TRANSTHEORETHICAL MODEL-BASED EDUCATION GIVEN FOR SMOKING CESSATION IN HIGHER SCHOOL STUDENTS

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Abstract. This study was carried out from 15 February 2007 to 02 January 2008 to evaluate the effect of Transtheoretical Model-based education given to high school students for smoking cessation. The population of the study consisted of 90 students who study at the 1st and 2nd years of a high school in Erzurum and who smoke. The sample of the study included 75 volunteer students: 15 students in total are excluded from the study. The remaining 60 students were divided into the experimental (n=30) and control (n=30) groups using the simple random sampling method. The students in the experimental group were given Transtheoretical Model-based planned education, and students in the control group were not given any education. As a result of last tests of the experimental and the control groups, it was observed that there was a statistically significant difference between measurements of "Social interaction and habit strength" (p=0.003), which is a subscale of it and "Temptation scale total score" (p=0.004), "Being able to cope with the social environments and negative sense (p=0.03), "Being able to cope with the habit strength" (p=0.001), which are subscales of "Self-efficacy scale", "Processes of change scale" total score, and its subscales: "Conscious raising" (p=0.006), "Dramatic relief" (p=0.001), "Environmental reevaluation" (p=0.035), "Self-reevaluation" (p=0.007).

Keywords: transtheoretical model, smoking cessation, adolescents, Turkey

INTRODUCTION

The habit of active and passive smoking is the prime cause of preventable diseases and death globally and is a major public health problem among both adults and children (Centers for Disease Control Prevention, 2006; Hamzaçebi *et al*, 2008).

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About 45% of the population over the age of 15 is seriously addicted to smoking in the world and in our country. This indicates how important the problem is, especially for the youth (Altinbas, 2002; Yildirim *et al*, 2004; Azak, 2006).

Effectively combating adolescents' and school-aged children's smoking is an emergency in terms of public health. There is a need for preventive studies against the rise of cigarette use and related problems, particularly among adolescents (Ögel *et al*, 2004). In its report

on "The global smoking epidemic 2008," WHO emphasized interventions aimed at smoking cessation with the six measures that it advised to governments (WHO, 2008). Today, many countries are trying to reduce cigarette consumption through these six measures.

Cigarette use is also increasing in Turkey. In a WHO report, Turkey has been included as the 10th country where cigarettes are most commonly used (WHO, 2008). In Turkey, the number of smokers has exceeded 17 million, and it has been determined that 34.6% of adult population and 6.9% young population who is between the ages of 13-15 smoke (Bozkurt *et al*, 2006; Warren *et al*, 2008; WHO, 2008).

The Transtheoretical Model-based practices, which were first defined by Prochaska, provide for an increase of nursing knowledge, experience and activities when they are used in health promotion programs, and interventions to change negative behavior (Prochaska and DiClemente, 1982; Velicer *et al*, 2000). The model describes the relationships between stages of change, process of change, perceptions of benefit and loss of decisional balance or change, self-efficacy in the behavior change, and encouraging factors (Redding *et al*, 2000; Cancer Prevention Research Center, 2008). Stages of change make up the dependent variables of the study, while the process of change makes up the independent variables of the study. This study was carried out to evaluate the effect of Transtheoretical Model-based education given to high school students to cease smoking. Our hypothesis was that, with the training provided, the experimental group would be more successful than the control group in the stages, progress, and process of smoking behavior change.

MATERIALS AND METHODS

The population of the study consisted of 90 students who studied at the 1st and 2nd years of a high school in Erzurum and who smoke. The sample of the study consisted of 75 volunteer students; 15 students were excluded from the study due to some reasons, and 15 students were excluded due to reasons like dropping school (1), marking errors (3), request to withdraw from work (5), and using contradictory responses (6). The remaining 60 students were divided into an experimental (*n*=30) and control (*n*=30) groups with a simple random sampling. In this study, sampling rate of the population was: Power = 0.80, Alpha = 0.05, effect size = 0.8 (Munro *et al*, 1993). The students in experimental group were given Transtheoretical Model-based education; the students in control group were not given any education. The first session applied to the experimental group was in the first month, the second session was in the third month, the third session was in the sixth month, and the fourth session was in the twelfth month. The content of the sessions consisted of training, distribution of training booklets, and application of the scales.

