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FACULTY OF HEALTH SCIENCES

DOCTORAL SCHOOL OF HEALTH SCIENCES

Head of the Doctoral School: Prof. Dr. Bódis József
Programme leader: dr. habil Rétsági Erzsébet, Prof. dr. habil Ács Pongrác
Supervisor: dr. habil Járomi Melinda
Co-Supervisor: dr. habil Hock Márta

DISEASE-SPECIFIC KNOWLEDGE EXAMINATION AND THE SIGNIFICANCE OF PATIENT EDUCATION IN PHYSIOTHERAPY – OSTEOPOROSIS-RELATED KNOWLEDGE EXAMINATION

Doctoral (Ph.D.) thesis booklet

Tardi Péter

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Introduction

The World Health Organization (WHO) defines health literacy as "the cognitive and social skills that determine the individual's motivation and ability to access, understand and use acquired knowledge to promote and maintain good health". Disease-specific knowledge is the base of health literacy. Disease-specific knowledge refers to experiential and learnable theoretical and practical knowledge, facts and abilities that related to the understanding, development, symptoms, frequency, prevention and treatment of the disease, which helps the individual in making decisions in health care.

The goal of the development of disease-specific knowledge is the formation and improvement of adherence. The WHO definition of adherence is "the individual's behavior in accordance with the recommendations agreed with a health professional in the area of medication, diet and lifestyle changes". Adherence assumes an active role on the part of the patient and shows the extent to which he cooperates with health professionals. It helps to develop an appropriate preventive approach and increases the efficiency of the treatment of the disease and the chance of staying in therapy.

Osteoporosis is a disease that affects the bone structure, which is associated with low bone mineral density and leads to damage to the microarchitecture of bone tissue. It has grown into a public health problem, as many studies have confirmed the negative impact of osteoporosis on the quality of life and physical and functional status of people with osteoporosis.

Osteoporosis affects one in three women and one in five men over the age of 50. According to a survey carried out in 2020 in the 5 largest countries of the European Union (United Kingdom - then still a member of the Union, France, Germany, Italy, Spain) and Sweden, 10% of women in their 60s, 20% of women age between 70 and 80 years old, 40% of women in their eighth decade and 66% of the female population age over 90 were affected by osteoporosis.

Today, the high social and personal costs of osteoporosis represent a huge challenge for public health, as in most cases, patients with osteoporosis remain untreated due to the absence of symptoms.

Aim of the study

The development of valid and reliable questionnaires adapted to the Hungarian language is essential for the development of disease-specific knowledge and attitudes, as well as for the development of patient education programs and their effectiveness monitoring.

A limitation in several domestic research is the lack of Hungarian language adaptation of internationally validated questionnaires, since in Hungary there are relatively few questionnaires available in disease-specific knowledge and -attitudes, as well as suitable instruments for examining health behavior.

In the absence of this, it is difficult to determine the quality of the Hungarian population's osteoporosis-related knowledge.

In the absence of a measuring device, osteoporosis-specific knowledge and behavior studies cannot be carried out on the Hungarian population, therefore cannot be compared with international studies' results.

This dissertation elaborates on the reliability, applicability and validity of the Hungarian language adaptations of questionnaires related to the assessment of disease-specific knowledge and behavior that can be used in the prevention and treatment of osteoporosis as one of today's leading musculoskeletal diseases.

Accordingly, our research objectives:

- Aim of the research was to adapt from English to Hungarian the first questionnaire available in Hungary to examine preventive osteoporosis-related knowledge among the premenopausal population and to examine its reliability, applicability and validity.

- Aim of the research was to adapt from English to Hungarian the first questionnaire available in Hungary for examining osteoporosis disease-realeted knowledge among the Hungarian female population over 50 years of age and to examine its reliability, applicability and validity.

- Finally, aim of the research was to adapt the first osteoporosis-related behavior and attitude questionnaire among the adult Hungarian female population from English to Hungarian, and to examine its reliability, applicability and validity.

