ORIGINAL RESEARCH

Predictor Scales of Cognitive Factors Affecting Physical Activity in Individuals Surviving Cancer: Psychometric Properties of Turkish Versions

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Background: Increasing physical activity in individuals surviving cancer is crucial in reducing treatment-related side effects and recurrence. Valid and reliable measurement tools are needed that will enable the factors affecting exercise to be addressed holistically and theoretically. This study aimed to adapt the Exercise Goal-Setting Scale, Exercise Planning and Scheduling Scale, Multidimensional Outcome Expectations for Exercise Scale, and Physical Activity Neighborhood Environment Scale into Turkish language and to explore psychometric properties of the Turkish versions of these scales in individuals surviving cancer. **Methods:** This methodologically designed research collected data from 153 participants at a hospital in Istanbul, Türkiye. The scales used in the study were adapted to the Turkish language through forward and backward translation and expert opinion. Content validity was assessed with a 2-week test-retest reliability, Cronbach's α reliability coefficient for stability, item-total correlation, and confirmatory factor analysis. **Results:** The scales showed good content validity (CVI = 0.95-0.99). Internal consistencies were acceptable to excellent (Cronbach's α = .79-.94), and moderate to good reproducibility estimates were observed (r = .67-.84). The MOEES factor structure also showed excellent fit. **Conclusions:** This study demonstrates that the adapted scales evaluated are valid and reliable for examining physical activity based on social cognitive processes in individuals surviving cancer in Türkiye. The scales examined in the study can be used to determine the cognitive factors affecting activity and to plan effective programs when providing physical activity counseling to individuals surviving cancer in Türkiye. **(Rehab Oncol 2024;43:10–18)** *Key words: cancer survivors, physical activity, psychometrics, social cognitive theories*

The number of people worldwide alive within 5 years of being diagnosed with cancer is estimated to be 50.6 million, while the number is approximately 581,000 for Tūrkiye.[1] All cancer treatment (chemotherapy, radiotherapy, surgery and immunotherapy) increase fatigue, anxiety, and depression and decrease muscle strength, body composition, self-esteem, happiness, and quality of life.[2] Numerous observational and interventional studies have reported that physical activity and especially exercise improve quality of life by eliminating the lasting side effects of treatment and outcomes related to cancer recurrence and mortality.[3]

Exercise, specifically refers to planned, structured physical activities aimed at improving physical fitness and overall well-being. Physical activity is an umbrella terms that encompasses all bodily movements that result in energy expenditure, including both exercise and daily activities. Both are essential components of a healthy lifestyle, with exercise being a subset of physical activity that is more focused on fitness and health outcomes.[4,5] International organizations recommend returning to regular physical activity as soon as possible after treatment and

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make specific physical activity recommendations.[6,7] Turkish Physical Activity Guidelines mention the impact of physical activity on cancer; however, there are no specific exercise guidelines for individuals surviving cancer in Turkish literature.[7]

It is necessary to know the predictors of the behavior to adhere and maintain regular physical activity. Predictors of physical activity vary widely; however, cognitive factors are more open to change than other variables.[8] Since Social Cognitive Theory (SCT) is based on cognitive processes in behavioral change, it is frequently used in studies addressing physical activity behavior.[9,10] The SCT assumes that personal, environmental, and behavioral factors play a mutual role in determining human behavior.[11]

Bandura argues that motivation alone is not enough to maintain a physical activity, as it depends on self-regulation behavior. Exercise self-regulation includes planning, organizing, and managing exercise activities.[11] The Exercise Goal-Setting Scale (EGS) and the Exercise Planning and Scheduling Scale (EPSS) are theory-based scales created by Rovniak et al[12] to measure the self-regulation dimension in SCT. These scales were used because they include questions covering goal-setting, planning, problem-solving, and self-monitoring, which Bandura regards as self-regulation skills.