1st Session (First month). The first session began with a meeting; the content and aims of training program were described. A demographic information form; the Fagerstrom Tolerance Questionnaire and Transtheoretical Model (TTM) scales; The Stage of Change Scale (SCS), which determines the stage of change; The Processes of Change Scale (PCS), which determines the processes of change; Self-efficacy Scale (SES); Temptations Scale (TS) and Decisional Balance Scale (DBS), which determines the progress of change were applied to students in the experimental group.

Three changes of stage were determined in the first measurement. It was found that, out of 30 students, 6 students were in the Pre-contemplation stage, 6 students were in the Contemplation stage, and 18 students were in the Preparation stage.

2nd Session (Third month). Four changes of stage were determined in the second session. Out of 27 students, 3 were in the Pre-contemplation stage, 1 was in the Contemplation stage, 13 were in the Preparation stage, and 10 were in the Action stage.

3rd Session (Sixth month). Five changes of stage were identified in the third session. Out of 27 students, 3 were in the Pre-contemplation stage, 5 were in the Contemplation stage, 7 were in the Preparation and Action stages, and 5 were in the Maintenance stage.

4th Session (Twelfth month). Five changes of stage were identified in the fourth session. Out of 27 students, 3 were in the Pre-contemplation stage, 9 were in the Contemplation stage, 4 were in the Preparation stage, 1 was in the Action stage, 10 students had quit smoking, and 2 students who re-started smoking regressed to the Contemplation stage.

Conversely, two sessions were applied to the control group, one in the first and the other in the twelfth month. Only scale applications were made in these sessions.

Data collection tools

The data were collected by using demographic data form, the Fagerstrom Tolerance Scale Measuring Levels of Addiction, and scales defining The Transtheoretical Model (TTM) such as The Stage of Change Scale (SCS), The Processes of Change Scale (PCS), Self-efficacy Scale (SES), Temptations Scale (TS), and Decisional Balance Scale (DBS), (Fagerstrom and Schneider, 1989; Scholl, 1998).

Data collection

Experimental group. Data from the experimental group were collected during four sessions: the first session was in the first month, the second session was in the third month, the third session was in the sixth month, and the fourth session was in the twelfth month. The students under the supervision of the researcher filled in forms, which took approximately 20 minutes. Data of both stages in the sessions were collected in the prepared school seminar hall.

Control group. Two sessions were applied to the control group in one year. The first session was held in the first month, while the second was held in the twelfth month. The students, who were without training, filled in forms, under the supervision of the researcher, which took approximately 20 minutes. The sessions of both groups were held on different days.

Data analysis

The data were analyzed using SPSS (version 20.0, IBM, Armonk, New York; under a legal license by Ataturk University, No 10241411). Demographic characteristics, smoking habits, and addiction levels of the students who were included in the research were assessed with chi-square and t-test. The progress made by the experimental group in behavior change and their smoking cessation states were analyzed with Friedman test in repeated measurements, while binary comparisons were analyzed with Wilcoxon signed-ranks test. The differences between pre- and post-measurements of the control group who was assessed with the same criteria were also analyzed with

Wilcoxon signed-ranks test. The differences between post-test measurements of the stages of change in the experimental and control groups were assessed using Mann-Whitney *U* test. Internal consistency analysis (Cronbach's alpha) was used to determine the validity and reliability of the scales.

Ethical considerations

In order to conduct this research, approval from the Ethics Committee of the Institute of Health Sciences, Ataturk University, and permission from National Education Department. (Ethics Committee for Human Research; Ref N^o: 2006.4.1/10, 2006 December 06). After giving explanations to the students, volunteers were included in the survey. After the application of the final tests, training given to the experimental group was also given to the control group.

RESULTS

It was found that the students in the experimental and control groups were similar in terms of descriptive characteristic (Table 1). All of the students were male.

The Stages of Change

In repeated measurements of the experimental group. There was a statistically significant difference between the groups in the Stages of Change. As a result of the binary comparisons made, there were no statistically significant differences between 1st and 2nd measurements, 2nd and 3rd measurements, 2nd and 4th measurements, and 3rd and 4th measurements. However, there were statistically significant differences between 1st and 3rd measurements, and 1st and 4th measurements. Data from the experimental group were collected in four sessions (Table 2): 1st session was in the first month (1st measurement), 2nd session was in the third month (2nd measurement), 3rd session was in the sixth month (3rd measurement), 4th session was in the twelfth month (4th measurement) (Z=7.30, *p*=0.001, Friedman test = 7.30, *p*=0.001).

