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Short Communication

Fighting the Smoking Epidemic in Syria: First Online Course to Equip Health Professionals with Smoking Cessation Competencies

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Abstract

Background: The prolonged conflict in Syria has increased psychosocial stress and contributed to high smoking rates. Despite healthcare providers' critical role in smoking cessation, medical curricula lack adequate coverage of related competencies, and high physician smoking rates remain major barriers. This study evaluated the effectiveness and feasibility of the Smoking Cessation Strategy Course (SCSC), an online course aimed at enhancing Syrian healthcare professionals' knowledge, perceived skills, and attitudes toward smoking cessation.

Methods: This single-arm intervention involved a peer-led, asynchronous online course comprising 10 brief lessons (each 10 minutes long) and facilitated WhatsApp discussions. Participants (n = 120) included medical, dental, and pharmacy students and graduates. Pre- and post-intervention questionnaires assessed smoking cessation knowledge, perceived skills, and attitudes. Paired t-tests evaluated changes ($P < 0.05$).

Finding: Ninety-four participants completed the post-test (78.3% retention). Knowledge improved significantly (pre-test 11.5 ± 1.5 vs. post-test 17.4 ± 1.55; $P < 0.001$, d = 0.86) and perceived skills (pre-test 3.53 ± 0.60 vs. post-test 4.14 ± 0.66; $P < 0.001$, d = 0.82). Attitudes showed slight, non-significant (pre-test 3.00 ± 0.37 vs. post-test 3.24 ± 0.40; $P = 0.19$). Dropout analysis indicated no demographic differences, though non-completers held more negative baseline attitudes.

Conclusion: The SCSC significantly improved knowledge and perceived confidence in delivering smoking cessation interventions, demonstrating feasibility in a low-resource, conflict-affected context. While attitude changes were limited, this online model offers a scalable, low-cost approach to strengthening tobacco treatment capacity in Syria and similar LMIC settings.

Keywords: Smoking cessation, Online education, Healthcare professionals, Syria, Feasibility studies

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Introduction

According to the World Health Organization (WHO), tobacco use causes over 8 million deaths annually, with the majority occurring in low- and middle-income countries (LMICs).[1] There is a strong connection between smoking and psychosocial stress, as many smokers report using cigarettes to alleviate stress. Perceived stress predicts failure to quit, and relapse often occurs in high-stress situations.[2] The intense stress resulting from exposure to both natural and man-made disasters is linked to increased smoking rates and a higher likelihood of relapse.[3,4]

This phenomenon is evident in Syria, located in the Eastern Mediterranean Region (EMR). Since the onset of the Syrian crisis in 2011, the population has faced almost continuous stress due to armed conflict and the resulting political, economic, and social instability. A community-based survey conducted in Syria in 2020 found high smoking rates, with 34.7% of men and 10.0% of women reporting cigarette use, and 34.3% of men and 27.6% of women using shisha (waterpipe).[5] The same

study highlighted the need for targeted health education for tobacco users who smoke as a coping mechanism for various stressors.[5]

Healthcare providers are ideally positioned to support smoking cessation efforts through brief behavioral interventions and the prescription of drug therapies.[6] Consequently, the U.S. Public Health Service Clinical Practice Guideline recommends that all clinicians be trained to implement the 5As model during routine healthcare encounter.[7,8] This model includes five strategies: asking patients about smoking status, assessing their readiness to quit, advising smokers to quit, assisting in developing a quit plan, and arranging follow-up.[9] However, a significant barrier to providing this support in many LMICs, including Syria, is that many physicians are smokers themselves, which reduces their willingness to address smoking with patients[10],[11]. In light of this, it is recommended that medical schools enhance their curricula to include evidence-based smoking cessation treatment.[12,13]

Given the gaps in healthcare provider training related to smoking cessation and the challenges of delivering effective training in Syria and other countries experiencing civil unrest, this study aimed to assess the effectiveness and feasibility of an online course on smoking cessation targeted at Syrian health professionals and medical students.

