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Research Article

Evaluation of an Adapted Certified Tobacco Treatment Specialist (CTTS) Program for Physicians in the Republic of North Macedonia

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Abstract

An estimated at 47% of adult men and 27% of women use tobacco in the Republic of N. Macedonia. Few policies and programs exist within the country to support tobacco dependence treatment**.** An adapted Certified Tobacco Treatment Specialist (aCTTS) program for physicians was implemented and evaluated to determine if participation increased knowledge and positive perceptions of clinic-based tobacco dependence treatment and counselling. In 2017, 97 physicians participated in the two-day aCTTS training. Program evaluation included a longitudinal survey at baseline and 6- and 12-months post-intervention, weekly logbooks on tobacco counselling activities, and qualitative interviews on program implementation. Outcomes data demonstrate sustained increases in knowledge at 6**-** ($p < 0.001$) and 12 months ($p < 0.001$) post**-**intervention and confidence to engage in counselling and treatment practices at 6- ($p < 0.009$) and 12-months ($p < 0.001$). Participants also decreased personal tobacco use. Logbook data indicate that participating physicians counselled 74.8% of patients with tobacco-related conditions over the 12-month evaluation period. Qualitative interview data support evaluation and logbook data on program outcomes and implementation. The aCTTS program evaluation demonstrates the potential for clinical physicians and other health care providers as mediators and supporters of tobacco cessation in the Republic of N Macedonia.

Keywords: *Certified Tobacco Treatment Specialist (CTTS); Physicians; Republic of North Macedonia*

Introduction

Approximately 80% of tobacco users live in low- and middle-income countries [1]. Globally, in 2015, an average of 35% of men and 6% of women smoked tobacco [2]. The rate of smoking in the Republic of N Macedonia (hereafter referred to as Macedonia) is estimated at 47% for adult men and 27% for women [3,4].

Tobacco use is associated with a broad range of diseases including cancers, chronic obstructive pulmonary disease, asthma, and cardiovascular disease [5]. Globally, lung cancer is one of the most common cancer overall (11.7%) and is the leading cause of cancer

death (18%). Among men, lung cancer is the most commonly occurring and leading cause of cancer deaths. Among women, lung cancer is the third most commonly occurring. Eastern Europe has the 2nd highest region-specific incidence age-standardized rates among men for lung cancer (49.0). The 2020 incidence rate of lung cancer in N Macedonia is 29.4/100,000 compared to 22.4 globally [6,7]. The frequency of exposure to second hand smoke increases the disease risk in non-smoking populations [8]. In a study of young adolescents in Macedonia, those children living with mothers who use tobacco were significantly more likely to have dry cough without infection [9].

Tobacco production and consumption contributes to social and economic challenges. These include household economics (e.g. expenses related to purchasing tobacco, healthcare costs), labour force costs, public funds expended for prevention and treatment, and management of tobacco production [2]. Historically, Macedonia has been involved in raising, cultivating, and processing tobacco, and use of tobacco is a part of cultural life as well as a sole and traditional source of income for many Macedonians [10]. The income from tobacco is a significant part of the GDP of the country.

In the Republic of N Macedonia, few policies and programs are in place to support tobacco dependence treatment. While universal health coverage is provided through a system of national health insurance, tobacco treatment services and medications are not covered. Indeed, only cytisine was available in Macedonia for a short period of time, and those interested in using nicotine replacement and other smoking cessation therapies must purchase them from neighbouring countries.

In 1995, 2008, and 2010 laws were implemented to protect people from the harmful effects of tobacco. These policies included restrictions on advertisements and smoking in certain public places, establishment of 16 years as the minimum purchase age for tobacco, and requiring a message about health risks of smoking be printed on cigarette packages. In 2008, the World Health Organization recognized Macedonia for achievements at a high-level to 'protect people from tobacco smoke,' and in 2008 and 2010 for enacting comprehensive smoke-free legislation [2]. However, since 2012, no "quit campaigns" have been initiated, and in 2017, the Macedonian Parliament decreased protections for non-smokers with an amendment that permits smoking areas within restaurants and on outside patios [11].