Material and method

The original English questionnaires examining disease-specific knowledge and -attitudes were translated and validated into Hungarian language according to Beaton's six-step guidelines (2000): preparation of translations, creation of a synthesis, back-translation of the synthesis, pre-testing, internal consistency examination, convergent validity examination.

As a first step, we asked permission and support in written from the authors of the original questionnaire - for all three questionnaires that were used.

After that, the questionnaire was translated into Hungarian. For each questionnaire, the translation was carried out by two independent persons, one of them has a professional translation qualification, while the other translator was a healthcare worker with a high-level English language exam.

We created a synthesis from the two Hungarian translations. The synthesis included the most applicable form every question/statement.

The synthesis was back-translated by two independent translators - similarly to the translation - by two independent persons, one of them has a professional translation qualification while the other translator was a healthcare worker with a high-level English language exam. After the back-translation the translators confirmed in written that the synthesis we prepared does not differ in terms of content, form and quality from the original English questionnaire.

After the back-translation we carried out a pre-test for all three questionnaires with 30 participants with a sample of Hungarian native-speaking women of an age suitable for the application of the given questionnaire. Expressions that caused problems/conflicted interpretation during the pre-testing were corrected.

The questionnaires final version formed and we sent it to the next level of the validation procedure, what was the internal consistency test. We performed the internal consistency test for all three questionnaires with the help of 40 participants. During the study, we asked the participants to fill out the questionnaire and after 3 weeks we asked them to fill it out again. We made difference test between the two surveys, which was designed to show that there is no significant difference between the answers of the first and second filling in the given questionnaire. Finally, we collected data by using the final Hungarian forms of every questionnaire.

For the external convergent validity test, we followed - the advice of the authors of the original questionnaires and - international questionnaire validation models.

Regarding the Osteoporosis Knowledge Assessment Tool (OKAT) we worked with socio-demographic data and parameters defined in the international literature (age, highest education level, lifestyle). In the case of the Osteoporosis Questionnaire (OPQ) we followed the advice of the author of the original questionnaire, beside the socio-demographic parameters, we used measured the quality of life (Short Form Health Survey, WHO Quality of Life-BREF) and physical activity (WHO Global Physical Activity Questionnaire) as external parameters, while regarding the Osteoporosis Health Belief Scale (OHBS) we used the OKAT questionnaire - that we validated in our previous study - as in international studies.

Osteoporosis Knowledge Assessment Tool (OKAT)

OKAT is a questionnaire that was validated by Winzenberg et al. in 2003. It measures osteoporosis-specific knowledge in English-language and it is suitable for examining the female population age between 25-44. It consists of 20 statements and respondent can answer with the options "true", "false", "I don't know". The 20 statements of the questionnaire focus on four basic areas: understanding the osteoporosis (symptoms and the background of osteoporosis), knowledge of risk factors, knowledge of preventive factors, osteoporosis treatment options. In case of an incorrect- or "I don't know" answer, the respondent receives 0 points, while for the correct answer the respondent receives 1 point. The total score of the questionnaire can be between 0 and 20 points.

Osteoporosis Questionnaire (OPQ)

The Osteoporosis Questionnaire (OPQ) was developed and validated in 2000 by Pande K.C. et al. The questionnaire intended to measure osteoporosis-related knowledge among postmenopausal women age over 50 years of age. The OPQ is a simple-choice questionnaire consisting of 20 questions which covers the following dimensions of osteoporosis-specific knowledge: general information about osteoporosis, risk factors, consequences and treatment of osteoporosis. There are four possible answers to each question: the fourth answer option is always the "I don't know" option, from the remaining three options only one option is the correct answer. For each correct answer the respondent receives 1 point, for each incorrect answer receives -1 point, while the "I don't know" answer means 0 points for the respondent. The total score of the OPQ can be between -20 points and 20 points.

