FEASIBILITY OF THE MULTIMODAL SMOKING CESSATION INTERVENTION DURING HOSPITALIZATION WITH SIX-MONTH FOLLOW-UP POST-DISCHARGE: A PILOT STUDY

Marta Čivljak[1], Rok Čivljak[2,3], Ilija Kuzman[2,3], Ana Grgić[3], Dijana Šember[3],
Sanja Belak Kovačević[3] and Livia Puljak[1]

[1]Catholic University of Croatia, Zagreb, Croatia;
[2]University of Zagreb School of Medicine, Zagreb, Croatia;
[3]Dr. Fran Mihaljević University Hospital for Infectious Diseases, Zagreb, Croatia

SUMMARY – The main aim of this pilot project was to introduce multimodal smoking cessation intervention in the hospital setting and to analyze users' satisfaction and efficacy of the intervention within six months post-discharge. Multimodal intervention for smoking cessation was used and it consisted of the "5 A's" model (Ask, Advice, Assess, Assist, Arrange) for behavior change, printed self-help materials for smoking cessation, and telephone counseling (one, three and six months after discharge from the hospital). The main outcome of the study was smoking status at six months. A total of 103 participants were included in this pilot project. At six-month follow-up, 49% of participants self-reported continuous non-smoking. Among the remaining participants, 20 reported smoking reduction, 19 were still smoking, and 16 participants were unable to make contact with. In the logistic regression, among all analyzed variables, only two of them were positively associated with smoking cessation after six months: participants' response that they would like to quit smoking within the next six months (B=4.688; p=0.018) and answering that they did not smoke when they were ill and bed-ridden due to illness (B=3.253; p=0.020). Satisfaction with the intervention was very high; 70% of participants rated the intervention as 'excellent'. Therefore, multimodal smoking cessation intervention can be successfully introduced at hospital setting yielding high smoking abstinence rates at six months post-discharge and high level of user satisfaction. Healthcare workers who work in hospitals should be educated so they can provide such intervention on a regular basis.

Key words: *Tobacco use; Smokers; Smoking cessation; Hospital*

Introduction

Tobacco smoking, morbidity and mortality attributable to smoking, are a major public health problem. According to the World Health Organization data from May 2020, 8 million people die each year due to tobacco, either because of direct tobacco use (7 million of those deaths) or due to second-hand smoke (1.2 million deaths) among non-smokers[1].

Evidence-based treatments of tobacco dependence are available and can enhance cessation rates. These treatments include advice of a physician, which is associated with two-fold likelihood of smoking cessation[2]; individual counseling[3]; telephone counsel-

ing[4]; group behavior therapy programs[5]; and pharmacotherapy[6-8].

It has been shown that nicotine replacement therapy (NRT), in all its forms available, can increase the rate of smoking cessation by 50% to 60% in various settings and regardless of the intensity of additional support that is provided together with NRT[6]. It has also been shown that bupropion, nortriptyline and varenicline may also help in achieving long-term smoking cessation[7,8].

However, despite the existing awareness of the risks associated with smoking and availability of various treatments, millions of people continue to smoke worldwide, partly due to a difficult and complex smoking cessation process. It has been reported that the majority of smokers would like to quit. Most of them will need to make multiple attempts, from approximately 6 to up to 30 times before they are able to quit permanently[9]. This is partly attributable to nicotine addiction. However, in addition to physical dependence on nicotine, there is also a strong emotional (psychological) dependence, as well as behavioral or learning factors that sustain addiction[10].

Consequently, success in smoking cessation depends on the motivation of an individual to quit smoking, their nicotine dependence severity, as well as their willingness for change[11,12]. Certain circumstances may help with smoking cessation. For example, it has been reported that the period of hospitalization is a good opportunity to help with smoking cessation[13]. A hospitalized smoker must abstain temporarily from tobacco use due to hospital policies which ban smoking. It has been reported that smoking cessation interventions that were delivered in hospitals and other settings where individuals with chronic medical illness are treated could be more effective compared to interventions in community settings. Programs that were shown to be effective share several common elements, i.e., effort to systematically identify smokers at admission or shortly after admission; counseling session delivered at bedside by a healthcare professional such as nurse or counselor who has been specially trained, and this counseling is often supplemented with written or audio-visual aids; advice about smoking cessation delivered by a physician; and follow-up support which is usually taking place *via* telephone, and continuing for at least 3 months after being discharged from the hospital[14].

Croatia has a long tradition of strengthening tobacco control, but many effective smoking cessation interventions have been underutilized[15]. System-level interventions to facilitate delivery of counseling and pharmacotherapy for smoking cessation in hospital setting and after hospital discharge were never developed in Croatia. Therefore, we conducted a pilot project for smoking cessation in hospitalized patients at Dr. Fran Mihaljević University Hospital for Infectious Diseases in Zagreb, Croatia. The main aim of this pilot project was to introduce a multi-modal smoking cessation intervention to hospitalized patients, to assess the efficacy of the intervention within six months post-discharge, and to analyze user satisfaction.

