Assessing the Impact of Smoking Cessation Training for Healthcare Providers: A Pre-Post Intervention Study by the Buntong Health Clinic Quit Smoking Clinic Team

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ABSTRACT	Published Online: October 08, 2025

Purpose: Smoking cessation remains a critical public health challenge, requiring effective interventions led by trained healthcare providers. This study evaluates the impact of a structured smoking cessation training program on healthcare providers' knowledge, attitudes, and self-efficacy in smoking cessation counselling.

Methods: A pre-post intervention study was conducted among 159 healthcare providers, including doctors, pharmacists, medical assistants, and nurses, who attended a structured smoking cessation training program at Klinik Kesihatan Buntong, Malaysia. The training comprised lectures, hands-on practical sessions, and role-playing exercises focused on evidence-based smoking cessation strategies. The Providers' Smoking Cessation Training Evaluation (ProSCiTE) tool was used to assess participants' knowledge, attitudes, and self-efficacy before and after training. Paired t-tests and McNemar's tests were conducted to analyse the changes.

Results: Significant improvements were observed across all three measured domains. The mean knowledge score increased by 2.8 points (p < 0.001), attitude scores improved by 1.4 points (p < 0.001), and self-efficacy scores rose by 8.9 points (p < 0.001). Medical assistants demonstrated the highest knowledge improvement, while pharmacists exhibited the greatest increase in self-efficacy. Despite overall positive outcomes, attitude improvements among pharmacists and nurses were not statistically significant. Additionally, the training led to a significant rise in participants' interest in further skill enhancement in smoking cessation counselling (p < 0.001).

Conclusion: The structured training program significantly enhanced healthcare providers' competencies in smoking cessation counselling, reinforcing the importance of targeted educational interventions. The findings underscore the need for profession-specific strategies to address attitude-related barriers and sustain long-term impact. Future training initiatives should incorporate digital tools, reinforcement training, and continuous professional development to optimize smoking cessation efforts and improve public health outcomes in Malaysia.

KEYWORDS:
Malaysia, ProSCiTE, smoking cessation, WHO FTFC, MPOWER

1. INTRODUCTION

Nicotine addiction remains a critical global health challenge, with smoking contributing to a wide range of diseases, including cancer, heart disease, stroke, and lung disorders, as highlighted by the United States' Centers for Disease Control and Prevention (CDC).[1] This addiction is responsible for over 8 million deaths worldwide annually, with the World Health Organization (WHO) reporting that tobacco use is fatal for up to half of its consumers.[2]

Each year, over 7 million deaths are directly caused by tobacco use, with an additional 1.2 million attributed to secondhand smoke exposure. With no safe level of exposure, secondhand smoke poses a pervasive and lethal threat to both smokers and non-smokers alike.[2]

In Malaysia, smoking remains a significant public health concern despite a modest decline in prevalence. The smoking rate among individuals aged 15 and older dropped from 22.8% in 2015 to 21.3% in 2019, as reported in Malaysia's 2020 submission to the WHO Framework Convention on Tobacco Control (WHO FCTC).[3] However, the 2019 National Health and Morbidity Survey (NHMS) estimated that 4.9 million Malaysians aged 15 and older continue to smoke.[4]

The WHO FCTC, established in 2005, is a landmark global treaty aimed at combating the tobacco epidemic. By 2016, 180 countries had ratified the treaty, committing to reducing the supply and demand for tobacco products.[5]To support its implementation, WHO introduced the MPOWER package in 2008, which outlines six key strategies: monitoring tobacco use, protecting individuals from tobacco smoke, offering help to quit, warning about the dangers of tobacco, enforcing advertising bans, and raising tobacco taxes — summarized as Monitor, Protect, Offer, Warn, Enforce, and Raise Tax.[5,6]

In line with the WHO FCTC, the Malaysian Ministry of Health launched the National Strategic Plan on Tobacco Control in 2015, adopting the MPOWER strategy. A critical focus is 'O' - Offering help to quit tobacco use, which emphasizes the role of healthcare providers in cessation efforts. Evidence shows that training healthcare providers significantly enhances their ability to support patients in quitting, with even brief interventions increasing the likelihood of quit attempts. [7,8,9] Despite this, over 50% of primary care providers in Malaysia do not routinely implement these interventions due to inadequate knowledge and skills.[9]

