

Evaluation of a Computer Interactive Multimedia Program in Smoking Cessation Counseling (CIMPSCC) for Pharmacy Students

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Objective: Develop a computer interactive multimedia program for health providers in smoking cessation counseling (CIMPSCC), and evaluate users' attitudes to the program.

Material and Method: The CIMPSCC program was developed via Flash Professional® version 9.1 and included the concept of 5As with interactive multimedia video containing conversations between a pharmacist and a smoker. A self-assessment questionnaire was also provided for the users. The program's effectiveness was assessed by comparing three groups of final year pharmacy students known as CIMPSCC, Lecture, and Control. Basic knowledge, case scenario, and total scores were statistically evaluated and attitudes towards the program were assessed.

Results: The CIMPSCC program was developed and its validity checked by a panel of specialists. Results showed there were statistically significant differences in basic knowledge, case scenario, and test scores within CIMPSCC and Lecture ($p = 0.001$). Post-test scores of basic knowledge and total scores were not significantly different, but case management skills between CIMPSCC and Lecture were significantly different ($p = 0.069, 0.129, \text{ and } 0.001$ respectively). This indicated that the CIMPSCC program positively improved knowledge and case management skills regarding smoking cessation counseling. Overall attitudes to the CIMPSCC program were favorable.

Conclusion: The CIMPSCC program showed positive results of basic knowledge and case management skills regarding smoking cessation counseling for pharmacy students and can be used as a valuable resource in the teaching and learning process.

Keywords: Computer-assisted instruction, Counseling, Multimedia, Program evaluation, Smoking cessation

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Smoking is the biggest preventable cause of morbidity and mortality in the world. The World Health Organization (WHO) estimated an annual global increases of deaths from smoking of approximately four million in 1998 to 4.9 million in 2003⁽¹⁾. The report also indicated the detrimental effects of smoking on quality of life, environments, and human resources⁽²⁾.

The diseases associated with smoking such as cardiovascular disorders and cancers are becoming increasingly serious. In Thailand, the 2001 annual report of National Statistics Department showed there were 10.6 million regular smokers, including children under the age of 11 years^(3,4). The spending on cigarettes increases every year⁽⁵⁾.

Because of increasing numbers of smokers and the effects of the habit on quality of life generally and health specifically, governments and health organizations have introduced cessation programs to help people quit smoking and possibly reduce the mortality within the next 25 years⁽⁶⁾. Ideally, cessation

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programs should have the potential of reaching a large proportion of the population, be easy to adopt, be effective, have good reliability, and be easy to maintain over time⁽⁷⁾. The most up-to-date, available smoking cessation tools are face-to-face counseling, which is intense, intimate, and personal, but the participation rates are usually low^(8,9). Intensive, multi-session clinical interventions can achieve up to 28% long-term cessation rates, however their reach is limited⁽¹⁰⁻¹³⁾. Similar situations occur in the Thai public health system with added limitations of lack of expertise, insufficient numbers of health sectors, and less access to the service⁽¹⁰⁾.

There are currently alternative tools available to promote smoking cessation. These include the implementation of computer-based communication technologies into counseling using self-help guides, web-based communication, and computer tailored programs⁽¹⁴⁾. These computer-based approaches have the advantage of combining the benefits of high-reach media-based interventions for smoking cessation. With the rapid development of such technology, new cessation programs tailored to the specific needs of smokers have become increasingly more sophisticated and less expensive^(15,16).

Computer-based learning (CBL) programs are one of the interactive techniques available for the purposes of increasing knowledge and learning skills. They have a number of advantages: a) users prefer CBL because instruction is available on demand at the time and location of choice, b) instruction is more motivational because users control the rate and level of materials delivered, and c) CBL is responsive to different learning styles, such as combinations of auditory, visual and kinesthetic features⁽¹⁷⁾. Previous studies indicated benefits and/or limitations of the usefulness of CBL in different fields⁽¹⁸⁻²²⁾.