In response to the immediate need for introduction of tobacco dependence treatment programs, Medical Faculty at Saints Cyril and Methodius University in Skopje partnered with Henry Ford Health System (Detroit, MI) to adapt and pilot a curriculum for Macedonian physicians based on the content of a Certified Tobacco Treatment Specialist (CTTS) training [12]. CTTS programs are accredited by the Council for Tobacco Treatment Training Programs and are offered in the United States through various health and higher education institutions [13].

To adapt the CTTS program, qualitative formative research was conducted using structured interviews and observations. In addition, the Macedonian research team members provided significant input based on their own medical practices and experiences related to patient tobacco use and barriers to physician counselling. The adapted CTTS (hereafter referred to as aCTTS) program included changes in content (e.g., development of culturally appropriate case studies), pedagogy (utilization of a train-the-trainer model), and delivery (shortened to a two-day training period).

Objective of the Study

In this paper, we present outcome and process data from a 12-month longitudinal evaluation survey, self-report logbook data regarding engagement in clinic-based tobacco counselling, and post-intervention qualitative interviews with a sample of trained physicians. The primary objective is to determine if the aCTTS program increases knowledge and positive perceptions of tobacco counseling among clinic-based physicians and supports physicians to implement tobacco dependence treatment and counselling in their practice.

Materials and Methods

Research population and sampling strategy

Physicians were identified through a public call and individuals' expressed interest in participating**.** A total of 103 physicians were invited to the aCTTS training and 97 (94.2%) participated. Participants included specialists in pulmonology, cardiology, internal medicine, family medicine, social medicine, and psychiatry. Physicians were recruited from all regions in N Macedonia.

Research framework and development of the evaluation survey

To maximize the identification of core concepts and procedures during the adaptation process and to identify effective future intervention strategies, our research was based on a modified 'systems model of preventive clinical care' [14]**.** Constructs within the model along with data from formative research were utilized to develop both qualitative and quantitative research instruments and to structure and inform data analysis (Figure 1 and table 1). In addition, a 30-item knowledge scale was adapted from the original CTTS post-program examination. The knowledge scale included with three subscales: 1) medication treatment for nicotine addiction; 2) counselling and motivational interviewing techniques; and 3) nicotine addiction.

Category	Constructs/Scales	Cohen α
Predisposing	Demographics, Education and Specialization Smoking Status (physician) Stages of Change for Smoking (physician)	N/A
Enabling	Knowledge (30 items)	N/A
	Patient-Physician Communication (5 items)	.74
	Barriers to Supporting Patients to Quit (5 items)	.58
	Severity of Tobacco Use (4 items)	.66
	Confidence in Documenting Tobacco Use and Providing Counseling (6 items)	.86
Reinforcing	Peer and Systemic Support (6 items)	.63

Table 1: *Longitudinal survey scales and items.*

Systems model of preventive clinical care (Figure 1) [13]

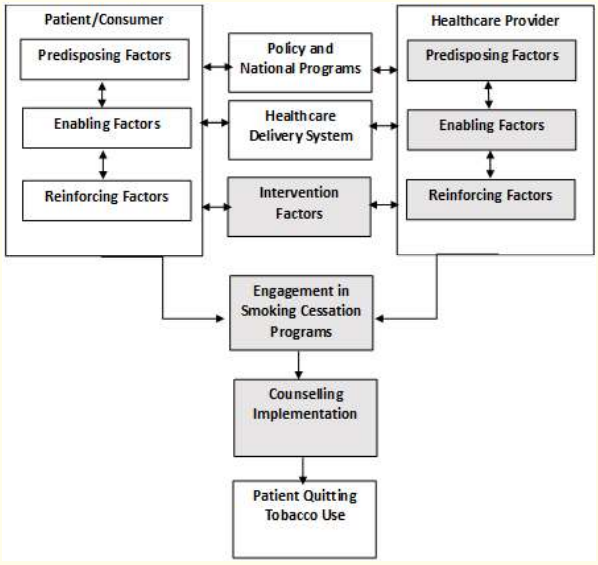

Figure 1: *Shaded areas indicate constructs included in the aCTTS longitudinal evaluation.*

The physician-patient communication scale included five items with four response options (Strongly Agree, Agree, Disagree, Strongly Disagree). Higher scores indicate better communication [maximum score 20]. Items included: 1) I know how to discuss health issues with my patients; 2) Patients listen to my advice about their health; 3) I feel comfortable talking to patients about their use of tobacco; 4) I can effectively communicate information about tobacco use to patients; and 5) It is my responsibility as a physician to encourage my patients to stop using tobacco.

