

INSTRUCTIONAL DESIGN AND ASSESSMENT

Training Malaysian Pharmacy Undergraduates with Knowledge and Skills on Smoking Cessation

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Objective. To evaluate the feasibility of an online training module, Certified Smoking Cessation Service Provider (CSCSP), developed for practicing pharmacists to equip pharmacy students with knowledge necessary for smoking cessation counseling and to assess the changes in student knowledge and skills regarding smoking cessation following training.

Design. Sixty third-year and 80 fourth-year pharmacy undergraduates (N=140) were given access to an online module, the main intervention in the study. Two linkable questionnaires were administered to assess students' preintervention and postintervention knowledge. For the third-year students, an additional role-play training component was incorporated, and student skills were assessed during week 14 with an Objective Structured Clinical Examination (OSCE).

Assessment. Preintervention and postintervention knowledge assessments were completed by 130 (92.8%) students. Sixty-six students scored above 50% for the knowledge component postintervention, compared to 13 at preintervention, demonstrating significant improvement ($\chi^2(1, N=130)=32, p=0.003$). All third-year students completed the intervention, and 66.7% were able to counsel excellently for smoking cessation, scoring more than 80%.

Conclusion. The CSCSP online module developed for practicing professionals was found suitable for equipping pharmacy undergraduates with knowledge on smoking cessation topics. The module, along with role-play training, also equipped students with knowledge and skills to provide smoking cessation counseling.

Keywords: smoking cessation, pharmacy undergraduates, active learning, Malaysia, pharmacy curricula

INTRODUCTION

Smoking is a major public health problem, causing an estimated 5 million people, including 10 thousand Malaysians,¹ to die prematurely each year. Comprehensive evidence-based tobacco control programs that combine educational, clinical, regulatory, economic, and social strategies reduce the health burden of smoking.² The Malaysian Quit Smoking Programme formulated a strategy to integrate smoking cessation programs into all relevant health care curricula, with the goal of providing comprehensive support for helping smokers quit.³

Internationally, the importance of such training is reflected in the recommendations that all health care students should receive education in the treatment of tobacco use and dependence during their professional training years.⁴⁻⁶ Nevertheless, studies repeatedly show that most students, including pharmacy undergraduates,

lack the necessary knowledge and skills.^{6,7} We found only 13.4% of 127 students scored above 50% in the knowledge assessment of tobacco-related and smoking cessation counseling component from our preliminary study conducted among pharmacy students.⁸

In Malaysia, the bachelor of pharmacy degree is offered as a 4-year program consisting of an average of 150 credit hours whereby one credit hour involves approximately 40 hours of students learning time, which consists of face-to-face and self-directed learning time. A survey on the tobacco-related curricula among all the pharmacy schools across Malaysia found the median teaching duration for tobacco-related topics was around 2.75 hours for core courses and 2 hours for elective courses.⁸

Babar et al reported that opportunities exist for Malaysian pharmacists to render services in smoking cessation.⁹ Despite these opportunities, Malaysian pharmacists were not contributing optimally in this area.^{10,11} Lack of comprehensive tobacco-related courses and training in most universities' curricula was cited as a major

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contributing factor, as well as lack of in-service training and continuing professional development (CPD) programs focusing on the subject.¹⁰ The latter issue was addressed through the initiation of the Certified Smoking Cessation Service Provider (CSCSP) program in 2004. The main objective of CSCSP was to provide Malaysian health care professionals with additional, specialized counseling skills to help smokers quit the habit. In August 2010, the online CSCSP module was launched to encourage more participation from practitioners by making the training available at their convenience.¹²

Several studies on web-based training for pharmacy students on smoking cessation counseling reported positive outcomes.^{13,14} Studies utilizing active-learning strategies to provide students with knowledge and skills for smoking cessation counseling also reported positive outcomes.¹⁵⁻¹⁷ However, none of these studies used modules developed for practicing health care professionals. In our study, the CSCSP module designed for practicing health care professionals was tested for its suitability to equip undergraduate pharmacy students with knowledge and skills at graduation to assist smokers with quitting.

