Original Article

The effect of theory - Based educational intervention on consumption of smokeless tobacco products by merchants' guilds

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Abstract:

BACKGROUND: Smokeless tobacco (SLT) products are highly addictive and contain at least 28 carcinogenic chemicals. The purpose of this study was to determine the effect of theory-based on the Transtheoretical Model of Behavior Change on consumption of SLT products by Merchants' Guilds in 2018.

MATERIALS AND METHODS: The present quasi-experimental research was conducted over one intervention group. The research population consisted of all consumers of the SLT products among the merchants' guilds in Chabahar City, Iran in 2018. Data were gathered from 320 individuals by simple random sampling using a valid and reliable researcher-made questionnaire. The intervention program was designed based on the Transtheoretical Model of Behavior Change cognitive processes and lasted 6 months. After the intervention, the same questionnaires were administered among the participants. The data were analyzed by SPSS version 20 using the descriptive and analytical tests.

RESULTS: In the preintervention phase, the participants' mean scores of the cognitive processes at the precontemplation, contemplation, and preparation stages were 29.16 ± 4.63, 25.07 ± 3.84, and 12.12 ± 1.63, respectively. At the postintervention phase, mean scores of the precontemplation, contemplation, and preparation stages reached to 40.5 ± 5.96, 38.8 ± 5.03, and 35.5 ± 4.23, respectively. Furthermore, the participants' mean sores at the action and maintenance stages were 36.4 ± 4.57 and 43.3 ± 3.29, respectively. According to the ANOVA, a significant relationship was found between cognitive processes at the preintervention phase and stages of change ($P < 0.001$).

CONCLUSIONS: Individuals can improve from the precontemplation, contemplation, and preparation phases to the action and maintenance stages by attending based on Transtheoretical Model of Behavior Change educational interventions. It is suggested that the structure of this model be used to reduce high-risk behaviors in other occupations.

Keywords:

Merchants' guilds, smokeless tobacco, transtheoretical model of behavior change

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Introduction

Tobacco is among the leading evitable causes of global morbidity and mortality.[1] Global tobacco epidemic kills more people than HIV, tuberculosis, and vector-borne diseases.[1] Around 10 million people are estimated to die of tobacco use in developing countries by 2030, and this figure is higher than the figures estimated for AIDS, drug abuse, road accidents, murder, and suicide.[1] According to the World Health Organization (WHO), 6 million deaths are attributable to tobacco use globally, of which nearly 1.2 million occur in South-East Asia.[2,3] Furthermore

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based on the statistics of this organization, tobacco consumption hurts the economy by more than half a trillion dollars.[2] Tobacco products are generally divided into two categories: smoking products and smokeless products.[1] Smokeless tobacco (SLT) products refers to the use of unburned tobacco by chewing, spitting, dipping, and snuffing.[4] SLT products are addictive due to its nicotine content and a large variation in the type and concentration of toxic substances exists in different products available worldwide.[2] Consumption of the SLT products increases the risk of tooth decay, tooth loss, gum disease, lips and tongue cancer, stomach ulcers, depression, cardiovascular diseases, premature birth, low-birth weight, congenital iron deficiency anemia, infertility, as well as esophageal and pancreatic cancers.[5-8] A review of studies from 113 countries revealed that SLT products use alone accounts for loss of over 6 million disability-adjusted-life-years and has caused 266,592 deaths from cancers and heart disease.[9] Almost 85% of the global disease burden of SLT use is from the South Asia region, of which India accounts for 74% and Bangladesh accounts for 5%.[9]

SLT is smuggled into southeastern Iran through the Pakistan border. The low cost of SLT, the families' lack of control, the misconceptions about SLT consumption, and the very low awareness in adolescents and youth about its adverse effects have increased the use of these substances.[1]

