Original Article
DOI: 10.22037/jds.v40i1.34546
ISSN 2645-4351

Effects of Smoking Cessation Counseling Based on the Stages of Change Model in a Dental School Setting: A Semi-Experimental Study

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(*Submitted: 27 November 2022 – Revised version received: 1 January 2023 – Accepted: 9 January 2023– Published online: Winter 2023*)

Objectives The present study aimed to evaluate the effects of smoking cessation counseling by a dentist on the smokers' preparation for change to quit smoking.
Methods This study was performed on 150 smokers, admitted to the Dental School of Shahid Beheshti University of Medical Sciences, Tehran, Iran. The patients were randomly divided into two groups of 75 participants. The intervention group received smoking cessation counseling by a single senior dental student for a 30-minute session. The patient's status in the stages of change was determined at baseline and one month after the intervention. For statistical analysis, paired t-test, Mann-Whitney U test, and multivariate linear regression analysis were performed at a significance level of $P<0.05$.
Results At baseline, there were no significant differences between the intervention and control groups in terms of the stage of change for smoking cessation. Also, there was no significant difference in the stages of change in the control group between the baseline and one-month follow-up. However, this difference was significant in the intervention group ($P=0.006$). In other words, the number of patients in the pre-contemplation stage decreased by 43%, the number of patients in the contemplation stage increased by 20%, and the number of patients in the action stage increased by 16%.
Conclusion Smoking cessation counseling enhances a person's forward movement and transition through the stages of change for cessation of smoking.
Keywords Smoking cessation; Smoking patients; Consultation; Dentists

Introduction

Smoking is one of the primary causes of morbidity and mortality around the world. Several studies have shown that patients who use tobacco are at risk of respiratory [1], cardiovascular, and neoplastic diseases, as well as cancers of the head and neck regions, mucosal disorders, periodontal disease [2], failure of dental implants, and halitosis. [3] Various methods have been used to encourage people to quit smoking. One of these methods is smoking cessation counseling, provided by a health practitioner including nurses, physicians, dentists, or social workers. [4-6] Findings on the effects of smoking cessation counseling have been promising, and higher cessation rates have been reported in counseled versus non-counseled smokers in multiple studies. [7-10]

Oral health professionals in the dental setting have a unique opportunity to encourage tobacco abstinence among tobacco users and help them quit smoking. [11, 12] The first and the most basic step in smoking cessation counseling is the identification and assessment of tobacco use in patients. Although most dentists and dental students identify patients who smoke, the majority of them provide no cessation intervention services. [13-15] In this regard, a systematic review by Carr et al. showed that interventions conducted by oral health professionals increased tobacco cessation rates within 12 months or longer. It was proposed that further examination of tobacco counseling in the dental office setting is important for identifying effective intervention components. [16]

Although many studies have examined smoking cessation, there are only few studies evaluating the effects of smoking cessation counseling by dentists on the smokers' cessation status in the cycle of change. [17, 18] Since more than 50% of smokers visit dentists and dental clinics at least once a year, dentists can take advantage of this golden opportunity to promote cessation counseling. [16] It should be noted that people are in different stages of change in behavior before counseling, and dentists should consider this difference in providing cessation counseling. Based on the transtheoretical model (TTM), people are in one of the stages of change for smoking cessation, including pre-contemplation (no intention to change behavior and not acknowledging the problem), contemplation (acknowledging the problem and seriously considering change, but not committed to taking action), preparation (intention to change), action (actively making changes), maintenance (maintaining the changed behavior) and relapse (returning to older behaviors). [19-21]

The present study aimed to investigate the effects of smoking cessation counseling based on the stages of change model on the smokers' knowledge of tobacco use, and to evaluate the oral health effects of this program and the smokers' attitudes toward smoking cessation in a dental school setting.

Methods and Materials

This semi-experimental study was performed on patients (undergoing different dental treatments), admitted to the

Dental School of Shahid Beheshti University of Medical Sciences, Tehran, Iran. The participants were explained about the objectives of the study, and formal consent was obtained for their participation. It was emphasized that participation in this study is completely voluntary and that the confidentiality of patients' data is protected. This study was approved by the 11th Ethical Committee of the Research Institute of Dental Sciences, Shahid Beheshti University of Medical Sciences (03/15/2010).

Considering a significance level of 95%, statistical power of 80%, and an estimate of 25% of participants moving in the cycle of change in the intervention group, a sample size of 140 was measured to be sufficient. Due to the possibility of loss to follow-up, 150 participants were selected and randomly divided into two intervention and control groups, based on the table of random numbers. Regarding the inclusion and exclusion criteria, only ever-smokers, that is, people who reported having smoked ≥100 cigarettes, were recruited, whereas patients who refused to answer the questions or had physical or mental problems were excluded.