Malaysia has made mixed progress with the MPOWER strategy. A complete measure for 'M - Monitoring' was achieved in 2016, while 'P - Protect' remains underdeveloped.[6] The country excelled in 'W - Warn' with packaging warnings (2017) and mass media campaigns (2018) raising tobacco risk awareness.[6] Moderate measures have been achieved for 'E - Enforce' and 'R - Raise Tax,' with a tax rate of 51.6%.[6]

Efforts in 'O - Offering help to quit tobacco use' remain moderate.[6] Strengthening this area could substantially reduce smoking prevalence and associated health burdens. Smoking poses significant challenges in Malaysia, with over 27,200 smoking-related deaths annually and an estimated RM3 billion spent yearly on treating major smoking-related diseases. [3,4]

Healthcare providers are pivotal in addressing this issue through effective tobacco cessation support. Strengthening the 'O' component of MPOWER by equipping providers with robust cessation strategies is critical to reducing smoking-related illnesses and alleviating the substantial financial strain on the healthcare system.

This study assesses the Quit Smoking Team's training program at Buntong Health Clinic, aimed at enhancing healthcare professionals' smoking cessation skills. Using the Providers' Smoking Cessation Training Evaluation (ProSCiTE) tool, it evaluates knowledge, attitudes, and self-efficacy scores pre- and post-training across professional groups, providing insights to improve competence and confidence in cessation interventions.[10]

II. METHODOLOGY

This study was a cross-sectional pre-post intervention analysis aimed at evaluating the effectiveness of a training program provided by the Buntong Health Clinic Quit Smoking Team. The study included doctors, pharmacists, medical assistants, and nurses who attended the training.

Initially, participants completed a questionnaire covering demographic data, knowledge, attitudes towards smoking cessation, and self-efficacy related to smoking cessation interventions before the training.

The training consisted of a 5-hour session with lectures on tobacco, non-pharmacological and pharmacological approaches, and motivational interviewing, followed by a 3-hour practical session with hands-on training and role-playing exercises. Participants then completed the same questionnaire after the training. Data were collected without personal identifiers from the course organizers.

The study population comprised healthcare providers from government health clinics across Perak who attended the Quit Smoking Clinic Training on September 19, 2023. Participants were included regardless of prior experience in quit smoking clinics. The study site was Klinik Kesihatan Buntong, where the training was organized.

All 159 healthcare providers who attended the training were included in the study, with no additional sample size calculations or sampling methods used. Inclusion criteria were doctors, pharmacists, nurses, and medical assistants from government health clinics in Perak who participated in the training. Exclusion criteria included participants who did not complete any questionnaires or who answered only one set of questionnaires.

III. INSTRUMENT

Permission was obtained from the authors of the ProSCiTE questionnaire, Siti Idayu Hasan, et. al., for use in this study. The validated ProSCiTE questionnaire, developed in 2019, includes six sections: demographic background, knowledge (12 items), attitude (8 items), self-efficacy (13 items), behaviour (19 items), and barriers (15 items). For this study, the focus was narrowed to three key components—knowledge, attitude, and self-efficacy—to assess the immediate impact of the training.

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Table I: Healthcare Providers' Characteristics. (N = 159)