We incorporated the online CSCSP module and role-playing into 2 courses engaging the third-year and fourth-year students at one institution. The main aim of this study was to evaluate the suitability of the module in providing pharmacy students with the knowledge necessary to provide smoking cessation counseling. We also evaluated third-year students' skills pertaining to smoking cessation counseling following exposure to CSCSP and role-play.

DESIGN

Pharmacy undergraduates for the academic year of 2011-2012 were recruited through convenience sampling from one institution. One hundred forty students were recruited, 60 third-year students and 80 fourth-year students. Third-year students had prior exposure to the basics of patient counseling, and fourth-year students had the opportunity to provide pharmaceutical care during their community and hospital rotations. The fourth-year students, who had exposure to tobacco-related topics the previous semester, were assessed only on the knowledge component while the third-year students, who had no prior exposure to tobacco-related topics, were assessed for knowledge and skills to provide smoking cessation counseling during the OSCE, as depicted in Figure 1. An exemption was obtained from the institutional review board where the study was conducted.

The existing CSCSP online module allowed convenient access for participants. The module could be easily

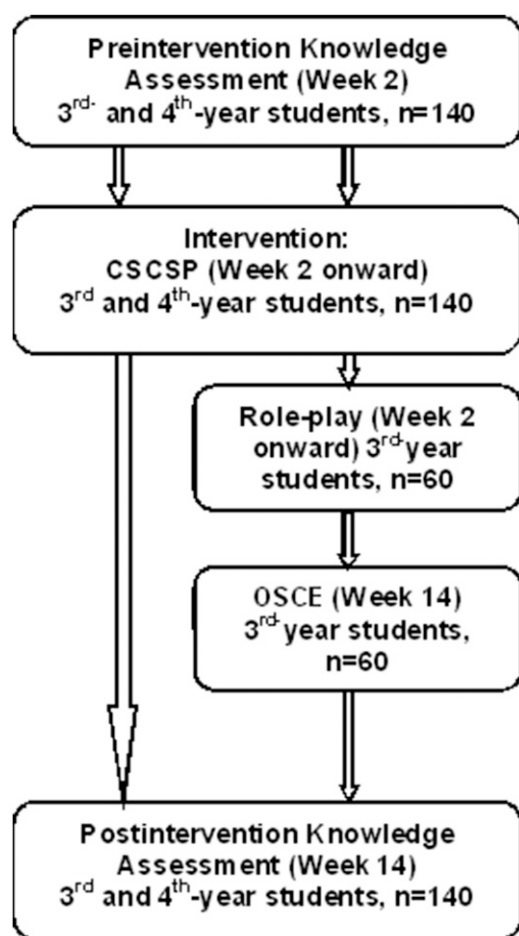


Figure 1. Participation and Intervention by Year of Study (CSCSP=certified smoking cessation service provider; OSCE=objective structured clinical examination).

integrated into the already tight curricula for the pharmacy program at this institution. A brief overview of the chapters, learning outcomes, and estimated time to complete each chapter in the module is outlined in Table 1. A pilot-test was administered to estimate the average time to complete the module; value, ease of use, comprehensiveness, quality, and module design were also assessed in the pilot-test. The training for the fourth-year students involved only CSCSP online intervention.

In addition to the online module, the third-year students were given access to 7 role-play scripts, which were uploaded to the learning management system of the institution. The scripts were developed based on the "5A's" model for smoking cessation counseling (ask, advise, assess, assist and arrange follow-up)¹⁸ and incorporated scenarios at different difficulty levels. Skills were assessed through an OSCE for the third-year students only. The students were asked to practice the role-play scripts with group members as preparation for the OSCE, which was scheduled in week 14.

Table 1. Overview and Learning Outcomes of the Chapters in the Certified Smoking Cessation Service Provider (CSCSP) Online Module