Different behavioral theories and models have been applied to investigate and shed light on the tobacco consumption behavior. In this regard, Procheska and De Clemente designed the Transtheoretical Model of Behavior Change or stages of change,[10] which shows a general pattern of the behavior change.[11] In this model, behavior is assumed to take place over a series of stages and includes four constructs: stages of change, processes of change, self-efficacy, and decisional balance.[12] According to this model, people go through five stages of change including precontemplation, contemplation, preparation, action, and maintenance. In the precontemplation stage, the individual does not want to change for the next 6 months and does not have a plan to adopt the health behaviors. At the contemplation stage, people are thinking about change in the next 6 months, but they are not yet fully ready for the change. At the preparation stage, the individual is ready for change and provides the required basics for starting the behavior. In the action stage, the individuals have changed their behavior for <6 months. During the maintenance stage, the individual has undergone the behavior change for more than 6 months.[13] Cognitive processes are explicit and covert activities used by individuals to modify their behavior and include social liberation (understanding one's own community of

supportive health options), self-awareness (to what extent people seek to absorb or incorporate new studies), re-evaluation of the environment (assessing effects of the problematic behavior on the physical and social environment), emotion relief (identifying and expressing emotions related to the risky behavior), and self-re-evaluation (assessing one's self with regard to the problematic behavior).[13]

Research and interventions using a transtheoretical model have a long history in the field of tobacco consumption behaviors. The results of a study by Kong *et al*.[14,15] indicate that the smoking cessation program including telephone counseling and text messaging using stages of change was effective for outpatients after a myocardial infarction. Mohamadi Zeidi *et al*.[16] reported that 10 and 20% of patients in the experimental group was reported action and maintenance stage regarding tobacco cessation after intervention and a significant relationship was observed between cognitive processes at the preintervention phase and stages of change. Abdelsalam and Said[17] reported that after the intervention, participants in the experimental group (32%) progressed from lower to higher stages of behavior change compared with those in the control group (1.9%). also participants who reached action/maintenance stage were 13.9% in the experimental group versus 1.9% in the control group. The results of a study by Ghorbani *et al*.[18] indicate that the proportion of patients in the precontemplation stage decreased by 43%, while the proportion of patients in the contemplation and action stages increased by 20% and 16%, respectively. Furthermore, a significant relationship was found between cognitive processes at the preintervention phase and stages of change.

Due to the positive effect of the interventions based on the Trans Theoretical Model of behavior change in the studies and also due to the role of merchants' guilds in the economy of local communities,[1] this study was conducted with the aim of determine the effect of theory-based on the Transtheoretical Model of Behavior Change on consumption of SLT Products by Merchants' Guilds in 2018.

Materials and Methods

Study design and setting
The present quasi-experimental study was conducted among Chabahar merchants' guilds using one intervention group.

Study participants and sampling
The research population consisted of the SLT products consumers among the merchants' guilds in Chabahar City. Inclusion criteria were consuming at least one

form of the SLT products (Pan, Pan Prag, Gutkha, Mava, Moist snuff, BT or Khani, and Pan Masala), having 20–50 years of age, satisfaction to participate in the study, ability to answer the questionnaire, and business license were administered at the guilds office. The exclusion criteria included smokers (cigarettes, hookahs, etc.) and concurrent participation in other tobacco reduction programs. According to the results of a similar study,[19] the participants' mean score of SLT consumption was 3.59 before the intervention, which reached to 3.86 after the intervention. Considering a 95% confidence interval and 80% probability of sample size, a total of 310 individuals were selected. $n = \dfrac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 (S_1^2 + S_2^2)}{(X_1 - X_2)^2}$ Ultimately, to increase the study accuracy and reduce the effects of sample loss, this study was conducted on 320 individuals.

Data collection tool and technique

Data were gathered by a researcher-made questionnaire. In order to determine its qualitative face validity, the questionnaire was administered among 20 SLT consumers. In this regard, the participants' understanding, writing style, and lack of difficulty in answering the questions was assessed,[20] and the required revisions were made accordingly. In order to determine the questionnaire's content validity, a panel of experts consisting of ten professors and experts in the field of health education and promotion and dentistry evaluated its quantitative and qualitative content validity. In order to calculate the questionnaire's reliability, it was distributed and completed among 40 people who consumed SLT products in a 2-week interval.