Variables	All trainees	Doctors	Pharmacists	MAs	Nurses
Total trainees, n (%)	159 (100)	57 (35.8)	32 (20.1)	58 (36.5)	12 (7.5)
Age in years, n (%)					
20-29	47 (29.6)	9 (15.8)	6 (18.8)	23 (39.7)	9 (75.0)
30-39	90 (56.6)	38 (66.7)	24 (75.0)	26 (44.8)	2 (16.7)
40-49	19 (11.9)	10 (17.5)	2 (6.3)	6 (10.3)	1 (8.3)
≥50	3 (1.9)	0 (0.0)	0 (0.0)	3 (5.2)	0 (0.0)
Age (years), median (IQR)	33.0 (30.0, 37.0)	34.0 (31.0, 38.0)	31.5 (30.0, 36.0)	30.0 (28.0, 36.0)	37.5 (33.0, 40.0)
Work experience (years), n (%)					
<5	60 (37.7)	24 (42.1)	7 (21.9)	29 (50.0)	0 (0.0)
5-9	50 (31.4)	17 (29.8)	16 (50.0)	15 (25.9)	2 (16.7)
10-14	30 (18.9)	11 (19.3)	7 (21.9)	6 (10.3)	6 (50.0)
≥15	19 (11.9)	5 (8.8)	2 (6.3)	8 (13.8)	4 (33.3)
Working experience (years), mean (SD)	8.1 (5.67)	7.3 (4.72)	8.2 (4.28)	7.5 (6.59)	14.1 (5.33)
Gender, n (%)					
Male	80 (50.3)	18 (31.6)	9 (28.1)	53 (91.4)	0 (0.0)
Female	79 (49.7)	39 (68.4)	23 (71.9)	5 (8.6)	12 (100.0)
Highest qualification, n (%)					
Diploma	60 (37.7)	0 (0.0)	0 (0.0)	52 (89.7)	8 (66.7)
Degree	87 (54.7)	49 (86.0)	32 (100.0)	6 (10.3)	0 (0.0)
Master	7 (4.4)	7 (12.3)	0 (0.0)	0 (0.0)	0 (0.0)
PHD	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Others	5 (3.1)	1 (1.8)	0 (0.0)	0 (0.0)	4 (33.3)
Tobacco-use status, n (%)					
Current smoker	30 (18.9)	6 (10.5)	4 (12.5)	15 (25.9)	5 (41.7)
Former smoker	11 (6.9)	2 (3.5)	2 (6.3)	7 (12.1)	0 (0.0)
Non-smoker	118 (74.2)	49 (86.0)	26 (81.3)	36 (62.1)	7 (58.3)
Percentage range of smokers in patients, n (%)					
0-25%	53 (33.3)	20 (35.1)	8 (25.0)	18 (31.0)	7 (58.3)
26%-50%	53 (33.3)	24 (42.1)	4 (12.5)	23 (39.7)	2 (16.7)
51%-75%	16 (10.1)	8 (14.0)	2 (6.3)	4 (6.9)	2 (16.7)
76%-100%	6 (3.8)	2 (3.5)	1 (3.1)	3 (5.2)	0 (0.0)
Unsure	31 (19.5)	3 (5.3)	17 (53.1)	10 (17.2)	1 (8.3)
Availability of Quit Smoking Clinic, n (%)					
Yes	148 (93.1)	57 (100.0)	27 (84.4)	55 (94.8)	9 (75.0)
No	10 (6.3)	0 (0.0)	4 (12.5)	3 (5.2)	3 (25.0)
Unsure	1 (0.6)	0 (0.0)	1 (3.1)	0 (0.0)	0 (0.0)
Attended Quit Smoking courses before, n (%)					
Yes	78 (49.1)	31 (54.4)	19 (59.4)	25 (43.1)	3 (25.0)
No	81 (50.9)	26 (45.6)	13 (40.6)	33 (56.9)	9 (75.0)
Interest in upgrading smoking cessation counselling skill, pre-course, n (%)					
Not at all interested	3 (1.9)	0 (0.0)	1 (3.1)	1 (1.7)	1 (8.3)
Slightly interested	9 (5.7)	1 (1.8)	0 (0.0)	5 (8.6)	3 (25.0)
Moderate interested	73 (45.9)	18 (31.6)	15 (46.9)	35 (60.3)	5 (41.7)
Extremely interested	74 (46.5)	38 (66.7)	16 (50.0)	17 (29.3)	3 (25.0)
Interest in upgrading smoking cessation counselling skill, post-course, n (%)					
Not at all interested	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)	1 (8.3)
Slightly interested	6 (3.8)	1 (1.8)	2 (6.3)	3 (5.2)	0 (0.0)
Moderate interested	56 (35.2)	17 (29.8)	9 (28.1)	26 (44.8)	4 (33.3)
Extremely interested	96 (60.4)	39 (68.4)	21 (65.6)	29 (50.0)	7 (58.3)

The revised questionnaire consists of four sections. Section A gathers demographic information such as age, gender, education level, work experience, smoking status, and profession type. The 'percentage range of smokers' patients' indicated how many patients seen by the participant in a typical week are smokers, with categories ranging from 0-25% to 76-100% and an option for Unsure. Their interest in upgrading smoking cessation counselling skills on a scale of 1 to 5, from Not at All Interested to Extremely Interested.

