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Transtheoretical Model-Based Nursing Interventions for Smoking Cessation in COPD Patients: A Randomized Controlled Trial

KOAH'lı Hastalarda Sigarayı Bırakmaya Yönelik Transteorik Model Temelli Hemşirelik Müdahaleleri: Randomize Kontrollü Çalışma

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This study was prepared based on the findings of Figen Çavuşoğlu's PhD thesis study titled The effect of home nursing interventions based on transtheoretical model for smoking cessation in patients with chronic obstructive pulmonary disease (İzmir: Dokuz Eylül University; 2018).
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ABSTRACT Objective: This study aimed to evaluate the effectiveness of transtheoretical model-based nursing interventions on smoking cessation in patients with Chronic Obstructive Pulmonary Disease (COPD). **Material and Methods:** An experimental design was employed in the study. The study involved 33 COPD patients in the experimental group and 35 COPD patients in the control group. Data were collected between January 2016 and November 2017. The data collection instruments included the Descriptive Characteristics Form, the Fagerstrom Nicotine Dependency Test, and the Transtheoretical Model scales for Decisional Balance, Self-Efficacy, Stages of Change, and Processes of Change. Both parametric and nonparametric tests were used for data analysis. **Results:** The subscale scores for Decisional Balance, Self-Efficacy, and Processes of Change showed significant differences in the experimental group following home nursing interventions. While there was significant improvement in the Stages of Change, 9 patients in the experimental group and 2 patients in the control group successfully quit smoking, and the difference between the groups was found to be significant. **Conclusion:** The results suggest that home care interventions based on the Transtheoretical Model are effective in supporting smoking cessation in COPD patients. It is recommended that nursing practices incorporate the Transtheoretical Model for smoking cessation interventions, utilizing a smoking cessation guide to enhance the effectiveness of these interventions.

Keywords: COPD; home care; nursing; smoking cessation; transtheoretical model

ÖZET Amaç: Bu araştırmanın amacı, Kronik Obstrüktif Akciğer Hastalığı (KOAH) olan hastalarda transteorik modele dayalı hemşirelik girişimlerinin sigara bırakma üzerine etkinliğini değerlendirmektir. **Gereç ve Yöntemler:** Çalışmada deneysel bir tasarım kullanılmıştır. Çalışmaya deney grubunda 33 KOAH hastası ve kontrol grubunda 35 KOAH hastası dâhil edilmiştir. Veriler Ocak 2016 ve Kasım 2017 tarihleri arasında toplanmıştır. Veri toplama araçları arasında Tanımlayıcı Özellikler Formu, Fagerstrom Nikotin Bağımlılık Testi ve Transteorik Model için Karar Dengesi, Öz Yeterlilik, Değişim Aşamaları ve Değişim Süreçleri ölçekleri kullanılmıştır. Veri analizi için hem parametrik hem de parametrik olmayan testler kullanılmıştır. **Bulgular:** Karar Dengesi alt ölçekleri, öz yeterlilik ve değişim süreçleri alt ölçek puanları evde hemşirelik girişimleri sonrasında deney grubunda anlamlı farklılık göstermiştir. Değişim aşamalarında anlamlı iyileşme görülürken, deney grubunda 9 hasta, kontrol grubunda ise 2 hasta sigarayı bırakmış ve aralarındaki fark anlamlı bulunmuştur. **Sonuç:** Bu çalışmanın sonuçları ışığında, KOAH'lı hastaların sigarayı bırakmaları için evde bakımın desteklenmesi ve müdahalelerin Transteorik Model temelinde planlanması önerilmektedir. Sigara bırakma girişimlerinde yer alan hemşirelerin sigara bırakma rehberini kullanarak transteorik modele dayalı girişim uygulamaları önerilmektedir.

Anahtar Kelimeler: KOAH; evde bakım; hemşirelik; sigara bırakma; transteorik model

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The prevalence of Chronic Obstructive Pulmonary Disease (COPD) worldwide is 11.7-15.8%, while in Türkiye it is 19.1%. Globally and in Türkiye, COPD ranks 3rd among causes of death. In Türkiye, it accounts for 45.6% of deaths due to respiratory system diseases.[1]

The most important risk factor for COPD is smoking.[2] Some patients diagnosed with COPD continue to smoke, facing greater difficulties and lower success rates in quitting compared to other smokers.[3,4] Smoking cessation is crucial for the effective treatment of COPD patients.[2] High-level evidence studies and guidelines emphasize the critical role of smoking cessation in treating COPD and highlight the significant influence of physicians, nurses, and other healthcare professionals in persuading patients to quit smoking.[5,6] It is seen that the transtheoretical model, one of the behavioral approach types, is frequently used in intervention studies for smoking cessation and successful results are obtained.[7-10] Developed by Prochaska and DiClemente, this model emphasizes that behavioral change occurs through a process, and interventions should be tailored to the individual's current stage of change.[11] The model comprises the stages of change, processes of change, decisional balance, and self-efficacy constructs.[12] Recent systematic reviews, meta-analyses and recommendations have shown that a treatment program that includes a combination of behavioral approach and pharmacotherapy is more effective in smoking cessation in COPD patients.[13,14] However, for COPD patients, home care and health education play a crucial role in preventing repeated hospital admissions and improving quality of life. The significance of this issue has been highlighted and evidenced in Cochrane studies.[15,16] Yet, the literature lacks studies on home-based nursing interventions specifically aimed at smoking cessation in COPD patients using the Transtheoretical Model. This study is expected to contribute to both the literature and the field of nursing with its unique focus.