<u>Osteoporosis Health Belief Scale</u>

The questionnaire was developed in 1991 by Kim et al. to examine the osteoporosis-specific attitude and behavior of the female population age over 18 years of age. The OHBS includes 7 dimensions: development of the disease, severity of the disease, benefits of exercise, benefits of calcium intake, limits of exercise, limits of calcium intake, and health motivation. The 7 dimensions contain a total of 42 statements and the respondent can answer from 1 to 5 on a Likert scale when 1 means "Completely Disagree" and 5 means "Completely Agree". The respondent can mark the answer that is characterizes her the most. For most of the dimensions, the higher score indicates appropriate preventive behavior, while in two dimensions about limitations, lower scores indicate the appropriate attitude and behavior.

Statistical analysis

During the validation of all three questionnaires the database was created by using the Microsoft Office Excel program after all statistical analyzes were performed by using IBM SPSS (version 24). A descriptive statistical analysis was performed, the data were expressed as mean ± standard deviation and frequency (%).

For the validation of all three questionnaires, we applied the all the tests that were used in the validation of the original questionnaire and we followed the advice of the authors of the original questionnaire. The validity, reliability and applicability of the OKAT were examined by the following statistical tests: Flesch reading ease index, Index of Difficulty, McNemar test, D-value (Item discrimination), Ferguson sigma, item-total correlation, Cronbach's alpha value, factor analysis (principal component analysis) - Kaiser–Meyer–Olkin (KMO) test and Bartlett's test.

To validate the OPQ, in addition to descriptive statistics, Spermann's correlation coefficient and Cronbach's alpha value were calculated.

During the validation of the OHBS, in addition to descriptive statistics, factor analysis (principal component analysis) - Kaiser–Meyer–Olkin (KMO) test and Bartlett's test, as well as Cronbach's alpha value and Spearman's correlation coefficient were used to verify the applicability and reliability.

Results

1. <u>Results of the OKAT reliability, applicability and validity</u>

557 premenopausal women participated in the OKAT validation. The average age of the participants was 34.45±6.92 years and the total score of the OKAT questionnaire was 11.33±4.33 out of 20 possible points.

Sample characterization in relation to OKAT results

Age categories	Number of cases	Frequency (%)	Mean ± S.D.	p value
25 – 29 years	188	33.75	11.85 ± 4.32	
30 – 34 years	90	16.16	11.18 ± 4.15	< 0.001
35 – 39 years	90	16.16	11.33 ± 4.33	
40 – 44 years	189	33.93	10.03 ± 4.06	
Marital status				
Single/Divorced/Widowed	131	23.52	10.87 ±4.56	
Lives in a relationship	221	39.68	11.45 ± 4.18	0.162
Married	205	36.8	10.7 ± 4.27	
Highest level of education				
Elementary School	9	1.62	5.22 ± 3.42	
Secondary School (Medical)	34	6.09	11.82 ± 3.19	
Secondary School (Non-medical)	60	10.77	7.68 ± 3.84	< 0.001
High school	75	13.46	9.61 ± 3.91	
College	225	40.39	11.88 ± 3.81	
University	140	25.13	11.74 ± 4.38	
Scientific degree (PhD)	14	2.51	14.43 ± 4.39	
Profession				
Healthcare occupation	181	32.49	14.53 ± 3.58	< 0.001
Not a health occupation	376	67.50	9.99 ± 4.04	
Occurrence of osteoporosis in the family history				
Yes	270	48.47	12.08 ± 4.17	< 0.001
No	287	51.53	10.06 ± 4.13	
Occurrence of osteoporosis-related fractures in the family history				
Yes	136	24.42	13.4 ± 3.96	
No	343	61.58	10.64 ± 4.04	< 0.001
I do not know	78	14.00	8.67 ± 3.94	

According to the results we discovered significant differences (p<0.001) between the total scores of the OKAT and the age groups. Disease-specific knowledge was higher at a younger age, which decreased with age.