Patients and Methods

Setting

The study was conducted at three departments (Department of Respiratory Tract Infections, Department of Osteoarticular and Skin and Soft Tissue Infections, and Department of Infections in Immunocompromised Patients), Dr. Fran Mihaljević University Hospital for Infectious diseases in Zagreb, Croatia. We recruited participants from December 2014 to December 2015. The last contact with all participants took place in June 2016.

Participants

Inclusion criteria were as follows: adults (≥18 years), smokers (smoked ≥1 cigarette a day every day in the last month), and those having stopped smoking in the last six months and were hospitalized for infectious diseases with no limitation in diagnosis that required at least seven-day hospital stay at the three hospital departments involved. Those who had stopped smoking recently were invited to participate in the smoking cessation program in order to prevent relapse[16].

Exclusion criteria were adult individuals who had never smoked or individuals who had stopped smoking >6 months before hospitalization.

Smoking status was assessed on admission. Two physicians (authors RČ and IK) recruited participants during admission at the hospital ward, asked them about their smoking status, advised them to quit smoking, and invited them to participate in a smoking cessation program as soon as their fever subsided. Two registered nurses (authors AG and DŠ) supported patients to quit smoking during daily contact while they were in the hospital. Besides this initial assessment and invitation to participate in the

study, all other contacts and the entire intervention was conducted by MČ.

The study protocol was approved by the Ethics Committee of the School of Medicine, University of Zagreb, Croatia and Ethics Committee of Dr. Fran Mihaljević University Hospital for Infectious Diseases in Zagreb, Croatia. All participants provided written consent to participate in the study.

Intervention

We used multimodal intervention for smoking cessation, which consisted of the "5 A's" behavioral change model (Ask, Advice, Assess, Assist, Arrange) addressing the use of tobacco and dependence, providing written materials about smoking cessation, and providing counseling *via* telephone three times after discharge from the hospital. The smoking cessation program started with a baseline survey that was administered by a physician. In the baseline survey, data on patient demographics (including information on sex, age, race/ethnicity, education), as well as health status, and information related to smoking behavior were collected. Smokers were asked about the number of cigarettes they smoked each day, their smoking habits, awareness about second-hand smoke and smoking in front of children.

Since the first two "A's" were implemented at hospital admission, the baseline interview was used to assess patient willingness to quit smoking and level of their nicotine dependence, and to collect information on their previous quit attempts and reasons for prior failure to stop smoking.

After filling out the baseline survey, participants were provided a brief counseling intervention with the aims to enhance tobacco user motivation to quit, stress the advantages of nonsmoking, and stress the advantages of quitting smoking while hospitalized. Participants were told that if they were not allowed to smoke in the hospital anyway, and if they did not smoke for seven days of hospital stay, nicotine would be washed out from the body, leaving only psychological addiction. Physician and nurses then provided advice for coping with this crisis and difficult moments.

At the end of first counseling, the physician gave the participants written material about smoking cessation. The written material was a brochure entitled *How to Become an Ex-Smoker*, written by the author MČ in Croatian language. The brochure had seven chapters, as follows: 1) Are you ready to quit smoking; 2) Facts

about smoking; 3) Advantages of smoking cessation; 4) Steps involved in smoking cessation; 5) What can you expect after you quit smoking; 6) Plan for each of the first seven days after quitting smoking; and 7) Testimonials of former smokers. The brochure was first used in the anti-tobacco campaign organized by *Difrakcija*, a not-for-profit organization in 2011 in Croatia.

Patients whose family members were smokers were asked to discuss with their family members the idea of quitting together. Next counseling was appointed. All patients received smoking cessation counseling three times during their hospital stay. First counseling took place as soon as the patients felt somewhat better, their general condition improved and their fever subsided. Second counseling took place after 3-4 days, and last counseling session during hospital stay took place before discharge. During second and third counseling, patients received advice about handling withdrawal symptoms if they had quit smoking. Patients who did not quit smoking received additional information about the benefits of smoking cessation. Patients who reduced smoking received additional advice about subsequently quitting smoking completely.

All components of this intervention were based on *A clinical practice guideline for treating tobacco use and dependence*, a report published in 2008 by the United States Public Health Service[16]. Initial counseling session took at least 30 minutes, where the first half consisted of patient interviews and the second half was intended for patient counseling. Subsequent in-hospital counseling sessions lasted for at least 15 minutes.

The intervention was delivered by one physician (author MČ), a medical doctor and a psychiatrist by training. MČ has years of experience in running group therapies for smoking cessation, providing continuous medical education about smoking cessation to family physicians, school physicians, and operators of the telephone quit-line for smoking cessation. MČ also wrote the materials administered to the participants as part of this intervention.