Methods

Study design and procedures

The study received approval from the ethical committee at the Syrian Virtual University (SVU) on July 5, 2022 (ID: 1000/0). An online, asynchronous course was developed and assessed using a one-group pre/post design. To promote that course, three advertisements in Arabic were shared on the Facebook page of Junior Chamber International Tartus over a span of three weeks. Current or graduated students from pharmacy, dental, and medical faculties in Syria were invited to participate. All eligible individuals first completed an online pretest questionnaire (see below) and were then added to a private WhatsApp group. For 10 consecutive days in November 2022, they received links to brief educational videos ($\leq$10 minutes each) and participated in facilitated group discussions. After completing the sessions, participants filled out the online posttest questionnaire.

Development of the Smoking Cessation Strategy Course (SCSC)

The course was developed based on a review of best practices in smoking cessation treatment[14-17]. Learning objectives were established based on the relevant literature review, described in the course map (Table 1). The course incorporated PowerPoint slides with voice-over narration to create 10 videos, which were uploaded to YouTube and kept unlisted during the course delivery period. Each day, a link to one of the 10 lessons was shared in the private WhatsApp group, allowing participants to watch the lesson at their convenience throughout the course. They were encouraged to ask questions, take notes, and provide feedback on any topic. Post-session discussions aimed to elaborate on topics covered in the course and address the high prevalence of smoking in Syria, fostering a collaborative and solutions-focused dialogue.

Pre-test and post-test assessments

A comprehensive questionnaire was integrated into the online registration form, which included the informed consent declaration and the pre-test. The pre-test collected sociodemographic information and assessed smoking-related knowledge, perceived cessation treatment skills, and attitudes toward smoking cessation. The questionnaire was validated in Arabic by MD and SH at SVU, underwent peer review for clarity and usability, and was revised based on feedback received. The knowledge assessment consisted of 20 objective questions focused on smoking cessation knowledge. Correct answers for the knowledge assessment were determined by consensus among the

Table 1. Smoking cessation strategy course map

Learning objectives	Learning Units	Title of each session & link[1]	Duration
To identify the current tobacco use in Syria To identify the harmful effects of smoking To identify the benefits of quitting smoking	1st Educational Unit: Theoretical Introduction	Smoking Profile in Syria	06:47 min
		Harmful Effects of Smoking 1 Cigarette	05:05 min
		Harmful Effects of Smoking 2 Nargileh & e-Cigarettes	05:50 min
		Smoking Cessation Benefits	05:05 min
To treat tobacco use in clinical settings Identify Withdrawal Symptoms Identify the Quit Day Characters	2nd Educational Unit: How to treat tobacco use	5A´s approach	09:49 min
		5R´s approach	06:01 min
		Smoking Cessation Medications	05:40 min
		Withdrawal symptoms & Quit day	03:57 min
To treat tobacco use on the community level	3rd Educational Unit: Treating tobacco use outside the clinic	What can be done	07:17 min
		Smoking cessation programs in Syria	09:39 min

[1] Clicking on the link opens the YouTube video for that session.

study team, based on the WHO guidelines[9] and U.S. Public Health Service Clinical Practice Guidelines.[15] Perceived skills were assessed through 12 self-reported questions based on a 5-point Likert scale (1 = Least confident to 5 = Most confident). Attitudes were evaluated based on the participants' agreement with 20 statements using the Likert scale, which included 10 positive and 10 negative statements regarding attitudes toward smoking cessation. Participants' attitudes were assessed using 20 Likert-scale statements (10 positive, 10 negative; e.g., 'Most smokers can quit without professional and 'Healthcare providers play a key role in smoking cessation). The scale showed good internal consistency (Cronbach's α = 0.82) and test-retest reliability (r = 0.80). The attitude statements were scored according to their responses on a scale of (1 = Totally disagree), (2 = Disagree), (3 = Neutral), (4 = Agree), and (5 = Totally agree). The complete assessment of the SCSC is provided in Supplementary file 1.

Data analysis

Data were analyzed using SPSS version 22.0. Changes in knowledge, perceived skills, and attitudes from pre-test to post-test were evaluated using Student's paired t-tests. A *p*-value of < 0.05 (two-tailed) was considered statistically significant.