The program that is the subject of the present study is a user-friendly interactive multimedia system using a digital video, video simulation, and audiovisual to create an easy and enjoyable learning program. The authors aimed to develop a computer interactive multimedia program of smoking cessation counseling (CIMPSCC), specifically for health providers. The evaluation of the effectiveness of the program is conducted with a survey of users' attitudes to the program.

Material and Method

The present study ran from February through May 2008 at the Computer Centre, Department of

Pharmaceutical Science, Ubon Rajathanee University, Thailand.

Design of CIMPSCC program

The CIMPSCC program was developed using the Flash Professional® version 9.1. This is a software program that allows a number of icons to be incorporated into a logical flowchart to form interactive programs ideally suited to CIMPSCC. Director® 7.0 digitized video clips were arranged according to the script and the audio portion was completed using Sound Forge XP® 4.5. It is being programmed to drive the slide presentation. After editing the video clips, the file was saved as a Shockwave movie on a CD-ROM with an approximate length of 5 to 10 minutes for each video clip. The program contained three different sections. The first one involved a concept of 5As: ask, advise, assess, assist, and arrange and was presented as "text" data. Adequate information regarding the definitions and classifications of the 5As was included. The second section showed interactive multimedia video conversations between pharmacists and smokers for users to learn the process of recording client data. In addition, techniques of history-taking, decision-making, and future planning were incorporated into the conversations. The final section provided a self-assessment containing a case scenario with multiple-choice questions (MCQ). The structural functions were programmed to interact as "face-to-face" responses between users and the program itself (Fig. 1, 2).

Evaluation of the contents of CIMPSCC program

The contents of the CIMPSCC program were examined and validated by a panel of three specialists-general physician, a clinical pharmacist, and a registered nurse-all of whom were involved in a smoking cessation clinic. A number of changes were made to the program as a result of the panel's examination.

Evaluation of the effectiveness of CIMPSCC program

Participants: Participants were eighty-five fifth year pharmacy students who voluntarily enrolled in the present study. The participants were randomly placed in three groups, CIMPSCC (30 number), Lecture (30), and Control (25). The CIMPSCC group underwent a computer-based program session with two hours of lectures about smoking cessation counseling. The participants in this group were allowed to access the program at any time during



Fig. 1

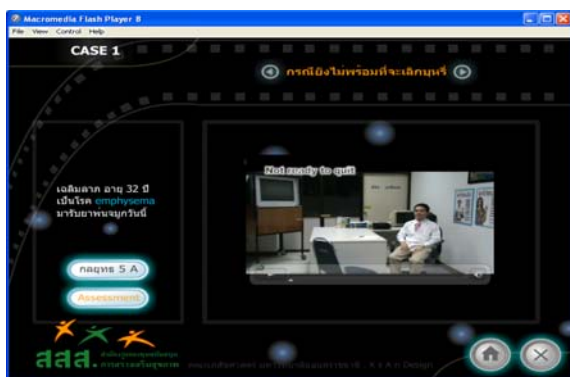
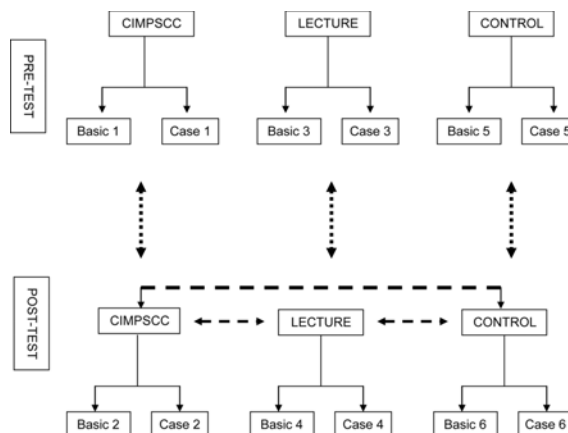


Fig. 2

working hours. The Lecture group received two hours of lectures about smoking cessation counseling. Finally, a Control group had no intervention neither lectures nor CIMPSCC other than the examination.

