



Original Article

Effect of psychiatric nurses' counseling on exercise behavior in individuals diagnosed with psychiatric disorders: A transtheoretical model-based randomized controlled trial

☯ Suna Uysal Yalçın,¹ ☯ Hülya Bilgin²

¹Department of Mental Health and Psychiatric Nursing, Kocaeli Health and Technology University, Kocaeli, Türkiye

²Department of Mental Health and Psychiatric Nursing, İstanbul University-Cerrahpaşa Florence Nightingale Faculty of Nursing, İstanbul, Türkiye

Abstract

Objectives: Insufficient physical activity, which is one of the unhealthy lifestyle behaviors, is more common in individuals diagnosed with psychiatric disorders. This experimental study aimed to examine the effect of psychiatric nurses' counseling role on improving exercise behavior in individuals diagnosed with psychiatric disorders through the TTM framework.

Methods: This randomized controlled trial, with pretest, posttest, and follow-up assessments, included 61 patients from a community mental health center (intervention, n=30; control, n=31). The study data were collected using the "Information Form", "Exercise Change Stages Scale", "Exercise Processes of Change Scale", "Exercise Self-Efficacy Scale", and "Exercise Decisional Balance Scale".

Results: The proportion of participants in the "preparation" phase after the intervention increased (n=15, 48.4%) in the intervention group, while the rate of participants in the "preparation" phase remained the same in the control group (n=8, 26.7%). The intervention group showed increases in the "Exercise Self-Efficacy Scale" and "Exercise Decisional Balance Scale" pros scores from baseline to post-intervention, with these gains persisting at follow-up. As a result, it was observed that the counseling role of psychiatric nurses through the Transtheoretical Model was effective in improving exercise behavior and physical health conditions of individuals diagnosed with psychiatric disorders.

Conclusion: The counseling role of psychiatric nurses based on the Transtheoretical Model has been found to be effective in improving exercise behavior among individuals diagnosed with psychiatric disorders, thereby reducing risks associated with physical illnesses. Additionally, the findings suggest that Transtheoretical Model-based counseling can be effectively utilized in the independent practices of psychiatric nurses, thereby strengthening their counseling role.

Keywords: Counseling; exercise; individuals diagnosed with psychiatric disorders; physical health; psychiatric nursing; transtheoretical model

On average, life expectancy is reduced by about one to two decades in individuals diagnosed with psychiatric disorders.^[1-3] This disparity is largely attributed to adverse lifestyle behaviors such as social exclusion, alcohol consumption, and smoking, as well as negative physical health behaviors, includ-

ing obesity, inadequate nutrition, lack of exercise, and sleep disorders.^[4-6] Antipsychotic medications contribute to metabolic disturbances (e.g., increased lipid levels and impaired glucose regulation), thereby compounding the elevated cardiovascular risk observed in people with psychiatric disorders.

Address for correspondence: Suna Uysal Yalçın, Kocaeli Sağlık ve Teknoloji Üniversitesi, Ruh Sağlığı ve Psikiyatri Hemşireliği Anabilim Dalı, Kocaeli, Türkiye

Phone: +90 544 371 68 06 **E-mail:** sunauysl@hotmail.com **ORCID:** 0000-0002-1048-1448

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^[5,7] Furthermore, the sedative effects of antipsychotic medications, along with the negative symptoms of psychosis, significantly diminish patients' ability and motivation to engage in physical exercise.^[4,8,9]

Depressive symptoms, diminished self-confidence, and tendencies toward social isolation can lead to reduced physical activity in individuals diagnosed with psychiatric disorders.^[1,4] However, regular exercise programs have been shown to mitigate these symptoms and enhance overall physical health. Evidence from systematic reviews shows that exercise interventions are effective for schizophrenia populations and confer measurable physical and mental health benefits.^[10] In research conducted by Bailey et al., patients with psychosis were found to recognize the importance of reducing sedentary behaviors, but increasing physical activity was not always their primary concern.^[7] Nevertheless, counseling interventions that encourage regular physical exercise are associated with meaningful mental and physical health benefits.

In an era of widespread access to information, the main obstacle to improving the life expectancy of individuals diagnosed with psychiatric disorders is the gap between knowledge and implementation. Addressing this gap requires prioritizing evidence-based interventions. The World Health Organization^[11] has emphasized that best practice recommendations incorporating a person-centered approach and effective management of physical healthcare are essential in bridging this implementation gap. Through their counseling responsibilities, psychiatric nurses can implement various interventions, such as supporting patients and their families, offering advice and teaching behavioral change strategies, as well as sharing essential health-related information. The Transtheoretical Model (TTM) is one of the most commonly employed frameworks for conceptualizing and supporting health behavior change. Developed by James Prochaska and Carlo DiClemente,^[12] the TTM conceptualizes behavior change as a process rather than an outcome. It emphasizes the necessity of stage-matched interventions to facilitate sustainable modifications.^[13] Prochaska and DiClemente^[12] argue that behavior change proceeds through a voluntary, progressive series of stages. This makes stage-appropriate, individualized intervention planning essential.

As a structured approach, the TTM serves as a valuable tool in guiding nurses in promoting healthy lifestyle behaviors.^[12,13] Within nursing care, it can be utilized as a framework to identify individuals at different stages of change, plan personalized goals and strategies for nursing interventions, and assess the effectiveness of these interventions.^[14] While the TTM has been used to explain the motivational determinants of physical activity (PA), limited evidence exists regarding its applicability to individuals diagnosed with psychiatric disorders. Romain and Abdel Baki^[15] demonstrated a positive correlation

What is presently known on this subject?