Pre- Post-test measurements in the control group. There were no statistically significant differences between the measurements and the Stages of Change (Z=0.272, *p*=0.065).

Pre-test of the control group: 1st measurement (First month). Three changes of stage were determined in the first measurement. Out of 30 students, 21 students were in the Preparation stage, 7 students were in the Pre-contemplation stage, and 2 students were in the Contemplation stage.

Post-test of the control group: 2nd measurement (Twelfth month). Three changes of stage were identified in the second measurement, as was found in the first measurement. Out of 27 students, 12 were in the Preparation stage, 12 were in the Contemplation stage, and 3 were in the Pre-contemplation stage.

Post-test measurements in the experimental and control groups. In the post-test measurements in the experimental and control groups, 3 students were in the Pre-contemplation stage in both groups, while 9 students in the experimental group and 12 students in the control group were in the Contemplation stage. It was found that 4 students in the experimental group and 12 students in the control group were in the Preparation stage. It was found that 1 student was in the Action stage, 10 students had quit smoking, and 2 students in the experimental group re-started smoking, whereas no students were found at these stages in the control group. There was a statistically significant difference between the Stages of Change in the post-

Table 1
The demographic characteristics of the experimental and control groups.

Demographic characteristics			Experimental group	%	Control group	%
Educational status	University	Father	1	3.3	1	3.3
		Mother	-	-	-	-
	High school	Father	5	16.7	3	10.0
		Mother	1	3.3	1	3.3
	Secondary school	Father	7	23.4	7	23.4
		Mother	2	6.7	1	3.3
	Primary school	Father	16	53.3	19	63.3
		Mother	21	70.0	18	60.0
	Illiterate	Father	1	3.3	-	-
		Mother	6	20.0	10	33.4
Father's occupation	Self-employed		3	10.0	5	16.7
	Officer		8	26.6	5	16.7
	Worker		4	13.3	2	6.7
	Retired		2	6.7	4	13.3
	Farmer		13	43.4	14	46.6
Mother's occupation	Housewife		30	100.0	30	100.0
Smoking status of family members	Non-smokers	Father	16	53.3	15	50.0
		Mother	29	96.7	28	93.4
		Siblings	21	70.0	18	60.0
	Smokers	Father	12	40.0	10	33.3
		Mother	1	3.3	1	3.3
		Siblings	9	30.0	12	40.0
	Quitted smokers	Father	2	6.7	5	16.7
		Mother	-	-	1	3.3
The reasons for starting to smoke[a]	The effect of friends		11	36.6	17	56.7
	The effect of family		4	13.3	1	3.3
	The effect of stress		10	33.3	13	43.3
	Wonder		5	16.6	5	16.7
	Affectation		26	86.6	22	73.3
	Other		4	13.3	2	6.7
Affectation status[a]	Affectation to father		5	16.6	3	10.0
	Affectation to mother		-	-	1	3.3
	Affectation to siblings		-	-	6	20.0
	Affectation to friends		24	80.0	17	56.7
	Affectation to TV		5	16.6	7	23.3
	Other		7	23.3	4	13.3

	p	t	X±SD	X±SD
The age of starting smoking	0.77	0.29	12.5±2.9	12.7±2.6
Number of attempts to quit	0.31	1.00	3.8±3.8	5.1±5.2
Dependency levels	0.94	0.07	3.2±2.5	3.3±2.2
Age	0.06		17.1±1.5	17.9±1.1

[a]Marked more than one choices.

Table 2
Distribution of Stages of Change in repeated measurement of experimental group.

Stages of Change	Experimental group measurements							
	1st measurement		2nd measurement		3rd measurement		4th measurement	
	S	%	S	%	S	%	S	%
Pre-contemplation	6	20	3	11.3	3	11	3	11.1
Contemplation	6	20	1	3.7	5	18.5	9	33.3
Preparation	18	60	13	48	7	26	4	14.8
Action	-		10	37	7	26	1	3.7
Maintenance	-		-		5	18.5	-	
Quitted smokers	-		-		-		1	37
Total	30	100	27	100	27	100	27	100
X±SD*	2.4±0.81		3.1±0.93		3.2±1.2		3.5±1.9	

*Friedman test= 7.30, p=0.001

test measurements of the experimental and control groups (U=262.50, p=0.001).

