoking among healthcare providers is also prevalent in many countries, and those who smoked were less likely to advise patients to stop smoking.[23] Healthcare providers also claimed that they lack knowledge in smoking cessation counselling techniques and confidence in the smoking cessation programme.[24] The most significant barrier in providing smoking cessation intervention is due to limited training of healthcare providers.[3 25 26]

According to the fourth edition of *Tobacco Atlas*, doctors often informed patients about the harmful effects of smoking, but they lack smoking cessation behavioural and pharmacotherapy intervention training to help their patients stop using tobacco products.[27] Therefore, there is a gap between the needs of the patients and the ability of healthcare providers to help them.[17] To address the gap, training including face-to-face and online training have been developed to improve smoking cessation competency and proficiency. These training programmes have shown to be effective in enhancing the counselling knowledge, skills and confidence of healthcare providers and their performance in smoking cessation intervention.[28–33] The meta-analyses by Cochrane Collaboration also showed healthcare providers who received specific training had a higher probability of performing smoking cessation intervention to help their patients stop smoking compared with their untrained control counterparts.[3 25] Pharmacists receiving online training followed by a roleplay session can counsel for smoking cessation.[34] A study by Cornuz in Switzerland showed that non-pharmacological smoking cessation interventions with active learning methods and practice with standardised patients by doctors produce better abstinence rates, provide better counselling and have a higher number of smokers willing to quit compared with other healthcare providers.[25]

On the other hand, nurses are well positioned to deliver effective smoking cessation intervention with minimal investment in training. A 1 hour training of smoking cessation has shown a significant increase in knowledge

and attitude compared with prior training.[33] Unfortunately, evidence suggests that less than 25% of healthcare providers have received even minimal training on smoking cessation treatment.[35]

Article 14 of the WHO Framework Convention on Tobacco Control states that 'each party shall develop and disseminate appropriate, comprehensive and integrated guidelines based on scientific evidence and best practices, taking into account national circumstances and priorities, and shall take effective measures to promote cessation of tobacco use and adequate treatment for tobacco dependence'.[36] One of the critical resources needed to implement Article 14 is sufficient numbers of healthcare providers trained to assess tobacco use and deliver brief advice about smoking cessation.[37] In line with this, Malaysia has developed a National Strategic Plan for Tobacco Control to achieve a tobacco-free nation by 2045 with the target of less than 5% tobacco use prevalence. Currently, a smoking cessation training programme called Smoking Cessation Organising, Planning and Execution (SCOPE) has been successfully developed and introduced since 2009 by a group of researchers from the Nicotine Addiction Research Group of University of Malaya Centre for Addiction Sciences (UMCAS). SCOPE is part of mQuit services recognised as one of the three pathways to become a certified smoking cessation provider in Malaysia.[38] Since the majority of the primary care providers play an essential role as front liners in promoting smoking cessation and offering support to tobacco users, the SCOPE module has been designed for different disciplines of healthcare providers (eg, doctors, dentists, pharmacists, nurses, medical assistants) to increase knowledge and best practices in smoking cessation in Malaysia.[38] The engagement of different disciplines of healthcare providers aligns with the evidence suggesting that the intervention delivered by any single type of healthcare provider (eg, doctors, dentists, nurses, psychologists) or multiple healthcare providers improves the abstinence rate compared with no intervention without healthcare providers (eg, self-help).[8] A higher cessation rate will be achieved with more intensive and frequent contacts with healthcare providers.[4]

Thus, the purpose of this study was to assess the pretraining and post-training results from the 8-hour SCOPE training on smoking cessation. We hypothesised that the training would increase smoking cessation-related knowledge, attitude and self-efficacy for all disciplines of healthcare providers including doctors, pharmacists, medical assistants and nurses.

METHODS

Development of SCOPE training

SCOPE is a comprehensive, 1-day programme developed from the 'Empowering Dentist into smoking cessation programme' (2009–2013) by the Nicotine Addiction Research Group of the UMCAS team who recognised the need to offer intensive smoking cessation counselling.[39]

The module was developed primarily by authors ASAN, a psychiatrist and addiction medicine specialist and FMH, a public health specialist and tobacco control expert. The module was reviewed and vetted by local and international experts to strengthen the content. The primary aim of the SCOPE training was to prepare healthcare providers to be competent and confident to assist smokers in quitting through evidence-based smoking cessation treatment.