One of the most important personal factors in the SCT is outcome expectancy, which refers to engagement in exercise because of the belief it will lead to desired outcomes and avoid undesirable ones.[11] Individuals surviving cancer are willing to participate in health behaviors due to fear of developing secondary cancer and recurrence after treatment. A critical step in increasing exercise is understanding exercise outcome expectations and planning interventions accordingly.[13] The Multidimensional Outcome Expectations for Exercise Scale (MOEES) is available in 5 languages for older individuals, patients with multiple sclerosis, the cardiac population, and individuals surviving cancer. Although there are other outcome expectancy scales for exercise in the literature,[13,14] MOEES is the only scale that assesses outcome expectancies in 3 dimensions based on physical, social, and self-evaluation as recommended by Bandura.[11]

The environment, a crucial predictor in physical activity studies, also acts as a socio-structural factor in SCT, facilitating or inhibiting behavior.[11,16] Even though the environmental factor is crucial, studies on physical activity for individuals surviving cancer rarely address it.[16-19] The Physical Activity Neighborhood Environment Scale (PANES) is a widely used scale in the international literature to assess the perceived environment in physical activity participation.[20]

To the authors' knowledge, there are no appropriate scales to measure these 3 dimensions of SCT in individuals surviving cancer in Türkiye. Adding these scales to the Turkish literature will provide data for future studies using SCT. In addition, this information will fill a gap in the Turkish literature involving individuals surviving cancer. However, since these scales were developed in Western societies, the validity and reliability of the scales may not be valid for the Turkish population considering social and ethnic differences. Therefore, the aim of this study was to translate and culturally adapt the EGS, EPSS, MOEES and PANES into Turkish and to investigate the psychometric properties of the Turkish version of these scales (EGS-TR, EPSS-TR, MOEES-TR, PANES-TR) individuals surviving cancer.

METHODS

Sample and Settings

The study utilized a cross-sectional design. Individuals surviving cancer visiting the outpatient clinic at a university hospital in Türkiye between June and October 2022 were invited to participate in the study. Inclusion criteria were being between 18 and 65, having had a cancer diagnosis, having a posttreatment duration of 1 month to 5 years (include surgery, radiation and chemotherapy), being able to read and write in Turkish, no evidence of recurrence, and no contraindications. The study's sample size was calculated to be 5 to 10 participants per item,[21,22] based on MOEES and PANES, which has the highest number of items (both are 15 items) among the instruments. A sample of 153 participants who met the inclusion criteria was considered suitable for this study. Ethical approval was obtained from the Ethics Committee of Istanbul Medipol University (11/01/2021/E-10840098-772.02-5581). This study was performed in line with the principles of the Declaration of Helsinki. The study complied with The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) and Consensus-Based Standards for the Selection of Measurement Instruments (COSMIN).[23] The risk of bias and the methodological quality were evaluated according to (COSMIN) 4-point scoring system (excellent, good, fair, poor) designed for the measurement properties of patient-reported outcome measures (PROMs). Quality of measurement properties including hypothesis testing/construct validity, measurement error, criterion validity, reliability and responsiveness were assessed using a rating scale of "positive," "indeterminate," and "negative" for each property.[24] A completed STROBE checklist for the trial can be found in supporting information.

Instruments

Participants Characteristics Questionnaire collected information about sociodemographic characteristics (age, gender, marital status, education, and monthly income) and cancer-related health status (diagnosis, duration, and type of treatments). Social cognitive scales that exhibited good psychometric properties in previous studies, were translated into different languages, and were considered to be one of the most appropriate instruments for use in the individuals surviving cancer were selected. These included one measure of outcome expectations, the MOEES,[25] one measure of self-regulation, which has 2

scales, the EGS and EPS,[12] and one measure of perceived environment, the PANES.[20] The scales' properties and their original psychometric testing results are shown in Table 1.

