



Development of the Protection Against Osteoporotic Fractures Scale

Osteoporotik Kırıktan Korunma Ölçeği'nin Geliştirilmesi

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Abstract

Objective: Osteoporosis is a bone disease that increases the risk of fractures. One out of every two women and one out of every five men are at risk for osteoporosis-related fractures during their lifetime. Bone loss can be prevented by taking precautions in every phase of life. To avoid the serious consequences of osteoporosis, healthy behaviours should be supported using theories of health behaviour as a framework. This study aimed to develop protection against osteoporotic fractures (PROF) scale and to test its validity and reliability.

Materials and Methods: This study was conducted among >55-year-old female outpatients who were admitted to the orthopaedic clinics of Zonguldak Atatürk Public Hospital. Test-retest was applied via face-to-face interviews. The sample size was calculated to be 10 times the number of scale items, resulting in a sample of 400 participants. The theory of planned behaviour provided the theoretical framework for the PROF scale development. Four strategies have been selected for PROF: (1) Bone mineral density measurement, (2) adherence to treatment, (3) physical exercise and (4) regulations to prevent falls at home.

Results: Factor and matrix correlations of the scale ranged from 0.68 to 0.130. Test-retest reliability of the whole scale was 0.95. Cronbach's α value was found to be 0.95. A strong and statistically significant positive correlation was noted between attitudes and subjective norms pertaining to PROF ($r=0.520$; 0.525 ; $p=0.01$, respectively). A moderate and statistically significant positive correlation was noted between intention and behaviour control ($r=0.462$; $p=0.01$).

Conclusion: The PROF scale was found to be highly valid and reliable. It can be a part of the public health model aimed at preventing osteoporotic fractures.

Keywords: Osteoporosis, osteoporotic fracture, theory of planned behaviour, scale development, reliability

Öz

Amaç: Osteoporoz kırık oluşma olasılığının arttığı bir kemik hastalığıdır. Her iki kadından biri, her beş erkekten biri hayatlarının bir döneminde osteoporoz ile ilgili kırık riski altındadır. Her dönemde önlemler alarak kemik kaybı önlenir. Osteoporozun ciddi sonuçlarından korunmak için sağlık davranış teorileri ile sağlık davranış desteklenmesi gerekir. Bu çalışmada amaç osteoporotik kırıkta korunma (PROF) ölçeğini geliştirmek, geçerlilik ve güvenilirliği göstermektir.

Gereç ve Yöntem: Çalışma Zonguldak Atatürk Devlet Hastanesi'nin Ortopedi Polikliniği'ne ayaktan başvuran 55 yaş üstündeki kadınlarda yürütülmüştür. Yüz yüze görüşme tekniği kullanılarak test re-test yapılmıştır. Örneklem seçilmeden, örneklem sayısı madde sayısının on katı olarak 400 hesaplanmıştır. Planlı davranış teorisi model olarak alınmıştır. Niyet ve davranış bağımlı değişkenlerdir. Tutum, öznel norm ve davranış kontrolü bağımsız değişkenlerdir. PROF'de dört strateji: 1) Kemik mineral yoğunluğu ölçümü, 2) tedaviye uyum, 3) fiziksel egzersiz ve 4) evde düşmeyi önleyecek düzenlemeler seçilmiştir.

Bulgular: PROF niyeti ile tutum ve öznel norm arasında istatistiksel olarak pozitif yönde, güçlü ve anlamlı bir ilişki vardır (sırasıyla $r=0,520$; $0,525$; $p=0,01$). Davranış kontrolü ile niyet arasında istatistiksel olarak pozitif yönde, orta güçte ve anlamlı bir ilişki vardır ($r=0,462$; $p=0,01$). Güvenirlilik Cronbach α değeri 0,95'dir.

Sonuç: PROF için geliştirilen ölçek yüksek güvenilirlik ve geçerliliğe sahiptir. Osteoporotik kırıklarla mücadelede halk sağlığı modellerinin bir parçası olabilir.