Measured variables

The baseline questionnaire was filled out immediately after enrollment and before first counseling. Using this questionnaire, we collected the following information: age, sex, marital status, level of education, status regarding use of cigarettes (currently smoking or stopped smoking within the last six months), num-

ber of cigarettes smoked *per* day, age when participant started smoking, whether the participant had tried to quit smoking before (yes or no), and how many previous quit attempts they had.

In this baseline questionnaire, we also assessed participant motivation to stop smoking; for this, we used simple qualitative test with the following three questions: Do you want to stop smoking for good? Are you interested in making serious attempt to stop in the near future? Are you interested in receiving help with your quit attempt? If the participant answered "yes" to at least two of these three questions, it suggested that behavioral support should be offered. This test was based on the methods described by West[11]. Motivation was assessed in order to identify smokers who were willing to attempt stop smoking and to better inform physician how to approach each patient during counseling.

To measure dependence on tobacco smoking, we used qualitative approach including two questions. The first question analyzes whether individuals who smoke have hard time abstaining from smoking cigarettes under circumstances in which they would normally smoke. The second question analyzes whether individuals who smoke had previously made a serious attempt to quit smoking but were not successful[11].

After finishing the baseline survey, we also used the Fagerström Test for Cigarette Dependence (FTCD), the most commonly used quantitative measure for assessing nicotine dependence[17,18]. FTCD provides an ordinal measure of cigarette dependence, consisting of six items; two items have four answers scored from 0 to 3, while the remaining four items are answered with No (scored 0) or Yes (scored 1). The total score may range between 0 and 10, whereas scores from 0 to 2 indicate very low, scores 3 to 4 low, 5 medium, 6 to 7 high, and 8 to 10 very high cigarette dependence[18]. The FTCD was also physician administered. Results of the test were commented with the participants. If the results were indicating very high dependence, participants were informed about nicotine replacement therapy or other pharmacotherapy treatment.

Post-discharge follow-up

After discharge from the hospital, patients were contacted three times by telephone by a physician (MČ) for follow-up support and information about their smoking status, at one, three and six months after discharge. Additionally, all participants were contacted in June 2016 for assessment of satisfaction with the intervention. Duration of each telephone contact was approximately 10 minutes. At each follow-up, multiple attempts were made to contact the non-responding participants by telephone. If a physician was unable to contact participants for three days after the scheduled follow-up call, the participant was marked as a non-responder for that time point.

During all four follow-up assessments, patients were asked about their smoking status. The following questions were asked by a physician: "do you currently smoke" (response was recorded as yes/no), and if they responded that they currently smoked, the next question was "did you reduce the number of cigarettes that you smoke *per* day". Participants who were still smoking were offered additional telephone counseling on how to quit smoking, and those who had quit smoking were supported to remain nonsmokers.

During the final contact in June 2016, all participants were contacted and, beside their smoking status, they were asked about their satisfaction with the interventions for smoking cessation they received at the hospital and post discharge. Participants were asked to rate their satisfaction with the program using grades 1 to 5. These five grades correspond to the grading system used in the Croatian educational system where 1 is a failing grade and grades 2 to 5 are passing grades meaning 2=sufficient, 3=good, 4=very good, and 5=excellent.

Primary outcome measure was smoking cessation rate at the longest follow-up of six months, based on the participant self-report. Secondary outcome measures were 1) smoking cessation rate at one-month and three-month follow-up; 2) the rate of smoking reduction at all analyzed time points; 3) factors associated with smoking cessation and smoking reduction at six-month follow-up; and 4) satisfaction with the intervention. Considering sample size, this was a pilot study about the feasibility of tested intervention in the hospital setting and we used a convenience sample; there was no formal sample size calculation.

Statistical analysis

Descriptive statistics was expressed as mean and standard deviation (SD) for variables with normal distribution. We used χ^2-test for categorical variables and Fisher exact test for results where we expected N less than 5. We used t-test for interval variables. The effect of intervention on the smoking status (par-

ticipant smoking *vs.* not smoking) at the four time points (baseline, first follow-up at one month, second follow-up at three months, and third follow-up at six months) was analyzed with Cochran test. Factors associated with reduced smoking, quitting smoking or failure of intervention were analyzed with binary logistic regression. Statistical significance was set at p<0.05. Analyses were performed by use of SPSS software (SPSS, Chicago, IL, USA).

Results

We invited 133 smokers to participate in this project; 30 refused to participate, and thus we had 103 participants. Participant flow is shown in Figure 1.