The content validity ratio (CVR) is used to ensure that the most important and correct content (item necessity) is selected. In the present study, each question was evaluated based on three options: necessary, useful but unnecessary and unnecessary. Any question with a ratio >0.62 (based on the Leuche table) was accepted. The content validity index (CVI) is used to ensure that tool items are best designed to measure content. In the present study, each question was examined by three criteria:

- Relevance (with 4 unrelated, somewhat related, relevant, and fully relevant options)
- Simplicity and fluency (with 4 complex options, up to simple, simple, and completely simple)
- Clarity and clarity (with 4 nonclear options, somewhat clear, clear, and perfectly clear)
- If the score was more than 0.79, it was acceptable.

In this research CVR and CVI were calculated as 0.9 and 0.95 for the stages of change questions, respectively. Furthermore, the Cronbach's alpha and intraclass correlation coefficient (ICC) were calculated as 0.91

and 0.9, respectively. In addition, CVR and CVI were calculated as 0.89 and 0.84 for the cognitive process questions, respectively. Cronbach's alpha and ICC were estimated at 0.85 and 0.8, for the cognitive process questions, respectively.

The questionnaire consisted of 5 demographic items (age, gender, marital status, place of residence and education level), five questions related to stages of change in the pre- and post-intervention phases (1 question for each stages of change). The cognitive process questions consisted of 20 questions (4 questions for each cognitive process construct). Each of these infrastructures was designed based on a 5-point Likert scale (not at all, not very, relatively, very, and very much). After confirming the questionnaire's content validity, ten items were reduced: three questions from the social liberation, one question from the awareness-raising construct, one question from the environmental reevaluation construct, and two questions related to the emotion relief construct.

An intervention program was designed based on the investigated cognitive processes. To increase the participants' awareness, the research team decided to use textbooks and educational pamphlets as the educational tools. Considering the environmental reevaluation, participants were provided with documents about the consequences and effects of the SLT products on the environment. The technique used for Emotion Relief Structure was a media campaign focusing on posting pictures of the consequences associated with consuming SLT substances. To deal with the Social Liberation Structures, posters were installed in public places with the words: "Consuming SLT products are forbidden in this place," or "No Mouth Pouring." In order to investigate the Self-Reevaluation Construct, participants were asked to review their current situation using the related stories about conditions of people who consumed these products versus the nonconsumers. Later, they were asked to close their eyes and imagine that they would be a nonconsumer within the next 6 months. They were given a chance to think and ask: What has changed in their lives? How do they see themselves? Do they feel healthy? Are their teeth white?

After ensuring about the validity and reliability of the questionnaire and its constructs, 320 participants completed the questionnaires. Furthermore, 6 months after the intervention, the same questionnaires were administered among the participants. Data were analyzed using SPSS version 20 (IBM Corp., Armonk, NY, USA) by running the descriptive (mean, standard deviation, and percentage) and analytical (Wilcoxon and ANOVA) tests. Significance level was set at 0.05.

Ethical considerations

Before sampling, participants were explained about the study purpose. Furthermore, participants were asked to sign written informed consents forms to cooperate in the research. They were also ensured about the confidentiality of their information. Ethics code (IR.SSU. SPH. REC.1396.105) was also obtained from the Ethics Committee of Yazd University of Medical Sciences.

Results

According to the results, most members of the merchants' guilds were male (62%), 20–30 years old (69.1%). The mean age of the respondents was 22.3 ± 0.61. Furthermore, 62.2% of participants were married. In terms of residence, most participants (64.4) lived in the village. The results of demographic variables of the merchants' guilds are summarized in Table 1.

In the preintervention phase, most merchants were in the precontemplation phase (85.3%), but after the intervention, 19% and 15.3% of the participants reached the action and maintenance stages, respectively. According to the Wilcoxon test, a significant difference was observed between these constructs before and after the intervention ($P = 0.029$). Comparison of the frequency of change stages in consuming SLT products is summarized in Table 2.