Translation and Cultural Validation

Permission was obtained from the authors for the use and translation of the scales, and some shared their instructions and suggestions regarding the same. The process to translate and adopt instruments into Turkish followed World Health Organisation guidelines[26] according to the steps as follows: (1) The English versions of the scales were translated into Turkish separately by one bilingual professional translator and one researcher with specific knowledge of the topic. (2) Two translated versions of the scales were combined (in Turkish), and the authors made the required revisions for the present study. (3) The combined scale was translated back to Turkish by one bilingual professional translator. (4) The translated scales were compared with the original scales. Both scales' items were confirmed to be very close in terms of meaning and grammar.

Content validity was accomplished by following these steps: (1) Eight experts (5 public health nurses, 2 public health specialists, and 1 physiotherapist) examined the scale regarding clearness and translation suitability. (2) The experts evaluated each item using a 4-point rating scale from 1 (not relevant or equivalent) to 4 (very relevant or equivalent) to assess the Content Validity Index (CVI). (3) After evaluating the CVI, most of the experts recommended minor modifications for PANES. These modifications were related to residential density items. Most experts recommended deleting row houses and condos as they are not part of the Turkish neighborhood structure. (4) After the expert recommendations were instituted, a pilot test with 10 participants determined that there was no problem understanding any scale items. Considering the results from the pilot study, the final Turkish version of the scales was created for psychometric testing.

Procedures

Patients admitted to the outpatient clinic were evaluated according to the sampling criteria by checking the disease data from the hospital's appointment panel. When the patients arrived for their appointments, the researcher informed them about the study, and their written consents were obtained. Data collection tools were conducted face-to-face and took an average of 30 minutes to complete. For test-retest reliability, consent was obtained from 30 patients, their phone numbers were noted. The test-retest survey which was created using Microsoft Forms (Redmond, DC) was sent via WhatsApp Messenger (Meta Inc, Santa Clara, CA) 2 weeks later. Whatsapp was preferred because it is more widely used than email among middle-aged and older adults in Türkiye. In order to ensure data security, the response time of the survey was limited to 6 hours.

Statistical Analyses

First, reverse coding of inversely worded items was conducted for psychometric testing. For each item of PANES, responses "don't know/not sure" were excluded from the data analysis. The reliability of the scales was assessed using internal consistency with item-total correlations and Cronbach's α coefficients. The criteria of item-total correlation >0.30 and Cronbach's α levels of ≥.70 were considered desirable.[26,27] The information of these participants was followed up only by the principal investigator and the data were anonymized after the retest was completed. To measure 2-week test-retest reliability, intraclass correlation coefficients (ICCs) were calculated for each score. Values for ICC range from 0.00 to 1.0, and

Table 1
Summary of the Social Cognitive Scales

Constructs	Scales	Items	Response Option	Psychometric Properties From the Original Study
Self-regulation	EGS[12]	10 items in self-regulation skills (goal-setting, self-monitoring, and problem-solving)	5 Likert scale from 1 (does not describe) to 5 (describes completely)	Cronbach's α = .89, ICC = 0.87
	EPSS[12]	10 items in self-regulation skills (scheduling and planning)		Cronbach's α = .87*, ICC = 0.89
Outcome expectation	MOEES[25] with 3 subscales	6 physical outcome expectation items 4 social outcome expectation items 5 self-evaluative outcome expectation items	5 Likert scale from 1 (strongly disagree) to 5 (strongly agree)	The physical subscale α = .82, the self-evaluative subscale α = .84 for, the social subscale α = .81
Perceived environment	PANES[20]	15 items related to housing structure, proximity to sports and recreational facilities, pedestrian and bicycle infrastructure, and traffic and crime density	4 Likert scale from 1 (strongly disagree) to 4 (strongly agree) and Don't know/Not sure item	ICC = 0.52-0.88

Abbreviations: EGS, Exercise Goal-Setting Scale; EPS, Exercise Planning and Scheduling; MOEES, Multidimensional Outcome Expectations for Exercise Scale; PANES, Physical Activity Neighborhood Environment Scale.

these values are interpreted as follows: <0.50 considered of poor reliability; 0.50 to 0.75 considered moderate reliability; 0.75 to 0.90 considered good reliability; and >0.90 considered excellent reliability.[28] Significance was accepted as P <.05 with a confidence interval calculated as 95%.