- Individuals diagnosed with psychiatric disorders experience significantly lower levels of physical activity, contributing to poorer physical health outcomes and reduced life expectancy. There is a recognized need for effective interventions to promote exercise in this population.
- Mental health nurses are uniquely positioned to advance integrated mental and physical health in individuals with psychiatric conditions.

What does this article add to the existing knowledge?

- Psychiatric nurses can offer a range of initiatives, including providing training on exercise behavior change to patients and sharing information, within their counseling role.
- Psychiatric nurses can improve and protect exercise behavior in individuals diagnosed with psychiatric disorders by performing a counseling role.
- The biggest obstacle to increasing the life expectancy of individuals diagnosed with psychiatric disorders is not a lack of knowledge, but a gap in practice.

What are the implications for practice?

- Individuals enrolled in Community Mental Health Centers (CMHCs) who are at elevated physical health risk should be identified, and individualized physical activity interventions should be planned and implemented.

between PA and the processes of change, as well as perceived benefits. They found that physically active individuals exhibited higher levels of behavioral change processes and perceived benefits compared with inactive individuals diagnosed with psychiatric disorders. Furthermore, Anastopoulou et al.^[16] examined the effect of TTM on dietary behaviors in individuals diagnosed with psychiatric disorders. Those receiving the TTM-based intervention (n=30) demonstrated healthier dietary behaviors and greater weight reduction compared with the control group (n=30), indicating preliminary support for the model's effectiveness in behavior modification.

In Türkiye, a variety of descriptive and experimental studies have been conducted using the Transtheoretical Model (TTM) in patient groups other than those with psychiatric diagnoses.^[17-19] However, research applying the TTM to psychiatric populations remains limited. Mansuroğlu and Kutlu^[20] delivered a TTM-based psychoeducation program to individuals diagnosed with psychiatric disorders in a group setting and evaluated its impact on healthy lifestyle behaviors. They reported a moderate improvement in physical exercise. Similarly, Fırıncık et al.^[21] examined the effects of a nutrition education program integrated with physical exercise on individuals diagnosed with schizophrenia, finding increased physical activity levels following a four-session group intervention. Against this background, the present study contributes to the literature by offering an explicitly model-driven, stage-matched TTM intervention delivered via personalized one-to-one nursing counseling. The study targets individuals with severe psychiatric disorders and employs an experimental design that includes pretest, posttest, and follow-up assessments. These features constitute the study's originality and contribution.

A review of the literature reveals that studies focusing on exercise behavior and using the Transtheoretical Model (TTM) in individuals diagnosed with psychiatric disorders have pre-

dominantly been conducted in Western countries, with limited research conducted in Eastern and Asian contexts. Given Türkiye's geographical position between Asia and Europe, this study sets an important precedent for future research in this area. Considering the cognitive impairments and lack of social agency that may hinder autonomous decision-making in this population, it is essential to develop culturally sensitive approaches to promoting exercise behaviors.

The objective of this experimental study was to examine the effect of psychiatric nurses' counseling role on improving exercise behavior in individuals diagnosed with psychiatric disorders through the TTM framework. By integrating TTM-based counseling strategies, psychiatric nurses can adopt a more holistic approach to care, addressing the physical health needs of this population, which are often overlooked. By encouraging patients to initiate or increase their physical activity levels, nurses can facilitate improvements in overall well-being and life expectancy. One of the primary barriers to regular exercise among overweight and obese individuals is the stigma associated with weight.^[22,23] Individuals diagnosed with psychiatric disorders often face dual stigmatization due to their condition and weight status. Making physical exercise a regular part of everyday life may lessen stigmatization and support more positive health outcomes.

Hypotheses

To determine the effect of psychiatric nurses' counseling role on improving exercise behavior in individuals diagnosed with psychiatric disorders through the TTM, the following hypotheses were proposed:

Hypothesis 1. Individuals diagnosed with a psychiatric disorder who receive counseling based on the TTM are expected to show a significant difference on the "Exercise Change Stages Scale" compared with the control group.

Hypothesis 2. Individuals diagnosed with a psychiatric disorder who receive counseling based on the Transtheoretical Model (TTM) are expected to show significant differences on the "Exercise Change Processes Scale", "Self-Efficacy Scale", and "Decision Balance Scale" compared with the control group.

Materials and Method

Study Design

A single-blind, randomized controlled design was used. This study was guided by the CONSORT checklist. Reporting was performed in accordance with CONSORT principles.

Place and Date

The study was conducted between June 2018 and December 2020 in an industrial, metropolitan city in Türkiye, with a local

population of approximately 2 million. There are two Community Mental Health Centers (CMHCs) in this metropolitan city. The CMHC where the research was conducted is located in the city center and is easily accessible. Patients enrolled in the CMHC were generally diagnosed with "schizophrenia spectrum and other psychotic disorders", while a small proportion were diagnosed with "mood disorders" or "mood disorders" accompanied by "intellectual disability". The CMHC is activity-centered, with regular course schedules (including cognitive exercise, occupational therapy, drama, choral work, folk dance, music therapy, and horse therapy) from 09:00 to 16:00 on weekdays. Patients diagnosed with psychiatric disorders and their families are informed about the course programs and encouraged to participate.