Table 3 shows mean scores of the cognitive processes regarding the stages of change according to the subconstructs in the preintervention phase. The mean score of social liberation in the precontemplation, contemplation, and preparation stages was 2.84 ± 0.87, 2.18 ± 0.67, and 1.14 ± 0.37, respectively. According to the ANOVA test, a significant relationship was found between the cognitive processes in preintervention phase and change stages ($P < 0.001$).

Table 1: Demographic variables of the merchants' guilds

Variables	Group	Frequency, *n* (%)
Age (years)	20-30	221 (69.1)
	30-40	77 (24.1)
	40-50	22 (6.8)
Gender	Male	198 (62.0)
	Female	122 (38.0)
Marital status	Single	121 (37.8)
	Married	199 (62.2)
Place of residence	Urban	103 (32.2)
	Village	206 (64.4)
	The outskirts of town	11 (3.4)
Education	Illiterate	19 (12.7)
	Primary school	25 (16.7)
	Junior high school	23 (15.3)
	High school and above	83 (55.3)

In the postintervention, mean scores of the increasing awareness subscale were 11.32 ± 2.51, 11.78 ± 3.07, and 14.24 ± 0.77 in the precontemplation, contemplation, and maintenance stages of change, respectively. Moreover, the mean scores of emotion relief were 7.69 ± 2.28 and 9.10 ± 1.50 in the precontemplation and maintenance stages, respectively. According to ANOVA, a significant relationship was observed between the cognitive processes sub-construct in the postintervention phase and the change stages ($P < 0.001$). Comparison of the mean scores in cognitive processes' subconstructs according to the postintervention is summarized in Table 4.

Discussion

The present study was conducted with the aim of determine the effect of a health education intervention on the consumption of SLT products in merchants' guilds. One of the most important findings in the preintervention phase was that only 2% of people were ready for change (at the preparation stage). Therefore, it can be noticed that these individuals may return to the earlier stages (precontemplation and contemplation stages) at any time in the case that the education does not continue or they do not follow the program.[10] The percentage of people in the preparation phase indicates that the process of behavior change in moving from the precontemplation to preparation phase has taken place very slowly. In this regard, the authorities are recommended to design health messages and appropriate interventions in quitting SLT products and inform the general public, especially those at the precontemplation stage. After the intervention, 19% of the patients quitted SLT for 1 month (the action stage) and 15% did not continue using SLT products for more than 6 months after the intervention (maintenance phase). Although most participants had no plans to quit using SLT products in the next 6 months (pre-contemplation stage) at the beginning of the intervention, 34% quitted completely at the end of the intervention. The latter result indicates that the interventions conducted in the study are effective and can increase the success rate significantly. In some studies,[14,16,21] most smokers quitted smoking after the interventions, which is inconsistent with our results. Such discrepancies can be due to difference in the studies' methodology.

Considering the cognitive processes' sub-constructs, the participants in the preintervention phase (pre-contemplation stage) used the "environmental reevaluation" more often than other subconstructs. The fact that this subconstruct achieved the highest score among the other cognitive subconstruct can show that participants learned and observed the importance of unhygienic excretion of saliva caused by consuming SLT

Table 2: Determination and comparison of the frequency of change stages in consuming smokeless tobacco products

Stages of change	Preintervention, *n* (%)	Postintervention, *n* (%)	*P* (Wilcoxon)
Precontemplation	273 (85.3)	91 (28.4)	0.029
Contemplation	40 (12.5)	52 (16.3)	
Preparation	7 (2.2)	67 (21)	
Action		61 (19)	
Maintenance		49 (15.3)	

Table 3: Determination and comparison of the mean scores in cognitive processes' sub-constructs' according to the preintervention test based on the stages of change

Cognitive processes	Stages of change			*P* (ANOVA)
	Precontemplation	Contemplation	Preparation	
Social liberation	2.84±0.87	2.18±0.67	1.14±0.37	<0.001
Increasing awareness	7.16±2.22	6.2±1.77	3.42±1.13	<0.001
Environmental reevaluation	9.81±2.05	8.9±1.95	4.42±1.61	<0.001
Emotion releif	6.24±1.5	5.8±1.2	2.00±1.8	<0.001
Self-reevaluation	3.11±3.1	2.00±1.03	1.00±1.01	<0.001
Cognitive processes	29.16±4.63	25.07±3.84	12.00±1.63	<0.001