The content validity of the scales was evaluated with CVI utilizing descriptive statistics by dividing the items rated 3 or 4 by the total number of items. The minimum CVI value of 0.75 for items in the scales was required to confirm expert validity.[29] The evaluation of the MOEES factor structures was conducted through construct validity analysis, as it is composed of multiple subscales. The confirmatory factor analysis (CFA) technique was employed to examine the scale construct validity. Inter-factor correlation was measured with Pearson Correlation coefficient. To assess the CFA's goodness of fit, various indices were utilized, such as the $\chi 2$ value to the degrees of freedom ($\chi 2/df$), Comparative Fit Index (CFI), Normed Fit Index (NFI), Goodness of Fit Index (GFI), Adjusted GFI (AGFI), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation Residual (RMSEA). The model's fit to the data was determined by the ratio of $\chi 2/df$ with a value ≤3 signifying an acceptable level of adaptability. Acceptable fit was indicated by CFI <.97, GFI <.95, SRMR ≤.10, and RMSEA ≤.08. Factor loadings should be positive and exceed >.30, with higher values considered better.[20-32]

All statistical calculations were performed using SPSS 21.0 (SPSS Inc, Chicago, IL) software and AMOS 24.0. Descriptive statistics were calculated using frequency, percentage, mean, and standard deviation for demographic data.

Table 2
Sample Characteristics (N = 153)

Sample Characteristics	n	%
Gender		
Female	111	72.5
Male	42	27.5
Marital status		
Married	116	75.8
Single	13	8.5
Divorced	24	15.7
Educational level		
Literate	10	6.5
Primary school	27	17.6
Secondary school	13	8.5
High school	46	30.1
Undergraduate	53	34.6
Postgraduate	4	2.6
Working status		
Full time	55	35.9
Part time	8	5.2
Student	1	0.7
House wife	47	30.7
Retired	41	26.8
Unemployed	1	0.7
Cancer type		
Breast	76	49.7
Gynecologic	11	7.2
Gastrointestinal	24	15.7
Urologic	15	9.8
Others	27	17.6
Treatment		
Chemotherapy	138	90.2
Radiotherapy	95	62.1
Adjuvant	31	20.3
Surgery	28	18.3
	Mean	**SD**
Treatment duration (months)	18.08	16.00
Age (years)	51.97	12.19

Abbreviation: SD, standard deviation.

RESULTS

Participant Characteristics

Participant details, including demographic and disease-related information, are available in Table 2.

Exercise Goal-Setting Scale (EGS-TR)

Minor modifications in expression were made for items 5 and 6, which had 0.75 CVI value. The CVI value of the scale was 0.95, which indicated good content validity. Cronbach's α for the scale was .92. Item-total correlation ranged from .53 to .82. Item 10 (I make my exercise goals public by telling other people about them) had the lowest correlation value and item 6 (I usually keep track of my progress in meeting my goals) had the highest. The ICC of the scale was 0.90 (95% confidence interval [CI], 0.78-0.95; P <.001), which indicated good reliability (Table 3).

Exercise Planning and Scheduling Scale (EPSS-TR)

Minor modifications in expression were made for items 4 and 5, which had 0.75 CVI value. The CVI value of the scale was 0.95, which shows that the scale had good content validity. Cronbach's α for the scale was .79. Item-total correlation values ranged from .40 to .76. Item 3 (finding time for exercise is difficult for me) had the lowest correlation value and item 4 (I schedule all events in my life around my exercise routine) had the highest. The ICC of the scale was 0.92 (95% CI, 0.82-0.96; P <.001), which indicated excellent reliability (Table 3).