The present study aimed to investigate the effects of nursing interventions on smoking cessation outcomes in COPD patients who smoke.

Hypotheses

After home-based nursing interventions performed according to the transtheoretic model,

1. H1: The experimental group will have a higher mean score on the Decisional Balance Scale (pros) and a lower score (cons) compared to the control group

2. H1: The mean Self-Efficacy Scale score will be higher in the experimental group.

3. H1: The mean Processes of Change Scale score will be higher in the experimental group.

4. H1: The progression between stages of change will be greater in the experimental group.

5. H1: Smoking cessation rates will be higher in the experimental group.

6. H1: Spirometry measurement values will be higher in the experimental group

7. H1: The mean score on the Fagerström Test for Nicotine Dependence (FTND) will be lower in the experimental group.

MATERIAL AND METHODS

The manuscript format of the study was designed in accordance with the CONSORT guidelines.

DESIGN AND SAMPLE

The study was designed as a randomized controlled experimental study trial (Protocol ID: B.30.2.ODM.0.20.08/1184; ClinicalTrial.gov ID: NCT04313738). Data were collected between January 2016 and November 2017 at the homes of COPD patients enrolled in a public specialized hospital. The sample size was initially determined using the Win episcope 2.0 (Zaragoza, Spain) program. The sample size was calculated as 78 with a 5% margin of error and at a 15% prevalence rate and 95% confidence interval. It was decided to include 40 patients in the intervention group and 40 patients in the control group. However, due to the challenges encountered during data collection, the planned sample size was not achieved. After completing the pre-test measurements, the sample power was re-calculated using the G-Power 3.1.9.7 (Heinrich Heine University Düsseldorf, Germany) program, confirming the adequacy

of the sample size (0.56-1.21). A post-hoc power analysis (0.42-0.99) was performed upon completion of data collection.

PARTICIPANTS

Sample selection was based on specific criteria. The inclusion criteria were as follows: volunteering to participate in the study, being diagnosed with COPD, being over 40 years old, currently smoking, not having any physical or mental problems that would prevent filling out the study questionnaires or using a telephone, having a mobile phone available at all times, living in the city center, not receiving any smoking cessation treatment at the time of the study, and not having any medical contraindications that would prevent spirometric evaluation. The exclusion criteria were as follows: patients with exacerbations in the last 2 months and those currently receiving smoking cessation treatment. Additional exclusion criteria for those already included in the study were: not completing the home visits process, agreeing to participate but then withdrawing from the study for any reason, and being diagnosed with lung cancer.

RANDOMIZATION

Among 4,437 patients diagnosed with COPD in the automation system of a public specialized hospital, those who met the sampling criteria were identified (n=1,682) and divided into experimental and control groups through a computer program (https://www.randomizer.org/). Then, these people were contacted by phone to determine the appropriate people and the final form of the groups was formed. Ultimately, the study began with 40 patients in each group (Figure 1). Details of the randomization process are provided in Figure 1.

DATA COLLECTION TOOLS

Data were collected using a descriptive information form, the following measurement tools and spirometry measurement.

Fagerström Test for Nicotine Dependence: The test developed by Fagerström, Heatherton et al. includes 6 items, each rated on a different scale.[17] A total score ranging from 0 to 10. The validity and reliability study of the Turkish version of the scale was conducted by Uysal et al.[18] The Cronbach's Alpha of the original scale was 0.61, while the Cronbach's Alpha was 0.56 in Uysal et al.'s validity and reliability study and 0.79 in the present study.[18]

Stages of Change Scale*:* Prochaska and Diclemente developed the SOC scale to explain smoking cessation as a gradual change process, formulating questions to assess this progression.[11] Individuals select one of the following statements that best describes their current situation: Precontemplation: I do not consider quitting smoking in the next 6 months. Contemplation: I am planning to quit smoking in the next 6 months. Preparation: I am planning to quit in the next 30 days. Action: I quit smoking less than 6 months ago. Maintenance: I have not been smoking for more than 6 months. The Turkish validity and reliability of the scale were conducted by Koyun et al.[19] The scale does not yield a numerical score; instead, it determines the stage of change based on the individual's responses to the statements.

Processes of Change Scale: Developed by Prochaska et al. the POC scale includes 30 items assessing cognitive processes (15 items) and behavioral processes (15 items).[20] Each process contains five sub-dimensions. The scale is a 5-point Likert type, ranging from 1 to 5 (1=never, 2=rarely, 3=occasionally, 4=often, 5=very often), determining the methods an individual uses in behavior change. The Cronbach's Alpha values for the original scale range between 0.78 and 0.91. The Cronbach's Alpha values for the Turkish version of the scale whose validity and reliability study was conducted by Koyun et al. ranged between 0.54 and 0.86.[19] In the present study, Cronbach's Alpha values ranged between 0.61 and 0.92.