Progress and process of changes

In the pre-test of the control and experimental groups. There were no significant differences found between the PCS total score, DBS, TS, SES total, and subscales. The difference between "Wishes desired to come true (p=0.016)" and "Self liberation (p=0.033)," which are the two sub-scales of PCS, showed that the control group regretted smoking and they wanted to quit (Table 3).

In the post-test of the experimental and control groups. There was no significant difference found between the post-test measurements of the experimental and control group regarding the average scores taken from the DBS total score and its sub-scales (Table 4).

Whereas the TS total score and its sub-scales "Social situations and habit strength" were higher and more signifi-

cantly different in the experimental group, the differences between the average scores of the others were not statistically significant. The finding suggests that the control group was more tempted to smoke in the face of "Social situations and habit strength" (Table 4).

The average score of SES sub-scale, "Being able to cope with weight control," had no significant difference. Data collected from the sub-scales "Being able to cope with the negative affect" and "Being able to cope with the social situations and habit strength" were higher in the experimental group and the difference between the groups was significant. This finding suggests that the experimental group could refrain from smoking despite tempting social situations, negative affects, and habit strength (Table 4).

The PCS total score and its sub-scales, "Consciousness raising," "Dramatic relief," "Environmental reevaluation" and "Self-reevaluation" were higher and

Table 3
Distribution of average score taken from DBS, TS, SES, and PCS total scores in pre-test of the experimental and control group.

TTM scales and their subscales	Experimental group X ±SD	Control group X ±SD	t	p
Social pros	6.7±3.0	6.0±3.1	0.8	0.408
Coping pros	8.1±2.5	8.5±3.8	0.4	0.628
Cons	22.0±6.3	24.4±6.0	1.4	0.166
DBS total score	37.0±7.8	38.9±7.9	0.9	0.367
Negative affect situations	6.7±2.4	6.4±3.2	0.4	0.685
Social situations and habit strength	12.7±4.8	13.0±5.0	0.2	0.823
Weight control	4.4±3.1	5.2±3.7	0.8	0.407
TS total score	23.9±7.6	24.7±9.7	0.3	0.748
Being able to cope with the negative affect	10.0±5.0	9.4±4.8	0.4	0.330
Being able to cope with the habit strength	5.5±3.1	4.7±2.5	0.9	0.646
Being able to cope with the weight control	5.5±3.1	5.6±3.5	0.6	0.946
SES total score	21.2±8.4	19.6±9.0	0.6	0.533
Consciousness raising	6.0±2.1	6.7±2.3	0.8	0.379
Dramatic relief	6.5±2.4	7.0±2.2	0.5	0.556
Environmental reevaluation	6.5±1.6	6.5±1.1	0.7	0.942
Social liberation	7.4±2.4	6.0±2.0	1.7	0.098
Self-reevaluation	6.1±2.7	7.1±1.9	1.2	0.217
Wishes desired to come true	6.5±2.2	8.4±1.7	2.5	0.016
Stimulus control	5.8±2.4	5.5±1.9	0.4	0.652
Helping relationships	5.7±2.0	6.5±2.6	0.7	0.453
Counter conditioning	5.6±2.1	6.2±2.6	0.5	0.569
Reinforcement management	6.0±3.1	7.0±2.3	1.0	0.298
Self-liberation	5.5±2.3	7.7±2.6	2.2	0.033
PCS total score	68.8±17.4	74.6±15.8	0.9	0.362

more significantly different in the experimental group. No significant difference found between the other average scores (Table 4).

DISCUSSION

A smoking cessation program, which consisted of training sessions, was effective in changing smoking behavior. It was observed that, in the experimental group, students progressed through the stages they were in in addition to quitting smoking. However, in the control group, not only did no one quit smoking, but also no positive transition was seen between the stages.

In the repeated measurements of the experimental group, it was sound that the smoking cessation rate of the experimental group, which adopted The Transtheoretical Model-based intervention, was 37%. It was thought that this positive result stemmed from the number of students in the total and sub-groups (Pre-contemplation, Contemplation, Preparation, Ac-

Table 4
Distribution of average score taken from DBS, TS, SES, and PCS total score in post-test of the experimental and control group.