The Multidimensional Outcome Expectations for Exercise Scale (MOEES-TR)

Minor modifications in expression were made for item 2, which had 0.75 CVI value. The CVI value of the scale was 0.98, indicating good content validity. Cronbach's α for the whole scale was .94. Item-total correlation ranged from .58 to .86. Item 1 (Exercise will improve my ability to perform daily activities) had the lowest correlation value, and item 13 (Exercise will increase my mental alertness) had the highest. Cronbach's α for the physical

Table 3
Psychometric Analysis of the Scales

Scales	Content Validity	ICC (95%CI)	Cronbach's α	Item-Item Correlation
Exercise goal-setting scale	0.95	0.90 (0.78-0.95)[a]	.92	0.58-0.81
Exercise planning and scheduling scale	0.95	0.92 (0.82-0.96)[a]	.79	0.30-0.66
The multidimensional outcome expectations for exercise scale	0.98		.94	0.44-0.80
Physical	–	0.42 (–0.26 to 0.73)	.90	0.49-0.68
Social	–	0.95 (0.89-0.98)[a]	.93	0.72-0.84
Self-evaluative	–	0.51 (–0.05 to 0.77),	.94	0.71-0.79
Physical activity neighborhood environment scale	0.99	0.91 (0.81-0.96)[a]	.80	0.76-0.81

[a]$P < .001$.

subscale was .90. Item-total correlation ranged from .61 to .79. Item 1 (Exercise will improve my ability to perform daily activities) had the lowest correlation value, and item 5 (Exercise will strengthen my bones) had the highest. Cronbach's α for the social subscale was .93. Item-total correlation ranged from .80 to .90. Item 14 (Exercise will increase my acceptance by others) had the lowest correlation value, and item 8 (Exercise will make me more at ease with people) had the highest. Cronbach's α for the self-evaluative subscale was .94. Item-total correlation ranged from .76 to .87. Item 15 (Exercise will give me a sense of personal accomplishment) had the lowest correlation value, and item 10 (Exercise will improve my psychological state) had the highest. The ICC of the the physical subscale was 0.42 (95% CI, –0.26 to 0.73; P <.082), which indicated poor reliability. The ICC of the the social subscale was 0.95 (95% CI, 0.89-0.98; P <.001), which indicated excellent reliability. The ICC of the the self-evaluative subscale was 0.51 (95% CI, –0.05 to 0.77; P <.033), which indicated moderate reliability (Table 3).

The construct validity of the original 3 sub-factor structure of the MOEES was assessed using CFA. The results of the analysis were $\chi 2/df$ = 2.292, SRMR = .054, GFI = .845, AGFI = .787, NFI = .91, CFI = .947, RMSEA = .092. The inter-factor correlations were significant (P <.001) and ranged from moderate to large (physical–self-evaluative, r = .85; physical-social, r = .47; self-evaluative–social, r = .78). Factor loadings of the items ranged from 0.64 to 0.97 (P < .001) (Figure).

Physical Activity Neighborhood Environment Scale (PANES-TR)

Minor modifications in expression were made for item 15, which had 0.75 CVI value. The CVI was 0.99, indicating that the scale had good content validity. Cronbach's α for the scale was .80. Item-total correlation ranged from .76 to .81. Item 5 (There are facilities to bicycle in or near my neighborhood, such as special lanes, separate paths or trails, shared use paths for cycles and pedestrians) had the lowest correlation value, and item 12 (There are many 4-way intersections in my neighborhood) had the highest. The ICC of the the scale was 0.91 (95% CI, 0.81-0.96; P <.001), which indicated excellent reliability (Table 3).

DISCUSSION

Improving physical activity behavior in individuals surviving cancer reduces the risk of recurrence and side effects of treatments and improves survival and quality of life. SCT is an important theory in examining cognitive factors that affect physical activity behavior.[33] Therefore, valid and reliable Turkish social cognitive scales are needed to monitor, evaluate, and improve physical activity behavior. This study's EGS-TR, EPSS-TR, MOEES-TR, and PANES-TR scales were proven valid and reliable in individuals surviving cancer in Türkiye. This study is the first cross-cultural adaptation of the selected social cognitive scales for the Turkish individuals surviving cancer.