The content of the training includes knowledge on the basic science of tobacco use and clinical science of tobacco treatment. This training outlined three components, including interactive lectures (questions and answer sessions, video presentation and quiz), practical session and role-play demonstration. The lectures consist of the following topics: introduction, tobacco control and policy, national strategic plan, harm to health, smoking as an addiction, pharmacological therapy and behavioural therapy in smoking cessation. The practical session consists of assessment on how to use the tobacco dependence instrument, the Fagerstrom Test for Nicotine Dependence (FTND), and how to monitor carbon monoxide levels using Smokerlyzer as well as how to run the quit smoking clinic. A 35 min practical session consisted of facilitators demonstrating how to use the piCO Bedfont Smokerlyzer followed by a small group demonstration guided by facilitators. All the participants have the opportunity to test the device and practise using FTND. The participants are also given guidelines to set up a standard quit smoking clinic approved by Ministry of Health. The goal of the role-play session was to provide participants with guided, hands-on practice in addressing tobacco treatment for patients. A 45 min session of role-playing represented various cases of tobacco treatment with three different scenarios (for example, patients at different stages of change—precontemplation, contemplation, preparation, action and maintenance). Role-play was based on the 5 A's counselling approach where the participants acted as smoking cessation providers, and the facilitator acted as a patient. Afterwards, the facilitators led a brief discussion on challenges in healthcare provider-delivered tobacco treatment.

Education materials provided to the healthcare providers included digital and print copies of the SCOPE handbook. A copy of the screening tool for nicotine dependence, Fagerstrom test and Smokerlyzer chart for monitoring carbon monoxide levels in the lung was given to each healthcare provider to facilitate the process of the smoking cessation intervention. Healthcare providers attended only one training session led by ASAN or FMH without booster sessions, reminders or other follow-up training sessions.

Study design and participants

A prepost study design was conducted among healthcare providers who attended the 8 hour SCOPE training over a period of 3 months, starting from December 2016 to February 2017. The study population comprised a group of healthcare providers with

different grades and specialities working at government health clinics in Malaysia. A total of 218 healthcare providers who completed the training and returned the pre-survey and post-survey were included in this study. The healthcare providers comprised medical doctors (n=98), medical assistants (n=44), pharmacists (n=42) and nurses (n=34).

Evaluation tool

A validated evaluation tool called Providers' Smoking Cessation Training Evaluation (ProSCiTE) (online supplementary file) was administered to the participants before and after the training programme.[40 41] ProSCiTE was initially developed and validated by SIH. It consists of 67 items which are divided into five main constructs including knowledge (12 items), attitude (8 items), self-efficacy (13 items), behaviour (19 items) and barriers (15 items) on smoking cessation intervention. However, only demographic background and three constructs (knowledge, attitude and self-efficacy) were measured in this study to determine the immediate impact of SCOPE training. The demographic characteristics assessed were age, gender, education level, working experience, smoking status and type of profession. Knowledge of smoking cessation withdrawal symptoms was assessed with 12 items with a Yes (1) or No (0) response which yielded a total maximum score of 12. Attitude was assessed using eight items rated by a 5-point Likert Scale from strongly disagree (1), disagree (2), neither disagree/agree (3), agree (4) and strongly agree (5) which yielded a total maximum score of 40. Self-efficacy was assessed using 13 items by a 5-point Likert Scale from certainly not (1), probably not (2), neutral (3), probably (4) and certainly (5), which yielded a total maximum score of 65. Construct validity based on eigenvalues and factor loadings to confirm the factor structure (knowledge, attitude, self-efficacy) was acceptable. The internal consistency and reliability of factor constructs were excellent for knowledge (α=0.93) and self-efficacy (α=0.93), and good for attitude (0.88).[41]

Study procedures

A representative sample from each health clinic was selected randomly from the list of healthcare providers provided by the State Health Department. The eligible healthcare providers, including local healthcare providers working in the government sector and never attended SCOPE training were invited and scheduled for this study. Participation in this study was voluntary. Participants were briefed regarding the purpose of the study before the training was conducted. The providers were awarded Continuing Professional Development credit after completing the training. The pretest survey was administered immediately before the training, and a post-test survey was administered immediately after the training.