There were significant differences (p<0.001) between education and types of profession. It was observed that higher education level was associated with better knowledge of osteoporosis. Osteoporosis-specific knowledge was significantly (p<0.001) higher among those with a medical degree.

A significant (p<0.001) positive correlation was found between education level (r=0.25) and osteoporosis-related knowledge, as well as health status (r=0.18), while a significant (p<0.001) negative correlation a relationship was found between osteoporosis-specific knowledge and age (r=-0.18).

We found high reliability for all elements of the Hungarian adaptation of the OKAT and none of the elements showed significant difference in the answers of the test and the retest. The reliability of the questionnaire is also supported by the value of Cronbach's alpha (0.81).

The correlation relationship between the elements of the questionnaire (>70%) proved to be outstanding in all cases, we did not experience a negative correlation relationship.

Regarding most of the components of the questionnaire, the difficulty index was in the satisfactory range (0.25-0.716).

2. Results of the OPQ reliability, applicability and validity

326 postmenopausal women participated in our study. The average age of the participants was 63.08±9.36 years, while the total score of the OPQ questionnaire was 8.76±6.94 out of 20 possible points.

Considering the results of osteoporosis-related knowledge, it is clearly seen that the participants who had a higher education obtained a higher score. The highest score belonged to the participants with a PhD degree (17.22±3.86), followed by those with a university degree (12.51±4.91) and college degree (9.98±5.97), while the high school - (9.65±5.46) and high school graduates (5.26±6.52) scores were significantly lower. In terms of samples, the score of primary school graduates (0.81±2.65) was the lowest.

It was also observed that the knowledge of participants who live with osteoporosis (n=111) (10.08±8.82) was higher than the knowledge score of those not affected by osteoporosis (n=117) (9.39±6.67) and the participants (n=97) (6.5±6.97) for those who did not know whether they were affected by osteoporosis.

We found a significant (p<0.001) correlation (R=0.37) between osteoporosis-specific knowledge and age. Significant (p=0.02) positive correlation (R=0.34) was between the number of years spent in hormone replacement therapy and the level of osteoporosis-related knowledge.

During the internal consistency test we did not find any significant (p≥0.25) differences between the results of the first and second filling in the test-retest for any question. The reliability of the questionnaire is also supported by the value of Cronbach's alpha that was 0.89.

Convergent validity - based on quality of life and osteoporosis-related knowledge

SF-36 Quality of life sub-dimensions	Full sample (n=326) mean ± standard deviation	Correlation analysis based on the OPQ questionnaire		Affected by osteoporosis (n=111) mean ± standard deviation	Not affected by osteoporosis (n=117) mean ± standard deviation	Result of difference analysis (p-value)
		p value	R value			
Physical funtioning	65.02±29.94	< 0.001	0.501	66.8±32.09	69.32±26.68	0.01
Physical role	55.3±42.12	< 0.001	-0.428	63.29±39.86	61.12±41.32	< 0.001
Body pain	49.16±37.47	< 0.001	-0.502	53.69±37.81	55.3±37.67	< 0.001
General health	42.98±24.34	< 0.001	0.499	45.01±25.19	47.3±23.98	< 0.001
Vitality	52.61±27.01	< 0.001	0.381	61.13±29.97	55±22.1	< 0.001
Social functioning	61.57±33.5	< 0.001	0.444	68.61±32.75	66.79±31.8	< 0.001
Emotional role	62.78±40.91	< 0.001	-0.351	68.17±41.29	73.22±39.21	< 0.001
Mental health	61.83±26.41	< 0.001	0.481	66.95±28.19	66.22±20.86	< 0.001
WHO-QOL BREF Quality of life dimensions						
Environmental dimension	62.3±18.99	< 0.001	0.512	69.23±17.62	64.43±13.36	< 0.001
Social relationships	61.21±20.06	< 0.001	0.398	67.07±18.49	64.62±18.6	< 0.001
Psychological health	62.11±20.22	< 0.001	0.506	68.51±19.86	65.3±17.59	< 0.001
Physical health	62.4±21.77	< 0.001	0.575	67.59±23.22	65.38±17.35	< 0.001

In addition to quality of life, physical activity was used as an external parameter to verify convergent validity. During the study a number of significant correlations were demonstrated between the subdimensions of the OPQ questionnaire and physical activity.