Anahtar kelimeler: Osteoporoz, osteoporotik kırık, planlı davranış teorisi, ölçek geliştirme, güvenilirlik

Introduction

Osteoporosis (OP) is the most common bone disease. OP is a skeletal system disease with increased risk for fractures and is characterized by reduced bone mineral density (BMD) and deteriorations in the bone tissue microstructure. According to the 2004 report of the World Health Organization, more than 200 million people suffer from OP and approximately 40% of affected people consist of females and people older than 50 years of age. Optimal power-flows (OPF) constitute approximately 1% of disability-adjusted life years pertaining to chronic diseases (1).

There are various risk factors for OP due to its multifactorial nature. Behaviors such as healthy nutrition, adequate physical activity, sensible medicine use, smoking cessation, and avoiding excessive alcohol consumption are important for protection against OP (2). Behaviors which promote bone development including sufficient calcium intake and regular weightlifting may decrease the risk for OP (2,3). Despite the well-documented benefits of exercise, aging women keep pursuing a sedentary lifestyle (4). Health education is a powerful instrument in terms of protection against OP and its consequences. Health behavior and lifestyle changes can be complex (5).

The theory of planned behavior (TPB) proposes a model which can measure how human behavior is shaped. The TPB investigates beliefs and attitudes that underlie health behaviors. According to this model, intention predicts the formation of a deliberate behavior (6).

TPB is determined by three conceptually independent constructs: attitudes towards a behavior, subjective norms, and behavior control. These three behaviors determine attitudes towards a behavior (7,8). Subjective norms are based upon the belief that reference person or groups approve the behavior (9). TPB is a health promotion theory for optimizing OPF. There wasn't any study which to promote positive health behaviors about OPF which was based on the TPB.

The aim of this study was to develop the protection against osteoporotic fractures (PROF) scale based on the TPB model.

Materials and Methods

In this study, based on the TPB model, a measure for protection against osteoporotic fractures in postmenopausal women was developed.

The current study was carried out at the Zonguldak Atatürk Public Hospital Orthopedic Clinics, which is located in the city of Zonguldak. The annual number of outpatients admitted to these clinics is 66,256. Universe of the study consisted of postmenopausal women aged above 55 years who admitted to the Zonguldak Atatürk Public Hospital Orthopedic Clinics. The study sample included postmenopausal women aged above 55 years who were outpatients and who were willing to participate in the study. Each patient was informed about the study and written consent was taken from the patients.

Sample size was determined by multiplying the number of items

(40 items) by 10, resulting in a sample size of 400 participants (10,11). The study was conducted with 400 outpatients who admitted to the hospital from May, 21st to September, 10th of the year 2015.

Inclusion criteria: Being a postmenopausal women aged 55 years and above, not undergoing major surgery during the last 2 months, not having an amputation.

Limitations: The sample does not represent all postmenopausal patients since it consisted of volunteering outpatients admitted to an orthopedic clinic. The follow-up period was 6 months and may not be of adequate length in terms of observing the consequences of behavior in the long run.

Definitions and Criteria Related to PROF Scale Variables

The PROF scale was developed according to the TPB. The variables "Attitude", "Subjective Norm", and "Perceived Behavior Control", which affect "Intention", the core of the model, were primary variables. Secondary variables/determinants of the model were beliefs measured through "Behavioral Beliefs", "Normative Beliefs", and "Control Beliefs". Notably, the role of past behavior, in addition to accounting for the influence of habitual behavior in intention and behavior, are evident in earlier studies (6). Therefore, it was decided that the past behavior should be included in the PROF scale.

In the study, 5-point Likert type response categories ranged from "I absolutely disagree" (1) to "I totally agree" (5). Since only the control beliefs difficulties part were negatively worded, the 5-point Likert type responses ranged from "I absolutely disagree" to "I totally agree" (1,5).