Ethical approval

Healthcare providers were informed, and they gave consent before the pretraining survey prior to the SCOPE training.

Data analysis

Data were analysed with IBM SPSS V.22. Descriptive analyses were performed on the demographic items. Paired samples t-tests were used to compare pretest and post-test results. The level of statistical significance was set to p<0.05 for all analyses.

Patient and public involvement

This is a pre-study and post-study from different healthcare disciplines and providers including doctors, pharmacists, medical assistants and nurses. No patients were involved in this study. All eligible healthcare providers were briefed on the purpose of the study, its benefit and potential harm. The study findings will be disseminated through academic publications and presentations, newspapers, printed and digital media, and media interview, and presented to the Ministry of Health, Malaysia.

RESULTS

Healthcare provider characteristics

Nearly half (44.9%) of the healthcare providers were doctors. Their mean age was 32.59 (6.69) years, ranging from 23 years to 55 years. Their mean working experience was 7.26 (5.80) years, ranging from 1 year to 34 years. Slightly more than half (64.7%) were female, and almost half (45.9%) of them obtained a bachelor's degree. The majority reported that they are non-smokers (88.8%), and there are no current smokers in all professions except for medical assistants (see table 1).

Changes in knowledge, attitudes and self-efficacy on smoking cessation intervention due to training

The results of the paired samples t-test show that mean knowledge differs before training (*M*=7.96, *SD*=2.34) and after training (*M*=10.35, *SD*=1.57) at the 0.001 level of significance (*t*=15.32, *df*=206, n=207, p<0.001, *95% CI for mean difference* 2.08 to 2.70). On average, the knowledge score was about 2.39 points higher after training. Each item in knowledge increased significantly after the training except for restlessness, diarrhoea and the urge to smoke. It was also found that healthcare providers' knowledge on mouth ulcers as a withdrawal symptom for nicotine addiction gains the greatest change in score followed by constipation. Before the training, most healthcare providers did not know that constipation was one of the withdrawal symptoms for nicotine addiction (see table 2).

The results of the paired sample t-test also show that mean attitude differs before training (*M*=34.32, *SD*=4.12) and after training (*M*=37.04, *SD*=3.92) at the 0.001 level of significance (*t*=8.24, *df*=206, n=207, p<0.001, *95% CI for mean difference* 2.07 to 3.37). On average, the attitude score was about 2.72 points higher after training. Each item in attitude increased significantly after the training. The attitude of healthcare providers who wanted to advise

Table 1 Healthcare providers' characteristics

Variable	All trainees n (%)	Nurses n (%)	Medical assistant n (%)	Doctors n (%)	Pharmacists n (%)
Total trainees	218 (100)	34 (15.60)	44 (20.2)	98 (44.9)	42 (19.3)
Age (years old) Mean (SD)	32.59 (6.69)	32.64 (8.03)	29.47 (4.58)	35.21 (7.09)	29.67 (2.91)
Working experience Mean (SD)	7.26 (5.80)	8.56 (7.57)	5.25 (3.90)	8.83 96.29)	4.64 (1.95)
Gender					
Male	77 (35.3)	2 (5.9)	40 (90.9)	27 (27.6)	8 (19.0)
Female	141 (64.7)	32 (94.1)	4 (9.1)	71 (72.4)	34 (81.0)
Ethnicity					
Malay	181 (83.0)	33 (97.1)	43 (97.7)	77 (78.6)	28 (66.7)
Chinese	16 (7.3)	0	0	7 (7.1)	9 (21.4)
Indian	21 (9.6)	1 (2.9)	1 (2.3)	14 (14.3)	5 (11.9)
Religion					
Muslim	179 (82.1)	33 (97.1)	43 (97.7)	76 (77.6)	27 (64.3)
Buddhist	8 (3.7)	0	0	2 (2.0)	6 (14.3)
Christian	12 (5.5)	0	0	7 (7.1)	5 (11.9)
Hindu	19 (8.7)	1 (2.9)	1 (2.3)	13 (13.3)	4 (9.5)
Education					
Diploma	73 (33.5)	32 (94.1)	40 (90.9)	1 (1.0)	0
Bachelor	100 (45.9)	2 (5.9)	4 (9.1)	60 (61.2)	34 (81.0)
Master	45 (20.6)	0	0	37 (37.8)	8 (19.0)
Smoking status*					
Current smokers	6 (2.8)	0	6 (13.6)	0	0
Former smokers	18 (8.4)	1 (3.1)	12 (27.3)	5 (5.2)	0
Non-smokers	191 (88.8)	31 (96.9)	26 (59.1)	92 (94.8)	42 (100.0)