A specific implementation framework was selected for this study, which met our specific goal. The developed program was based on the TTM model of change, which construes behavior change as an intentional process that unfolds over time and involves progress through six stages of change. [20] TTM integrates the processes and principles of change in leading theories (hence called "transtheoretical"). A standardized questionnaire was used to evaluate the participants' pre- and post-intervention status in the stages of change, as well as their knowledge of smoking hazards and attitude toward smoking cessation. The psychometric properties of this questionnaire have been published elsewhere. [22]

The questionnaire used in this study consisted of demographic data (sex, age, marital status, income, and education), questions about smoking status (consumption of other types of tobacco products, type of cigarette, frequency of smoking, and age of starting smoking), a question for determining the stage of change according to TTM (i.e., pre-contemplation, contemplation, preparation, action, maintenance, and relapse), six questions for evaluating the respondent's knowledge about the effects of smoking on health of themselves and others, and 21 questions evaluating the respondent's attitude toward smoking cessation and the dentist's role.

All the participants were classified into either of the six stages of change according to TTM: patients who do not want to quit smoking in the next six months (pre-contemplation); patients who will think about smoking cessation in the next six months (contemplation); patients who will decide to quit smoking in the next 30 days (preparation); patients who had quitted smoking and had been abstinent for less than six months (action); patients who had stopped smoking for more than six months (maintenance); and patients who had quitted smoking, but are smoking again (relapse).

Questions related to the knowledge of tobacco use, oral health effects, and attitude toward smoking cessation were scored on a five-point Likert scale, ranging from "strongly disagree" (score 1) to "strongly agree" (score 5). In the intervention group, a question ("If I can help you quit smoking, will you be ready?") was asked to create motivation according to the patient's stage. The 5As (Ask, Advise, Assess, Assist, Arrange) was used to help a tobacco users who were ready to quit while 5 R's (relevance, risks, rewards, roadblocks, and repetition) were applied for motivational counseling to help those who were not ready to quit. [23]

The intervention group completed the questionnaire in three intervals: at baseline (before counseling), immediately after a brief tobacco use control, and one-month follow-up. On the other hand, the control group completed the questionnaire in two intervals, that is, at baseline and in the one-month follow-up. and brochure were given to both groups for the second time after completing the questionnaires. A between-group analysis in the one-month follow-up (using independent t-test) and a within-group comparison of baseline versus one-month follow-up were carried out (using paired t-test).

Mann-Whitney U test was used to compare quantitative variables with an abnormal distribution between the case and control groups. Wilcoxon signed-rank test was also used to compare the stages of change between the case and control groups. To evaluate the role of different variables, including interference and other possible confounding variables, such as age, sex, and level of education, multivariate linear regression models were used. All analyses were performed using SPSS version 18. The level of statistical significance was set at <0.05.

Results

A total of 150 patients (75 patients in each of the intervention and control groups) participated in this semi-experimental study. The majority of the participants (84.7%) were male. Overall, 8.8% of the patients were younger than 30 years, 5.3% were in the age range of 30-45 years, and 6.8% were older than 45 years. Regarding education, 20.6% of the participants had school education, 16.7% had a diploma, and 62.7% had academic education. There were no significant differences between the intervention and control groups in terms of sex, age group, and educational level.

As shown in Table 1, at baseline, approximately 70% of the patients were in the pre-contemplation stage, 5% were in the contemplation stage, 1% was in the preparation stage, and 3% were in the action stage. At baseline, there were no

significant differences between the intervention and control groups regarding the stages of change. In the control group, the proportion of people in different stages of change did not vary significantly in the one-month follow-up. However, this proportion significantly changed in the intervention group (P=0.006). In other words, the number of patients in the pre-contemplation stage decreased by 43%, the number of patients in the contemplation stage increased by 20%, and the number of patients in the action stage increased by 16%.

Table 2 indicates the relationship between demographic variables and transition through the stages of change. The younger age group showed significantly more forward movements in the cycle of change, while more than 80% of the middle-aged or old-age group showed no change or backward movements (P=0.012). Compared to 99% of the participants in the control group with no movement in the cycle of change, 45% of the participants in the case group showed forward movements in the stages of change (P=0.000).

As shown in Table 3, the regression analysis revealed that after controlling for age, sex, and education, knowledge and attitude in the one-month follow-up were associated with the stage of change. However, attitude was associated with participation in the counseling program.