The scale was prepared based on the TPB model, which is one of the health promotion models for developing target behaviors (7,9). In the PROF scale, four target activities aimed at protecting women against OPF's included maintaining a calcium-rich diet-sunbathing, use of OP medication when necessary, daily physical activity-programmed exercises, and new house arrangements to prevent falls. Each activity was adapted to the TPB model. For each strategic precaution, the TPB was used to create a pool of 98 items. Forty items were selected from the item pool for draft of PROF scale. Higher scores indicated higher levels of protection, while lower scores indicated insufficient protection. For a standard TPB based study, a draft scale was formed by 5 experts. According to the opinions of the experts, the items that were stated to be problematic were corrected in line with the recommendations and 98 items were subtracted and a draft scale consisting of 40 items was created. Thus, content validity was established. Reliability was tested using the test-retest method, where the scale was readministered after a two week interval.

Ethical approval was obtained from the Bülent Ecevit University Faculty of Medicine Clinical Research Ethics Committee (protocol no: 2015-18-20/05). Administrative permission to conduct the study was obtained from the Zonguldak Public Hospital (document numbered 79914002/900 and record

numbered 7201). Two interviews and a test-retest application were conducted with each volunteering patient via the face-to-face interview method. Data was collected from 400 patients using the sociodemographic data form and the PROF scale. Participants answered the PROF scale by selecting one of the 5-point Likert type response categories (12). Also a questionnaire which contained a 12-item information form questioning sociodemographic and OPF's related characteristics was used.

Statistical Analysis

Statistical analysis of the study was conducted using the SPSS 19.0. Data was tested for normality using the Shapiro-Wilk test. The Mann-Whitney U test was applied to non-normally distributed variables in 2 group comparisons, while the Kruskal-Wallis test was used for 3 group comparisons. Spearman correlation analysis was used to examine the relationship between the variables. Factor analysis was used to determine the subscales of the scale. Cronbach alpha (α) internal consistency coefficient was calculated in evaluating the reliability of the scale. Level of statistical significance was set at $p < 0.05$.

Reliability Analyses

Two different methods of reliability, namely internal consistency and time validity, were used of assessing the reliability of the draft of PROF scale which includes 40 items. In order to evaluate reliability, α internal consistency coefficient was first calculated. α is an appropriate internal consistency method when response categories range from 1 to 5 (13). α internal consistency coefficient is calculated by dividing the total item variance to the general variance. This coefficient may range from 0 to 1. A value over 0.70 indicates high levels of reliability (14). The test-retest technique, which evaluates invariance of test scores over time, was used by examining the correlation between pre- and post-test results. For establishing content validity, the content of the scale was logically evaluated by four experts. In order to be able to discover and reveal the dimensions of the scale, a principal components analysis (PCA), which is one of the exploratory factor analysis (EFA) methods, was carried out. To determine the factor structure of the scale, a principal component analysis with varimax rotation, which is a linear rotation technique, was conducted. In factor analysis, factor loadings of 0.60 and above was considered as high, while 0.30-0.59 was considered as moderate loading, regardless of plus and minus signs (14). In the current study, a total of 22 items with rotated factor loadings above 0.30 were included in the factorial construct.

In order to be able to discover and reveal the dimensions of the scale that are required in the scale development process. Confirmatory factor analysis (CFA) procedures were conducted, and all analyses were carried out using the AMOS Version 4.1 software. Data were analyzed in five stages: (1) we conducted EFA with half of the sample using maximum likelihood extraction with oblique rotation using structural equation modeling statistics package AMOS 6.0 (2). We confirmed the fit of the generated factor structure in the second half of the sample by conducting CFA (3).

Extraction and rotation; to determine the factor structure of the scale, principal component analysis was performed with orthogonal (Varimax) rotation, which is a linear rotation technique (11,12). In this study, 22 items with a factor load of 0.30 after rotation were included in the factor structure. Thus, 18 items from the load of 0.29 were removed from the draft scale.

Results

The mean age of the 400 patients was 62.7 ± 7.17 . Patients were at the least 55 years old and at the most 86 years old. It was found that 68.5% were married, 31.5% were single, and 10.3% live alone. Among the participants, 79.1% were housewives, 9.3% were retired, 6.8% were in paid employment, and 4.8% reported to be unable to work. Of the women, 43.5% were illiterate, 11.3% were literate, 30.2% were elementary school graduates, 8.5% were high school graduates, and 6.5% were university graduates.