Participants and Sample Size

The study was conducted in a CMHC affiliated with a state hospital. A total of 396 patients are registered at the CMHC. The sample size was calculated using a priori power analysis with the G*Power 3.1.9.2 program. For the analysis, F tests/ANOVA for repeated measures (group \times time interaction; within-between interaction) were selected for the randomized controlled experimental design, which included two groups (intervention-control) and three time points (pretest-posttest-follow-up). The power analysis was performed based on the primary outcome measure, the total score of the Exercise Self-Efficacy Scale (ESES). Parameters: effect size=0.185; α =0.05; power=0.80. Accordingly, it was determined that a minimum of 50 participants (25 in each group) should be included in the study. From a total of 396 patients, 61 who met the eligibility criteria and agreed to participate were selected as the study sample (Fig. 1). To anticipate possible attrition, 31 participants were placed in the intervention group, while 30 were allocated to the control group.

Inclusion Criteria

Participants met the following inclusion criteria: DSM-5-defined schizophrenia spectrum or other psychotic disorder; current use of antipsychotic medication; age between 18 and 70 years; and BMI \geq 25 kg/m².

Exclusion Criteria

Exclusion criteria were as follows: having an intellectual disability; being in the postpartum period; having a diagnosed eating or feeding disorder; having psychosis due to general medical conditions; being pregnant; having an orthopedic condition that prevents walking; experiencing visual or auditory impairments; or having a diagnosis of diabetes, respiratory system disorder, or hypertension.

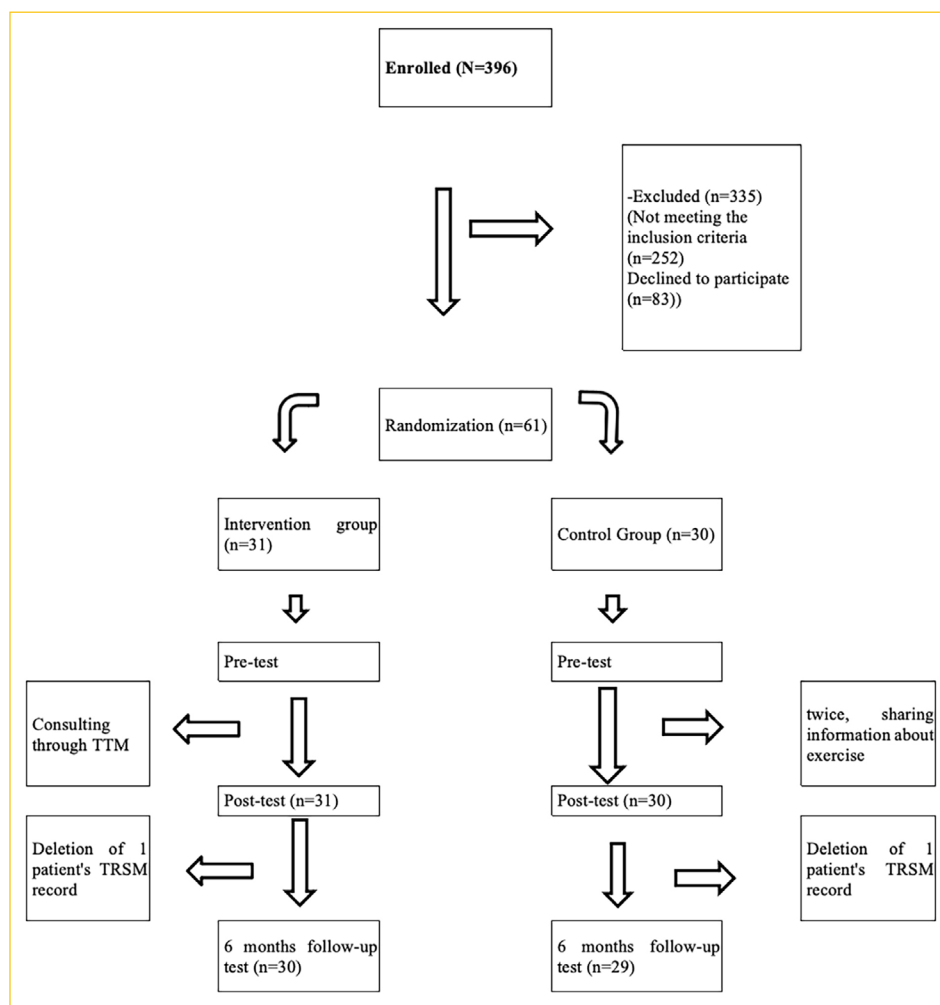


Figure 1. CONSORT flow diagram of the study.

Randomization and Blinding

The first author assessed patients' medical records and consulted with healthcare professionals involved in patient care to determine whether they met the study eligibility criteria. Of 396 patients assessed for eligibility, 252 were excluded because they either did not meet the inclusion criteria or declined participation. Sixty-one participants were randomized (computer-generated sequence; stratified by gender and age; concealed envelopes) to the intervention (n=31) or control (n=30) groups. The randomization was conducted by a third party not involved in the research team (see Fig. 1 for the CONSORT diagram summary of the trial design).

Data Collection Tools

Questionnaire: Drawing on previous studies, the research team designed the questionnaire.^[5,22,24] Minor revisions were made based on expert opinions. The final questionnaire consisted of 24 questions (yes/no questions in the form of open-ended and visual analogue scales) under the headings of "Individual Characteristics", "Features Associated with Physi-

cal Health", and "Features Associated with Psychiatric Disease".