Osteoporosis-related knowledge and physical activity
correlation analysis results

Physical activity	Full sample (n=326) mean ± standard deviation	Correlation analysis based on the OPQ questionnaire	
		p value	R value
Intensive work (minutes/week)	479.86±684.02	0.309	0.06
Moderate work (minutes/week)	678.16±804.5	0.437	0.044
Travel, transport movement (minutes/week)	262.83±380.27	< 0.001	0.21
Intensive recreational activity (minutes/week)	77.71±123.46	< 0.001	0.354
Moderate recreational activity (minutes/week)	115.15±154.82	< 0.001	0.348
Total moderate exercise (minutes/week)	815.6±863.59	0.041	0.125
Total intensive movement (minutes/week)	543.57±719.59	0.018	0.145
Total movement (minutes/week)	1645.99±1432.88	0.071	0.0114

1. Results of the OHBS reliability, applicability and validity

Our sample consisted of 600 participants, their average age was 37.7±13.15 years, the youngest participant was 24, while the oldest was 75.

Regarding the OHBS our sample scored 126.28 points out of 210 possible points. Among the categories, the scores of the "Severity of the clinical disease" (16.16±5.66 points) and "Development of the disease " (15.47±5.94 points) dimensions were conspicuously low.

Our sample scored only 8.78±3.1 out of 20 possible points on the OKAT questionnaire used to examine disease-specific knowledge.

Based on our study and calculations, age has a weak relationship with the disease-specific attitude. We thought we discovered a higher degree of correlation with the patient's attitude and behavior than age with the highest level of education. The highest level of education shows a remarkable relationship with "Health motivation" (p<0.001; r=0.22), as well as "Limitations of calcium intake" (p<0.001; r=-0.23) and "Limitations of exercise" (p<0.001; r=-0.17) subdimensions.

In case of the OKAT score we also reached a similar result, disease-specific knowledge was more closely related to the highest education (p=0.01; r=0.11) than to age (p=0.326; r=0.04).

When comparing the osteoporosis-related knowledge and the OHBS dimensions, we found a significant correlation relationships between the osteoporosis-related knowledge with „Benefits of exercise" (p<0.001; r=0.17), "Limitations of calcium intake" (p<0.001; r=-0.18), and "Health motivation" (p<0.001; r=0.16) dimensions.

During the internal consistency test we found no significant (p≥0.921) differences between the results of the first and second filling in the test-retest of the questionnaire.

OHBS reliability test results

OHBS subdimensions	Mean	Standard deviation	Median	Interquartile range		Cronbach-alfa value
				Lowest	Highest	
Development of the disease	15.47	5.94	15.00	12.00	19.00	**0.921**
Severity of disease	16.16	5.66	16.00	12.00	21.00	**0.866**
Benefits of exercise	22.60	4.06	23.00	20.00	25.00	**0.908**
Benefits of calcium intake	24.35	5.12	24.00	22.00	29.00	**0.849**
Limits of physical exercise	13.58	5.43	13.00	9.00	18.00	**0.857**
Limits on calcium intake	11.65	4.06	12.00	8.00	14.00	**0.842**
Health motivation	22.47	4.67	23.00	20.00	26.00	**0.856**
OHBS total	**126.28**	**14.85**	**127.00**	**117.00**	**135.00**	**0.802**

The 42-item questionnaire was included in factor analysis, which separated 7 factors, which can be matched to the original factors. The KMO test (KMO = 0.886) and Bartlett's test (p<0.001) confirmed that the data are suitable for exploratory factor analysis: the 7 factors explained 63% of the examined factors.