Results

Participants characteristics

A total of 120 participants aged 18 to 47 years (53 males and 67 females) enrolled in the online course. The largest group of participants came from a dentistry background, with 55 participants (45.8%), followed by those from a medical background (44, 36.7%) and a pharmacy background (21 participants, 17.5%). Among the participants, 19 (15.8%) were smokers, while 101 (84.2%) were non-smokers.

Dropout analysis (completers [n = 94] vs. non-completers [n = 26]) revealed no significant differences in age, sex, or faculty distribution with a small effect size (all $P > 0.05$ via Chi-square/t-tests) between dropouts and completers (Table 2). However, non-completers (dropouts) were more likely to hold negative pre-test attitudes (medium effect size $d = 0.450$, $P = 0.043$), such as believing smoking cessation was solely the smoker's responsibility and it's Ok to smoke in front of patients.

Table 2. Comparison of dropouts and completers' demographics and attitudes in pretest

	Dropouts (n = 26)	Completers (n = 94)	Effect size (Cohen's d)	*P* value
sex	10M - 16 F	51 F - 43M	0.06*	0.508
age	25.76 ± 6.99	28.12 ± 7.00	0.337**	0.130
faculty distribution	1.40 ± 1.00	1.70 ± 1.23	0.267**	0.255
Attitudes	2.92 ± 1.58	3.63 ± 1.57	0.450**	0.043

* Cramer's V, Chi-square test.
** Cohen's d, -independent-test.

Knowledge, skills, and attitudes about smoking cessation

Results are shown in Table 3. The mean number of correctly answered questions in the knowledge section increased significantly from pre-test (11.5 ± 1.5) to post-test (17.4 ± 1.55) ($P < 0.000$).

Regarding the skills assessment, the mean score improved from the pre-test (3.53 ± 0.60) to the post-test (4.14 ± 0.66), which was statistically significant ($P < 0.000$). Effect sizes were large for knowledge (Cohen's d = 0.863) and skills (d = 0.822), indicating substantial improvements post-intervention. Item-level responses for the knowledge and skills sections of the assessment are presented in Tables 4 and 5, respectively.

The mean attitude score in the pre-test showed a slight improvement, but this change was not statistically significant, increasing from 3.00. ± 0.37 in the pre-test to 3.24 ± 0.40 in the posttest ($P < 0.19$).

Discussion

The study presents the development and preliminary evaluation of a novel online course, SCSC, aimed at training healthcare professionals in evidence-based strategies to assist patients in quitting smoking. Improvements were noted in smoking cessation knowledge and perceived skills, although attitudes remained unchanged. Furthermore, this online course proved to be highly feasible in a resource-limited environment, utilizing open-source and free resources.

This is not the first initiative to create effective training

Table 3. Knowledge, perceived skills, and attitudes assessment of study participants

Knowledge Section				
	Pre-Course		**Post-Course**	
	n**	**%**	**n****	**%**
Total	120	100	94	100
Mean ± SD	11.75 ± 1.51		17.47 ± 1.55	
P-value	0.000*			
Skill Section				
	Pre-Course		**Post-Course**	
	n**	**%**	**n****	**%**
Total	120	100	94	100
Mean ± SD	3.53 ± 0.60		4.14 ± 0.66	
P-value	0.000*			
Attitudes Section				
	Pre-Course		**Post-Course**	
	n**	**%**	**n****	**%**
Total	120	100	94	100
Mean ± SD	3.00 ± 0.37		3.24 ± 0.40	
P-value	0.190*			

*Paired Sample t-test.
** The number of participants who answered correctly (Knowledge), who agreed/strongly agreed on the statements (Skills and Attitudes).