Exercise Stages of Change Scale: This scale was formulated by Prochaska and DiClemente^[12] as part of smoking cessation studies. Marcus et al.^[25] adapted the "Stages of Change Scale" for exercise. The scale is used to categorize individuals into five distinct stages of exercise behavior change through an algorithmic approach. Classification is based on a single question assessing exercise behavior, with responses determining the individual's current stage of exercise behavior. Each stage represents a more advanced level compared with the previous one in terms of an individual's awareness, motivation, and actions related to exercise behavior. In a further adaptation for Turkish society, Gümüş and Kitiş^[26] validated the scale, reporting a Cronbach's alpha value of 0.79 for reliability. Cronbach's alpha for the scale in our sample was 0.94.

Exercise Processes of Change Scale: This was formulated by Marcus et al.^[25] and reflects the experiences used by individuals in the process of transitioning to the next stage of change. It consists of 40 items measured on a five-point Likert scale (never, rarely, occasionally, often, very often).

Higher scores on the scale indicate a greater likelihood of success in achieving change.^[26] The scale consists of ten sub-dimensions grouped under two main categories. Cognitive processes include “consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, and social liberation”. Behavioral processes consist of “counter-conditioning, helping relationships, contingency management, self-liberation, and stimulus control”. The Cronbach’s alpha value was reported as 0.97, and the scale was translated into Turkish by Gümüş and Kitiş.^[26] In the study adapted by Ay and Bayık Temel,^[27] the Cronbach’s alpha value was reported as 0.95. Cronbach’s alpha for the scale in our sample was 0.90.

Exercise Self-Efficacy Scale: This was formulated by Marcus et al.^[25] It is a five-item Likert-type scale that measures individuals’ self-confidence in exercising. A high total score indicates that the individual has high self-confidence in exercise. In the study adapted by Ay and Bayık Temel,^[27] the Cronbach’s alpha value was reported as 0.90. Cronbach’s alpha for the scale in our sample was 0.96.

Exercise Decision-Balance Scale: Developed by Marcus et al.,^[25] the scale comprises 16 items rated on a five-point Likert-type scale (“not important” to “highly important”). The scale, which reveals the benefits and harms of changing behavior, consists of two subdimensions: perception of benefit and perception of harm. High benefit and harm subscale scores indicate that the individual is aware of the benefits and harms of exercise behavior and has a greater likelihood of making informed decisions about change. The Cronbach’s alpha of the scale was reported as 0.82 by Gümüş and Kitiş.^[26] In our study, the Cronbach’s alpha value was 0.92.

My Physical Health Chart: This is a concrete tool prepared by the researcher in which the goals that participants should achieve during their exercise training are determined. This chart was completed by the researcher and the patient together and was evaluated with the patient before and after each interview.

Exercise by Stages of Change Brochure: For each stage of change outlined in the TTM, a brochure was designed and distributed to the intervention group, offering both written and visual guidance to encourage exercise. Before being provided to the patient, the brochure was introduced by the researcher, and the patient’s stage of change was identified using the brochure and reviewed together with the patient.^[28,29]

Data Collection Process

In the pretest, posttest, and follow-up phases, the stage of change in exercise behavior for participants in both groups was determined using the “Exercise Stages of Change Scale” algorithm.

Data Collection Process – Preliminary Stage

To conduct the study in a qualified and effective manner, a quiet and simple room was selected and used exclusively by the researcher. Participants randomized and blinded into both groups were introduced to the study forms and scales, which were administered via face-to-face interviews. All participants received information about the study timeline and program, including the intervention group (one training session per week for eight weeks) and the control group (two sessions over the same period). Exercise counseling targeted planned, purposeful, and repetitive activities (i.e., exercise), primarily walking and simple home-based exercises, in line with participants’ functional capacity and safety considerations.

Intervention Group Implementation Stage

Each interview lasted approximately 45–60 minutes and was conducted weekly for eight weeks. Before each interview, the “Exercise Stages of Change Scale” was used to determine the stage of the patients (precontemplation, contemplation, preparation, action, maintenance). Based on these assessments, the intervention approach was guided by the “Goals, Processes, and Strategies for the Exercise Stages of Change” Table 1. During the precontemplation stage, patients were informed about the benefits of regular exercise to raise awareness. In the contemplation stage, brochures were provided to enhance patients’ confidence in making changes, goal-setting activities were conducted, and these goals were recorded in the “My Physical Health” follow-up form. For patients in the preparation stage, individualized planning was carried out, an exercise initiation date was determined, and support was provided throughout the change process. Informative materials (brochures, charts, etc.) containing exercises (walking + home-based exercises) that patients in the action phase could perform at home were provided. The exercises in the brochure were demonstrated to the patient one-on-one during the consultation, and patients were asked to practice them. They were encouraged to keep regular records. In the maintenance stage, positive reinforcement was provided to ensure the sustainability of achievements, and strategies were developed to prevent the influence of negative stimuli.