Data collection: Participants completed the MCQ examination before undertaking any activities. This examination was divided into two sections - basic knowledge of 5As (score/10) and case studies (score/10). The contents of the examination were generally similar to both the CIMPSCC program and the lecture presented to CIMPSCC and Lecture. The participants took one hour to complete the examination and within a week after each individual group completed the activity, all participants underwent the same examination. Only CIMPSCC was provided with a questionnaire survey regarding attitudes to the program. A Likert' scale (5-point) was used to measure the responses to the program functions and usefulness of CIMPSCC. A questionnaire paper was reviewed prior to a study via clinical specialists. The comparisons of the performances of participants in different groups



note: \longleftrightarrow comparison within group (e.g., Basic 1 vs. Basic 2, Case 1 vs. Case 2)
 \longleftrightarrow comparison between groups (e.g. Basic 2 vs. Basic 4, Case 2 vs. Case 4)
 Basic means question items related to basic knowledge of 5As concept
 Case means question items related to case scenario of smoking cessation counseling

Flowchart A.

were analyzed via descriptive and analytical statistics (Flowchart A).

Results

Eight-five fifth year pharmacy students were enrolled in the present study. Most of the participants were males (61.17%) and 82.35% were between 20 and 23 years of age. Just over half stated that they had an average level of background of computer skills (52.94%), and over one-third (35.29%) had experience of using a self-learning interactive computer program. Most participants usually used Microsoft Office tools such as Word, Excel, Power Point, and Access (89.41%). The results of mean \pm standard deviations of pre-post scores in the examinations in each group are demonstrated in Table 1.

Comparison of pre- and post-test scores within groups indicated significantly higher scores in basic knowledge, case scenario, and total scores within CIMPSCC ($p = 0.001, 0.001$, and 0.001 respectively). Similar findings were also evident with Lecture ($p = 0.001, 0.001$, and 0.001 , respectively). There were no truly significant differences between pre- and post-test scores in Control (Table 2).

Table 3 shows the findings of the comparisons between groups of post-test scores. In reference

Table 1. Results of examination in each group (n = 85)

Examination scores	CIMPSCC (n = 30)		Lecture (n = 30)		Control n = (25)	
	Pre-test Mean \pm SD	Post-test Mean \pm SD	Pre-test Mean \pm SD	Post-test Mean \pm SD	Pre-test Mean \pm SD	Post-test Mean \pm SD
Basic knowledge (/10)	4.53 \pm 1.17	6.80 \pm 1.27	4.57 \pm 1.22	6.23 \pm 1.33	4.88 \pm 1.13	4.76 \pm 0.88
Case study (/10)	4.77 \pm 1.10	5.93 \pm 1.20	4.57 \pm 1.11	7.13 \pm 1.07	4.08 \pm 0.86	6.94 \pm 1.04
Total scores (/20)	9.30 \pm 1.70	12.73 \pm 1.46	9.10 \pm 1.80	13.37 \pm 1.90	8.96 \pm 1.57	9.32 \pm 1.34

Table 2. Comparison of pre- and post-test scores within groups (n = 85)

Variables	CIMPSCC (n = 30)			Lecture (n = 30)			Control (n = 25)		
	t	df	Sig ^a (2-tailed)	t	df	Sig (2-tailed)	t	df	Sig (2-tailed)
Basic knowledge	-0.75	29	0.001	-5.00	29	0.001	0.39	24	0.694
Case scenario	-3.62	29	0.001	-12.44	29	0.001	2.07	24	0.050
Total scores	-7.39	29	0.001	-9.49	29	0.001	-0.96	24	0.345

^a paired t-test (p < 0.05)

Table 3. Comparison of post-test scores between groups (n = 85)

Variables	Comparison between groups		Mean difference	Std. error	Sig ^b
Basic knowledge	CIMPSCC	Lecture	0.567	0.308	0.069
		Control	2.040	0.323	0.001 ^A
	Lecture	Control	1.473	0.323	0.001 ^B
Case scenario	CIMPSCC	Lecture	-1.200	0.275	0.001 ^C
		Control	1.850	0.289	0.001 ^D
	Lecture	Control	3.050	0.289	0.001 ^E
Total scores	CIMPSCC	Lecture	-0.633	0.413	0.129
		Control	3.413	0.434	0.001 ^F
	Lecture	Control	4.050	0.434	0.001 ^G