Section B evaluates knowledge of smoking cessation withdrawal symptoms. Knowledge score was assessed through 12 questions with binary answers (Yes/No), ranging from 0 to 12 with 12 questions, scored out of 12.

Section C and D assess attitudes and self-efficacy toward smoking cessation interventions using 5-point Likert scales (1 = strongly agree, 5 = strongly disagree). Attitude is measured with 8 questions (max score = 40), while self-efficacy is evaluated with 13 questions (max score = 65).

IV. RESULTS

A total of 159 healthcare providers participated in the training program, comprising doctors (n = 57, 35.8%), pharmacists (n = 32, 20.1%), medical assistants (n = 58, 36.5%), and nurses (n = 12, 7.5%). The mean age of participants was 33.8 years (SD = 6.16), with the majority falling within the 30-39 age group (n = 97, 61%). The mean duration of professional experience was 8.1 years (SD = 5.67), with 37.7% (n = 60) having less than five years of experience. Most participants were non-smokers (n = 118, 74.2%), while 30 participants (18.9%) were current smokers, and 11 (6.9%) were former smokers.

The majority of participants (n = 148, 93.1%) were from clinics offering Quit Smoking Clinic services, and approximately half (n = 78, 49.1%) had attended previous smoking cessation training. Prior to the course, 45.9% (n = 73) of participants reported moderate interest in improving their smoking cessation counselling skills, while 46.5% (n = 74) expressed extreme interest.

Post-training, the proportion of participants with extreme interest increased to 60.4% (n = 96), reflecting an overall positive shift in motivation. A McNemar's test was conducted to assess changes in interest levels before and after the intervention. The results showed a significant shift in interest, χ^2 (1, N = 159) = 13.781, p < 0.001, indicating that more participants became extremely interested post-intervention.

Table II. Results of McNemar's Test for Changes in Interest Levels Before and After the Intervention

Pre-Intervention Interest	Post-Intervention Interest	n
Moderately, slightly, and not interested	Moderately, slightly, and not interested	58
Moderately, slightly, and not interested	Extremely interested	27
Extremely interested	Moderately, slightly, and not interested	5
Extremely interested	Extremely interested	69

A paired sample t-test was conducted to evaluate the impact of the training on participants' knowledge, attitudes, and self-efficacy. Statistically significant improvements were observed in all three domains (p < .001). The mean knowledge score increased by 2.8 points (95% CI = 2.41, 3.27), the mean attitude score improved by 1.4 points (95% CI = 0.85, 1.97), and the mean self-efficacy score increased by 8.9 points (95% CI = 7.82, 10.05).
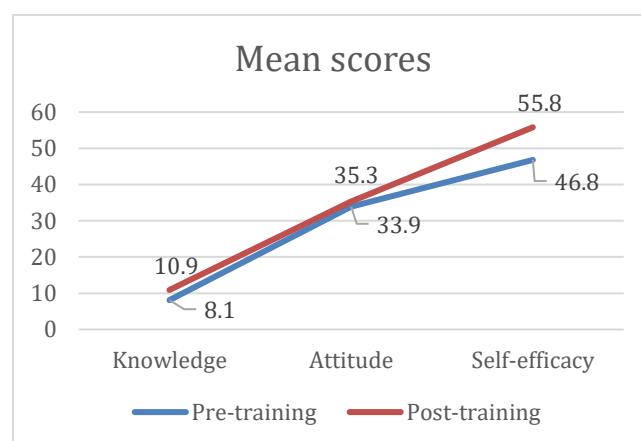
Fig. 1: Mean scores for Knowledge, Attitude and Self-efficacy pre- and post-training (p<.001).