Diploma: In the Malaysian context, diploma is a qualification obtained during tertiary education and minimum qualification to be employed as nurse or medical assistants in the government sector. It is of a level below the bachelor's degree qualification.
*n, 215.
%, percentage; n, frequency.

patients to stop using tobacco products gained the greatest change. Also, the likelihood of patients quitting smoking increases if the healthcare provider advises patients to quit. Before the training, it showed that attitude towards asking parents/guardian on the effect of secondhand smoke was the lowest. However, after the training, the attitude towards secondhand smoke increased (see table 3).

A significant increase in healthcare providers' self-efficacy was also found when pretraining and post-training was compared. Among the three measures, self-efficacy scores provide greatest changes after the training. Results of the paired sample t-test also show that mean self-efficacy differs before training (*M*=40.31, *SD*=8.61) and after training (*M*=54.67, *SD*=7.45) at the 0.001 level of significance (*t*=23.22, *df*=206, n=207, p<0.001, *95% CI for mean difference* 13.14 to 15.58). On average, healthcare providers' post-training score was 14.36 points higher than their pretraining score. Each item in self-efficacy increased significantly after the training. Practical and assessment

modules on how to detect carbon monoxide in their breath using Smokerlyzer depicted the greatest change in score followed by managing withdrawal symptoms to prevent relapse, -behavioural therapy to assist smokers in quitting and pharmacotherapy therapy to prescribe medication to treat smokers. Healthcare providers have the lowest confidence in using Smokerlyzer before the training. However, it showed greater improvement from the practical session in the training (see table 4).

Changes in knowledge, attitudes and self-efficacy on smoking cessation intervention due to training for each profession

The paired sample t-test in figure 1 revealed significant increases in all four professions and measures. Mean knowledge for nurses differs before training (*M*=7.36, *SD*=2.66) and after training (*M*=10.12, *SD*=2.32) at the 0.001 level of significance (*t*=5.26, *df*=32, n=33, p<0.001, *95% CI for mean difference* 1.69 to 3.82). Mean knowledge for medical assistant differs before training (*M*=7.00,

Table 2 Paired sample t-test comparing pretraining and post-training for each item and total knowledge score.

Variables	Pretraining Mean (SD)	Post-training Mean (SD)	95% CI for mean difference	t
1.Irritability	0.89 (0.31)	0.99 (0.10)	0.05 to 0.15	4.25**
2.Depression	0.73 (0.45)	0.98 (0.15)	0.18 to 0.31	7.63**
3.Restlessness	0.95 (0.18)	0.99 (0.10)	0.00 to 0.05	1.90
4.Poor concentration	0.92 (0.27)	0.99 (0.12)	0.02 to 0.10	3.22*
5.Increased appetite	0.52 (0.50)	0.85 (0.36)	0.26 to 0.39	9.83**
6 .Weight gain	0.51 (0.50)	0.82 (0.38)	0.24 to 0.38	8.52**
7.Light headedness	0.82 (0.39)	0.96 (0.20)	0.09 to 0.19	5.20**
8.Night-time awakening	0.64 (0.48)	0.90 (0.30)	0.20 to 0.33	7.95**
9.Constipation	0.47 (0.50)	0.84 (0.37)	0.30 to 0.44	10.2**
10.Diarrhoea	0.22 (0.42)	0.27 (0.45)	0.01 to 0.11	1.51
11.Mouth ulcers	0.32 (0.47)	0.80 (0.40)	0.40 to 0.55	12.38**
12.Urge to smoke	0.95 (0.21)	0.98 (0.15)	0.00 to 0.05	1.67
Total knowledge scores	7.96 (2.34)	10.35 (1.57)	2.08 to 2.70	15.32**

*p<0.05, **p<0.001.
Knowledge items were measured by Yes (1) or No (0) with a total maximum score of 12.