TTM scales and their subscales	Experimental group X ±SD	Control group X ±SD	U/t	p
Social pros	7.9±4.1	6.4±3.3	t=1.4	0.162
Coping pros	8.4±3.1	7.6±3.2	t=0.8	0.405
Cons	21.0±5.3	24.0±5.9	t=1.9	0.061
Negative affect situations	7.2±2.6	6.4±3.2	t=1.0	0.292
Social situations and habit strength	13.7±4.6	9.7±4.6	t=3.1	0.003
Weight control	5.8±3.7	4.4±2.4	t=1.5	0.121
TS total score	27.0±6.8	19.5±9.2	U=190.0	0.002
Being able to cope with the negative affect	8.0±4.1	1.4±5.8	U=223.0	0.020
Being able to cope with the habit strength	4.3±2.5	7.6±3.6	U=157.5	0.001
Being able to cope with the weight control	6.2±3.6	6.5±3.0	t=0.3	0.737
SES total score	18.6±7.3	25.5±10.3	t=2.7	0.008
Consciousness raising	5.2±2.1	7.2±2.5	t=2.8	0.006
Dramatic relief	5.3±2.2	7.8±2.3	t=3.7	0.001
Environmental reevaluation	6.4±1.5	7.4±1.5	t=2.1	0.035
Social liberation	6.2±1.3	6.4±2.3	t=0.2	0.783
Self-reevaluation	6.2±1.6	7.7±2.3	U=156.5	0.013
Wishes desired to come true	9.0±0.2	8.8±1.9	U=209.0	0.654
Stimulus control	5.2±1.9	6.3±3.0	t=1.4	0.157
Helping relationships	5.6±2.9	6.7±2.5	t=1.4	0.146
Counter conditioning	5.1±2.2	6.2±2.6	t=1.5	0.129
Reinforcement management	6.3±1.3	6.7±2.7	t=0.5	0.586
Self-liberation	7.5±2.0	7.3±2.9	t=0.3	0.752
PCS total score	68.4±10.3	78.5±20.6	t=2.0	0.044

tion, and Maintenance sub-groups) of the intervention group were few so that the intervention time devoted to each group and student increased.

Türkcan *et al* (2005) noted that smoking cessation rate is 20% as a result of the educational program consisting of four sessions for smoking cessation. According to Grimshaw and Stanton's analysis of the results of 15 studies, which consisted of interventions for smoking cessation in adolescents, the smoking cessation rate was 15% in developing countries, while that rate was 26% in the USA and England (Grimshaw and Stanton, 2006). In his study related to the smoking cessation process and stages in male adolescents, Ham (2007) found smoking cessation rate was 57.4%. Kleinjan *et al* (2008) found that the smoking cessation rate was 73.2%, in his study conducted with class 9 and 10 students. Similarly, in their studies carried out on adolescents, both Lawandowski (1998) and Kim (2006) found a statistically significant difference between the "Stages of Change" and smoking cessation program.

In this study, two non-intervention methods were combined in implementation, such as leaflets, along with interventional methods as counseling and training for the experimental group to facilitate behavior change. More students quit smoking and advanced in the stages of change in the experimental group in comparison with the control group. This finding supports the hypothesis of the study.

In their studies, Prochaska and Velicer (1997) found that interventional methods were more effective than the non-interventional ones in behavior change. Lawandowski (1998) divided the adolescents into two groups for smoking cessation. He applied stage-specific interventions in one group, but he also applied assistance interventions by himself to the other group. Success was achieved in the experimental group to whom the Transtheoretical Model-based interventions were applied. This study is parallel to Lawendowski's study (Lawendowski, 1998) in terms of these results. In two different studies carried out by Aveyard *et al* (1999, 2001) the Transtheoretical Model expert system computer program-centered education was given to the experimental group in three sessions, and it was found that these interventions did not contribute to smoking cessation or progress in stages of change. Erol (2005) compared two interventional methods like motivational talk and health education in smoking behavior change, found results as similar in both groups but determined that they have no statistical significance. Prochaska *et al* (2008) found no difference between the two interventional methods in which motivational interventions and the Transtheoretical Model were applied in changing unhealthy behaviors including smoking.

In this study, the students in the Action stage, who maintained smoking cessation after six months, quit smoking because of the full application of all the stages of the model. The start-to-finish process of the interventions lasted one year. Based on this fact, we can say that smoking cessation in adolescents was effective in the short run. Long-term results could not be determined as it exceeded the data collection period of the study.