Self-Efficacy Scale: The scale developed by Velicer et al. measures the degree of confidence an individual has in maintaining non-smoking behavior in situations that trigger smoking.[21] The validity and reliability study of the Turkish version of the scale was conducted by Koyun et al.[19] While the Cronbach's Alpha of the original scale was 0.82, the Cronbach's Alpha was 0.85 in Koyun et al.'s validity and reliability study and 0.93 in the present study.[19] The

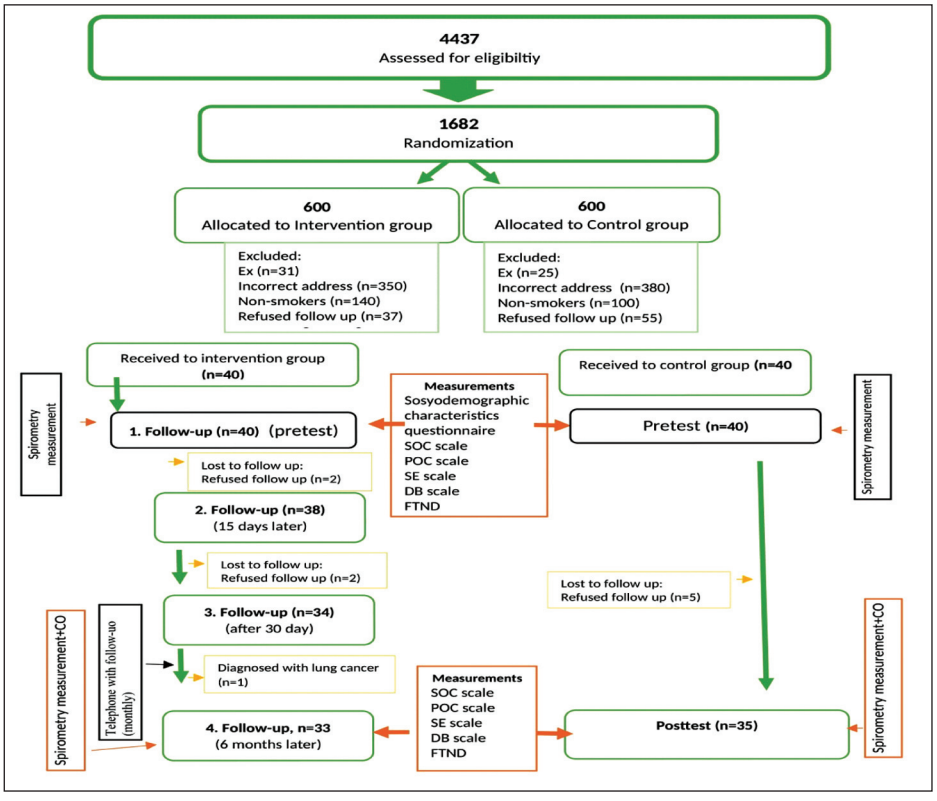

FIGURE 1: Consort flowchart.

CO: Carbon monoxide; SOC: Stages of change; POC: Processes of change; SE: Self-efficacy; DB: Decisional balance; FTND: the Fagerström test for nicotine dependence.

scale consists of eight items rated on a 5-point Likert type scale ranging from 1 to 5 (1=not confident at all, 2=a little confident, 3=confident, 4=very confident and 5=extremely confident). The lowest and highest possible scores to be obtained from the scale are 8 and 40, respectively, with higher scores indicating greater success in maintaining non-smoking behavior.

Decisional Balance Scale: Developed by Velicer et al. the DB Scale consists of 12 items in two sub-dimensions: Pros of change (6 items) and Cons of change (6 items).[22] The Cronbach's Alpha values, used to calculate the internal validity of the original scale, were 0.87 for the Pros of change subscale and 0.90 for the Cons of change subscale.

The Cronbach's Alpha values for the Pros of Change and Cons of Change subscales was 0.88 and 0.82, respectively in the Turkish validity-reliability study of the scale conducted by Koyun et al. and 0.71 and 0.85 in the present study.[19] The scale items are rated on a 5-point Likert scale ranging from 1 to 5 (1=not important at all, 2=very little important, 3=moderately important, 4=very important and 5=extremely important). The minimum and maximum possible scores for each subscale are 6 and 30, respectively. High scores on the Pros of change subscale indicate that the individual is determined to change, while high scores on the Cons of change subscale suggest that the person is not fully aware of the harms of the problematic behavior.

IMPLEMENTATION OF THE INTERVENTIONS

During the home visits, the TTM-based Smoking Cessation Guide prepared by Koyun and Eroglu as well as the educational booklet prepared by the researcher were used.[23,24]

TTM-based Smoking Cessation Guide: The guide was prepared considering the needs of individuals at each stage according to the Transtheoretical Model. It introduces the characteristics of each stage

of change of the model and provides information and strategies for initiating change in individuals. To use the guide, the individual's stage of change is 1st determined using the Stages of Change Scale, and then the appropriate procedure is followed according to the guide.