It was found that 80.8% of women were active at home or outside on a daily life (house chores, gardening, shopping).

Among the participants, 35.8% stated that they never fell, 45.5% said they had fallen but did not have bone fractures, 16.3% had a fracture, and 2.5% had multiple fractures. For BMD measurements, bone scan was "never done" in 37.0% of the participants, was done at least once in 63.0%, and was frequently and/or completely done in 9.6%. It was found that 44.8% of the patients never adhered to doctors' medical advice and nutrition recommendations, 32.3% reported to minimally adhere, and 10.8% reported to completely adhere. Among the participants, 63.5% of patients did not regularly engage in physical exercise in the last year, 20.4% rarely exercised, and 6.9% frequently exercised. Of the participants, 63.3% said that they did not make any arrangements in their houses to prevent falling, 19.2% did minimal arrangements, and 5.8% did considerable arrangements.

TPB variables and retest reliability of the PROF scale test were given in Table 1. The PROF scale had a α coefficient of 0.95, while the α coefficients of the variables ranged from 0.70 to 0.89. Test-retest reliability of the entire scale was 0.95 ($p < 0.01$) and the test-retest reliability of the variables were 0.72-0.90.

Suitability of data for factor analysis was examined using the KMO value, which was found to be 0.90 (excellent). The Bartlett Sphericity value was $p = 0.001$ and below 0.10. These two values indicate that factor analysis can be conducted.

To test construct validity, an exploratory analysis, the PCA, was initially used. Items with factor loadings above 0.30 were determined and the PROF scale was reduced to 22 items. A varimax rotation was conducted, resulting in 6 factors with Eigenvalues above 1. Factor 1 accounted for 36.44% of the total variance, factor 2 accounted for 8.49%, factor 3 accounted for 7.15%, factor 4 accounted for 4.85%, factor 5 accounted for 4.22%, and factor 6 accounted for 3.87%. In the study, total variance was found to be 65.0%. The 28-item factor structure

and total variance of the PROF scale was provided in Table 2. Table 2 shows the matrix structure of the PROF scale. The items grouped under 6 factors. Sixteen items were removed from the scale.

Factor matrix structure of the sub scales of the PROF scale were given in Table 3 and 4.

Correlations between variables fromed in accordance with the TPB model were shown in Table 4.

A final confirmatory model was proposed that had structure with the six factors being nested within structure of PROF scale. This model also passed the fit criteria, and the results are given at the bottom of Table 5.

CFA model goodness fit indexes of PROF scale with 22 items were very high Table 5.

Relative chi-square index (CMIN/DF) value was found to be 3.41. This value is considered sufficient for the model to be accepted. The adjusted goodness-of-fit index value of 0.834, the goodness-of-fit index (GFI) value of 0.870, the comparative fit index (CFI) value of 0.900. Approximation of the GFI and CFI values to 1 indicates increased compliance. Root mean square of the residuals of 0.078 indicates that the goodness of fit is high. Based on the post-deposition treatment (PDT), the initial 40-item model CFA. According to their calculations, the model was not considered acceptable when looking at the goodness of fit indexes. PROF scale CFA model fit goodness indices The DFA model goodness of fit index of the 22-item. A final confirmatory model was proposed which had the structure of the six factors being nested within the structure of PROF scale. The model also passed the fit criteria, and the results were given at the bottom of Table 5.

In Figure 1 CFA standardized regression coefficients and factor correlation values were seen. There were positive strong correlation with F1 and four factors F2 ($r=0.532$), F4 ($r=0.707$),

F5 ($r=0.803$) and F6 ($r=0.614$). There were positive strong correlation with F2 and two factors F5 ($r=0.571$) and F6 ($r=0.614$). Also F4 and F5 were positive strong correlated ($r=0.614$).