When analysed by profession, medical assistants exhibited the highest improvement in knowledge scores, with an increase of 3.3 points (95% CI = 2.43, 4.16, p < .001). Pharmacists demonstrated the highest improvement in self-efficacy, with an increase of 10.2 points (95% CI = 7.63, 12.69, p < .001). Attitude scores showed significant improvement across all professions except for pharmacists and nurses, where changes were not statistically significant (p = 0.08 and p = .197, respectively).

Post-training assessments revealed that pharmacists retained the highest mean knowledge scores (11.5, SD = 0.95), while doctors maintained the highest post-training mean attitude (36.7, SD = 3.78) and self-efficacy scores (58.0, SD = 6.17). Despite overall improvements, the relatively smaller gains in attitude scores for pharmacists and nurses suggest the need for tailored interventions to enhance perception and confidence in smoking cessation practices.

Table III. Paired Sample t-Test Comparing Pre- and Post-Training Total Knowledge, Attitude, and Self-Efficacy Scores Across Professions

Variables	Pre-training, Mean (SD)	Post-training, Mean (SD)	Mean difference (95% CI)	t (df)	p
Scores for all trainees, (n =159)					
Knowledge	8.1 (2.84)	10.9 (2.36)	2.8 (2.41, 3.27)	13.045 (158)	<.001
Attitude	33.9 (4.19)	35.3 (4.14)	1.4 (0.85, 1.97)	4.978 (158)	<.001
Self-efficacy	46.8 (7.71)	55.8 (6.40)	8.9 (7.82, 10.05)	15.852 (158)	<.001
Scores for Doctors, (n = 57)					
Knowledge	8.6 (2.74)	11.2 (1.90)	2.6 (1.87, 3.29)	7.304 (56)	<.001
Attitude	35.5 (3.24)	36.7 (3.78)	1.2 (0.59, 1.77)	3.996 (56)	<.001
Self-efficacy	48.4 (7.69)	58.0 (6.17)	9.5 (7.76, 11.29)	10.798 (56)	<.001
Scores for Pharmacists, (n = 32)					
Knowledge	8.7 (1.63)	11.5 (0.95)	2.8 (2.07, 3.43)	8.258 (31)	<.001
Attitude	34.4 (3.71)	35.2 (3.61)	0.7 (-0.09, 1.53)	1.810 (31)	.08
Self-efficacy	43.6 (7.30)	53.8 (5.27)	10.2 (7.63, 12.69)	8.183 (31)	<.001
Scores for Medical Assistants, (n = 58)					
Knowledge	7.2 (3.20)	10.5 (2.92)	3.3 (2.43, 4.16)	7.617 (57)	<.001
Attitude	32.3 (4.23)	34.2 (4.45)	1.9 (0.67, 3.16)	3.068 (57)	.003
Self-efficacy	47.0 (6.61)	55.1 (6.26)	8.0 (6.14, 9.90)	8.550 (57)	<.001
Scores for Nurses, (n = 12)					
Knowledge	8.1 (3.20)	10.3 (3.49)	2.2 (0.87, 3.46)	3.684 (11)	.004
Attitude	32.7 (6.11)	34.6 (4.06)	1.9 (-1.15, 4.99)	1.374 (11)	.197
Self-efficacy	46.9 (11.53)	54.3 (8.38)	7.3 (1.53, 13.14)	2.780 (11)	.018

The training significantly improved knowledge, attitudes, and self-efficacy among healthcare providers. Medical assistants demonstrated the highest increase in knowledge scores, while pharmacists showed the greatest improvement in self-efficacy. Attitude improvements were significant for most groups, except for pharmacists and nurses. Post-training, pharmacists retained the highest knowledge scores, while doctors exhibited the highest attitude and self-efficacy levels. The increase in participants' interest in smoking cessation counseling post-training highlights the program's effectiveness in fostering motivation and skill enhancement These results underscore the importance of structured training programs in equipping healthcare providers with the necessary competencies to support smoking cessation efforts effectively. Future training should incorporate targeted strategies to address attitude-related barriers among pharmacists and nurses.