Educational Booklet: The booklet, prepared by the researcher based on the relevant literature, was finalized after incorporating feedback from five experts in public health nursing, pulmonary diseases, family medicine, and psychiatric nursing.[3,10,12,22,24] The booklet provides information on the function of the lungs, the definition of COPD, the symptoms of COPD, the factors that cause COPD, the relationship between the disease and smoking, and the effects of smoking cessation on COPD. The evaluation of the booklet was based on expert opinion and focused on content validity. The final version of the booklet was then developed based on feedback.

The nursing intervention in this study involved home visits, 6-month periodic follow-ups, health education, smoking cessation interventions aligned with motivational interviewing principles, and telephone counseling. Patients in the intervention group were 1st invited to the hospital for spirometry measurements, followed by scheduling the first of four planned home visits.

In the first home visit, the purpose of the study was explained, pretests were administered and nursing interventions were applied. In the 2nd, 3rd and 4th home visits, the patient's stage of change was reevaluated and nursing interventions were performed in accordance with the guidelines. Between the 3rd and 4th home visits, telephone contact was made once a month.

At the end of the sixth month, post-test measurements were made. The carbon monoxide (CO) levels of those who reported having quit smoking were measured using a handheld device. Those with CO levels below 5 were considered as non-smokers.

The control group did not receive a home visit. Instead, tests were administered at the first interview at the hospital and at the last interview at the end of the 6th month. Afterwards, the control group also received a nursing intervention and was given a handbook.

STATISTICS

Data were analyzed using the IBM SPSS V23 (IBM, United States). The independent samples t-test and Mann-Whitney U test were used to compare the intergroup data, while the paired samples t-test and Wilcoxon test were employed to compare intragroup pre-test and post-test values. The chi-square test and Fisher's exact test were used to analyze the categorical data. p values less than 0.05 were considered statistically significant. The Fisher's exact test was used to check the significance in categorical data. In addition, to maintain randomization and accurately evaluate the program's effect within realistic boundaries, an intention-to-treat (ITT) analysis was conducted. This analysis was conducted for 12 participants who left the study after the pre-test data collection, with 7 from the experimental group and 5 from the control group. While the ITT analysis was not included in the thesis, it was performed in this article following the reviewers' recommendations.

ETHICAL CONSIDERATIONS

Study approval was granted by the Ondokuz Mayıs University Clinical Research Ethics Committee (date: September 3, 2014, no: 2014/773). Institutional permission and permissions for the scales used were obtained. All participants were informed about the study and provided informed consent. The study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

Data on the demographic characteristics and smoking habits of the participants are presented in Table 1. At the onset of the study, there were no statistically significant differences between the participants in the intervention and control groups in terms of their demographic characteristics and smoking habits ($p>0.05$).

The distribution of the intervention and control groups according to the stages of change is given in Table 2. A significant difference was found between

TABLE 1: Sociodemographic characteristics of the intervention and control group.

Sociodemographic characteristics	Intervention group (n=40) X̄±SD	Control group (n=40) X̄±SD	t value*	p value
Age (X̄±SD)	58.73±13.19	60.43±9.53	-0.660	0.511
Age of smoking	16.03±5.20	16.08±4.85	-0.044	0.965
Number of hospital admissions (X̄±SD)	2.38±1.67	2.93±2.43	-1.178	0.242
	Intervention group (n=40)		Control group (n=40)			
	n	%	n	%	χ^{2**}	p value
Gender						
Female	10	25.0	10	25.0	0.000	1.00
Male	30	75.0	30	75.0		
Marital status						
Married	37	92.5	37	92.5	0.667	0.717
Single	3	7.5	3	7.5		
Educational level						
İlliterate	0	0	3	7.5		
Literate	3	7.5	1	2.5		
Primary school	22	55.0	20	50.0	4.453	0.486
Middle school	8	20.0	7	17.5		
High school and above	7	17.5	9	22.5		
Employment status						
Employed	21	52.5	22	55.0	0.50	0.823
Unemployed	19	47.5	18	45.0		
Income status						
Bad	1	2.5	5	12.5		
Middle	32	80.0	25	62.5	4.056	0.132
Good	7	17.5	10	25.0		
Number of cigarettes per day						
10 and lower	3	7.5	9	22.5		
11-20	26	65.0	20	50.0	5.668	0.129
21-30	6	5.0	9	22.5		
31 and above	5	12.5	2	5.0		
Quitting experience in past						
Yes	27	67.5	25	62.5	0.0220	0.639
No	13	32.5	15	37.5		

*Independent samples t-test statistics; **Chi-square test statistics. SD: Standard deviation.

the 2 groups in terms of the stages of change after the 6-month follow-up nursing intervention ($p<0.001$). Further analysis revealed that the difference was primarily due to the scores the patients obtained during the preparation stage. Initially, during the first home visit, 45% of participants in the intervention group were in the precontemplation stage, and 12.5% were in the preparation stage. By the last visit, 22.5% were in the precontemplation stage, 32.5% in the contemplation stage, 22.5% in the preparation stage, 10% in the action stage, and 12.5% in the maintenance stage.