Table 4: Determination and comparison of the mean scores in cognitive processes' sub-constructs according to the postintervention based on stages of change

Cognitive processes	Stages of change					*P* (ANOVA)
	Precontemplation	Contemplation	Preparation	Action	Maintenance	
Social liberation	4.02±1.15	3.48±0.96	3.28±0.86	3.33±0.94	2.33±1.16	<0.001
Increasing awareness	11.32±2.51	11.78±3.07	10.74±2.27	11.39±2.26	14.24±0.77	<0.001
Environmental reevaluation	12.6±2.85	11.65±1.44	11.32±1.43	11.47±1.97	14.28±1.35	<0.001
Emotion relief	7.69±2.28	7.75±1.72	6.86±1.51	6.93±1.47	9.10±1.50	<0.001
Self-reevaluation	4.8±0.46	4.15±1.1	3.27±1.02	3.30±1.03	3.35±1.14	<0.001
Cognitive processes	40.5±5.96	38.8±5.03	35.5±4.23	36.4±4.57	43.3±3.29	<0.001

products. Unhealthy disposal of saliva by spitting into the public passages not only creates an ugly landscape but also transmits diseases such as tuberculosis and hepatitis A. The results of the study of Vahedian-Shahroodi *et al.*,[22] Mostafavi *et al.*,[23] Thrul *et al.*,[24] and Huang *et al.*[25] were similar to the results of the present study. This means that, in these studies, in the precontemplation stage, the re-evaluation of the environment structure was used more than other structures by the participants. However, the results of the study of Jalilian *et al.*[26] and Aveyard *et al.*[27] were not similar to the findings of the present study. In these studies, the difference between the mean of the two stages in this structure (before and after the intervention) was not significant. Perhaps the reason for the difference between the results of these studies and the present study is the difference in the intervention method or the difference in the subject of these studies with the present study.

Furthermore, the mean score of cognitive processes in the postintervention phase was significantly higher than the preintervention phase. In the preintervention phase, participants had a poor knowledge about disadvantages of the SLT products. Most of them were unaware of the diseases associated with these products such as periodontal disease and common cancers such as oral cancer, esophageal cancer, and pancreatic cancer. Moreover, most participants were unaware that SLT products cause addiction. In the postintervention phase, among the cognitive processes' subconstructs, the participants' awareness increased significantly compared to the preintervention phase. This increase can be attributed to the educational materials on the dangers of SLT products delivered through Whatsapp, educational pamphlets, and training sessions. The effect of social media along with other tobacco control activities is undeniable on increasing the people's awareness.[28-30] Hekmatpoue *et al.*,[31] Vahedian-Shahroodi *et al.*,[22] Mostafavi *et al.*,[23] and Jalilian *et al.*[26] also supported our findings by mentioning that awareness had the highest score among the cognitive processes' subconstructs after the intervention. However, results of some studies were inconsistent with the findings of the present study.[32-34] The difference observed between the findings can be justified by the fact that the outcome measure studied in the literature was physical activity, while the present study measured the SLT products. Moreover, the follow-up period in the conducted studies was 3 months, whereas, it was 6 months in our study.

Limitations and recommendation

Considering the limitations of this study, self-reporting data collection method was applied by administering questionnaires, which can affect accuracy of the findings. In addition, nicotine replacement therapy was not possible in this study considering the monetary limitations and high volume of research samples. Hence, future researchers are suggested to conduct similar research among consumers of other smoking and nonsmoking products using a larger sample size.

Conclusions

Based on the results, individuals can move from the precontemplation, contemplation, and preparation stages to the action and maintenance phases by attending the educational interventions designed and implemented based on the cognitive processes.

Conflicts of interest

There are no conflicts of interest.

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