Participant characteristics

On average, participants were aged 49 years and the majority of participants were men, married, with high-school education (Table 1). Mean age when they started smoking was 17 years, and on average they

Table 1. Characteristics of study participants

Characteristic	Result
Age, mean (SD) (yrs)	49.26 (13.15)
Sex, n (%): Men Women	76 (73.8) 27 (26.2)
Marital status, n (%): Married Single	72 (69.9) 31 (30.1)
Education, n (%): Less than high school High school graduate College undergraduate College graduate	7 (6.8) 66 (64.1) 13 (12.6) 17 (16.5)
Smoking status, n (%): Current smokers Stopped smoking Never smoker	101 (98.1) 2 (1.9) 0 (0)
Age at starting smoking, mean (SD) (yrs)	16.79 (3.6)
Number of cigarettes/day, mean (SD)	23.39 (10.9)
Previous quit attempts, n (%): Yes No	80 (79.2) 21 (20.8)
Number of previous quit attempts, mean (SD)	2.6 (2.3)

SD=standard deviation; yrs=years

smoked 24 cigarettes *per* day. There were 80% of participants that had tried to quit smoking previously, and the mean number of these previous attempts was 2.5.

Motivation to stop smoking

Out of 103 participants, 98 (95%) indicated they wanted to stop smoking for good (Table 2). With the exception of one participant, all other participants were interested to seriously try to stop smoking in the near future, and most of them were interested in quitting within the next month (77%). There were 63 (61%) participants who indicated that they believed they could manage to quit smoking on their own, and

Table 2. Motivation to stop smoking and reasons for quitting

Question	n (%)
Do you want to stop smoking for good? Yes No	98 (95.1) 5 (4.9)
Are you interested in making serious attempt to stop smoking in the near future? Yes No	102 (99.0) 1 (1.0)
If you are interested in quitting smoking, when do you plan it? Within the next month Within the next six months Within the next year	79 (76.7) 16 (15.5) 6 (5.8)
Are you interested in receiving help with your quit attempt? Yes No	39 (37.9) 63 (61.2)
What are the reasons why you would like to quit smoking? Health Financial reasons Want to 'get rid' of the bad habit Family pressure Aesthetics	90 (87.4) 47 (45.6) 17 (16.5) 6 (5.8) 2 (1.9)

were not interested in receiving help with their quit attempt. When asked about the reasons why they would like to stop smoking now, multiple responses were offered and participants could choose more than one answer. Health was the most important reason why they would like to quit smoking (87%), followed by financial reasons due to the high cost of cigarettes (46%) and desire to 'get rid' of the bad habit (17%) (Table 2).

According to the FTCD test, at baseline there were 13% of participants with very low nicotine dependence, 27% with low, 11% with medium, 22% with high, and 27% with very high nicotine dependence.

Primary outcome

At six-month follow-up, there were 49% of the participants who self-reported continuous non-smoking. Among the remaining participants, 20 reported reduced smoking, 19 were smoking, and we were unable to contact 16 participants (Table 3).

Secondary outcomes

Smoking cessation and smoking reduction after one and three months

At 1-month follow-up, 36 (35%) participants indicated that they did not smoke, while 26 (25%) reported reduced smoking (Table 3). At 3-month follow-up, 39 (38%) participants indicated that they did not smoke, while 28 (27%) reported reduced smoking (Table 3).

Table 3. Participant smoking status at one, three and six months after hospital discharge

Smoking status	1-month follow-up, n (%)	3-month follow-up, n (%)	6-month follow-up, n (%)
Not smoking	36 (35)	39 (38)	48 (49)
Smoking	19 (18)	17 (16)	19 (18)
Reduced smoking	26 (25)	28 (27)	20 (19)
Unable to contact	22 (21)	19 (18)	16 (15)

Factors associated with smoking cessation and smoking reduction at six months

In logistic regression, among all factors analyzed, only two variables were positively associated with smoking cessation after six months, i.e., participant response that they would like to quit smoking within the next six months (B=4.688; p=0.018), and answer 'no' to the question 'Do you smoke if you are so ill that you are in bed most of the day?' (B=3.253; p=0.020). None of the variables analyzed was associated with smoking reduction at six months (Table 4).

Satisfaction with the intervention

Among 86 participants who responded to the question about satisfaction with the intervention, 60 (70%) responded 'excellent', 21 (24%) responded 'very good' and six responded 'good'. When asked about their satisfaction with the study personnel, 84 (98%) responded 'excellent' and two (2%) responded 'very good'.

Discussion

In this study assessing multimodal intervention for smoking cessation among hospitalized smokers, we found that the rates of smoking cessation increased during the three follow-up intervals, with the prevalence of smoking of 35% at one month, 38% at three months, and 49% at six months. At the time of the last contact, the participants indicated very high satisfaction with this intervention and study personnel.

Multiple reasons facilitating smoking cessation during hospitalization have been suggested, including more rapid resolution of a disease for which patients were admitted, treatments to be used will work better, reduced risk of complications during hospital stay, shorter hospitalization, smoker being removed from settings that are usually associated with smoking cigarettes, patients are continuously surrounded and assisted by healthcare workers who can help them refrain from smoking, and hospital is an institutional environment within healthcare that promotes health-related behaviors and activities[19,20].