The comparison of the smoking cessation status between the intervention and control groups demonstrated that 22.0% of the participants in the intervention group and 2.5% of the participants in the control group quit smoking. This difference was statistically significant ($p<0.05$; Table 3).

The mean post-test scores for the pros of change subscale of the Decisional Balance Scale increased statistically significantly in both the intervention group and the control group ($p<0.05$), with a significant difference in favor of the intervention group between the 2 groups ($p<0.05$). The mean scores for the cons of change subscale of the Decisional Balance Scale decreased statistically significantly in the intervention group but not in the control group ($p>0.05$), and the difference between the 2 groups at the post-test was not significant ($p>0.05$). After the nursing intervention, the mean self-efficacy scores increased significantly in both groups ($p<0.05$), with

TABLE 2: Comparison of first and last follow-up comparison of change stage by intervention and control groups.

Change of stage	First follow-up I* n (%)	First follow-up C* n (%)	Last follow-up I n (%)	Last follow-up C n (%)
Precontemplation	18 (45)	26 (65)	9 (22.5)	25 (62.5)
Contemplation	17 (42.5)	14 (35)	13 (32.5)	10 (25.0)
Preparation	5 (12.5)	-	9 (22.5)	4 (10.0)
Action	-	-	4 (10.0)	-
Maintenance	-	-	5 (12.5)	1 (2.5)
Total	40 (100)	40 (100)	40 (100)	40 (100)
Statistics	χ^{2**}: 6.745 p: 0.034		χ^{2**}: 16.510 p: 0.002	

*I: Intervention group; C: Control group; **Chi-square test statistics.

TABLE 3: Comparison of smoking cessation status of patients according to intervention and control groups.

	Intervention (n=40) (%)	Control (n=40) (%)	z value*	p value
Action and maintenance	9 (22.0)	1 (2.5)	16.055	**0.001**

*Fisher's exact test.

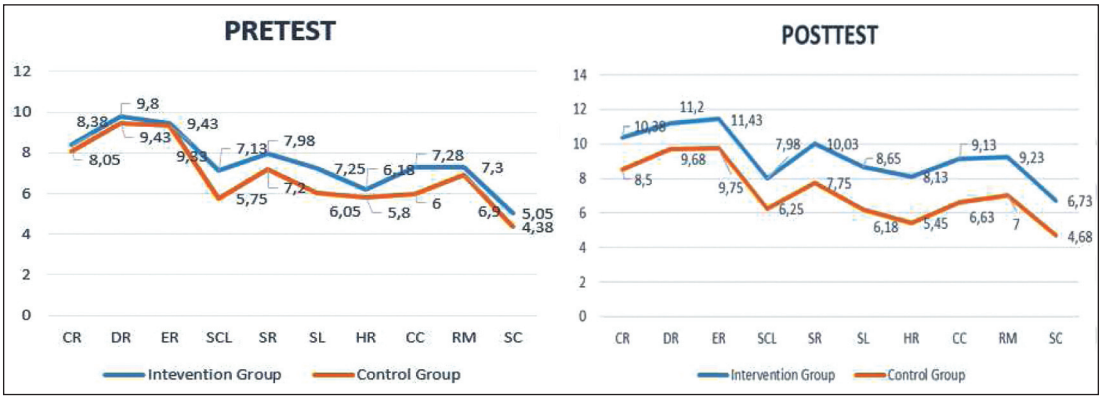

FIGURE 2: Comparison of Scores of sub-dimenson of process of change scale in the intervertion and control groups.

* CR: Consciousness raising; DR: Dramatic relief; ER: Environmental reevalution; SCL: Social liberation; SR: Self-reevalution; SL: Self-liberation; HR: Helping relationships; CC: Counter contidioning; RM: Reinforcement management; SC: Stimulus control.

a significant difference between the 2 groups at the posttest ($p<0.05$).

The results for the Processes of Change methods, another component of the transtheoretic model, and its sub-dimensions are presented in Figure 2. There was a significant increase in the mean scores obtained from all the sub-dimensions of cognitive and behavioral processes in the intervention group ($p<0.05$), and the difference between the 2 groups in the posttest analysis was statistically significant ($p<0.05$). In the control group, the mean posttest scores for the 2 sub-dimensions of the cognitive processes (Consciousness Raising, Environmental Reevaluation) and the 2 sub-dimensions of the behavioral processes (Counter-Conditioning, Social Liberation) increased significantly compared to the pre-test scores ($p<0.05$).

The mean scores obtained from the Fagerström Test at the post-test differed significantly from those obtained at the pre-test in both groups ($p<0.05$). There was also a significant difference between the groups when comparing the post-test scores ($p<0.05$). Evaluation of the spirometry measurement results of the patients with COPD in the intervention and control groups was based on the Forced Expiratory Volume (FEV_1) scores. The mean FEV_1 scores of the patients in the intervention group increased significantly from the pre-test to the post-test measurements ($p<0.05$). However, the difference between the two groups in terms of their post-test scores was not significant ($p>0.05$) (Table 4).

DISCUSSION

This study demonstrated the impact of nursing interventions based on the Transtheoretical Model on patient outcomes in COPD patients who smoke.