The barriers to supporting patients scale included five items with four response options (Strongly Agree, Agree, Disagree, Strongly Disagree). Higher scores indicate more barriers [maximum score 20]. Items included: 1) There is little I can do to persuade my patients to stop using tobacco; 2) Some patients have used tobacco for too long to successfully quit; 3) As long as I tell my patients to quit, that is all that I can do to help them; 4) If patients cannot obtain medications to help them quit tobacco, there is little I can do to support my patients; and 5) I have no way to follow up with patients to find out if they have tried to quit tobacco use.

The severity of tobacco use scale included four items with four response options (Strongly Agree, Agree, Disagree, Strongly Disagree). Higher scores indicate higher perceived impact of tobacco use on health [maximum score 16]. Items included: 1) Tobacco use contributes significantly to the health status of my patients; 2) Tobacco use is a significant cause of disease in Macedonia; 3) In general, my patients' health would improve if they stopped using tobacco; and 4) Second hand smoke affects the health of my patients who do not use tobacco.

The scale for confidence in documenting, diagnosing and treating tobacco use included six items with five response options (Strongly Agree, Agree, Unsure, Disagree, Strongly Disagree). Higher scores indicate greater confidence [maximum score 30]. Items included: *I can….* 1) Complete a tobacco history; 2) Diagnose nicotine dependence; 3) Recognize the symptoms of nicotine withdrawal; 4) Incorporate available pharmacotherapy into the treatment plan; 5) Incorporate relapse prevention approaches; and 6) Apply at least two motivational interviewing techniques.

The peer and system support scale included six items with three response options (Often, Sometime, Never). Higher scores indicate greater perceived support [maximum score 18]. Items included: In the last 6 months…. 1) I have discussed risks of patients' tobacco use with my supervisors; 2) I have discussed risks of patients' tobacco use with my colleagues (fellow physicians/health care providers); 3) I provided support to colleagues who want to stop use of tobacco; 4) My hospital/clinic has enforced regulations that ban use of tobacco indoors; 5) My hospital/clinic is responsive to employee requests to enforce regulations related to tobacco use; and 6) Professional organizations that I belong to have provided me with information to support me in preventing and treating tobacco use.

Data collection and management

Survey data were collected at baseline and 6- and 12-months post-intervention. Survey data were entered into a Google data entry shell and imported into SPSS (version 25). Data were cleaned using descriptive data analysis and variables were created for scales. At the end of the aCTTS training, participants were provided with logbooks and instructed on documenting numbers of patients counselled and time spent engaged in counselling each week. Logbook data were collected monthly between June 2017 and May 2018 and entered into a Google data entry shell. At 12-months post-intervention, ten trained physicians were randomly selected and invited to participate in qualitative interviews regarding their experiences implementing tobacco treatment counselling methods in their practices. Data were collected using a standardized interview guide to ensure consistency in questions and probes across interviews. Interviews were conducted in English, audio recorded, and transcribed.

Quantitative data analysis

Frequencies and descriptive statistics were used to summarize the logbook data. Descriptive data analysis was performed on the survey data to summarize demographic characteristics of the respondents and items regarding respondent tobacco use. For continuous

variables, means and standard deviations were calculated. Bivariate analysis including Pearson chi square for categorical variables and independent t-tests for continuous variables were used to assess significant differences between the three data collection points. Data were analysed using SPSS version 25.

Qualitative data analysis

Transcribed texts were reviewed for data relevant to respondents' perceptions regarding knowledge and skills gained through the training, implementation challenges, and the impact of counselling on their patients. Data were segregated into groupings based on these broader categories and then further reviewed to identify themes and patterns. Selected illustrative text were extracted to support data interpretation.

Ethics

The study was reviewed and approved by the institutional review board at Henry Ford Health System and the Ethical Committee of the Faculty of Medicine, Saints Cyril and Methodius University. All participants in the evaluation completed a written consent form.