^{A,B,C,D,E,F,G} The mean difference is significant at less than 0.05 level, ^b ANOVA; post hoc test

to basic knowledge scores, the results showed significantly higher scores of CIMPSCC than Control (p = 0.001^A). However, there was no significant difference of post-test scores between CIMPSCC and Lecture (p = 0.069). Post-test scores regarding case scenario of Lecture were significantly higher than CIMPSCC (p = 0.001^C) whereas a significantly higher score was found in CIMPSCC compared to Control (p = 0.001^D). In contrast, there was no significant

difference in total scores between CIMPSCC and Lecture (p = 0.129) but CIMPSCC had significantly higher total scores compared to Control (p = 0.001^F). The findings showed Lecture had significantly higher post-test scores in all three sections compared to Control (p = 0.001^B, 0.001^E, and 0.001^G, respectively).

Regarding the attitudes toward the CIMPSCC program, the results showed most participants were favorably disposed to the CIMPSCC program.

Comments indicated approval of the use of multimedia tools such as video clips, audio visuals in the program as they made it more interesting (63.33%). The participants also felt that they learnt how to communicate with clients who needed to quit smoking (50%). The self-assessment of the program fostered improvements in their smoking cessation counseling skills (73.34%). However, they stated that the simulation cases and program functions were difficult (50% and 43.33%, respectively) (Table 4).

Discussion

This present study found that participants' performances in smoking-cessation counseling skills improved following the interventions of the CIMPSCC program and class lectures. The findings indicated both basic knowledge of 5As and case management skills were significantly improved after the implementation of the interventions in each group (Table 2). Nevertheless, there were no significant differences of the performance in both basic knowledge-gaining and total scores when compared between CIMPSCC and Lecture. Thus, exposure to a CIMPSCC program was considered as effective as the traditional educational method of lectures in smoking cessation counseling skill development. Other studies' findings also supported the implementation of a computer interactive multimedia program (CIMP) as a beneficial supplement to

teaching and learning, even though its use for smoking cessation is still not frequently seen⁽²³⁻²⁶⁾.

A computer-based learning enables the direct application of learning theory to practice. The theory of constructivism sees the smoking-cessation counselor as the facilitator who provides other health personnel with relevant experiences targeted to their level of understanding. Learning occurs when health personnel engage actively with the task provided and is consolidated by in-depth self-assessment. The theory of reflective practice argues that professional competence cannot only be achieved through the formal teaching and learning process but requires exposure to the real situation^(13,14,16). However, there are still some limitations regarding real practice especially in the case when a pharmacist might not have the chance to see smokers as they were required to go to a special cessation clinic. As a result, the simulation case interviews in the program give an opportunity to develop effective interviewing and patient assessment skills. Additionally, when evaluating the participants' performances regarding basic knowledge of smoking cessation, it was noticeable all participants were in the same class. Thus, the exchange of knowledge information among them might be possible. As a result, their scores might not reflect the overall picture of their performances. In addition, it was suggested time spending to complete CIMPSCC

Table 4. Participants' responses to a questionnaire to assess the CIMPSCC program (n = 30)

Questionnaire items	Strongly disagree/ disagree n (%)	Neutral n (%)	Strongly agree/ agree n (%)
The CIMPSCC is appropriately designed to assist smoking cessation counseling	5 (16.67)	5 (16.67)	20 (66.66)
The program is easy to use	13 (43.33)	7 (23.33)	10 (33.33)
I may have felt adequately prepared to use the program	15 (50)	6 (20)	9 (30)
The program may have taken a reasonable amount of time to complete	9 (30)	12 (40)	9 (30)
I think the multimedia tools (e.g., video clips, audio visual) made the program more interesting	2 (6.67)	9 (30)	19 (63.33)
A self-assessment fostered improvement in my basic knowledge of smoking cessation counseling	5 (16.67)	3 (10)	22 (73.34)
The simulation cases were difficult	7 (23.33)	8 (26.67)	15 (50)
I felt that I learnt how to communicate with clients who needed to quit smoking	12 (40)	3 (10)	15 (50)
Overall, the program is useful	4 (13.33)	6 (20)	20 (66.67)
The program is reasonably quick for response	3 (10)	3 (10)	24 (80)
The challenge of the program appeals to me	9 (30)	6 (20)	15 (50)
I will use skills I gained from the program in the future	8 (26.67)	6 (20)	16 (53.33)