Overview and estimated time to complete	Learning Outcomes
<p>Chapter 1: Epidemiology and Impact of Tobacco Use Overview of global and Malaysian smoking patterns, smoking statistics among Malaysian adults and youths, deaths attributable to smoking and the impact of second-hand tobacco smoke (20 minutes).</p>	<p>Demonstrated understanding of:</p> <ul style="list-style-type: none"> ● smoking epidemiology in Malaysia ● impact of tobacco use including second-hand smoke ● health benefits of quitting
<p>Chapter 2: Tobacco Control Strategy Efforts outlined by the National Tobacco Control Programme to decrease the prevalence of tobacco use in Malaysia, proposed model of MPOWER Malaysia Package (MMP), adapted from WHO MPOWER Package (30 minutes).</p>	<p>Demonstrated understanding of:</p> <ul style="list-style-type: none"> ● the role of WHO Framework Convention on Tobacco Control and National Tobacco Control Program in tobacco control ● vision, mission, objectives, and strategies of National Tobacco Control Program ● components of National Tobacco Control Program and MPOWER Malaysia Package
<p>Chapter 3: Understanding and Assessment of Tobacco Use and Dependence Characteristics of nicotine dependence based on DSM-IV, pharmacokinetic, and pharmacodynamic aspects of nicotine, the Fagerstrom Test for Nicotine Dependence (25 minutes).</p>	<p>Demonstrated understanding of:</p> <ul style="list-style-type: none"> ● nicotine addiction and dependence characteristics ● pharmacology of nicotine ● nicotine withdrawal symptoms ● assessment of tobacco dependence
<p>Chapter 4A: Management of Tobacco Smoking and Dependence – Behavior Transtheoretical Model of Behavior Change, processes of change, building a helping relationship, motivational interviewing, how to utilize them for smoking cessation counseling (30 minutes).</p>	<p>Demonstrated understanding of:</p> <ul style="list-style-type: none"> ● Transtheoretical Model of Behavior Change ● Stages of Changes ● Processes of Changes ● Decisional Balance ● Motivational Interviewing
<p>Chapter 4B: Management of Tobacco Smoking and Dependence – Pharmacological Both nicotine replacement therapy and nonnicotine based products, dosage form and strength of each product and special precaution, common side effects, dosing information, prescribing instructions. Combination therapy and smoking-drug interaction also included. (30 minutes).</p>	<p>Demonstrated understanding of:</p> <ul style="list-style-type: none"> ● nicotine replacement therapy ● non-nicotine-based products ● second-line pharmacological agents ● smoking and drug interactions
<p>Chapter 5A: Establishing a Smoking Cessation Service – Community Key recommendations for smoking cessation counseling based on the 5 A's; ask about smoking, advise smokers to quit, assess readiness to quit, assist patients with quitting, and arrange follow-up counseling.' Hyperlinks to all the documents needed for the counseling also included (20 minutes).</p>	<p>Demonstrated understanding of:</p> <ul style="list-style-type: none"> ● 5A's model and 5R's ● counselling interventions for quitting ● smoking cessation service in community pharmacies
<p>Chapter 5B: Establishing a Smoking Cessation Service – Hospitals The algorithm that incorporated the 5A's model to promote smoking cessation in Malaysian hospitals, flowcharts for both initial and follow-up visits, hyperlinks to the necessary documents included (15 minutes).</p>	<p>Demonstrated understanding of:</p> <ul style="list-style-type: none"> ● steps involved in providing smoking cessation service in Quit Smoking Clinics ● various documentation procedure

At the end of each chapter, 10 true/false questions based on respective chapter content were included as part of the CSCSP online module

Changes in participant knowledge were assessed using the same set of 14 multiple-choice questions. Pre-intervention knowledge was assessed in the second week prior to CSCSP access, while postintervention knowledge

was assessed at week 14. A linkable questionnaire was aligned to the chapters in the CSCSP module to assess students' tobacco-related and smoking cessation counseling knowledge. Two questions per chapter covered the

essential topics of the module and only correct answers were given points. These questions were pretested with 9 students. The average difficulty index for all 14 questions was 0.45, determined by calculating the average ratio of correct answers to all questions attempted by students. A question was considered difficult if the index was below 0.30. Index value above 0.70 indicated an easy question. Ideally, the difficulty index should be in the range of 0.50 to 0.60.¹⁹

The rubric for awarding points for the counseling skill component during the OSCE was adapted from the CSCSP attachment checklist (Table 2). This rubric was mainly based on the 5A's model for smoking cessation counseling; other relevant criteria for general counseling skills were also included. In dealing with patients, students were encouraged to use layman's terms rather than medical terminology. Examiners at each of the 3 stations assessed the students' skills using the grading rubrics, adapted to the respective cases at their station. Two

faculty members developed 3 cases, one of which included a smoker, for the OSCE. The cases and the grading rubrics were reviewed for content and clarity by 2 other faculty members, and changes suggested were incorporated and reviewed a final time. Only one of the 3 cases included assessed students' skills at smoking cessation counseling; the remaining 2 assessed students' ability to counsel for the correct usage of peak flow meter and inhalers. Participants were required to ask all patients about smoking. Three laboratory technicians were recruited to play the role of patients and were instructed not to provide information unless they clearly understood the students' requests.