It has been suggested that assisting a smoker who has been hospitalized with smoking cessation should be entrusted to all professionals working in a hospital, including both healthcare and non-healthcare workers; for this reason, it would be desirable if all hospital workers could receive education that would empower them to help patients with smoking cessation[20].

In this study, we used the knowledge gained previously about effective interventions for hospitalized patients. For example, it was shown that in-hospital counseling delivered by a healthcare professional in combination with self-help materials was better than standard treatment, especially if the intervention continued for at least one month of the patient discharge from the hospital[13]. In this study, patients received a multimodal intervention, also including self-help materials.

Furthermore, research has shown that activities prolonging the smoking cessation intervention beyond

Table 4. Association of not smoking at six-month follow-up with variables analyzed

Variables in the equation

Variable		B	SE	Wald	df	Sig.	Exp(B)
Step 1	Female sex	1.064	1.192	0.796	1	0.372	2.898
	Age	0.005	0.034	0.024	1	0.878	1.005
	Marital status: not married	0.683	0.799	0.730	1	0.393	1.980
	Education (ref: no formal education or primary)			5.800	3	0.122	
	Secondary education	0.670	1.566	0.183	1	0.669	1.953
	Tertiary education	-0.663	0.874	0.576	1	0.448	0.515
	University education	-2.969	1.395	4.532	1	0.033	0.051
	q2. Age when they started smoking	0.261	0.140	3.492	1	0.062	1.298
	q3. Number of cigarettes smoked *per* day	-0.035	0.092	0.147	1	0.702	0.965
	q4. Do you usually smoke in front of children? no	-0.868	0.785	1.223	1	0.269	0.420
	q5. Did you ever try to quit smoking? no	1.253	1.064	1.387	1	0.239	3.501
	q8. Is someone in your family smoking? no	-0.564	0.743	0.576	1	0.448	0.569
	q10. Do you take any medication? no	0.942	0.879	1.148	1	0.284	2.566
	q13. Is it difficult for you not to smoke in situations in which you used to smoke? no	-0.037	0.942	0.002	1	0.968	0.963
	q14. Would you like to quit smoking forever? no	-0.376	5.343	0.005	1	0.944	0.686
	q16. I would like to stop smoking (ref: within the next month)			7.776	2	0.020	
	q16. I would like to stop smoking within the next 6 months	4.688	1.989	5.554	1	0.018	108.641
	q16. I would like to stop smoking within the next 12 months	2.886	2.064	1.956	1	0.162	17.929
	q17. Interested in expert help to assist you in smoking cessation			0.018	2	0.991	
	q17(1). Interested in expert help to assist you in smoking cessation: yes	19.678	40,192.563	0.000	1	1.000	351,440,721.137
	q17(2). Interested in expert help to assist you in smoking cessation: no	19.777	40,192.563	0.000	1	1.000	388,309,726.121
	Total score on Fagerstrom test	1.175	1.095	1.151	1	0.283	3.238
	Degree of nicotine dependence – Fagerstrom test	-0.558	1.179	0.224	1	0.636	0.572
	q18. How soon after you wake up do you smoke your first cigarette? (ref: after 60 minutes)			0.718	3	0.869	
	31-60 minutes	-0.471	3.123	0.023	1	0.880	0.624
	6-30 minutes	-1.030	2.376	0.188	1	0.665	0.357
	within 5 minutes	.072	1.311	0.003	1	0.956	1.074
	q19 Do you find it difficult to refrain from smoking in places where it is forbidden: yes	1.853	1.454	1.623	1	0.203	6.379
	q20 Which cigarette would you hate most to give up? any other	1.947	1.305	2.226	1	0.136	7.008
	q21 How many cigarettes *per* day do you smoke? (ref: 10 or less)			4.227	3	0.238	
	11-20 cigarettes	1.415	3.961	0.128	1	0.721	4.118
	21-30 cigarettes	1.442	2.780	0.269	1	0.604	4.228
	31 cigarettes or more	-1.341	1.701	0.622	1	0.430	0.261
	q22 Do you smoke more frequently during the first hours after awakening than during the rest of the day: yes	2.206	1.452	2.308	1	0.129	9.079
	q23 Do you smoke even if you are so ill that you are in bed most of the day: yes	3.253	1.396	5.430	1	0.020	25.862
	Constant	-37.468	40,192.565	0.000	1	0.999	0.000

Variable(s) entered on step 1: sex, age, marital status, education, q2, q3, q4, q5, q8, q10, q13, q14, q16, q17, Total score on Fagerstrom test, Degree of nicotine dependence – Fagerstrom test, q18, q19, q20, q21, q22, q23

Logistic regression 2: Association between reduced smoking at six-month follow-up with variables analyzed