Response were rated using a Likert' scale on which 1 = strongly disagree and 5 = strongly agree

sessions should be measured to assess the difficulty of the program.

The findings showed case management (case scenario) was significantly better performed by participants in Lecture compared to CIMPSCC (Table 3). Some similar previous studies proposed the existence of external factors influencing performance^(27,28). Examples were provided, such as participants did not seriously involve themselves as their enthusiasm and willingness had no effect on their examination grade, and limited access time for CIMPSCC (one week), busy study timetables, and poor familiarization with the program. Thus, it is possible that scores in case scenario may improve in repeated scenario through increased familiarity with the simulator and the environment. Increased participant exposure to the program and/or cross-over designs with different test scenarios (but similar exposure to the program) could address this issue. However, the approach of lectures involving face-to-face interaction is effective practice, therefore, its use alongside a computer-based program is a positive factor in the improvement of users' performances⁽²⁹⁾.

In Thailand, the improvement of counselor skills, especially in relation to the concept of 5As, is still limited. Collaboration among health providers is poor, particularly for pharmacists. Consequently, general service is mostly dependent upon physicians and nurses. This situation hampers the efficiency of smoking cessation services due to heavy hospital workloads. Hopefully, the findings of the present study will encourage health providers who want to be involved in smoking cessation services. Furthermore, the CIMPSCC program may be of benefit to drug store pharmacists as they often see clients seeking assistance to quit smoking.

Generally, participants' attitudes to the program were favorable. This finding is similar to that of the Morgan and Cleave-Hogg (2000) study, which found users had positive attitudes to simulation-based programs⁽³⁰⁾. However, the users stated they found some difficulties in using the program. In addition, the duration of the program session was slightly too long, thus they felt tired by the end of the program. The program adjustment is still needed in long-term use. A further study of knowledge and skills retention should be conducted to discover the durability of learning or the need for a refresher program. Nevertheless, there is a noticeable limitation regarding the Likert' scale used in the present study. Even the content of questionnaire items was reviewed via clinical specialists, however,

the questionnaire items have not been utilized (pilot) prior to the present study. As a result, the reliability of the questionnaire via Likert' scale might be doubtful. A further pilot of the questionnaire paper needs to be stated prior to a future evaluation.

Conclusion

The results of the present study demonstrated benefits of a CIMPSCC program in smoking-cessation counseling skills for pharmacy students. Use of the program produced greater improvements in knowledge and case management skills compared to the traditional method of lectures and the control group. While overall attitudes towards the program were positive, it requires adjustments and further studies of knowledge and skill retention are needed.

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การประเมินผลโปรแกรมคอมพิวเตอร์แบบโต้ตอบที่จำลองมีเดียเรื่องการฝึกทักษะการให้คำปรึกษาเพื่อเลิกบุหรี่

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วัตถุประสงค์: การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อพัฒนาโปรแกรมคอมพิวเตอร์แบบโต้ตอบที่จำลองมีเดีย เรื่องการฝึกทักษะการให้คำปรึกษาเพื่อเลิกบุหรี่ให้กับบุคลากรทางการแพทย์ และประเมินทัศนคติผู้ใช้โปรแกรม