EGSS-TR, had good content validity (CVI = 0.95). It had high internal consistency (α = .92), and test-retest reliability (ICC = 0.90) similar to the original language.[12] The Turkish version of the scale had higher internal consistency than the Korean (α = .89) and Thai (α = .89) versions. However, the test-retest reliability of the Turkish version was lower than that of the Indonesian (ICC = 0.85), Korean (r = .88) and Thai (r = .87) versions.[34-36] The Korean version of the scale was similarly studied in individuals surviving breast cancer.

EPSS-TR had good content validity (CVI = 0.95). The scale had good internal consistency (α = .79), and test-retest reliability (ICC = 0.92) similar to the original language.[12] In the Thai version of the scale, internal consistency analyses were conducted with 2 factors: negative (α = .72) and positive (α = .82). The test-retest reliability of the Turkish version of the scale was found to be higher than Indonesian (ICC = 0.77) and the Thai (r = .89) versions.[34,35] In a study conducted with middle-aged and older adults in Indonesia, the scales had high internal consistency (EGS α = .93 and EPS α = .83).[35]

MOEES-TR had good content validity (CVI = 0.98). Regarding the tool's test-retest reliability, physical subscale had poor reliability (ICC = 0.42), self-evaluation subscale had moderate reliability (ICC = 0.51), and social