During the second week of the semester, preintervention knowledge was assessed among all participating students. Following this, students were given access to the module. An OSCE was conducted in week 14 of the semester for the third-year students, during which their smoking cessation counseling skills were assessed. At

Table 2. Objective Structured Clinical Examination (OSCE) Grading Rubrics

Evaluation Points	Max Grades
Did the student greet and introduce himself/herself to the patient?	5
Did the student "ask" if patient smokes?	5
Did the student "advise" and obtain the patient's agreement to participate?	5
Did the student obtain relevant smoking history, including:	10
length of smoking (years)	
average number of cigarettes or pack(s) per day	
brand of cigarettes mostly smoked	
cost per pack of cigarettes mostly smoked	
Did the student obtain relevant quitting history, including:	10
number of previous quit attempts	
methods of quitting (including type of NRT, if used)	
longest duration of abstinence	
reasons for relapse	
Did the student note reason(s) of current quit attempt?	5
Did the student determine level of nicotine dependence via Fagerstrom Score?	5
Did the student assess what patient knows regarding:	10
harmful effects of (active) smoking	
harmful effects of secondhand smoke	
benefits of quitting	
methods of quitting	
withdrawal symptoms and methods of coping	
Did the student discuss on selecting an appropriate quit date?	5
Did the student provide accurate information on nonpharmacotherapy (behavioral)	10
methods to quitting and coping with withdrawal symptoms?	
Did the student provide accurate information on NRT, including reason, dosing,	10
administration technique, monitoring of efficacy and possible side-effects?	
Did the student verify patient understanding, especially on the use of NRT?	5
Did the student arrange appropriate follow-up appointment date?	5
Did the student express gratitude?	5
Did the student use appropriate language (lay) throughout the session?	5
Total grades	100

the end of week 14, a linkable questionnaire using the same set of 14 multiple-choice questions to assess post-intervention knowledge was made available to participants. The preintervention and postintervention knowledge assessment was conducted by distributing the questionnaire in-person.

Paired *t* tests were used to analyze knowledge scores before and after the intervention, and chi-square tests determined the change in proportion of students scoring above 50%. The knowledge scores were subjected to a 2-way analysis of variance (ANOVA) for the module intervention (before, after) and role-play intervention (exposed, not exposed) to determine the impact of the interventions on changes in knowledge scores. Descriptive statistics were computed as percentages for the OSCE based on the grades awarded for the skill assessment.

EVALUATION AND ASSESSMENT

The preintervention and postintervention survey instruments were completed by 130 students, yielding a 92.9% overall response rate, of which 77 were fourth-year students and 53 were third-year students. The mean age and its standard deviation for participating students were 22.5(0.6) for fourth-year students and 21.1(0.7) for third-year students. The majority of the participants were female—75% of the fourth-year students (n=58) and 72% of the third-year students (n=38).

There was significant improvement in preintervention to postintervention mean knowledge scores among all students, with slightly higher improvement among third-year students, who had exposure to the role-play intervention (Table 3). The number of students who scored above 50% for the knowledge component improved significantly from 13 at preintervention to 66 at postintervention: $\chi^2(1, N=130)=32, p=0.003$. The lowest grades were obtained for questions pertaining to pharmacology of nicotine and behavioral changes, yielding difficulty indices of 0.20 and 0.15, respectively, at preintervention. These improved to 0.87 and 0.78, respectively, following the online module intervention. The highest preintervention scores were obtained for

questions on nicotine withdrawal and second-hand smoke health effect, yielding the difficulty indices of 0.80 and 0.74, respectively, with slight improvement noticed for both at postintervention. The average difficulty index for the remaining questions improved fairly from 0.30 at preintervention to 0.70 at postintervention.