After the “Goals, Processes, and Strategies for the Stages of Exercise Change” table was developed, input on the program was obtained from five experts: one Professor, two Associate Professors, and one Assistant Professor in Psychiatric and Mental Health Nursing, as well as one clinical psychologist who is a member of the Motivational Interviewing Network of Trainers. Based on expert feedback, the program was revised and subsequently piloted with two individuals diagnosed with psychiatric disorders, after which it was finalized. Participant feedback and scale scores indicated that the program was

Table 1. Goals, processes and strategies for exercise change stages

Stages	Goals	Change processes	Strategies for supporting change
Pre-contemplation	Raising awareness for the need for change	Raising awareness Emotional arousal Re-evaluating the environment	The impact of excess weight on health and body image, identifying barriers to regular exercise The effects of regular exercise on life, encouraging consideration of change Identifying enjoyable activities, understanding behaviours and feelings about exercise Understanding thoughts about exercise Discussing what movement and inactivity mean to the individual or family, and how they contribute to their lives Providing personalised information about the benefits of starting an exercise programme
Contemplation	Increasing confidence in change and motivation	Raising awareness Re-evaluating the environment Emotional arousal	Identifying questions about exercise, continuing education on the health effects of not exercising and the health benefits of exercising Identifying barriers to regular exercise, offering solutions Identifying social support, determining enjoyable activities Planning to be active, identifying situations where there is indecision about exercising, raising awareness and emphasising, mentioning avoiding lifts and using fewer vehicles in daily life activities Setting aside time for exercise and encouraging implementation Encouraging reflection on how inactivity affects their lives Showing real events and people to illustrate how inactivity affects their lives
Preparation	Preparing an exercise plan	Self-reevaluation Coming to terms with oneself	Providing information about the benefits of physical activity and the personal risks of physical inactivity Supporting them in creating a new image for themselves, Motivating their belief in change, adapting Identifying alternatives for exercising and making plans, facilitating the involvement of other support systems Identifying areas where they can be successful and encouraging behavioural change for this purpose The physical and psychological benefits of regular exercise, discovering sports activities that interest them Setting goals, determining dates, drawing up a behaviour contract
Action	Reviewing the exercise initiation and implementation plan	Reinforcement Supportive relationships Stimulus control, Counterconditioning	Provide frequent positive reinforcement, Mobilise social support to participate in or support the process Always record exercise activities Praise success, review exercise benefits and the current programme Develop a plan to continue, maintain motivation Support confidence, identify social support
Maintenance	Reversal/ Finding a solution to prevent potential immobility	Stimulus control	Planning for triggers that could disrupt exercise, Joining support groups or finding friends who can support you while exercising Rewarding yourself meaningfully for completing regular exercise Reiterating the benefits, recommendations for staying healthy and avoiding injury Re-evaluate goals, examine success and failure, provide desired information and feedback Practise empathy and teach how to prevent relapse, Identify sources of social support

feasible and appropriate. Data from the pilot implementation were not included in the main analysis.

The educational sessions were delivered individually and face-to-face by the first author, who has formal training in motivational interviewing and clinical experience working with acute psychiatric patients. The counseling process was tailored to participants' needs, and a target date for behavior change was established. The program emphasizes the pivotal role of nurses in improving the physical health of individuals diagnosed with psychiatric disorders.

Control Group Application

Data were collected by administering all forms and scales through face-to-face interviews. A total of two interviews (over

nine weeks) were conducted for approximately one hour, in the form of questions and answers about exercise and its benefits. No individualized exercise prescription, stage-matched counseling, behavioral rehearsal, goal-setting, or monitoring tools were provided.

Ethical Responsibilities

Ethical approval was granted by the Kocaeli University Ethics Committee (approval date: 10 March 2018; reference 2018/267), and all procedures adhered to the Declaration of Helsinki. With permission from the ethics committee, the necessary approval was obtained from the Kocaeli Governorship Provincial Health Directorate for conducting the research in the relevant institution (Approval Number: 08-01-2018, 34059705-799).

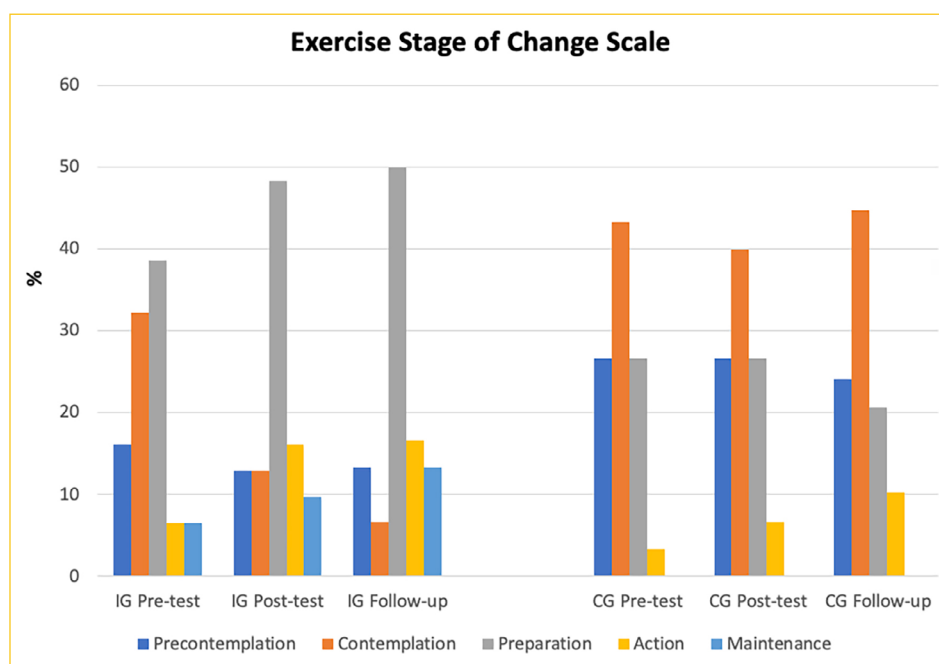


Figure 2. Exercise stage of change scale- intergroup comparison (n=61).

intervention group, more participants progressed through the preparation, action, and maintenance stages at both the posttest and follow-up (Fig. 2). These findings are consistent with Hypothesis H1.