In the study, while the post-test scores for the Decision Balance Benefits subscale increased in both groups, they decreased for the Cons of Change subscale. However, no significant difference was observed between the experimental and control groups. This showed that the direct intervention did not have a different effect. Measuring the control group in the hospital may also have had a stimulating effect by increasing their perception of smoking cessation. A systematic review in patients with COPD found that counseling by health professionals had a significant positive effect on smoking cessation, but had no significant effect on physical activity.[25] Studies examining smokers' attitudes towards smoking according to stages of change have shown that positive attitudes towards smoking decreased and negative attitudes towards smoking increased as individuals progressed through the stages of smoking cessation.[10,26,27]

In the study, after the nursing intervention for COPD patients, the self-efficacy scores of the patients in the experimental group increased significantly, and a significant difference was also found between the groups. The increase in self-efficacy scores indicates the effectiveness of the intervention, suggesting that it boosted patients' self-confidence by encouraging behavior change. Similarly, in the

TABLE 4: Comparison of decisional balance scale, self-efficacy scale, Fagerström test for nicotine dependence and the Forced Expiratory Volume mean scores of patients in the intervention and control group.

Scales	Group	Pretest median $\bar{X}$±SD	Posttest median $\bar{X}$±SD	Statistics	p value
Pros of change	Intervention	21.95±4.6	24.4±4.9	t**:-3.991	**<0.001**
	Control	21.13±4.9	22.1±5.4	t**:-2.846	**0.007**
	t value*	0.769	2.062		
	p value	0.444	**0.043**		
Cons of change	Intervention	17.35±7.5	14.13±6.8	t**:-3.092	**0.004**
	Control	19.35±7.0	18.43±7.5	t**:1.583	0.122
	t value*	-1.232	-2.693		
	p value	0.222	**0.009**		
Self-efficacy	Intervention	22.2±8.1	26.6±9.4	t**:-3.458	**0.001**
	Control	16.9±5.8	19.1±8.1	t**:-2.095	**0.043**
	t value*	3.363	3.840		
	p value	**0.001**	**<0.001**		
Fagerström test for nicotine dependence	Intervention	4 (0-10)	1 (0-7)	Z****: -4.566	**<0.001**
	Control	5 (0-9)	3 (0-9)	Z****: -2.701	**0.007**
	U***	694.0	398.5		
	p value	0.304	**<0.001**		
FEV_1	Intervention	64.9±6.2	66.7±6.8	t**: -2.823	**0.007**
	Control	64.2±8.1	63.6±7.5	t**: 1.092	0.281
	t value*	0.401	1.755		
	p value	0.690	0.084		

*Independent samples t-test statistic; **Dependent samples t-test statistic; ***Mann-Whitney U test; ****Wilcoxon signed rank test. SD: Standard deviation.

study by Lindberg et al. quitting smoking led to a significant increase in the self-efficacy scores of COPD patients. These findings are supported by the literature.[28,29]

The analysis of the mean scores from all subdimensions of the Processes of Change scale at the post-test revealed an increase in both the intervention and control groups, with the increase being significantly higher in the intervention group. This indicates that the nursing intervention implemented in the study contributed effectively to the use of behavior change methods. Similarly, Koyun and Eroglu's study also found a significant increase in the mean scores obtained from the Processes of Change scale.[27]

As stated in the literature, individuals in the precontemplation and contemplation stages tend to use cognitive methods such as environmental reevaluation. Those in the preparation stage often use self-reevaluation methods, while individuals in the action stage are more likely to employ behavioral methods.[30,31] Based on this, it can be concluded that the findings support the use of Transtheoretical Model-based smoking cessation interventions. The patients in the intervention group were more likely to take action towards change compared to the control group due to the intervention.

The analysis of the results for the stages of change demonstrated positive progress in the intervention group, with the last follow-up indicating a significant difference between the groups. In Cabezas et al. randomized controlled study based on the motivational interviewing principles aligned with the stages of change, the smoking cessation rate was 1.5 times higher in the intervention group.[8] Other studies have also shown that interventions based on motivational interviewing and the Transtheoretical Model lead to improvements in the stages of change among participants.[27,32] Additionally, the study found that the smoking cessation rate in the intervention group was significantly higher than that in the control group. This suggests that smoking cessation interventions based on the Transtheoretical Model can be

effective in promoting behavior change and directly influencing smoking cessation, particularly in a patient sample with high nicotine dependence, such as COPD patients. Similarly, In Koyun and Eroglu's study, after the smoking cessation intervention, none of the participants in the control group quit smoking, while 13.2% of the women in the intervention group quit smoking.[27] In another randomized controlled experimental study with COPD patients, patients were divided into 3 groups and the smoking cessation rate in the group in which motivational cognitive behavioral harm reduction program and combined therapy were applied was found to be higher than in the group in which nicotine replacement therapy was applied and this result was confirmed by a significant decrease in carbon monoxide measurements.[33] The study results showed that the significant impact on decisional balance, self-efficacy, the process of behavior change, stages of change, and smoking cessation in the intervention group was also reflected in the patients' nicotine dependence levels. At the end of the intervention, the nicotine dependence levels in the intervention group decreased significantly compared to the control group.