SD=2.47) and after training (M=9.72, SD=1.89) at the 0.001 level of significance (t=7.26, df=38, n=39, p<0.001, *95% CI for mean difference* 1.96 to 3.48). Mean knowledge for doctors differs before training (M=8.38, SD=2.19) and after training (M=10.66, SD=1.22) at the 0.001 level of significance (t=10.70 df=92, n=93, p<0.001, *95% CI for mean difference* 1.86 to 2.70). Mean knowledge for pharmacists differs before training (M=8.40, SD=1.93) and after

training (M=10.45, SD=1.11) at the 0.001 level of significance (t=7.24, df=41, n=42, p<0.001, *95% CI for mean difference* 1.48 to 2.62).

Mean attitude for nurses differs before training (M=34.76, SD=3.39) and after training (M=37.33, SD=3.53) at the 0.001 level of significance (t=3.70, df=32, n=33, p<0.001, *95% CI for mean difference* 1.16 to 4.00). Mean attitude for medical assistant differs before training

Table 3 Paired sample t-test comparing pretraining and post-training for each item and total attitude score

Items	Pretraining Mean (SD)	Post-training Mean (SD)	95% CI for mean difference	t
1.A patient's chance of quitting smoking increases if the healthcare provider advises him/her to quit.	3.85 (0.89)	4.52 (0.67)	0.54 to 0.79	10.62**
2.Patients want you to advise them to stop using any tobacco products. Healthcare providers like you should…	3.59 (0.86)	4.34 (0.75)	0.61 to 0.88	11.05**
3.Get specific training on smoking cessation counselling techniques.	4.56 (0.60)	4.72 (0.57)	0.06 to 0.27	3.20*
4.Set a good example for their patients and public by not using any tobacco products.	4.64 (0.58)	4.75 (0.55)	0.01 to 0.20	2.20*
5.Routinely ask patients/clients about tobacco use.	4.38 (0.66)	4.69 (0.59)	0.19 to 0.42	5.39**
6.Routinely ask parents/guardians about tobacco use during paediatric visits.	4.29 (0.74)	4.61 (0.70)	0.22 to 0.45	5.23**
7.Routinely advise patients/clients who use any tobacco products to quit.	4.49 (0.65)	4.72 (0.59)	0.12 to 0.33	4.24**
8.Routinely assist patients using any tobacco products to quit.	4.52 (0.64)	4.71 (0.60)	0.08 to 0.29	3.42*
Total attitude scores	34.32 (4.12)	37.04 (3.92)	2.07 to 3.37	8.24**

*p< 0.05, **p< 0.001.
Attitude items were measured by using a 5-point Likert Scale: strongly disagree (1), disagree (2), neither disagree/agree (3), agree (4) and strongly agree (5) with a total maximum score of 40.

Table 4 Paired sample t-test comparing pretraining and post-training for each item and total self-efficacy score

Items	Pretraining mean (SD)	Post-training mean (SD)	95% CI for mean difference	t
1.I know appropriate questions to ask my patients.	3.78 (0.84)	4.45 (0.60)	0.55 to 0.78	11.32**
2.I am able to motivate my patients who are interested in quitting smoking.	3.85 (0.81)	4.40 (0.62)	0.43 to 0.66	9.47**
3.I am able to assist patients to quit even if the patient thinks that it is difficult to give up.	3.68 (0.81)	4.27 (0.65)	0.47 to 0.71	9.73**
4.I have the pharmacological therapy skills to assist patients to quit smoking.	3.35 (1.06)	4.15 (0.87)	0.65 to 0.94	10.57**
5.I have the behavioural therapy skills to assist patients to quit smoking.	3.28 (0.96)	4.14 (0.72)	0.71 to 1.01	11.57**
6.I can advise patients to consider smoking cessation.	4.14 (4.14)	4.50 (0.56)	0.26 to 0.47	6.67**
7.I can provide counselling when time is limited.	3.18 (0.97)	3.89 (0.94)	0.55 to 0.85	9.32**
8.I can counsel patients who are not interested in quitting.	3.31 (0.94)	4.05 (0.82)	0.60 to 0.89	10.12**
9.I know how to prescribe medication (nicotine replacement therapy/bupropion) to treat tobacco dependency.	2.93 (1.26)	3.81 (1.07)	0.69 to 1.05	9.56**
10.I can assess patient's different stages of readiness to quit smoking.	3.50 (0.96)	4.17 (0.75)	0.53 to 0.79	9.89**
11.I can assess patient's level of nicotine dependency using the Fagerstrom test.	3.43 (1.21)	4.30 (0.86)	0.70 to 1.03	10.35**
12.I can use Smokerlyzer to determine patient's carbon monoxide level.	2.63 (1.34)	4.28 (1.07)	1.43 to 1.86	15.11**
13.I can assist recent quitters to learn how to cope with situations or triggers that might lead them to relapse to using tobacco.	3.37 (1.02)	4.28 (0.70)	0.76 to 1.06	11.86**
Total self-efficacy scores	40.31 (8.61)	54.67 (7.45)	13.14 to 15.58	23.22**