Table 4. The knowledge section of the assessment and participants' answers

Question		Pre-Course		Post-Course	
		n	%	n	%
1	The most common reason for Syrian university students to smoke* 1st	25	20.8	33	35.1
2	Smoking just one cigarette per day accounts for* 1st	17	14.2	80	85.1
3	Secondhand smoke from nargileh causes* 1st	81	67.5	89	94.7
4	The five A's include the following, except* 2nd	40	33.3	77	81.9
5	The five A's include the following, except* 2nd	16	13.3	51	54.3
6	All of the following are considered as a Nicotine Replacement Therapy (NRT), except* 2nd	85	70.8	76	80.9
7	All of the following are considered withdrawal symptoms, except* 2nd	89	74.2	80	85.1
8	Quit day should be* 2nd	85	70.8	78	83
9	The smoking cessation model to be implemented in the LMICs consists of* 3rd	106	88.3	90	95.7
10	Smoking cessation will negatively affect* 1st	95	79.2	89	94.7
11	Setting a quit day and sticking to it is an effective way of quitting smoking** 2nd	95	79.2	90	95.7
12	The five R's is an effective approach to smokers who intend to quit smoking** 2nd	106	88.3	89	94.7
13	Nargileh smoke causes more harm to passive smokers than cigarette smoke, even for those who are in the adjacent room** 1st	89	74.2	88	93.6
14	Pharmacological treatment of tobacco dependence is more effective when used with behavioral interventions** 2nd	113	94.2	92	97.9
15	Withdrawal symptoms begin after the first 24 hours of quitting smoking** 2nd	86	71.7	79	84
16	Smoking is not considered a disease, but rather a bad habit** 2nd	60	50	87	92.6
17	Blood pressure decreases after the first 20 minutes of smoking cessation** 1st	72	60	79	84
18	The five R's is an effective approach to smokers who intend to quit smoking** 2nd	102	85	69	73.4
19	The five A's is an effective evidence-based approach to treat nicotine dependence** 2nd	86	71.7	91	96.8
20	Smoking rates among Syrian men are among the highest in the region** 1st	89	74.2	88	93.6
Total		120	100	94	100
Mean ± SD		11.75 ± 1.51		17.47 ± 1.55	
P value		0.000			

1st, 2nd, 3rd, the learning objectives being assessed.
*Multiple choice questions (choices can be found in the Supplementary file).
**True/False Items (answers can be found in the Supplementary file).

methods for healthcare professionals in the Arab world to deliver smoking cessation treatment. However, previous efforts have primarily relied on traditional instructional methods, such as in-person classes and workshops,[18,19] which are often impractical in resource-poor environments, particularly in war-torn countries like Syria. In contrast, online methods have demonstrated effectiveness in Syria for training healthcare professionals in areas like evidence-based medicine and scientific writing.[20,21] Nevertheless, these approaches have yet to be tested specifically for smoking cessation training.

The positive outcomes of this study align with those of a previous study that employed an online course to train U.S. pharmacy, nursing, and other health profession students in smoking cessation treatment.[22] However, that course required eight hours of instructional time and involved numerous additional assignments for course credit. The present study contributes to the literature by showing positive results in a low-resource setting through brief instruction that is both feasible and easily disseminated. Additionally, the novel interactive component of the course, which facilitated online discussions and created a classroom-like experience, further enhanced the program's effectiveness. For example, discussions emphasized how each healthcare professional could contribute to smoking cessation by providing tailored advice based on their specialty. A dentist could emphasize the harmful effects of smoking on oral hygiene, while an internal medicine specialist could focus on its negative impact on the digestive system. Participants also discussed the lack of resources available to health professionals regarding smoking cessation, prompting some participants to voluntarily share relevant materials in the WhatsApp group.

It is important to note that while SCSC improved knowledge and perceived skills, it did not significantly impact attitudes toward smoking cessation treatment. This may be attributed to a ceiling effect, as many participants already held positive attitudes, leaving little room for improvement. Attitudes may also require longer-term experiential learning and targeted curricular elements to shift, and our measurement approach and immediate post-test timing may have further limited the detection of change.