วัสดุและวิธีการ: โปรแกรม CIMPSCC ได้รับการพัฒนาขึ้นโดยอาศัยซอฟต์แวร์ที่มีชื่อว่า Flash Professional® version 9.1 ซึ่งตัวโปรแกรมนี้จะบรรจุเนื้อหาเกี่ยวกับหลักการ 5A ซึ่งประกอบด้วยขั้นตอนทักษะการให้คำปรึกษาเพื่อเลิกบุหรี่ นอกจากนั้นโปรแกรมยังได้บรรจุวิดีโอคลิปบทสนทนาระหว่างเภสัชกร และผู้มาขอรับบริการเลิกบุหรี่เพื่อช่วยให้ผู้ใช้งานสามารถเรียนรู้หลักการ 5A จากบทสนทนาได้ ตอนท้ายของโปรแกรมจะมีแบบทดสอบตนเองเกี่ยวกับความรู้และทักษะของการให้คำปรึกษาเพื่อเลิกบุหรี่ตามหลักการ 5A หลังจากโปรแกรมถูกพัฒนาเสร็จได้มีการนำไปทดสอบประสิทธิภาพการทำงานกับกลุ่มตัวอย่างที่เป็นนักศึกษาเภสัชศาสตร์ชั้นปีที่ 5 โดยการเปรียบเทียบกับอีกกลุ่มที่ได้รับความรู้ และทักษะเรื่องเดียวกันจากการเรียนในห้องเรียนซึ่งโปรแกรม CIMPSCC และการเรียนในห้องถือเป็นตัวแปรทดสอบที่ใช้ในการทดสอบครั้งนี้ซึ่งค่าคะแนนที่วัดได้ จากองค์ความรู้เกี่ยวกับหลักการ 5A, และกรณีศึกษาผู้มาขอรับบริการ ซึ่งจะถูกนำไปวิเคราะห์เปรียบเทียบระหว่างกลุ่มที่ใช้โปรแกรม CIMPSCC, กลุ่มที่เรียนในห้อง, และกลุ่มควบคุม k

ผลการศึกษา: โปรแกรม CIMPSCC ได้ผ่านการทดสอบทั้งความถูกต้องด้านเนื้อหาจากผู้เชี่ยวชาญ และประสิทธิภาพการทำงานของโปรแกรม ผลการศึกษาแสดงให้เห็นว่าค่าคะแนนในส่วนขององค์ความรู้เกี่ยวกับ 5A, และกรณีศึกษาผู้มาขอรับบริการของแต่ละกลุ่มระหว่างก่อนและหลังให้ตัวแปรทดสอบลงไปนั้นมีความแตกต่างทางสถิติอย่างมีนัยสำคัญ ($p = 0.001$) ทั้งนี้ค่าคะแนนหลังจากให้ตัวแปรทดสอบเปรียบเทียบระหว่างกลุ่ม พบว่าองค์ความรู้เกี่ยวกับ 5A และคะแนนสะสมไม่มีความแตกต่างกันทางสถิติ อย่างไรก็ตาม เมื่อพิจารณาที่ค่าคะแนนในส่วนกรณีศึกษาผู้มาขอรับบริการพบความแตกต่างเชิงสถิติอย่างมีนัยสำคัญ ($p = 0.069, 0.129, \text{ และ } 0.001$ ตามลำดับ) จากผลการศึกษาอาจกล่าวได้ว่าโปรแกรม CIMPSCC สามารถใช้เป็นสื่อการเรียนรู้ด้วยตนเองที่ใช้พัฒนาทั้งองค์ความรู้ และทักษะการให้คำปรึกษาเพื่อเลิกบุหรืกับกลุ่มตัวอย่างได้นอกจากนั้นผู้ใช้โปรแกรมยังแสดงความพึงพอใจกับโปรแกรม CIMPSCC อีกด้วย

สรุป: โปรแกรม CIMPSCC สามารถช่วยให้ผู้ใช้งานพัฒนาองค์ความรู้และทักษะการให้คำปรึกษาเพื่อเลิกบุหรืกับกลุ่มตัวอย่างได้ ดังนั้นอาจกล่าวได้ว่าโปรแกรกดังกล่าว เป็นเครื่องมือที่ใช้ในการเรียนรู้อีกประเภทหนึ่ง นอกเหนือไปจากการเรียนรู้ในห้องเรียน