		B	SE	Wald	df	Sig.	Exp(B)
Step 1[a]	Female sex	-1.534	1.503	1.042	1	0.307	0.216
	Age	0.035	0.050	0.488	1	0.485	1.036
	Marital status: not married	0.232	1.033	0.051	1	0.822	1.262
	Education (ref: no formal education or primary)			0.870	3	0.833	
	Secondary education	-19.765	12322.568	0.000	1	0.999	0.000
	Tertiary education	1.226	1.506	0.663	1	0.416	3.408
	University education	1.384	1.673	0.684	1	0.408	3.992
	q2. Age when they started smoking	-0.342	0.253	1.837	1	0.175	0.710
	q3. Number of cigarettes smoked *per* day	-0.121	0.138	0.764	1	0.382	0.886
	q4. Do you usually smoke in front of children? No	-0.756	1.117	0.458	1	0.499	0.469
	q5. Did you ever try to quit smoking? No	0.052	1.122	0.002	1	0.963	1.054
	q8. Is someone in your family smoking? No	1.264	1.077	1.377	1	0.241	3.539
	q10. Do you take any medication? No	1.248	1.221	1.045	1	0.307	3.482
	q13. Is it difficult for you not to smoke in situations in which you used to smoke? No	-.206	1.801	0.013	1	0.909	0.814
	q14. Would you like to quit smoking forever? No	20.549	16831.834	0.000	1	0.999	840,145,588.608
	q16. I would like to stop smoking (ref: within the next month)			2.225	2	0.329	
	q16. I would like to stop smoking within the next 6 months	22.267	13661.645	0.000	1	0.999	4681314535.198
	q16. I would like to stop smoking within the next 12 months	23.966	13,661.645	0.000	1	0.999	25,598,690,204.498
	q17. Interested in an expert help to assist you in smoking cessation			3.684	2	0.158	
	q17(1). Interested in an expert help to assist you in smoking cessation: Yes	69.918	44367.291	0.000	1	0.999	2317,838,917,480,964,000,000,000,000,000.000
	q17(2). Interested in an expert help to assist you in smoking cessation: No	67.709	44,367.291	0.000	1	0.999	254,565,702,239,321,980,000,000,000,000.000
	Total score on Fagerstrom test	-23.900	9,393.883	0.000	1	0.998	0.000
	Degree of nicotine dependence - Fagerstrom test	0.006	1.574	0.000	1	0.997	1.006
	q18. How soon after you wake up do you smoke your first cigarette? (ref: after 60 minutes)			4.954	3	0.175	
	(31-60 minutes)	-68.219	28,181.649	0.000	1	0.998	0.000
	(6-30 minutes)	-47.080	18,787.767	0.000	1	0.998	0.000
	(within 5 minutes)	-26.424	9,393.883	0.000	1	0.998	0.000
	q19 Do you find it difficult to refrain from smoking in places where it is forbidden? Yes	-25.326	9,393.883	0.000	1	0.998	0.000
	q20 Which cigarette would you hate most to give up? any other	-23.725	9,393.883	0.000	1	0.998	0.000
	q21 How many cigarettes *per* day do you smoke? (ref: 10 or less)			1.228	3	0.746	
	11-20 cigarettes	-74.118	28,181.650	0.000	1	0.998	0.000
	21-30 cigarettes	-48.714	18,787.766	0.000	1	0.998	0.000
	31 cigarettes or more	-23.486	9,393.883	0.000	1	0.998	0.000
	q22 Do you smoke more frequently during the first hours after awakening than during the rest of the day? Yes	-22.313	9,393.883	0.000	1	0.998	0.000
	q23 Do you smoke even if you are so ill that you are in bed most of the day? Yes	-28.549	9,393.883	0.000	1	0.998	0.000
	Constant	132.792	87,938.685	0.000	1	0.999	4.687E+057

a. Variable(s) entered on step 1: sex, age, marital status, education, q2, q3, q4, q5, q8, q10, q13, q14, q16, q17, Total score on Fagerstrom test, Degree of nicotine dependence - Fagerstrom test, q18, q19, q20, q21, q22, q23.

the hospitalization period are helpful, and the most important factor recognized was personal contact between the patient and the healthcare professional, including proactive telephone contact, which can help further improve the efficacy of the intervention administered to the patient during hospital stay[13].

Our data analyses indicated that only two variables were positively associated with smoking cessation at six-month post-hospital discharge, i.e., participant response that they would like to quit smoking within the next six months and not smoking when they are ill and bed-ridden due to illness. The former variable is very important because it shows the importance of patient motivation for smoking cessation.

In our study, we found the prevalence of non-smoking to be higher after six months of the intervention initiation compared to smoking status at one and three months. Similar results were described earlier in long-term studies[21,22].