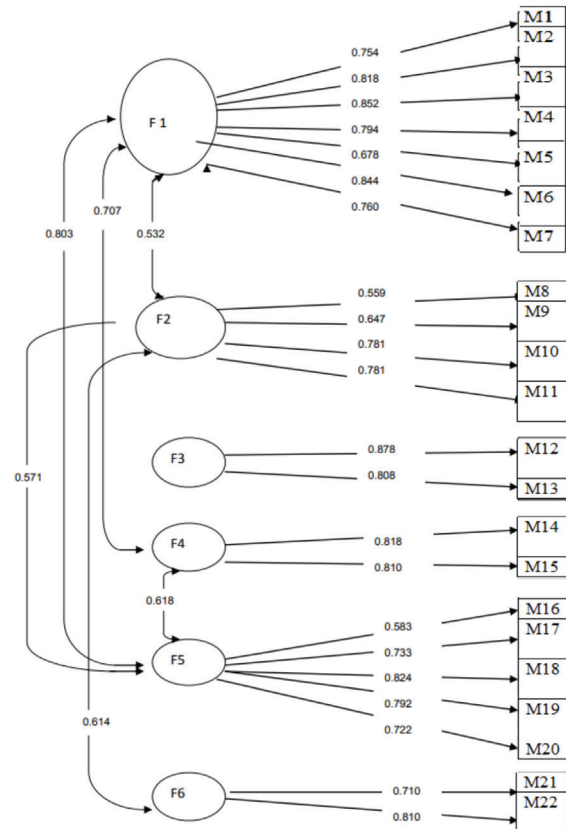


Figure 1. First-level exploratory factor analysis with standardized results

Table 1. Theory of planned behavior variables of protection against osteoporotic fractures scale test and re-test reliability

Factors	Items	Test Cr α	Re-test Cr α
1- Behavioral beliefs (items: 1-7)	7	0.82	0.83
2- Intention (items: 8-11)	4	0.70	0.76
3- Past behavior (items: 12-13)	2	0.73	0.72
4- Subjectif norm (items: 14-15)	2	0.84	0.85
5- Perceived behavioral control (items: 16-20)	5	0.86	0.85
6- Attitude (items: 21-22)	2	0.71	0.72
Total	22	0.95	0.95

Table 2. The factor variance and total variance of the protection against osteoporotic fractures scale

Factor	Eigenvalue	Variance total	Variance	Number of items
1	10.20	36.44	36.44	7
2	2.37	8.49	44.93	4
3	2.00	7.15	52.09	2
4	1.36	4.85	56.95	2
5	1.82	4.22	61.17	5
6	1.08	3.87	65.4	2

Table 3. Factor matrix structure of the sub scales (F1-3) of the protection against osteoporotic fractures scale

Items	English version of PROF items	r
Behavioral beliefs (F1)		
1	If I know about the proper physical exercises I can do, it will be easier for me to do physical exercise.	0.778
2	If you exercise physically, you will be protected from bone fractures, and you will live longer without being dependent on anyone.	0.743
3	If I have knowledge about anti-dumping domestic regulations, it will be easier to take measures.	0.657
4	It will be easier for me to follow the recommendation if I know about the medical treatment or supplemental support recommended by the doctor.	0.645
5	If I apply the medical treatment recommendations that my doctor recommends, I should be protected from bones and fractures.	0.636
6	Physical exercise is difficult for me.	0.613
7	It is difficult for me to arrange it in the house to prevent falling.	0.545
Intention (F2)		
8	I intend to measure BMD at certain intervals.	0.694
9	I intend to comply with the medical treatment or supplementary advice suggested by my doctor to protect from bone erosion.	0.678
10	I intend to make an arrangement to prevent my home from falling within a year.	0.678
11	I want to make arrangements in the house to prevent falling.	0.653
Past behavior (F3)		
12	I have done BMD measurements at certain intervals until now.	0.887
13	I applied the medical treatment or supplementary advice suggested by the doctor to protect from bone marrow.	0.904

BMD: Bone mineral density, PROF: Protection against osteoporotic fractures

Table 4. Factor matrix structure of the some sub scales (F4-6) of the protection against osteoporotic fractures scale