*p< 0.05, **p< 0.001.
Self-efficacy items were measured by using a 5-point Likert Scale from certainly not (1), probably not (2), neutral (3), probably (4) and certainly (5), with a total maximum score of 65.
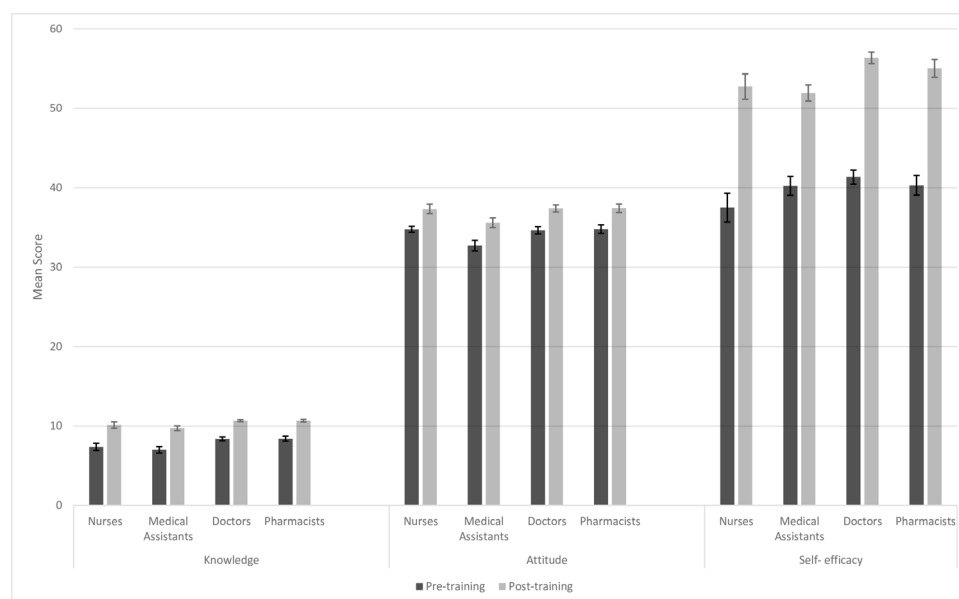

Figure 1 Mean healthcare providers' scores on knowledge, attitude and self-efficacy at pretraining and post-training. Error bars represent SEs.

(*M*=32.72, *SD*=3.80) and after training (*M*=35.59, *SD*=3.80) at the 0.001 level of significance (*t*=4.15, *df*=38, n=39, p<0.001, *95% CI for mean difference* 1.47 to 4.27). Mean attitude for doctors differs before training (*M*=34.63, *SD*=4.47) and after training (*M*=37.39, *SD*=4.22) at the 0.001 level of significance (*t*=4.68 *df*=92, n=93, p<0.001, *95% CI for mean difference* 1.58 to 3.92). Mean attitude for pharmacists differs before training (*M*=34.78, *SD*=3.56) and after training (*M*=37.40, *SD*=3.44) at the 0.001 level of significance (*t*=5.03, *df*=41, n=42, p<0.001, *95% CI for mean difference* 1.59 to 3.67).