Discussion

1. <u>Discussion of the results of the Osteoporosis Knowledge Assessment Tool</u>

The disease-specific knowledge of the Hungarian female population between the age of 25 and 44 in relation to osteoporosis can be said to be average or slightly above average based on the total score, compared with the results found in the international literature. The score of our sample was significantly higher than the results achieved in research conducted in Australia, Syria, Pakistan and India. A Chinese survey gave us approximately the same results, while a higher score was measured in Saudi Arabia.

Several studies have confirmed the importance and impact of education in terms of disease-specific knowledge. Better disease-specific knowledge was reported in the case of a higher educational qualification and a medical background. In our study there was a significant correlation between the highest level of education and the score of disease-specific knowledge, and significant differences were found between the score of disease-specific knowledge and level-, types of education.

Several studies have shown that medical students and workers have better knowledge of osteoporosis than non-medical students/workers. In our study, healthcare workers had significantly better knowledge than non-healthcare workers, which is in line with what was observed during the validation process among the Arab population. In that study the authors got the same results as us, the healthcare education was the most decisive parameter in the level of disease-specific knowledge.

In randomized cross-sectional studies osteoporosis-related knowledge of premenopausal women was found to be higher at a younger age. This relationship, according to which there is a significant negative correlation between age and the level of disease-specific knowledge, was also detectable in the present study.

2. <u>Discussion of the results of the Osteoporosis Questionnaire</u>

Osteoporosis-specific knowledge measurements by using the OPQ have been conducted in many countries around the world and our results are similar to those women living in England and the United States and significantly higher than the disease-specific knowledge of women in Australia, Brazil, Brunei, the Czech Republic and India.

In most studies conducted using the OPQ questionnaire, it was confirmed that in the postmenopausal population age, the presence of osteoporosis, the use of hormone replacement therapy and the number of years spent in therapy showed a correlation with the quality of osteoporosis-related knowledge.

Cross-sectional studies reported better disease-specific knowledge in the case of higher education, which was also confirmed in our research.

Previous studies have proven that the knowledge of women affected by osteoporosis is significantly higher compared to women not affected by osteoporosis, which support our results, as the score of participants affected by osteoporosis was higher than the score of participants not affected by osteoporosis.

Several studies have confirmed the negative impact of osteoporosis on the quality of life. It is an accepted fact that better disease-specific knowledge shows a better quality of life. During our correlation analysis, a medium-strength significant correlation relationship was shown between disease-specific knowledge and all subdimensions of quality of life in the results of the Short Form Health Survey and the WHO Quality of Life-BREF quality of life scale.

des Bordes et al. in their research, they drew attention to the correlation between disease-specific knowledge and physical activity, which relationship was also shown in our study, as we found a significant correlation between disease-specific knowledge and several sub-dimensions of physical activity, such as travel, transport, intensive -, moderate recreational activity, and between all moderate and all intense movements.

3. Discussion of the results of the Osteoporosis Health Belief Scale

Osteoporosis-specific behavior studies using the OHBS have been conducted in many countries worldwide, both for men and women. The results of our sample mostly match the data measured in Poland.

Based on international literature, the relationship between osteoporosis-specific behavior and attitude and disease-specific knowledge is not clear, different studies showed different results. In Syria and Palestine, they believed to have discovered a correlation between disease-specific knowledge and behavior, while in China, with the involvement of nurses, no relationship was found between the two investigated parameters.