V. DISCUSSION

The findings of this study demonstrate that the training program conducted by the Buntong Health Clinic Quit Smoking Team significantly improved the knowledge, attitudes, and self-efficacy of healthcare providers in smoking cessation interventions. These results align with existing literature suggesting that structured training enhances the competency and confidence of healthcare professionals in delivering smoking cessation support.[7]

The significant increase in knowledge scores among participants, particularly among medical assistants, indicates that the training effectively provided essential information on smoking cessation strategies. This finding is consistent with a study by Hasan et al. (2019), which reported that an 8-hour Smoking Cessation Organising, Planning and Execution (SCOPE) training program in Malaysia led to a significant increase in knowledge scores among healthcare providers.[10] Similarly, Kristina et al. (2015) found that a one-day workshop for Indonesian community pharmacists significantly improved their knowledge, perceived role, and self-efficacy in smoking cessation counselling.[11]

While overall attitude scores improved significantly, the changes were not statistically significant among pharmacists and nurses. This suggests that while the training had a positive influence, additional targeted interventions may be necessary to address specific concerns or barriers within these professional groups. Factors such as prior exposure to cessation training or differing professional roles in smoking cession counselling may explain these variations.[7]

Findings from another study conducted in Malaysia emphasized the importance of tailored interventions for

different healthcare roles to optimize training effectiveness.[12] Additionally, Mersha et al. (2023) highlighted that healthcare providers' attitudes toward smoking cessation interventions play a crucial role in improving adherence to cessation strategies, suggesting that interventions should include reinforcement training to sustain positive attitudes over time.[14]

Self-efficacy showed the highest increase, particularly among pharmacists. This is a crucial finding, as higher self-efficacy is associated with a greater likelihood of actively engaging in patient counselling and intervention efforts. The structured role-playing and practical exercises included in the training may have contributed to this improvement, reinforcing confidence in delivering smoking cessation support.[13]

Similarly, a study by Preechawong et al. (2011) found that a theory-based training program in tobacco cessation counselling significantly increased nurses' confidence and provision of counselling.[13] However, barriers such as time constraints, lack of institutional support, and limited access to pharmacotherapy have been noted in prior studies as challenges that reduce the effectiveness of smoking cessation interventions.[14] These challenges should be considered in future training programs to ensure sustained improvements in practice.

The importance of pharmacotherapy in smoking cessation was also highlighted by Mersha et al. (2023), who emphasized that healthcare providers' knowledge and attitudes towards smoking cessation medication significantly impact patient adherence.[14] Ensuring that training includes comprehensive pharmacotherapy modules may further enhance intervention outcomes.

Furthermore, a study by Li et al. (2021) suggested that integrating digital tools and telemedicine in smoking cessation interventions could enhance provider engagement and patient adherence, pointing to potential advancements in cessation training programmes.[15].

VI. LIMITATIONS AND FUTURE DIRECTIONS

While the study provides valuable insights, certain limitations must be acknowledged. The absence of a control group limits the ability to attribute improvements solely to the training program. Additionally, the study relied on self-reported data, which may be subject to response bias. Future research should consider longitudinal follow-ups to assess the retention of knowledge and sustained impact on clinical practice. Mersha et al. (2023) emphasize that larger studies across broader healthcare provider groups are needed to comprehensively assess the effectiveness of adherence support strategies in smoking cessation interventions.[14]

To enhance training outcomes, future programs should consider incorporating ongoing mentorship, refresher courses, and digital learning tools to reinforce key concepts.

Addressing the specific needs of different healthcare professions and providing continuous support can further strengthen smoking cessation interventions in Malaysia.

VII. CONCLUSION

Overall, this study underscores the effectiveness of structured training programs in equipping healthcare providers with essential competencies for smoking cessation interventions. The significant improvements in knowledge and self-efficacy highlight the value of such training in strengthening the 'O' component of MPOWER. However, variations across professional groups indicate the need for tailored strategies to address specific barriers and sustain long-term impact. Future initiatives should integrate profession-specific training, continuous professional development, and technology-based interventions to optimize smoking cessation efforts and improve public health outcomes in Malaysia.

VIII. ACKNOWLEDGMENTS

IX. DISCLOSURE

The author reports no conflicts of interest in this work.

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