Items	English version of PROF items	r
Subjectif norm (F4)		
14	My family and friends are welcomed to exercise physical exercise in order to avoid bone loss.	0.600
15	My family and my friends hopes to make a new arrangement in the house to prevent the fall.	0.599
Perceived behavioral control (F5)		
16	I want to do proper physical exercise.	0.694
17	It is necessary to make a new arrangement in the house to prevent falling.	0.678
18	I have the ability to make arrangements inside the house to prevent falling.	0.678
19	I have a BMD measure.	0.653
20	There is a medical practitioner's advice on medical treatment or supplementary advice.	0.636
Attitude (F6)		
21	It is necessary to carry out BMD measurements at certain intervals.	0.744
22	It is necessary to follow the ecommendations of the doctor for medical treatment or supplementary support.	0.778

BMD: Bone mineral density, PROF: Protection against osteoporotic fractures

Discussion

The Centers for Disease Control determined people who needed screening. Screening is recommended for Caucasian women aged 65 years or above without any additional risk factors, while it is recommended for younger women who are at risk for OP

and fractures (15). Since there are no scales on protection against fractures based on the TPB model, an EFA was undertaken in the current study in order to explore an empirical construct (15,16). According to the results of the factor analysis, which was conducted in order to test the construct validity of the PROF scale, 28 items with factor loadings ranging from 0.39 to 0.77

Table 5. Confirmatory factor analysis model goodness fit indexes of protection against osteoporotic fractures scale with 22 items

CFA model goodness fit indexes of PROF-scale with 22 items							
χ^2	DF	p	CMIN/DF	AGFI	GFI	CFI	RMSEA
734,334	215	0.001	3.416	0.834	0.870	0.900	0.078
CFA model goodness fit indexes of PROF-scale with 40 items							
2894.065	568	0.001	5.095	0.614	0.671	0.763	0.101
CFA: Confirmatory factor analysis, DF: Degree of freedom, CMIN/DF: Relative chi-square index, AGFI: Adjusted goodness-of-fit index, GFI: Goodness-of-fit index, CFI: Comparative fit index, RMSEA: Root mean square of the residuals, PROF: Protection against osteoporotic fractures							

were grouped under 6 factors. The 6 factors explained 65% of the total variance. Measurements taken from the same patients were found to be highly reliable. The Cr α coefficient of the entire scale was 0.95 and ranged from 0.70 to 0.89 for the subscales. The factor and matrix correlations of the scale varied from 0.68 to 0.130. Test-retest reliability of the entire scale was 0.95 and varied from 0.72 to 0.90 for the subscales. Accordingly, it was demonstrated that the PROF scale was valid and reliable. There was a strong and positive correlation between women's intentions to protect against OPF's and subjective norms. Women who had positive attitudes towards BMD measurement and medicine use (93% and 85%, respectively) had higher intention scores. Women who had positive attitudes towards physical exercise and making arrangements to prevent falling (73% and 70%, respectively) had lower intention scores. High rates of BMD measurement and medicine use (75% and 65%, respectively) in women who perceived the effect of subjective norm values on intention as social pressure from the family indicated that family is a positive element for social pressure. There was a positive and moderate correlation between intention and perceived behavioral control. Perceived behavior control was evaluated in terms of opportunities and possibilities. Accordingly, 88% of the participants had the opportunity to have a BMD measurement, 84% had the opportunity to apply medical treatment and recommendations, 61% had the opportunity to engage in physical exercise, and 57% had the opportunity to make house arrangements to prevent falls. There was a strong and positive relationship between perceived behavior control and control beliefs. Behavior control was evaluated in terms of opportunities and possibilities. Accordingly, 88% of the participants had the opportunity to have a BMD measurement, 84% had the opportunity to apply medical treatment and recommendations, 61% had the opportunity to engage in physical exercise, and 57% had the opportunity to make house arrangements to prevent falls.