Table 3 shows significant between-group differences in the Exercise Processes of Change Scale (EPCS) in consciousness raising (cognitive processes) and counterconditioning (behavioral processes) at all three time points (baseline, post-intervention, and follow-up; all $p < 0.05$), with consistently higher scores in the intervention group. Notably, these group differences were sustained over time.

At baseline, the groups did not differ in the remaining EPCS subscales—dramatic relief, environmental reevaluation, self-reevaluation, social liberation, helping relationships, contingency management, self-liberation, and stimulus control (all $p > 0.05$). However, at both post-intervention and follow-up assessments, the intervention group scored significantly higher than the control group across each of these domains (all $p < 0.05$).

Within-group analyses indicated that, in the intervention group, post-intervention and follow-up scores were significantly higher than baseline for consciousness raising, dramatic relief, self-reevaluation, social liberation, helping relationships, contingency management, self-liberation, and stimulus control. Environmental reevaluation increased significantly from baseline to post-intervention and remained higher at follow-up, while counterconditioning also showed significant improvements over time (Table 3). In the control group, no meaningful within-group change was observed, with the exception of helping relationships, which increased at follow-up compared with baseline. Overall, these results support Hypothesis H2.

At baseline, total Exercise Self-Efficacy Scale (ESES) scores were comparable between the intervention and control groups ($p > 0.05$). In contrast, at both post-intervention and follow-up, the intervention group exhibited significantly higher ESES scores than the control group (both $p < 0.05$; Table 4).

For the Exercise Decisional Balance Scale (EDBS), statistically significant between-group differences were observed for both Pros and Cons at all assessment points (baseline, post-intervention, and follow-up; all $p < 0.05$). Although the intervention group had lower Pros scores at baseline than the control group, it surpassed the control group at post-intervention and follow-up, while maintaining consistently lower Cons scores across all measurements (Table 4).

Within-group analyses showed no significant change over time in ESES scores in the control group (all $p > 0.05$). However, the control group demonstrated significant temporal changes in EDBS Pros and Cons (both $p < 0.05$): Pros scores were lower at follow-up than at baseline, and Cons scores at baseline and follow-up were higher than those at posttest (Table 4). In the intervention group, ESES and both EDBS subscales changed significantly over time (all $p < 0.05$): posttest and follow-up ESES and EDBS Pros scores increased relative to baseline, whereas posttest EDBS Cons scores decreased compared with baseline ($p < 0.01$). Collectively, these results support Hypothesis H2.

Discussion

The increased risk of physical health problems in individuals diagnosed with psychiatric disorders is a problem that cannot be solved by information alone; it requires structured ap-

Table 3. EPCS- cognitive and behavioral processes comparison of subgroup scores-intergroup and ingroup (n=61)

EPCS-Cognitive processes	Intervention Group (n=31)			Control Group (n=30)		
	Values	Values	p	EPCS-Behavioral Processes	Intervention Group (n=31)	Control Group (n=30)
Consciousness raising				Counterconditioning		
Pre-test (1)	8,16±2,84	6,80±2,33	Z=-2,014 p=0,044	Pre-test (1)	7,65±2,82	6,03±1,69 Z=-2,284 p=0,022
Post-test (2)	10,00±2,46	7,97±2,59	Z=-3,037 p=0,002	Post-test (2)	9,10±2,69	6,30±2,00 Z=-3,983 p=0,000
Follow-up test (3)	10,03±2,94	7,62±2,19	t=3,561 p=0,001	Follow-up test (3)	8,83±2,45	6,31±1,97 Z=-3,776 p=0,000
p	F=15,839 p=0,000 [1-2,3]	χ ² =5,442 p=0,066		P value	χ ² =9,976 p=0,007 [1-2]	χ ² =1,012 p=0,603
Dramatic relief				Helping relationships		
Pre-test (1)	9,03±2,89	9,10±2,83	t=-0,092 p=0,927	Pre-test (1)	7,90±3,11	6,40±2,67 Z=-1,957 p=0,051
Post-test (2)	11,71±3,24	8,67±2,52	Z=-3,829 p=0,000	Post-test (2)	9,90±3,07	6,83±2,70 Z=-3,934 p=0,000
Follow-up test (3)	11,37±3,24	7,93±2,02	Z=-4,509 p=0,000	Follow-up test (3)	9,67±2,97	7,55±2,72 t=-2,715 p=0,007
p	χ ² =32,019 p=0,000 [1-2,3]	χ ² =5,570 p=0,062		p	F=11,584 p=0,000 [1-2,3]	χ ² =8,458 p=0,015 [1-3]
Environmental reevaluation				Contingency management		
Pre-test (1)	9,81±2,96	8,93±2,94	t=1,156 p=0,252	Pre-test (1)	7,55±3,00	6,87±2,15 Z=-0,642 p=0,521
Post-test (2)	11,52±3,21	7,93±2,61	Z=-4,157 p=0,000	Post-test (2)	10,61±3,15	6,93±2,32 Z=-4,264 p=0,000
Follow-up test (3)	10,90±3,47	8,90±2,98	t=2,376 p=0,021	Follow-up test (3)	10,97±3,64	7,59±2,78 Z=-3,655 p=0,000
p	χ ² =13,767 p=0,001 [1-2]	F=2,301 p=0,110		p	χ ² =24,718 p=0,000 [1-2,3]	χ ² =1,838 p=0,399
Self-reevaluation				Self-liberation		
Pre-test (1)	9,32±3,05	9,03±2,54	t=0,402 p=0,689	Pre-test (1)	8,26±3,14	8,07±2,55 Z=-0,168 p=0,867
Post-test (2)	11,32±3,16	8,40±2,47	Z=-3,895 p=0,000	Post-test (2)	11,51±3,59	7,57±2,7 Z=-4,193 p=0,000
Follow-up test (3)	11,17±3,06	8,66±2,65	Z=-3,445 p=0,001	Follow-up test (3)	11,07±3,42	7,07±2,58 Z=-4,324 p=0,000
p	χ ² =23,096 p=0,000 [1-2,3]	F=0,973 p=0,384		p	χ ² =28,500 p=0,000 [1-2,3]	χ ² =3,780 p=0,151
Social liberation				Stimulus control		
Pre-test (1)	7,77±2,73	6,73±1,91	Z=-1,577 p=0,115	Pre-test (1)	7,52±3,09	6,33±1,92 Z=-1,314 p=0,189
Post-test (2)	9,84±2,65	6,90±1,71	Z=-4,303 p=0,000	Post-test (2)	9,90±2,91	6,73±2,65 Z=-3,867 p=0,000
Follow-up test (3)	9,23±2,27	7,38±2,01	Z=-3,394 p=0,001	Follow-up test (3)	10,00±2,75	6,86±2,28 Z=-4,196 p=0,000
p	χ ² =17,896 p=0,000 [1-2,3]	χ ² =2,020 p=0,364		p	χ ² =26,640 p=0,000 [1-2,3]	χ ² =2,022 p=0,364