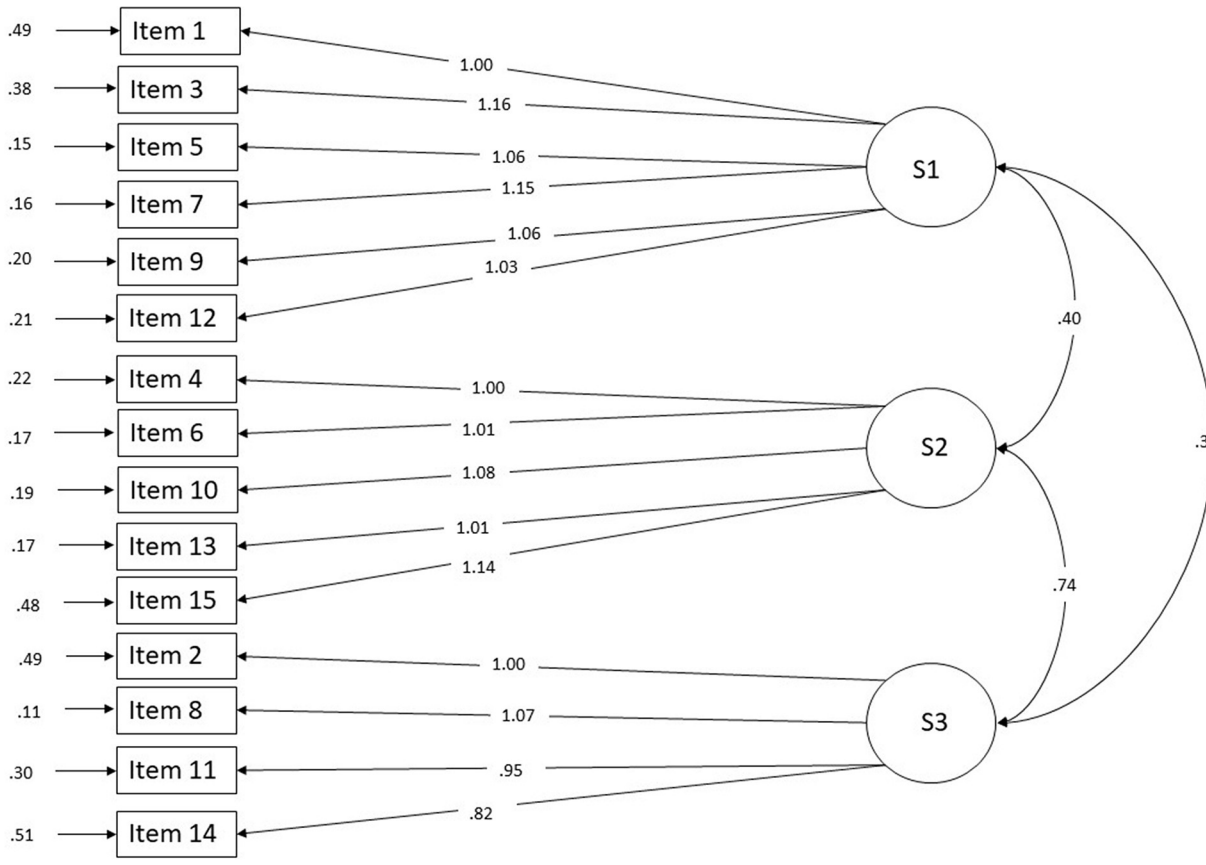

Fig. CFA of the Multidimensional Outcome Expectations for Exercise Scale (MOEES-TR). χ^2/df = 2.292, RMR = .054, GFI = .845, AGFI = .787, NFI = .91, CFI = .947, RMSEA = .092. CFA: Confirmatory Factor Analysis, S1: Physical Outcome Expectation subscale, S2: Self-Evaluative Outcome Expectation subscale, S3: Social Outcome Expectation subscale, RMR: root mean square residual; GFI: goodness of fit index; AGFI: Adjusted GFI; NFI: normal fit index; CFI: comparative fit index; RMSEA: root mean.

subscale had excellent reliablity (ICC = 0.95). The test-retest reliability of the MOEES was investigated in the Indonesian and Swedish versions, the highest reliability was found in the social subscale.[35,37] Similar to current study, the physical subscale has poor reliability in the Swedish version.[35] The scale had high internal consistency with its subscales (total scale Cronbach's α = .94, physical subscale = .90, social subscale = .93, and self-evaluative subscale = .94). The current study has the highest level of internal consistency compared to other studies[35-39] in which psychometric tests of the scale were conducted. In this study, CFA was used for the construct validity of the MOESS-TR and showed excellent fit. The Swedish version of the scale, in a study conducted with a cardiac population, had poor fit, and items 5 and 15 had low factor loadings (<.5).[37] In a study on Continuing-Care Retirement Communities in the USA,[38] the scale showed poor fit, with low factor loadings for items 6, 9, and 11 (<.5). Similarly, a study conducted with middle-aged and older adults in Indonesia also showed poor fit.[35] These results may be due to cultural factors, older age, and a sample with a high burden of chronic diseases. The present study showed an excellent fit with all items, in line with the original research[25] and a study in people with MS.[39] Thus, the scale was evaluated for the first time in a population of individuals surviving cancer and found to be appropriate for use.

Although exercise improves the long-term side effects of cancer treatment and the quality of life, studies have shown that individuals surviving cancer lack this awareness.[13,14] Identifying individuals surviving cancer' beliefs in exercise outcome expectancies provides the basis for understanding how to increase exercise for this population. Outcome expectancies are highly influential in predicting health behaviors and are key in many behavioral theories, including SCT.[11,12] The literature includes other outcome expectancy scales for exercise, but most are unidimensional and do not consider the theoretical and conceptual distinction between different outcome expectancies.[15,40] As the MOESS is the only scale that addresses the 3 dimensions of outcome expectations (physical, social, and self-evaluative) in Bandura's SCT with separate subscales, it was deemed necessary to translate it into Turkish.