In our study, two students who re-started smoking after moving in the direction of smoking cessation regressed to the Contemplation stage. In the third measurement, 5 students in the Contemplation stage rose to 9 in the post-test after six months. It is thought that the reason for that negative state was the prolonged period of interviews, so shortening of this period will positively affect the result.

It was observed that, while progressing in the stages of behavior change, individuals could not succeed in changing addictive and harmful behavior in the first trial, and turned back to their old behaviors. Individuals in this situation sometimes determine the encouraging situations and succeed in their next trial. They sometimes resisted changing behavior as they were demoralized, and 15% of them regressed to the pre-contemplation stage, and 85% of them regressed to the Contemplation and Preparation stages.

In their studies for smoking cessation, Prochaska and Velicer (1997) provided counseling to one group for a year and gave an expert system computer program-centered education to the other group. The effect of counseling service decreased over time in comparison with the effect of expert system program after stopping interventions.

In the post-test measurements of this study, it was found that in the experimental group, the desire to smoke in tempting

social situations was low compared to the control group; the self-efficacy power to refrain from smoking was high ($p<0.05$). This finding is consistent with the TTM structure and literature and demonstrates the impact of the intervention applied to the experimental group (Velicer *et al*, 2000; Redding *et al*, 2000. Likewise, Plummer *et al* (2001) determined that in adolescents, the desire to smoke in tempting social situations became lower as they advance through the stages. In her study conducted with smoking adolescents, Erol (2005) found that the power to cope with tempting situations and habit strength was higher in the motivation group than in the education group. Similarly, in his study, Kim (2006) suggested that adolescents, who act in the direction of smoking cessation, are less affected in tempting situations. As in our study, Sholl (2008) found that, within the conceptual framework of the TTM, succumbing to the factors that encourage smoking decreased, and the power to cope with tempting situations and habit strength was higher.

It was found that, the power to cope with the tempting social situations, negative affects, and habit strength was considerably higher in the experimental group than in the control group ($p<0.05$). In addition, the power to refrain from smoking, even in tempting situations related to weight control, gradually increased in successive sessions. This situation suggested that students increased their self-efficacy to cope with the temptations to smoke and habit strength thanks to training; the experimental group was in the Action stage, and they showed positive progress between stages. These findings suggest that the effect of the interventions implemented for the experimental group motivated the students in accordance with the structure of the TTM, and supported the progress.

This positive change could not be observed in the control group. Similar to our study, other studies found that the relationship between smoking habit and self-efficacy was negative (Prochaska *et al*, 1988; Yazici and Özbay, 2004). Kim (2006) also demonstrated that as the stages progressed, adolescents' self-efficacy progress increased in a meaningful way. In their study, Velicer *et al* (1990) pointed out that adults' power to cope with habit strength after smoking cessation significantly increased. Three months after intervention, Erol (2005) found that the power to cope with habit strength was higher in the motivation group than the education group. Furthermore, although the power to refrain from smoking in coping with weight control was higher in the motivation group six months after his intervention, it decreased in both groups.

The experimental group considerably increased the intensity of using behavior change processes in following sessions ($p<0.05$). This finding confirms the idea that students used the processes more as they advance through the stages for smoking cessation and the number of interventions increased. It is also consistent with structure of the model. Additionally, it was demonstrated that the interventions implemented increased the chances to quit smoking, so it confirms the hypothesis of the research. Kim (2006) found that "The Process of behavior change" was used more as they advance through the stages, and there was a statistically significant relationship between smoking cessation and processes of change.

The advantage of this study was that many smoking cessation studies are conducted regardless of individual's thoughts and level of readiness for behavior change. This model and study, which

is a five-staged change plan, helps to understand whether the subjects are ready to gradually adjust themselves for smoking cessation treatment, because individuals, in each stage, need different training and counseling. A smoking cessation program, which consists of training sessions, was effective in changing smoking behavior. It was observed that, in the experimental group, students progressed through the stages they were in aside from quitting smoking. However, in the control group, not only did nobody quit smoking, but also no positive transition was seen between the stages.

The limitation of this study was that because the length of time between interventions weakens the effect of intervention; it should be recommended that in further studies we should create longer-term group interventions or more individualized approach alternatives for smokers who are resistant to quit smoking, in addition to coping with negative feelings and encouraging interventions for maintaining student attendance. This study indicated that public health nurses may make use of the Transtheoretical Model in smoking cessation training as a framework in order to define individuals who are in different stages of change, plan, apply and assess individual nursing interventions, and plan new interventions.

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