* t: Independent Sample-t test; **Z: Mann-Whitney; *** χ²: Friedman; ****: F.Repeated Measure. EPCS: Exercise processes of change scale

proaches that support sustainable behavioral change. Therefore, demonstrating the effect of theory-based counseling interventions provided by nurses on exercise behavior is im-

portant for clinical practice. In this context, this experimental study aimed to examine the effect of psychiatric nurses' counseling role on improving exercise behavior in individuals diag-

Table 4. Comparison of 'exercise self-efficacy scale' scores and 'exercise decisional balance scale'-pros and cons subgroup scores-intergroup and ingroup (n=61)

Scales	Pre-test (1)			Post-test (2)			Follow-up test (3)			
	Intervention group (n=31)	Control Group (n=30)	p	Intervention group (n=31)	Control group (n=30)	p	Intervention Group (n=31)	Control group (n=30)	p	p
ESES	6.97±2.21	7.00±2.27	Z=-0.177 p=0.859	11.42±3.66	8.07±3.40	Z=-3.594 p=0.000	10.87±21.91	6.83±2.54	Z=-3.748 p=0.000	$\chi^2=35.188$ p=0.000 ^a (1-2.3) $\chi^2=2.966$ p=0.227
Pros (EDBS)	23.97±7.64	28.20±6.68	Z=-2.327 p=0.020	30.81±6.43	25.13±7.27	Z=-3.346 p=0.001	29.07±6.46	24.86±6.71	Z=-2.801 p=0.005	$\chi^2=39.056$ p=0.000 ^a (1-2.3) $\chi^2=10.954$ p=0.004 ^b (1-3)
Cons (EDBS)	15.16±6.21	17.50±3.25	Z=-2.211 p=0.027	12.61±5.01	15.73±4.74	Z=-2.696 p=0.007	13.07±3.89	17.66±2.09	Z=-5.030 p=0.000	$\chi^2=9.189$ p=0.010 ^a (1-2) $\chi^2=7.505$ p=0.023 ^b (2-1.3)

Z: Mann-Whitney U; χ^2 : Friedman; F: Repeated Measure; ^a: Intervention group-within-group comparisons; ^b: Control group-within-group comparisons. ESES: Exercise self-efficacy scale; EDBS: Exercise decisional balance scale.

nosed with psychiatric disorders through the TTM framework. This approach contributes significantly to the literature.

Counseling effectiveness studies on TTM-based comprehensive exercise have often been conducted for other medical conditions (diabetes, heart diseases, chronic pain, obesity, etc.). Kaplan Serin and Citlik Saritas^[14] found that three-quarters (75%) of individuals with type 2 diabetes advanced in stage following a TTM-informed exercise counseling program. Likewise, Wen et al.^[30] noted higher proportions of ostomy patients in the intervention arm reaching the action or maintenance stages compared with controls.

Consistent with evidence from non-psychiatric samples, this study found that participants in the intervention group progressed to more advanced stages of change both immediately after the intervention and at the follow-up assessment. This between-group difference may be attributable to TTM-based nursing counseling. The observed stage advancement was supported by the individualized implementation of TTM principles, whereby stage-specific goals were set and stage-matched strategies (e.g., consciousness raising, self-reevaluation, counter-conditioning, and reinforcement management) were applied to facilitate change and sustain motivation.

Similarly, Karlsson and Danielsson^[31] highlighted that setting a goal during exercise enhances its perceived meaning, noting that striving toward a goal makes the activity more purposeful. Achieving goals creates a sense of pride in patients and encourages them to explore their goals, providing a person-

alized response rather than general advice about physical activity or exercise. They note that an exercise plan design could be more effective.^[31]

Researchers have examined which theoretical determinants are most strongly associated with physical activity among individuals diagnosed with schizophrenia. Consistent with our findings, numerous studies indicate that TTM-based motivational interviewing effectively facilitates exercise engagement and progression across the stages of change.^[14,15,26,31] A period of at least six months is generally recommended for a new lifestyle behavior to become sufficiently integrated, after which the emphasis can shift toward sustaining the habit.^[31,32] The importance of long-term intervention, follow-up, and regular monitoring should be considered in our study.