There was a strong and positive relationship between subjective norms and normative beliefs. In normative belief evaluation, it was thought that families would positively respond to BMD measurements and adherence to medicines and medical recommendations (90% and 77%, respectively) and physical exercise and house arrangements (70% and 65%, respectively). The women reported to be willing to have a BMD measurement (92%), to adhere to medicines and medical recommendations

(85%), to engage in appropriate physical exercise (60%), and to make house arrangements to prevent falling (50%).

A moderate and positive relationship was found between attitudes and behavioral beliefs. In terms of behavioral beliefs, 90% of the women believed that they can discover whether they have OP or not if they had a BMD measurement, 75% believed that they can protect themselves against OP and OPF's if they adhere to medical treatment and recommendations, 73% believed that they can protect themselves against OP and OPF's and live independently for a long time if they engaged in appropriate physical exercise, and 73% believed that they can decrease the risk for OPF's if they make house arrangements to prevent falls. In order to increase the rate of physical exercise in this population, public health interventions regarding exercise beliefs may prove to be beneficial.

The concepts of PDT were beneficial in terms of understanding commitment to exercise programs or participation in leisure time physical activity (12). In studies which underlined the importance of exercise habits in term of predicting exercise behavior, personal beliefs which were affected by affective interests and social importance predicted intentions. Perceiving regular exercise as a difficult thing and taking or not taking personal responsibility regarding exercise depend upon beliefs (17). It is important to protect the spine by engaging in appropriate daily exercises (18). The belief that falls can be prevented should be supported.

Study Limitations

This study was conducted with female outpatients who were above 55 years of age and who admitted to the orthopedic clinics of Zonguldak Atatürk Public Hospital and cannot be generalized to all female outpatients.

Conclusion

Four out of every five women are active at home or outside, while one is not. Of the women, 65% fell at least once and among those who fell, 69% did not have a fracture as a result and 31% had at least one fracture. One fifth of the sample had an orthopedic surgery during adulthood. Approximately one fourth of the women used an optic or hearing device, while one tenth used assistive walking devices or more than one device. Among the women, 37% never had a BMD measurement, 45% never adhered to medical treatment and recommendations, and 63% never engaged in physical exercise and never made house

arrangements to prevent falling.

The study demonstrated that the majority of women (91%) intended to have a BMD measurement, 87% intended to adhere to medicines and medical recommendations, 60% intended to engage in appropriate physical exercise, and only 50% intended to make house arrangements to prevent falling. 88% believed that it would be easier to have a BMD measurement if they increased their knowledge on the subject, 70.7% believed that it would be easier to adhere to medicines and medical recommendations if they increased their knowledge on the subject, 65% believed that it would be easier to engage in appropriate physical exercise if they increased their knowledge on the subject, and 68% believed that it would be easier to make house arrangements to prevent falling if they increased their knowledge on such arrangements.

The scale had a very high reliability coefficient ($Cr \alpha$ 0.95). Test-retest reliability was also high. The PROF scale was reduced to 28 items by selecting items with factor loadings between 0.39 and 0.77. It was determined that the scale had 6 factors. A strong and positive relationship was found between intentions to protect against OPF's and attitudes and subjective norms, while a moderate and positive association was found between intentions and behavior control. Attitudes and behavioral beliefs were moderately and positively correlated, behavior control and control beliefs were strongly and positively correlated, and subjective norms and normative beliefs were strongly and positively correlated. This self-report scale evaluates how well postmenopausal women protect themselves against OPF's and provides a comprehensible framework by providing strategic steps to develop health behaviors. This scale can be a part of public health models aimed at fighting postmenopausal OP and OPF's.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Bülent Ecevit University Faculty of Medicine Clinical Research Ethics Committee (protocol no: 2015-18-20/05).

Informed Consent: Each patient was informed about the study and written consent was taken from the patients.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: S.A., Concept: S.A., M.A.K., Design: S.A., M.A.K., Data Collection or Processing: S.A., Analysis or Interpretation: S.A., M.A.K., Z.E., Literature Search: S.A., M.A.K., Z.E., Writing: S.A., M.A.K., Z.E.

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