Results

Logbook data

Eighty-nine participating physicians kept logbook data between June 2017 and May 2018. A total of 396,898 patient visits were recorded including 156,854 (39.5%) for tobacco-related conditions. Of patients with tobacco-related conditions, 74.8% (117,334) were reported to have been counselled. The average time spent counselling each patient was 8 minutes. Data by month indicate an increase in counselling from 68% in June 2017 to 77% in September 2017 with this increase sustained over the rest of the 12-month data collection period (Figure 2).

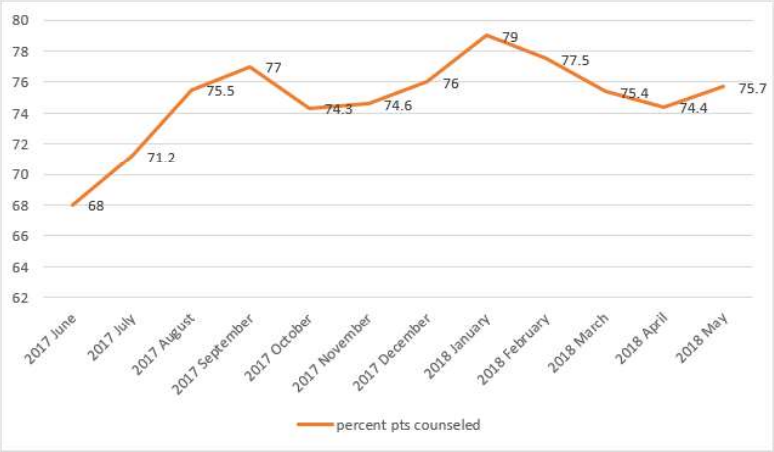

Figure 2: *Percentages of patients with tobacco-related conditions receiving counseling (May 2017 to June 2018).*

Longitudinal survey data

A total of 97 physicians completed the baseline survey and 87 completed the survey at all three data collection points (89.7%). Overall, 62.1% of respondents were female with a mean age of 48.3 (SD 9.9) years. Mean years since residency was 12.5 (SD 9.2) years and majority of respondents were internists or pulmonologists (See table 2).

Gender [N = 87]	Female	62.1% (54)
Place of Employment [N = 81]	Private Hospital	1.2% (1)
	Public Hospital	76.5% (62)
	Private Clinic	14.8% (12)
	Public Clinic	7.4% (6)
Speciality [N = 87]	Internal Medicine	40.2% (35)
	Pulmonology	16.1% (14)
	Family Medicine	10.3% (9)
	Social Medicine	10.3% (9)
	Cardiology	6.9% (6)
	Other	16.1% (14)
Mean Age (SD) [N = 87]		48.3 (9.9)
Mean Years Since Residency (SD) [N = 76]		12.5 (9.2)

Table 2: *Respondent demographics.*

Between baseline and post-intervention there were significant increases in total knowledge from 10.7 (SD 3.3) out of a possible score of 30 to 18.3 (SD 6.4) [$p < 0.001$] at 6-months and 19.9 (SD 5.6) [$p < 0.001$] at 12-months. Significant improvements were also evident across the three subscales (see Table 3). All effect sizes (Cohen d) were large (d = 0.8) with the exception of counselling knowledge at 6 months, which showed a medium effect size (d = 0.5).

	Baseline	**6 Months**		**12 Months**	
	[Mean (SD)]	**[Mean (SD)]**	**Cohen d**	**[Mean (SD)]**	**Cohen d**
Total Knowledge (30 items)	10.7 (3.3)	18.3 (6.4)[c] t = -10.47	1.14	19.9 (5.6)[c] t = -14.13	1.53
Knowledge Treatment (8 items)	3.4 (1.5)	5.7 (1.9)[c] t = -9.81	1.07	5.9 (1.6)[c] t = -11.35	1.23
Knowledge Counseling (10 items)	4.1 (1.7)	5.7 (2.3)[c] t = -5.37	0.59	6.3 (2.0)[c] t = -8.04	0.87
Knowledge Addiction (5 items)	0.8 (0.7)	2.5 (1.7)[c] t = -8.33	0.91	3.0 (1.5)[c] t = -12.75	1.38