Mean self-efficacy for nurses differs before training (*M*=37.48, *SD*=10.41) and after training (*M*=52.73, *SD*=9.17) at the 0.001 level of significance (*t*=10.95, *df*=32, n=33, p<0.001, *95% CI for mean difference* 12.41 to 18.08). Mean self-efficacy for medical assistant differs before training (*M*=40.23, *SD*=7.44) and after training (*M*=51.92, *SD*=6.31) at the 0.001 level of significance (*t*=10.18, *df*=38, n=39, p<0.001, *95% CI for mean difference* 9.37 to 14.02). Mean self-efficacy for doctors differs before training (*M*=41.35, S*D*=8.54) and after training (*M*=56.36, *SD*=6.91) at the 0.001 level of significance (*t*=15.16, *df*=92, n=93, p<0.001, *95% CI for mean difference* 13.04 to 16.80). Mean self-efficacy for pharmacists differs before training (*M*=40.31, *SD*=8.00) and after training (*M*=55.02, *SD*=7.21) at the 0.001 level of significance (*t*=10.19, *df*=41, n=42, p<0.001, *95% CI for mean difference* 11.80 to 17.63).

Nurses obtain the most significant changes for knowledge score with an increase of 2.76 points, followed by medical assistants (2.72), doctors (2.28) and pharmacists (2.05). On attitude, medical assistants gained the most significant changes with an increase of 2.87 points, followed by doctors (2.76), pharmacists (2.62) and nurses (2.57). Similar results were also found for self-efficacy, where nurses gained the most significant changes with an increase of 15.25 points, followed by doctors (15.01), pharmacists (14.71) and medical assistants (11.69).

Post-training results showed that doctors and pharmacists obtained the highest score for knowledge, pharmacists for attitude and doctors for self-efficacy. The lowest scored were recorded for nurses and medical assistants seen in both pretraining and post-training for all measures.

DISCUSSION

This study evaluated a tailored smoking cessation training for healthcare providers based on lectures, practical sessions and role-play. Our study showed significant improvement in healthcare providers' knowledge, attitude and self-efficacy in smoking cessation intervention. This was also the first evaluation of such a training intervention among healthcare providers using the 5 A's approach in the Malaysian context. These findings indicate that knowledge, attitude and self-efficacy did not differ much among the different disciplines of healthcare providers, and improved significantly as a result of their participation in SCOPE training. Prior to the training,

pharmacists had higher scores on both knowledge and attitude while doctors had higher scores on self-efficacy related to smoking cessation. After the training, a higher knowledge score was obtained by both pharmacists and doctors, attitude score by pharmacists, and self-efficacy score by doctors. Although nurses and medical assistants had slightly lower scores for each measure, they gained the most significant change after the training. The gaps in the baseline score among medical assistants and nurses indicated that these groups had minimal exposure to smoking cessation prior to the training. This finding is also in line with a study in Arkansas, USA, which found that nurses' score on knowledge and self-efficacy was lower than doctors.[10] The results from this study suggest that training in smoking cessation is effective in the short term and can provide better knowledge and positive attitude, and improve their confidence level in assisting smokers to quit smoking using the 5A's smoking cessation intervention particularly among the nurses and medical assistants.

This present study recorded significant improvements in knowledge, attitude and self-efficacy after the SCOPE training. It is in agreement with previous studies in which healthcare providers have reported improvements in knowledge, attitude and self-efficacy in smoking cessation intervention after training.[3 10 33 42–48] This study suggests that the smoking status among SCOPE participants is essential, whereby there are no current smokers among the doctors, pharmacists and the nurses. When compared with a study conducted in Bosnia and Herzegovina, where there is no established smoking cessation programme, more than half of the nurses who worked at the family medicine teaching centre smoke, and about 40% of their doctors smoke. The smokers among these professionals would most likely not advocate their patients for smoking cessation despite agreeing that smoking is harmful to health and would not advise young adults to start smoking.[49] Previous studies also reported that non-smoking healthcare providers had more positive attitudes towards the hospital's smoke-free policy compared with smokers.[50 51] With the SCOPE programme, in the attitude component, the training improved their attitude towards advocating and advising patients to stop smoking. This showed the importance of having a structured and well-organised smoking cessation programme to better assist healthcare providers in Malaysia in helping patients to quit smoking. When participants were asked to give their responses regarding their attitude towards providing smoking cessation intervention to their patients, it showed significant improvement post-training, particularly for secondhand smoke. This evidence supports that healthcare providers are aware of the importance of identifying and advising patients on the harmful effects of secondhand smoke. The more positive attitude, particularly among medical assistants, which was observed after the training also suggests that our healthcare providers are aware of their role and are ready to implement smoking cessation in practice.