It has already been recognized that not all hospitalized smokers have high motivation to quit smoking[23]. Those less motivated may be less likely to succeed, even when they engage in the smoking cessation intervention. In our study, the majority of included participants reported that they would be interested to stop smoking, and most of them indicated that they would like to stop smoking during the following months. However, when asked about their interest in getting professional help with smoking cessation, only 37.9% indicated that they were interested in such help. Despite this seeming lack of desire to get professional help with smoking cessation, all these patients enrolled in this study where they did receive professional help by a physician aimed toward helping them quit smoking.

These findings indicate that patients should be approached and assessed with multiple questions, and not just asked whether or not they are interested in getting professional help with smoking cessation. The findings of this study argue in favor of asking multiple questions regarding willingness to stop smoking and timeline associated.

This pilot study showed that it was feasible to provide multimodal intervention in the hospital setting. However, this particular intervention was conducted entirely by one person, on top of her usual daily duties, which was considered very demanding. Healthcare personnel caring for patients in the hospital setting, both physicians and nurses, should be educated

for providing such interventions and performing follow-up as part of their daily duties, with work time cleared for such tasks. Introducing non-smoking policies in hospitals is commendable, but not sufficient to prevent smoking during hospitalization. Even though Croatia has laws banning smoking at hospital premises, staff is witnessing patients walking out the hospital grounds so they could smoke.

The advantage of this intervention is its relative low cost, but it is very labor intensive and would require factoring in the cost of staff time when comparing it to other interventions.

A limitation of the present study was the small sample size and absence of a control arm; however, this was a pilot study testing the feasibility of conducting such a multimodal intervention in the setting of a hospital for infectious diseases. Additionally, we did not biochemically validate participant self-reports on smoking cessation.

Conclusion

In this pilot study, we showed that a multimodal smoking cessation intervention could be successfully introduced in a hospital setting, and yielded high smoking abstinence rates at six months post-discharge. Healthcare personnel employed at hospitals should be educated to provide such intervention on regular basis.

References

1. World Health Organization. Tobacco. Key facts. Available at: https://www.who.int/news-room/fact-sheets/detail/tobacco. 2018.

2. Stead LF, Buitrago D, Preciado N, Sanchez G, Hartmann-Boyce J, Lancaster T. Physician advice for smoking cessation. Cochrane Database Syst Rev. 2013;5:CD000165. doi: 10.1002/14651858.CD000165.pub4.

3. Lancaster T, Stead LF. Individual behavioural counselling for smoking cessation. Cochrane Database Syst Rev. 2017;3:CD001292. doi: 10.1002/14651858.CD001292.pub3.

4. Stead LF, Hartmann-Boyce J, Perera R, Lancaster T. Telephone counselling for smoking cessation. The Cochrane database of systematic reviews. 2013;8:CD002850. doi: 10.1002/14651858.CD002850.pub3.

5. Stead LF, Carroll AJ, Lancaster T. Group behaviour therapy programmes for smoking cessation. Cochrane Database Syst Rev. 2017;3:CD001007. doi: 10.1002/14651858.CD001007. pub3.

6. Hartmann-Boyce J, Chepkin SC, Ye W, Bullen C, Lancaster T. Nicotine replacement therapy versus control for smoking cessation. Cochrane Database Syst Rev. 2018;5:CD000146. doi: 10.1002/14651858.CD000146.pub5.

7. Hughes JR, Stead LF, Hartmann-Boyce J, Cahill K,Lancaster T. Antidepressants for smoking cessation. Cochrane Database Syst Rev. 2014;1:CD000031. doi: 10.1002/14651858. CD000031.pub4.

8. Cahill K, Lindson-Hawley N, Thomas KH, Fanshawe TR,Lancaster T. Nicotine receptor partial agonists for smoking cessation. Cochrane Database Syst Rev. 2016;5:CD006103. doi: 10.1002/14651858.CD006103.pub7.

9. Chaiton M, Diemert L, Cohen JE, Bondy SJ, Selby P, Philipneri A, *et al*. Estimating the number of quit attempts it takes to quit smoking successfully in a longitudinal cohort of smokers. BMJ Open. 2016;6:e011045. doi: 10.1136/bmjopen-2016-011045.

10. Rose JE. Nicotine and nonnicotine factors in cigarette addiction. Psychopharmacology. 2006;184:274-85. doi: 10.1007/s00213-005-0250-x.

11. West R. Assessment of dependence and motivation to stop smoking. BMJ. 2004;328:338-9. doi: 10.1136/bmj.328.7435.338.

12. Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. Am J Health Promot. 1997;12:38-48. doi: 10.4278/0890-1171-12.1.38.

13. Rigotti NA, Clair C, Munafo MR, Stead LF. Interventions for smoking cessation in hospitalised patients. Cochrane Database Syst Rev. 2012;5:CD001837. doi: 10.1002/14651858. CD001837.pub3.

14. Rigotti NA. II. Smoking cessation in the hospital setting – a new opportunity for managed care. Introduction. Tob Control. 2000;9 Suppl 1:I54-5. doi: 10.1136/tc.9.suppl_1.i54.