SCSC addresses a critical gap in access to smoking

Table 5. The statements used in the perceived skill section of the assessment and participants' answers

Question		Pre-Course				Post-Course			
		n	%	mean	SD	n	%	mean	SD
1	Asking a patient about his smoking status	78	65	3.76	0.97	80	85.1	4.42	0.90
2	Providing clear advice for a smoking patient to help him quit smoking.	74	61.6	3.82	1.06	87	92.5	4.48	0.74
3	Assisting a smoker in raising his readiness to quit smoking	75	62.5	3.78	1.09	82	87.2	4.27	0.84
4	Assessing a smoker's readiness to quit smoking	46	38.3	3.23	1.07	68	72.3	3.97	0.96
5	Arranging with a patient who smokes for a follow-up session	79	65.8	3.81	0.93	74	78.7	4.16	0.93
6	Personalizing advice for a smoker's health status	58	48.3	3.43	1.13	84	89.3	4.41	0.87
7	Treating tobacco dependence in a smoker who does NOT intend to quit smoking	11	9.2	2.11	0.94	33	35.1	3.04	1.04
8	Asking a smoker patient to list by himself the benefits of smoking cessation	82	68.3	3.78	1.04	69	73.4	3.89	1.31
9	Asking a smoker patient to list by himself the harmful effects of smoking	68	56.7	3.54	1.09	79	84	4.23	0.86
10	Asking a smoker patient to list the obstacles in the way of total abstinence	67	55.8	3.50	1.22	81	86.1	4.24	0.90
11	Treating tobacco dependence in a smoker who intends to quit smoking	82	68.3	3.88	0.92	79	84	4.25	0.87
12	Motivating a smoker patient to give smoking cessation a try	82	68.3	3.88	0.98	81	86.1	4.36	0.86
Total		120	100			94	100		
Mean ± SD			3.53 ± 0.60				4.14 ± 0.66		
P value				0.000*					

* The number of participants who agreed/strongly agreed on the statements.

cessation training opportunities in Syria; broader efforts are needed to train healthcare professionals in delivering smoking cessation interventions,[23] including enhancing training within the curricula of medical, nursing, pharmacy, and other health profession.[11,23] SCSC represents a significant step forward in this neglected area and can help build a comprehensive, evidence-based tobacco treatment framework initiated by the Syrian Center for Tobacco Studies.[23]

This preliminary report aimed to provide didactic training to a sample of Syrian health professionals on interventions designed to assist patients quitting smoking. The next phase involves experiential training, whereby these professionals will actively participate in our upcoming smoking cessation program, applying what they learned from the course with real patients.

While this study makes a positive contribution to the literature, several limitations should be acknowledged. First, while a randomized controlled trial (e.g., waitlist control) would strengthen validity, wartime conditions and urgent training needs necessitated a pragmatic, single-group design. Future studies should combine SCSC with controlled evaluations to assess causality. This study design limited the ability to attribute observed changes directly to the intervention. Second, our results may not be generalizable to the broader population of healthcare professionals in Syria and beyond, as participants were volunteers who likely had a higher motivation to learn and provide smoking cessation treatment. Third, self-reported skills may reflect social desirability bias. Objective measures such as clinical stimulation should be used in future research. In addition, patient outcomes (e.g., documentation of cessation advice, quit attempts, or successful abstinence) could provide valuable evidence of whether training translates into meaningful changes in clinical practice. Lastly, nearly one-fourth of participants dropped out without completing the post-test, potentially due to attitudes such as the belief that smoking cessation is solely the smoker's responsibility or a waste of resources. Future work should focus on improving healthcare providers' attitudes toward cessation to improve their willingness to receive training. Additionally, poor internet access in Syria may have further hindered participation.

Despite these limitations, SCSC's brief, low-cost format aligns with the Syrian Center for Tobacco Studies' call for scalable cessation training[23]. Its integration into existing tobacco control programs could amplify impact. Further research is needed to evaluate the long-term impact of the program on provider knowledge, skills, and service provision, as well as its effectiveness in improving cessation success. This course serves as an initial step for health professionals to learn about smoking cessation interventions and aims to guide smokers toward quitting and adopting healthier lifestyles.

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Authors' Contribution

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Competing Interests
The authors declare that they have no conflict of interest.

Ethical Approval
The study was approved by the Ethical Committee at the Syrian Virtual University (SVU) (Approval ID: 1000/0).

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Supplementary File
Smoking Cessation Procedures Online Course Assessment

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