A systematic review of the belief and attitude of physicians in the UK revealed that the three most prevalent negative beliefs concerned the time needed to discuss smoking, a perceived lack of effectiveness of such discussions and a perceived lack of skill in conducting such discussions.[52] As skill is concerned, training in smoking cessation can increase the level of confidence among quit-smoking providers, and with experience, can reduce the consultation time and increase the effectiveness of consultation. Although most healthcare providers already have positive attitude scores towards smoking cessation intervention at pretraining, the mean total attitude scores increased significantly at post-training. This reflected that the training could help healthcare providers understand their role in providing smoking cessation intervention. Thus, it is vital to equip them with skills to competently assist smokers in quitting.[53]

The findings also suggested that there is a potential benefit by training all healthcare providers, particularly in self-efficacy. However, when self-efficacy was explored by each item, it was apparent that they lacked confidence concerning the component of the 5A's at pre-training with 'Ask' and 'Advise' being higher and 'Assess', 'Assist' and 'Arrange' somewhat lower. The confidence level was increased for all of these 5A's after the training, primarily 'Assist 'and 'Assess'. It showed that SCOPE training can increase the knowledge, attitude and self-efficacy of healthcare providers. Our result is in accordance with previous studies suggesting that simple activities like 'Ask' and 'Advise' are supported by existing systems that prompt good performance whereas 'Assess' and 'Assist' require more complex skill sets. In addition, a higher degree of coordinated clinic system is needed to 'Arrange' follow-up cases for clinicians. There is a need for an integrated system-based approach involving multiple top-down stakeholders and environmental factors with the goal of connecting administrators, clinicians and staff to develop effective strategies to provide smokers with smoking cessation intervention.[47] Apart from that, updated CPGs for treating tobacco use and dependence have emphasised the increasing evidence that the healthcare system significantly affects the likelihood that smokers receive effective smoking cessation intervention.[9] We suggest that video demonstration, role-play[54] and practical sessions play a vital role to help in increasing the confidence of healthcare providers in providing more complex 5 A's components. Role-play sessions could prepare them to provide effective intervention with more confidence to assess and assist patients from ambivalence to change, and then offer them with appropriate behavioural and pharmacotherapy intervention.

With respect to self-efficacy, SCOPE training increased healthcare providers' confidence to use Smokerlyzer followed by managing withdrawal symptoms to prevent relapse, behavioural therapy and pharmacotherapy, thus suggesting that more emphasis should be made for this training module as the pretraining score is lowest. This supported the evidence that training on smoking cessation should be widely and continuously provided to all healthcare providers to prepare them to be competent in assisting smokers using all the 5 A's smoking cessation intervention components.

Nevertheless, our study has limitations. First, it relies on the self-reported response from our healthcare providers. Data must be interpreted carefully as there is the possibility of healthcare providers tending to over-report the frequency of smoking cessation intervention.[45] The healthcare providers involved in this study were only from 3 out of 14 states in Malaysia. Thus, generalising the findings to the overall population of healthcare providers should be done with caution. The nature of the prestudy and post-study lacks a control group for the intervention, and without long-term follow-up, it does not indicate a causal relationship between the impact of the training on the healthcare providers' behaviour and smoking cessation outcome. This study also does not include implementation data and, therefore, no data are available to suggest that changes of knowledge, attitude and self-efficacy translate into practice. Future study should consider having a control group, preferably in a larger sample to improve the significance of this study and patients' smoking cessation outcome. This study could explore their attitude towards smoking cessation advice, where in-depth questions or a qualitative approach would help answer this section on attitude. Even though knowledge has been greatly improved in this study, the duration of the information retained is not measured as no follow-up study was done. Evidence showed that knowledge can be maintained beyond a 3-month follow-up period except for a brief advice component, which decreased at 3 months.[43] Thus, continuing the professional course for smoking cessation should be done frequently.

CONCLUSION

In conclusion, this study demonstrates that SCOPE training improved healthcare providers' knowledge, attitude and self-efficacy on smoking cessation intervention. Continuous future training is recommended to better equip healthcare providers with the latest knowledge, right attitude and high self-efficacy to integrate what they have learnt into their practice successfully.

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