15. Civljak M, Tudor Car L, Skara S, Oreskovic S. The gap between the knowledge and current practices – a case of tobacco control programs in Croatia. Coll Antropol. 2015;39:803-8.

16. A clinical practice guideline for treating tobacco use and dependence: 2008 update. A U.S. Public Health Service report. Am J Prev Med. 2008;35:158-76. doi: 10.1016/j.amepre.2008.04.009.

17. Fagerstrom KO. Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. Addict Behav. 1978;3:235-41. doi: 10.1016/0306-4603(78)90024-2.

18. Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. Br J Addict. 1991;86:1119-27. doi: 10.1111/j.1360-0443.1991.tb01879.x.

19. Myers K, Hajek P, Hinds C, McRobbie H. Stopping smoking shortly before surgery and postoperative complications: a systematic review and meta-analysis. Arch Intern Med. 2011;171:983-9. doi: 10.1001/archinternmed.2011.97.

20. Jimenez Ruiz CA, de Granda Orive JI, Solano Reina S, Riesco Miranda JA, de Higes Martinez E, Pascual Lledo JF, *et al*. Guidelines for the Treatment of Smoking in Hospitalized Patients. Arch Bronconeumol. 2017;53:387-94. doi: 10.1016/j.arbres.2016.11.004.

21. Murray RP, Gerald LB, Lindgren PG, Connett JE, Rand CS, Anthonisen NR. Characteristics of participants who stop smoking and sustain abstinence for 1 and 5 years in the Lung Health Study. Prev Med. 2000;30:392-400. doi: 10.1006/pmed.2000.0642.

22. Nohlert E, Ohrvik J, Tegelberg A, Tillgren P, Helgason AR. Long-term follow-up of a high- and low-intensity smoking cessation intervention in a dental setting – a randomized trial. BMC Public Health. 2013;13:592. doi: 10.1186/1471-2458-13-592.

23. Sepulveda-Sanchez JM, Canca-Sanchez JC, Rivas-Ruiz F, Martin-Garcia M, Lorente Marquez C, Timonet-Andreu EM. Assessing motivation to smoking cessation in hospitalized patients. Enferm Clin. 2018;28:13-9. doi: 10.1016/j.enfcli.2016.11.005.

Sažetak

IZVEDIVOST MULTIMODALNE INTERVENCIJE ZA PRESTANAK PUŠENJA TIJEKOM
HOSPITALIZACIJE SA ŠESTOMJESEČNIM PRAĆENJEM NAKON OTPUSTA: PILOT ISTRAŽIVANJE

M. Čivljak, R. Čivljak, I. Kuzman, A. Grgić, D. Šember, S. Belak Kovačević i *L. Puljak*

Glavni cilj ovoga probnog projekta bio je provesti multimodalnu intervenciju za prestanak pušenja kod hospitaliziranih bolesnika i analizirati učinkovitost intervencije šest mjeseci nakon otpusta iz bolnice, kao i zadovoljstvo korisnika intervencijom. Primijenjena je multimodalna intervencija za prestanak pušenja koja se sastojala od pristupa „5 P" (Pitati, Poticati, Procijeniti, Pomoći i Pratiti) za promjenu ponašanja, tiskanih materijala za samopomoć kod prestanka pušenja i telefonskog savjetovanja (nakon jednog mjeseca, tri mjeseca i šest mjeseci od otpusta iz bolnice). Glavni ishod studije bio je pušački status nakon šest mjeseci. Uključeno je ukupno 103 sudionika. Nakon šest mjeseci praćenja 49% sudionika izjavilo je da su prestali pušiti. Među preostalim sudionicima 20 ih je smanjilo broj popušenih cigareta na dan, 19 ih je i dalje pušilo, a sa 16 sudionika se nije moglo stupiti u kontakt. U logističkoj regresiji su od svih analiziranih varijabla samo dvije bile pozitivno povezane s prestankom pušenja nakon šest mjeseci: odgovor sudionika da bi htjeli prestati pušiti u sljedećih šest mjeseci (B=4,688; p=0,018) i odgovor da ne puše kad su bolesni u toj mjeri da moraju ležati u krevetu (B=3,253; p=0,020). Zadovoljstvo intervencijom bilo je vrlo visoko; 70% sudionika ocijenilo je intervenciju kao "izvrsnu". Stoga se multimodalna intervencija za prestanak pušenja može uspješno uvesti u bolničkim uvjetima, omogućuje visoku stopu apstinencije od pušenja šest mjeseci nakon otpusta i veliko zadovoljstvo korisnika. Zdravstveno osoblje koje radi u bolnicama trebalo bi se obrazovati kako bi mogli redovito pružati takvu intervenciju.

Ključne riječi: *Upotreba duhana; Pušači; Prestanak pušenja; Bolnica*