CONCLUSION

According to the Transtheoretical Model, home-based nursing interventions increased the perception of benefits and self-efficacy regarding smoking cessation, decreased the perception of cons of change, increased smoking cessation rates, and positively affected nicotine dependence levels in patients with COPD.

The strength of the study is that the nursing intervention was applied directly in the patient's own environment, at home and one-to-one counseling was performed.

It is recommended that future nursing interventions based on the Transtheoretical Model, incorporating home visits and motivational interviewing techniques, be conducted with nonsmokers with COPD as well as smokers with other chronic diseases.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Figen Çavuşoğlu, Ayşe Şamlı, Oğuz Kılınç;* ***Design:*** *Figen Çavuşoğlu, Ayşe Şamlı, Oğuz Kılınç;* ***Control/Supervision:*** *Figen Çavuşoğlu, Oğuz Kılınç;* ***Data Collection and/or Processing:*** *Figen Çavuşoğlu, Nazmiye Tibel Tuna;* ***Analysis and/or Interpretation:*** *Figen Çavuşoğlu, Ayşe Şamlı;* ***Literature Review:*** *Figen Çavuşoğlu;* ***Writing the Article:*** *Figen Çavuşoğlu, Ayşe Şamlı, Oğuz Kılınç, Nazmiye Tibel Tuna;* ***Critical Review:*** *Ayşe Şamlı, Oğuz Kılınç, Nazmiye Tibel Tuna;* ***References and Fundings:*** *Figen Çavuşoğlu;* ***Materials:*** *Figen Çavuşoğlu.*