Table 3: *Knowledge scores at baseline, 6 and 12 months.*

[c] *$p < 0.001$; Cohen d (effect sizes): d = 0.2 (small); d = 0.5 (medium); d = 0.8 (large).*

As described, a series of scales were adapted or developed to assess constructs within the 'systems model of preventive clinical care' framework (See table 1). Data demonstrate an increase in confidence in physician practices related to tobacco use documentation, diagnosis, and treatment between baseline (22.4, SD 5.1) and 6 months (24.2, SD 3.6) [$p = 0.009$] and 12 months post-intervention (24.9, SD 3.5) [$p < 0.001$] with small (d = 0.20) and medium effect sizes respectively (Table 4). There were no significant changes between baseline and post-intervention in the other four scales.

	No. Items Potential Range	Baseline [Mean (SD)]	6 Months [Mean (SD)]	12 Months [Mean (SD)]
Physician-Patient Communication	5 5 to 20	17.5 (2.0)	17.9 (1.7) t = -1.39	17.7 (2.1) t = -0.37
Barriers to Supporting Patients	5 5 to 20	11.9 (2.4)	12.3 (2.4) t = -1.04	12.3 (2.9) t = -0.79
Tobacco Use Severity	4 4 to 16	14.8 (1.6)	14.7 (1.6) t = -0.20	14.3 (1.8) t = 1.84
Confidence in Documenting, Diagnosing and Counseling	6 6 to 30	22.4 (5.1)	24.2 (3.6) [b] t = -2.68 Cohen d = 0.29	24.9 (3.5) [c] t = -3.95 Cohen d = 0.43
Peer/Systemic Support	6 6 to 18	15.4 (2.0)	15.4 (2.0 t = -0.092	15.2 (2.4) t = 0.913

Table 4: *Scale scores at baseline, 6 and 12 months.*

[b] p < 0.01, [c] p < 0.001; Cohen d (effect sizes): d = 0.2 (small); d = 0.5 (medium); d = 0.8 (large).

Physicians were also asked about their own tobacco use and plans to quit. Over 50% of respondents reported ever using tobacco (smoked 100 cigarettes or more in their lifetime). At 6-months post-intervention, among respondents completing both the baseline and 6-month survey, the percentage of respondents using tobacco dropped from 32.1% (25/78) to 29.5% (23/78) [X^2 = 31.98; p < 0.001]. At 12-months post-intervention compared to baseline, the percentage of smokers dropped from 31.1% (23/74) to 23.0% (17/74) [X^2 = 29.09; p < 0.001]. In addition, in terms of 'stages of change,' there is a significant shift in physicians' interest in quitting or actual quitting behaviours between baseline and 6-months (X^2 = 23.52 p = 0.005) and at 12-months there is a trending shift (X^2 = 16.71; p = 0.053) (See table 5).

Which of the following best describes your interest in quitting tobacco?	Baseline	6-month[b]	12-month[1]
I have no interest in change my use of tobacco (1)	11.1% (4)	2.9% (1)	0
I am thinking of quitting tobacco within the next 6 months but not the next 30 days (2)	27.8% (10)	23.5% (8)	22.6% (7)
I am planning to quit tobacco in the next 30 days (3)	19.4% (7)	14.7% (5)	16.1% (5)
I quit using tobacco within the past 6 months (4)	41.7 (15)	14.7% (5)	12.9% (4)
I quit using tobacco more than 6 months ago (5)	0	44.1 (15)	48.4 (15)

Table 5: *Respondents' stages of change for tobacco use at baseline, 6 and 12 months.*

[b]p < 0.01; [1]p = 0.053.

Qualitative post intervention data

To help contextualize the physicians' experiences with the training and program implementation, qualitative interviews were conducted with 10 randomly selected participants. These data are supportive of the outcome survey evaluation data.

Physicians noted that participating in the aCTTS program increased their confidence and/or motivated them to counsel patients.

"Based on this knowledge, my advice to patients has been more resolute and regular and, as a consequence, I've really had some satisfactory success with patients who have quit smoking…."

"I got familiar with all of the effects of smoking on health…we can advise our patients better regarding their quitting…."

"Well, frankly, the training did not notably advance my knowledge about the health risks of smoking, but it was and still is a great motive for me to continue to act positively on my patients…."