PANES-TR had good content validity (CVI = 0.99). Items were not omitted from the original scale to enable cross-country comparisons. In the scale adaptation study, revisions were made to item 1 according to the housing

types in Turkish society. In item 1, the term "townhouse" was removed as it is not seen in Turkish society. In Turkish society, housing types "condo" and "apartment" are the same; thus, "condo" was removed from the items. The test-retest reliability of the scale was excellent (ICC = 0.91), similar to other studies. ICC in the original research was between 0.52 and 0.88.[20] The ICC ranged from 0.64 to 0.84 in samples from neighborhoods varying in walkability in different states in the USA.[41] Items had similarly high reliability in the Swedish (ICCs ranged from 0.36 to 0.98) and Nigerian (ICCs ranged from 0.62 to 1.00) versions of the scale.[41,42] The scale had good internal consistency (Cronbach's $\alpha = .80$). Item 5 had the lowest item-total correlation, possibly due to the differences in the regulation of bicycle lanes between regions. Item 12 of the item-total correlation scale related to street connectivity had the highest correlation value. In this respect, the current study is similar to those conducted in the USA[43] and Australia,[44] revealing street connectivity as an important feature of neighborhood walkability. The current study did not examine the scale's construct validity across settlements with different environmental characteristics; therefore, researchers may need to explore this aspect in future studies.

The strength of this study is that it used a process of cultural adaptation of scales commonly utilized to examine physical activity behavior in the context of SCT. Studies on the physical activity behavior of individuals surviving cancer in Türkiye are quite limited. Psychometric measurements of these scales in individuals surviving cancer in Türkiye will pioneer physical activity studies conducted with this cohort. Most of the physical activity interventions used with individuals surviving cancer include a self-regulation component[8,45]; however, there are no reliable and valid measurements of scales that examine the self-regulation skills of goal-setting, planning, problem-solving, and self-monitoring, defined by Bandura, published in Turkish. EGS-TR and EPSS-TR can be used to examine self-regulation skills in this population. In this study, MOEES and PANES were psychometrically tested for the first time in a population of individuals surviving cancer and found to be appropriate for use in the Turkish population.

Limitations

This study was conducted with individuals surviving cancer aged 18 to 65 years, living in a big city, and admitted to a single center; therefore, generalization to the Turkish population as a whole is limited. The overrepresentation of individuals with breast cancer in the sample leading to gender imbalance and limitations in the study. The study was conducted in one of the metropolitan cities of Türkiye. Accordingly, this is a limitation for the reliability of the PANES-TR scale because the level of urbanization affects the level of walkability as it will change the planning of the region. For future adaptation studies of PANES, culturally appropriate items can be adapted. The east of Türkiye is less developed in terms of urbanization than the west. As in the Nigerian version of the scale, regional differences can be addressed, and aesthetic factors that affect walkability, such as stray animals and garbage, can be used in new adaptation studies. One other study limitation is that only 30 of the 153 participants had test-retest reliability analysis performed.

CONCLUSIONS

Despite the increase in the individuals surviving cancer in Türkiye, there is a huge gap in rehabilitation programs. Regular physical activity and exercise can be used as an intervention in cancer rehabilitation to improve the health and well-being of the patient. Although there are many exercise guidelines for the individuals surviving cancer, the lack of physical activity behavior indicates the need for individualized interventions. Therefore, evidence-based and individualized interventions are needed to achieve behavioral change in physical activity. Health professionals working in cancer rehabilitation need to know the individual better, examine the predictors of behavior and develop interventions accordingly. The adapted scales are cognitive questionnaires that will be used to monitor, assess and improve physical activity behavior. Health professionals working in cancer rehabilitation in Türkiye can use EGS-TR and EPS-TR to identify the patient's exercise goals, plan and schedule. MOEES-TR can be used to assess what the patient expects from exercise and PANES-TR can be used to assess the impact of perception of the environment on physical activity behavior. The adapted scales will be useful for health professionals working in cancer rehabilitation in Türkiye to increase adherence and sustainability of exercise intervention.

STUDY DETAILS

Author Contributions

Role	Author
Conceptualization	SK, MNE
Data collection and analysis	SK
Methodology	SK, MNE
Writing - original draft	SK
Writing - review & editing	SK, MNE

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Ethical Approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Istanbul Medipol University (11/01/2021/E-10840098-772.02-5581).

Consent to Participate

Informed consent was obtained from all individual participants included in the study.

Data sharing statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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