REFERENCES

1. Öz MA, Özbek M, Aslan D. 15 Kasım Dünya KOAH Günü (2023). Hacettepe Üniversitesi Tıp Fakültesi Halk Sağlığı Anabilim Dalı Toplum İçin Bilgilendirme Dizisi (2023/2024-16). Available from: [Link]
2. Kacabaş A, Atış S, Çöplü L, Erdinç E, Ergab B, Gürgün A, et al. Chronic obstructive pulmonary disease (COPD) prevention, diagnosis and treatment report 2014. Turkish Thoracic Journal. 2014; Supplement 2 April 15. Date of access: 14 February 2025, [Link]
3. Önen ZP, Şen E, Gülbay BE, Yıldız Akcakoca Ö, Acıcan T, Saryal S, et al. Long-term smoking cessation rates and differences in outpatients with Chronic Obstructive Pulmonary Disease and Asthma. Smoking and Health. 2011;12(2):67-71. [Crossref]
4. Anderson JE, Jorenby DE, Scott WJ, Fiore MC. Treating tobacco use and dependence: an evidence-based clinical practice guideline for tobacco cessation. Chest. 2002;121(3):932-41. [Crossref] [PubMed]
5. Fiore MC, Jaén CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, et al. Treating tobacco use and dependence: 2008 update. Clinical Practice Guideline. Available from: [Link]
6. Dale LC, Glover ED, Sachs DP, Schroeder DR, Offord KP, Croghan IT, et al. Bupropion for smoking cessation : predictors of successful outcome. Chest. 2001;119(5):1357-64. [Crossref] [PubMed]
7. Moqaddas A, Reisi M, Mahmoodi M, Javadzade H. Predictive factors of stages of change in Hookah smoking cessation among Iranian adults based on the transtheoretical model. Addict Health. 2023;15(2):77-86. [Crossref] [PubMed] [PMC]
8. Cabezas C, Advani M, Puente D, Rodriguez-Blanco T, Martin C; ISTAPS Study Group. Effectiveness of a stepped primary care smoking cessation intervention: cluster randomized clinical trial (ISTAPS study). Addiction. 2011;106(9):1696-706. [Crossref] [PubMed]
9. Sayed SH, El-Sakkar SM, Elsaka SA, El-Houfey AA. Effect of cigarette smoking cessation educational intervention based on the trans-theoretical model using motivational interviewing on Egyptian males' smoking knowledge and behavior: a randomized controlled trial. Tehran University of Medical Sciences. 2023;10(2):108-23. [Crossref]
10. Sharifirad GR, Eslami AA, Charkazi A, Mostafavi F, Shahnazi H. The effect of individual counseling, line follow-up, and free nicotine replacement therapy on smoking cessation in the samples of Iranian smokers: examination of transtheoretical model. J Res Med Sci. 2012;17(12):1128-36. [PubMed] [PMC]
11. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. J Consult Clin Psychol. 1983;51(3):390-5. [Crossref] [PubMed]
12. Redding CA, Rossi JS, Rossi SR, Velicer WF, Prochaska JO. Health behavior models. The International Electronic Journal of Health Education, 2000;3(Special Issue):180-93.
13. Wei X, Guo K, Shang X, Wang S, Yang C, Li J, et al. Effects of different interventions on smoking cessation in chronic obstructive pulmonary disease patients: a systematic review and network meta-analysis. Int J Nurs Stud. 2022;136:104362. [Crossref] [PubMed]
14. Principe R, Zagà V, Martucci P, Di Michele L, Barbetta C, Serafini A, et al. Smoking cessation in the management of Chronic Obstructive Pulmonary Disease (COPD): narrative review and recommendations. Ann Ist Super Sanita. 2024;60(1):14-28. [PubMed]
15. Effing T, Monninkhof EM, van der Valk PD, van der Palen J, van Herwaarden CL, Partidge MR, et al. Self-management education for patients with chronic obstructive pulmonary disease. Cochrane Database Syst Rev. 2007;(4):CD002990. Update in: Cochrane Database Syst Rev. 2014;(3):CD002990. [Crossref] [PubMed]
16. Jeppesen E, Brurberg KG, Vist GE, Wedzicha JA, Wright JJ, Greenstone M, et al. Hospital at home for acute exacerbations of chronic obstructive pulmonary disease. Cochrane Database Syst Rev. 2012;2012(5):CD003573. [Crossref] [PubMed] [PMC]
17. Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström test for nicotine dependence: a revision of the Fagerström Tolerance Questionnaire. Br J Addict. 1991;86(9):1119-27. [Crossref] [PubMed]
18. Uysal MA, Kadakal F, Karşidağ C, Bayram NG, Uysal O, Yilmaz V. Fagerstrom test for nicotine dependence: reliability in a Turkish sample and factor analysis. Tuberk Toraks. 2004;52(2):115-21. [PubMed]
19. Koyun A, Eroglu K, Bodur S. Sigara içen yetişkinler için Geliştirilmiş Değişim Aşamaları Modeli Ölçeklerinin Türkçeye uyarlama çalışması [Turkish adaptation study of Stage of Change Model Scales which developed for adults who smoke]. Turkiye Klinikleri J Nurs Sci. 2015;7(2):69-78. [Crossref]
20. Prochaska JO, Velicer WF, DiClemente CC, Fava J. Measuring processes of change: applications to the cessation of smoking. J Consult Clin Psychol. 1988;56(4):520-8. [Crossref] [PubMed]
21. Velicer WF, Diclemente CC, Rossi JS, Prochaska JO. Relapse situations and self-efficacy: an integrative model. Addict Behav. 1990;15(3):271-83. [Crossref] [PubMed]
22. Velicer WF, DiClemente CC, Prochaska JO, Brandenburg N. Decisional balance measure for assessing and predicting smoking status. J Pers Soc Psychol. 1985;48(5):1279-89. [Crossref] [PubMed]
23. Koyun A, Eroglu K. Model of Change Stages (Prepared according to Transteoretic Model and Stages) Guideline of Smoking Cessation. 1st edition, Palme publication, Ankara, 2013. p. 51-126.
24. Çavuşoğlu F. COPD and Cigarette. 1st ed. Samsun: Ondokuz Mayıs University publication. 2017
25. Williams MT, Effing TW, Paquet C, Gibbs CA, Lewthwaite H, Li LSK, et al. Counseling for health behavior change in people with COPD: systematic review. Int J Chron Obstruct Pulmon Dis. 2017;12:2165-78. [Crossref] [PubMed] [PMC]
26. Fjalldal SB, Janson C, Benediktsdóttir B, Gudmundsson G, Burney P, Buist AS, et al. Smoking, stages of change and decisional balance in Iceland and Sweden. Clin Respir J. 2011;5(2):76-83. [Crossref] [PubMed]
27. Koyun A, Eroğlu K. The effect of transtheoretical model-based individual counseling, training, and a 6-month follow-up on smoking cessation in adult women: a randomized controlled trial. Turk J Med Sci. 2016;46(1):105-11. [Crossref] [PubMed]
28. Yalçınkaya Alkar Ö, Karanci AN. What are the differences in decisional balance and self-efficacy between Turkish smokers in different stages of change? Addictive Behaviors. 2007;32(4):836-49. [Crossref] [PubMed]
29. Lindberg A, Niska B, Stridsman C, Eklund BM, Eriksson B, Hedman L. Low nicotine dependence and high self-efficacy can predict smoking cessation independent of the presence of chronic obstructive pulmonary disease: a three year follow up of a population-based study. Tob Induc Dis. 2015;13(1):27. [Crossref] [PubMed] [PMC]
30. Chang L. A new health education for occupational health promotion- Transtheoretical Model approach. International Congress Series. 2006;1294(11):115-8. [Crossref]
31. Kim YH. Adolescents' smoking behavior and its relationships with psychological constructs based on transtheoretical model: a cross-sectional survey. Int J Nurs Stud. 2006;43(4):439-46. [Crossref] [PubMed]
32. Chang YH, Fu CH, Hsu MH, Okoli C, Guo SE. The effectiveness of a transtheoretical model-based smoking cessation intervention for rural smokers: a quasi-experimental longitudinal study. Patient Educ Couns. 2024;122:108136. [Crossref] [PubMed]
33. Zarghami M, Taghizadeh F, Sharifpour A, Alipour A. Efficacy of smoking cessation on stress, anxiety, and depression in smokers with Chronic Obstructive Pulmonary Disease: a randomized controlled clinical trial. Addict Health. 2018;10(3):137-47. [PubMed] [PMC]