Concurrently, more patients progressed into the preparation, action, and maintenance stages. While TTM-based intervention research in psychiatric cohorts remains limited, findings from other clinical groups indicate that individuals situated in higher stages (precontemplation → maintenance continuum) typically display elevated self-efficacy scores.^[19,20] In this context, rising self-efficacy is considered an expected precursor and facilitator of action.

The absence of an increase in posttest and follow-up "consciousness raising" scores (EPCS) in the intervention group suggests that healthier alternative behaviors were not sufficiently substituted for unhealthy behaviors. Our study focused solely on exercise. In studies addressing broader

health behaviors, such as healthy nutrition and smoking cessation programs, the EPCS “consciousness raising” test score may also increase.

Moreover, the control group's EDBS Pros score decreased from the pretest to the follow-up (Table 3), indicating that the determination to maintain exercise among individuals diagnosed with psychiatric disorders may decrease over time, possibly due to the 8-month gap between the pretest and follow-up assessments. To prevent this decline, shorter supportive contacts or follow-up calls are recommended. One of the most significant obstacles to the long-term adoption of positive lifestyle behaviors is the inability to sustain initial motivation. In their study of 43 overweight patients with severe psychiatric disorders, Romain et al.^[15] found that the perceived benefits of physical activity were higher among physically active participants compared with those who were inactive.

Studies indicate that utilizing motivational resources makes it easier for psychiatric patients to maintain a high level of physical activity and adapt to an exercise program.^[19,29] In our study, the high follow-up score on the EPCS “self-liberation” subscale in the intervention group indicates that participants strengthened their motivational commitment to sustaining exercise behavior (Table 3). This intervention is potentially feasible for routine CMHC practice because it relies on brief, structured, stage-matched counseling delivered by psychiatric nurses and supported by low-cost materials (stage-specific brochures and an individualized goal/monitoring chart).

The EDBS subscale scores differed between the groups from the outset (Table 4). For the intervention to be effective, it is crucial to observe that participants' EDBS Pros levels and ESES scores increased after the intervention. In contrast, the control group exhibited higher levels of perceived benefits of exercise, which persisted during the follow-up period. Similar to our study, Gorczyński and Faulkner^[33] conducted a descriptive study using the TTM with 54 patients aged 18–70 years who had severe psychiatric disorders. They found that the EDBS Pros scores for physical activity increased significantly as patients progressed toward the action and maintenance stages.

This study differs from others in that the structured counseling conducted by a psychiatric nurse is adapted to the stages of the TTM (stage-matched), providing a framework that is applicable in the CMHC context, individualized, and includes follow-up. It targets not only exercise recommendations but also TTM components such as self-efficacy, decisional balance, and processes of change. Future pragmatic studies should test simplified delivery models (group-based sessions, hybrid follow-up) and incorporate objective activity measures (accelerometry/pedometer) to support scalability and reduce self-report bias.

Limitations

This study is subject to several limitations. Participant awareness of the intervention focus may have introduced reactivity (Hawthorne effect) or social desirability bias. The pre-intervention administration of the assessment scales may have produced measurement reactivity (testing effects), potentially inflating or suppressing subsequent changes. Additionally, unmeasured temporal shifts in psychological status, physical health, or concurrent medical treatments could have acted as uncontrolled confounders. Furthermore, the control and intervention groups were registered at the same CMHC, and discussions with the control group about exercise and its benefits were conducted twice (over eight weeks), which may have increased participants' awareness. The feasibility of exercise, the length of the scales, the administration of all scales on the same day, and the possibility of participants providing socially desirable responses were also considered. Finally, exercise outcomes were assessed using self-reported instruments rather than objective measures. Therefore, this may have led to misclassification of exercise behavior and over- or underestimation of change.

A key limitation is the absence of prospective trial registration, which may reduce transparency and limit comparison with other registered trials.

Conclusion and Recommendations

This study aimed to determine the effect of the counseling role of psychiatric nurses on the development of the physical health status of individuals diagnosed with psychiatric disorders through the TTM. The results from the pretest, posttest, control groups, and repeated-measures design showed that the counseling provided by psychiatric nurses through the TTM was effective in improving participants' exercise behavior. After the counseling program, the positive feelings and thoughts of the participants about the intervention, their desire to continue the program, and the increase in their daily physical activity provide further subjective evidence of the effectiveness of the intervention.

Community Mental Health Centers (CMHCs)—regular points of follow-up and rehabilitation for individuals diagnosed with psychiatric disorders—play a pivotal role in safeguarding and promoting patients' physical health. Systematic identification of patients at CMHCs who either exhibit physical health risk or suboptimal activity levels is essential, followed by the implementation of structured, stage-appropriate interventions to encourage sustained physical activity. Given the central role of exercise in mitigating cardiometabolic risk and improving overall quality of life among individuals diagnosed with psychiatric disorders, our TTM-based intervention—incorporating individualized education and follow-up—demonstrated

that exercise routines are modifiable through a theoretically grounded, nurse-delivered framework. The feasibility observed in the Turkish context suggests potential for broader adoption both nationally and internationally, including extension to populations with other chronic medical conditions. To enable consistent translation into routine practice, the development of pragmatic nursing guidelines (covering readiness assessment, stage-matched strategies, motivational reinforcement, and follow-up scheduling) is warranted.

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