Physicians also noted the importance of acquiring new communication and counselling skills.

"It is very important to talk with a patient openly, it means the patient should be treated as an individual, and we should approach them with care and a willingness to help. The face to face conversation and the trust, which needs to be built with the patient, is something I've really known that it should be achieved, but the training provided some instructions how to implement it, how to get closer to the patient…."

Physicians discussed successes with helping patients quit, but also acknowledged that there remain challenges.

"They are my motive to pay more attention and try to do more for them, but as you know, we are all different. I've been successful with some patients, but with some of them, unfortunately, I haven't been".

"…a patient visited my office. I asked her about her smoking status. She told me she had quit 2 ½ months ago. It was after her visit to my office…I was really glad because I remember well she's told me she would never have a chance to quit…"

Program participants also mentioned that after the training they discussed tobacco use with peers and friends who were smokers.

"I've talked about the training with some friends who are smokers…just because of my intensive talking against smoking, one of my friends has quit…."

"…my role in my colleagues' process of quitting smoking is now more scientifically based compared to the previous one…"

The qualitative interviews also provided information about physicians' perceptions and reactions to the larger issue of tobacco use policies within the clinical and hospital workplaces.

"If the regulations against smoking were stricter and if they were really implemented and respected…to prevent cigarette smoking during working hours, even during the breaks….it would help the employees…it may look cruel to them at the beginning, but it is for their own good, in my opinion."

Discussion

To our knowledge, the aCTTS physician training is the only tobacco treatment education program implemented and evaluated for healthcare providers in N Macedonia. The longitudinal evaluation data demonstrate sustained increases in knowledge between baseline, 6-months and 12-months post-intervention and in confidence to engage in counselling and treatment practices across these same data collection points. Qualitative interview data support quantitative data that physicians gained knowledge and confidence from the program. Logbook data indicate that over a 12-month period (June 2017 to May 2018), participating physicians counselled 74.8% of patients with tobacco-related conditions. These data demonstrate that the aCTTS program was effective in changing physicians' knowledge and attitudes regarding tobacco counselling and tobacco dependence treatment and provide important process evaluation information in terms of program implementation within clinical settings and program sustainability.

An additional important finding was the impact of participating in the aCTTS program on physicians' personal use of tobacco. In 2014, the prevalence of smoking among Macedonian physicians was estimated at 29%. Research indicate that 35% of physicians who smoke rarely advise their patients to stop smoking and express more lax attitudes with respect to smoking bans in public places [15]. Decreasing physicians' and other healthcare providers' use of tobacco is a high priority to foster counselling of patients and increase healthcare provider advocacy for tobacco treatment resources.

A sizable proportion of adults in Macedonia, as well as other countries in the Balkan region, continue to use tobacco. As a result, poor health outcomes for users and those exposed to second hand smoke will continue to contribute to both social and economic costs in these countries. Key next steps to expand on the success of the aCTTS program include: 1) conduct of a randomized controlled trial (RCT) to provide more rigorous evaluation outcomes data and support further implementation and dissemination in Macedonia and the region; 2) expansion of the program to include training of nurses and other health care providers; 3) development and evaluation of a program to establish tobacco treatment specialists who can support healthcare providers by providing in-depth counselling and patient education; 4) development and evaluation of multi-media patient education programs; and, 5) identification of ways to build on the success of the aCTTS training to increase quitting among health providers.

Limitation of the Study

Study limitations include the small sample size and lack of a control group. The small sample size limits our ability to discern potential impact on specific groups (e.g. smokers/non-smokers). There is also a need to revisit and pilot some of the scales to increase internal consistency and scale reliability as some Cohen alphas were low. In addition, longitudinal outcomes data on patient success with quitting tobacco is needed to ensure that the counselling sessions are resulting in behaviour change.

Conclusion

There is an urgent need for socially and culturally salient interventions to support tobacco dependence treatment in low- and middle-income countries. Data indicate that the aCTTS training program positively affected participating Macedonian physicians' knowledge and self-confidence in tobacco dependence treatment and supported them in engaging in patient counselling. Further rigorous research projects are needed to provide additional data from the aCTTS and related programs to support implementation and dissemination in N Macedonia and elsewhere in the Balkans.

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