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Table 1- Percentage of patients in the case and control groups in the stages of change

	Groups	**Stages of change**					
		Pre-contemplation	Contemplation	Preparation	Action	Maintenance	Relapse
Baseline	Intervention	76	5.3	1.3	2.7	0	14.7
	Control	66.7	10.7	0	5.3	0	17.3
One-month follow-up	Intervention	33.3	25.3	14.7	18.7	0	8
	Control	65.3	12	0	5.3	0	17.3

Table 2- Percentage of change in behaviors in the stages of change according to TTM after a brief tobacco cessation counseling in a dental setting

Variables		**Degree of movement in the cycle of change**						
		5	3	2	1	0	-3	-4
Sex	Female	0	8.7	0	13	73.9	0	4.3
	Male	0.8	7.1	6.3	8.7	73.2	2.4	1.6
Age*	<30	2.3	13.6	4.5	15.9	63.6	0	0
	30-45	0	7.6	9.1	4.5	72.7	4.5	1.5
	>45	0	0	0	10	85	0	5
Education	High school	0	3.2	3.2	12.9	74.2	0	6.5
	Diploma	0	4	4	8	84	0	0
	Academic	1.1	9.6	6.4	8.5	72	3.2	1.1
Group***	Control	1.3	14.7	10.7	17.3	48	4	4
	Case	0	0	0	1.3	98.7	0	0

*P<0.05.
***P<0.001

Table 3- Regression analysis of different variables and their associations with the knowledge and attitude scores

Model	Dependent variable: knowledge	P-value	Dependent variable: attitude	P-value
	Beta		Beta	
Intervention/control group	0.110	0.146	-0.21	0.009
Stage of change (baseline or one-month follow-up)	0.33	0.001	0.236	0.004

*Controlled for age, sex, and education.

Discussion

The results of this study showed that individuals who received smoking cessation counseling successfully moved forward in the change cycle. Also, the attitude of the participants who received counseling improved significantly. This finding shows the significant positive effect of smoking cessation counseling by a dentist in the dental setting on the cycle of change and the patient's perspective. This semi-experimental study with a control group design allowed for the analysis of the effectiveness of counseling in preparedness for change. Another advantage of this study was using a theory-based model, which could ultimately indicate the individual's movement

in the stages of change.

After a one-month follow-up, the number of patients in the pre-contemplation stage decreased by 43%; the number of patients in the contemplation stage increased by 20%; and the number of patients in the action stage increased by 16%. These changes suggest that counseling encourages more people to consider smoking cessation. Other studies have also reported that smoking cessation interventions in dental offices and other social environments may increase smoking cessation in smokers. [16, 18]

Prochaska and DiClemente, in 1983, divided the participants into five stages of change, including pre-contemplation, contemplation, action, maintenance, and relapse. The results showed that flexible participants experienced minimum change in the pre-contemplation stage. [20] In the current study, the number of participants in the pre-contemplation stage (76%) decreased to 33% after the intervention. Moreover, Ma et al., in 2003, concluded that participants older than 21 years were more motivated to quit smoking compared to those younger than 21 years. However, in the current study, younger participants (<30 years) showed forward movements in the change cycle compared to their older counterparts. [15]

The present study showed that knowledge in the one-month follow-up was associated with age, sex, and stage of change. On the other hand, attitude was associated with participation in the counseling program and the stage of change. Garnier et al., in 2010, found that regular education of dentists about smoking may improve smoking counseling. [24] Therefore, we should find a solution to help dentists perform optimally and decrease the possible obstacles. To conduct further relevant research, the possible obstacles to smoking cessation counseling by dentists should be evaluated in other dental settings, including private dental offices. The outcomes of smoking cessation counseling should be also evaluated over a longer period. Moreover, to take advantage of the dentists' abilities in smoking cessation counseling, some changes should be applied in dentistry educational programs to train all dental students with proper skills on smoking cessation counseling, or some continuing education courses should be established for graduate dentists to help them perform their professional tasks. Nonetheless, if smokers are not interested in counseling for any reason, information packages can be prepared for them so that they can visit professional smoking cessation centers to receive the help they need.

Conclusion

It can be concluded that smoking cessation counseling enhances forward movements through the stages of change for smoking cessation. Analysis of this movement may be an important tool for evaluating the effectiveness of counseling.

Conflict of Interest

No Conflict of Interest Declared ■

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How to cite:
Ghorbani Z, Ebn Ahmady A, Hosseini Z, Azimi S. Effects of Smoking Cessation Counseling Based on the Stages of Change Model in a Dental School Setting: A Semi-Experimental Study. J Dent Sch 2022;40(1):7-11.