From the results of the 2-way ANOVA, the main effect of the module intervention was significant with higher knowledge scores at postintervention (M=52.5%, SD=11.9) than at preintervention (M=39.4%, SD=10.8). The interaction effect was significant, $F(1,128)=5.81, p=0.017$, indicating the impact of the module intervention was slightly greater among students who also had exposure to the role-play intervention. However, the main effect of the role-play intervention was not significant in terms of knowledge score improvement: $F(1, 128)=1.59, p=0.112$.

Sixty third-year students completed the OSCE, a 100% response rate, which resulted from this component being included as part of the continuous assessment for the semester. Approximately 66.7% of students were able to counsel excellently for smoking cessation, scoring more than 80%. The lowest grades obtained were 45%, while the highest were 95%. Almost all students performed the first 2A's (ie, ask and advise). Approximately two thirds managed to proceed smoothly to the next steps, (ie, assess, assist, and arrange follow-up). Apart from the 5A-based tasks, which accounted for 85% of the total grades, students were also assessed on their general counseling skills, such as using layman terms and expressing gratitude to the patients for their time and willingness to participate and listen, which are considered good counseling practices.

DISCUSSION

Our findings indicated that students' knowledge pertaining to smoking cessation counseling improved following the CSCSP online intervention. This is consistent with the findings of Brown and Janke, who reported significant improvement for knowledge scores, (from preintervention of 36.3% to 84.5% at postintervention) following a web-based training.¹³ Although the

Table 3. Preintervention and Postintervention Knowledge Scores^a

	Fourth-Year (n=77)	Third-Year (n=53)
Preintervention mean score % (SD)	40.7 (10.1)	37.6(11.5)
Intervention	CSCSP online module	CSCSP online module and role-play
Postintervention mean score % (SD)	52(13.1)	53(9.8)
<i>t</i> value	21.21	18.46
<i>p</i> value	<0.001	<0.001

^aCorrect answers were given one mark each and the percentage was computed based upon the total 14 multiple-choice questions
CSCSP=Certified Smoking Cessation Service Provider

mean improvement of knowledge score in our study was less than that noted in Brown and Janke's study, the difference could be explained by the 12-week lapse between intervention knowledge assessments in our study vs the 2 to 3 weeks between assessments in the Brown and Janke study.

Although the fourth-year students in our study had exposure to tobacco-related topics the previous semester, the preintervention knowledge scores were relatively low with a mean of 40.7 (10.1%). This suggests that continuous emphasis on training regarding the importance of tobacco-related and smoking cessation counseling should be placed throughout the undergraduate program, and faculty members involved should view this training as a process rather than one-time event. Follow up is therefore necessary.

We found the third-year students had slightly higher improvement in the knowledge component. However, the knowledge assessment in this study was aligned to the content of the CSCSP module, which may explain the reason for the role-play intervention alone not contributing significantly to the knowledge score gain. Yet, active learning such as role-play improves students' confidence and skill in providing smoking cessation counseling, and the active-learning process involving role-play did contribute to their ability to provide smoking cessation counseling, assessed during the OSCE.^{15,16} In our study, two-thirds of the third-year students were able to provide smoking cessation counseling appropriately following the module and role-play interventions, corroborating findings from other studies.¹⁵⁻¹⁷

In this study, a major limitation was that we did not know if students accessed the CSCSP online module. The module was incorporated as optional reading material, and its content was not assessed as part of their final examination. However, an effort was made to encourage students to use the module and the multiple-choice questions in the knowledge assessment were aligned to the module content. A question could have been included in the questionnaire to ascertain whether students had accessed the module. Another limitation was that students' skills to counsel before the role-play and CSCSP interventions were not determined. Lastly, since the sample was obtained from only one institution, the generalizability of the findings is limited. Moreover, the study lacked a control group and a large sample size.

SUMMARY

The Certified Smoking Cessation Service Provider (CSCSP), an online module developed for practicing professionals, was found suitable in equipping pharmacy

undergraduates with knowledge on smoking cessation topics. Students' counseling skills were encouraging following role-play training and CSCSP intervention. Students should be given continuous encouragement and opportunities throughout the undergraduate program to practice such skills and reinforce the knowledge obtained. Training for smoking cessation counseling should be seen as an ongoing process rather than as one-time event.

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