Results of a disease-specific behavior test using the OHBS questionnaire

Author, year	Sitati et al, 2021	Ishtaya et al, 2018	Janiszewska et al, 2016	Abdulameer et al, 2013	Kim et al, 2013	Sahib, 2018	Dai et al, 2020]	Tardi et al, 2021
Examination location	Kenya	Palestine	Poland	Malaysia	Korea	Syria	China	**Hungary**
Population	Post-menopausal African population	Diabetes mellitus (males and females)	Females age between 45-65	II. type diabetes mellitus patients	Females age between24-78	Females and males age over 18 years	Nurses	**Females age over 18**
Number of cases	n=254	n=300	n=300	n=250	n=77	n=300	n=558	**n=600**
OHBS subdimensions								
Development of the disease	14.7±0.3	16.9±4	15.6±4.88	21.90±7.62	18.59±4.34	20.68±5.594	16.10±4.34	**15.47±5.94**
Severity of disease	19±0.4	19.4±3.6	17.22±3.95	22.84±6.86	18.97±3.8	22.37±5.99	15.65±3.9	**16.16±5.66**
Benefits of exercise	20±0.4	23.1±2.5	22.35±3.57	25.44±3.62	23.02±3.03	22.81±6.385	21.47±4.24	**22.6±4.06**
Benefits of calcium intake	20.4±0.5	22.8±2.4	22.65±3.03	25.81±2.82	20.29±2.79	22.34±6.016	19.78±3.84	**24.35±5.12**
Limits of physical exercise	13.4±0.3	16.6±3.5	16.85±4.37	21.49±8.45	15.55±3.47	19.43±8.257	15.01±3.81	**13.58±5.43**
Limits of calcium intake	13.4±0.3	15.4±2.7	15.44±4.4	16.16±7.74	15.03±3.02	19.33±7.928	14.2±3.86	**11.65±4.67**
Health motivation	19.4±0.4	22±2.8	21.27±3.63	24.67±5.91	20.23±3.04	23±6.174	22.19±4.03	**22.47±4.67**

Our results are supported by the results found in international literature, based on which the highest educational level plays an important role in the development of disease-specific knowledge and attitudes. Janiszewska et al. during their research they obtained a result consistent with our study, according to which there is a correlation between the highest educational level and disease-specific behavior.

New scientific results

1. Based on our results, the Hungarian language adaptation of the Osteoporosis Knowledge Assessment Tool (OKAT) was successful. The OKAT is the first usable, reliable and valid questionnaire to examine the disease-specific knowledge of the Hungarian female population between the age of 25-44 about osteoporosis.

2. Based on our results, the Hungarian language adaptation of the Osteoporosis Questionnaire (OPQ) was successful. The OPQ is the first usable, reliable and valid questionnaire to examine the disease-specific knowledge of the Hungarian female population over the age of 50 regarding osteoporosis.

3. Based on our results, the Hungarian language adaptation of the Osteoporosis Health Belief Scale (OHBS) was successful. The OHBS is the first applicable, reliable and valid questionnaire to examine the disease-specific behavior of the Hungarian female population over the age of 18 in relation to osteoporosis.

4. The development of disease-specific knowledge and behavior, which is considered strong evidence in the treatment of osteoporosis, was unfeasible until now in the absence of assessment with applicable and reliable measuring devices in any age group. For the first time in our country, disease-specific knowledge and behavior regarding osteoporosis was surveyed with a large population in different age groups.

5. Even though it has been surveyed many times in international research, in our country our study is the first survey with a large population, which is aimed to measure the disease-specific knowledge and socio-demographic factors related to osteoporosis, as well as quality of life, physical activity and disease-specific behavior and exploring the relationship between of them in the Hungarian female population.

Recommendations

- We recommend the development of preventive and therapeutic patient education programs (individual, group, online) for the effective treatment of osteoporosis in populations of different ages.

- We recommend carrying out representative surveys with a larger population, in order to determine the disease-specific knowledge and behavior of women living in Hungary related to osteoporosis in a region- and age-specific manner.

- We recommend testing the reliability and applicability of the questionnaires adapted and validated for the Hungarian female population for men.

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