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Evaluation of Selection Criteria of Clinicians in the Treatment of Osteoporosis, OSTREQ Research in Türkiye

Klinisyenlerin Osteoporoz Tedavisindeki Tercih Kriterlerinin Anket ile (OSTREQ) Değerlendirilmesi Türkiye Uyarlaması Çalışması

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Abstract

Objective: This study aims to adapt the OSTREQ questionnaire, developed by Makras et al., into Turkish to assess the factors that clinicians take into consideration when planning osteoporosis treatment, as clinicians take many factors into consideration when making their decisions due to various treatment options.
Materials and Methods: The Turkish version of the OSTREQ questionnaire, comprising 17 questions and an 8-section format, used a 5-point Likert scale. From April 2018 to November 2019, the survey was conducted with 188 clinicians in rheumatology, physical therapy, rehabilitation, endocrinology, and metabolic diseases. After excluding 18 duplicate responses, data from 170 clinicians were analyzed.
Results: Participants included 21.8% endocrinologists, 28.8% rheumatologists, and 49.4% physical therapy and rehabilitation specialists. Factor analysis showed item loadings between 0.33 and 0.92, exceeding the 0.32 threshold. The overall Cronbach's alpha was 0.855, indicating high internal consistency. There were no significant differences among specialties in subscales like "disease severity and treatment efficacy". However, rheumatologists scored significantly higher than endocrinologists on "health system and cost" (p=0.034).
Conclusion: The Turkish OSTREQ questionnaire is a valid, reliable tool for evaluating factors in osteoporosis treatment decisions. With minimal modification, it can assess clinicians' views on specific anti-osteoporotic agents, aiding healthcare and pharmaceutical stakeholders.
Keywords: Osteoporosis, surveys and questionnaires, therapeutics

Öz

Amaç: Bu çalışma, çeşitli tedavi seçenekleri nedeniyle klinisyenler kararlarını verirken birçok faktörü göz önünde bulundurduğu osteoporoz tedavisini planlarken dikkate aldıkları faktörleri değerlendirmek amacıyla Makras ve ark. tarafından geliştirilen OSTREQ anketinin Türkçeye uyarlanmasını amaçlamaktadır.
Gereç ve Yöntem: OSTREQ anketinin 17 soruluk ve 8 bölümlük Türkçe versiyonu, 5'li Likert ölçeği kullanılarak uygulandı. Anket, Nisan 2018 ile Kasım 2019 tarihleri arasında romatoloji, fizik tedavi, rehabilitasyon, endokrinoloji ve metabolizma hastalıkları uzmanı olan 188 klinisyene uygulandı. Çift yanıt veren 18 kişi çalışmadan çıkarıldı ve 170 katılımcının verileri analiz edildi.
Bulgular: Katılımcıların %21,8'i endokrinolog, %28,8'i romatolog, %49,4'ü ise fizik tedavi ve rehabilitasyon uzmanıdır. Faktör analizi, anket maddelerinin 0,33 ile 0,92 arasında faktör yüklerine sahip olduğunu gösterdi ve bu değerler 0,32 eşik değerinin üzerindedir. Genel Cronbach alfa değeri 0,855 olup yüksek iç tutarlılık göstermektedir. "Hastalığın ciddiyeti ve tedavi etkinliği" alt ölçeğinde uzmanlıklar arasında anlamlı fark bulunmazken, "sağlık sistemi ve maliyet" alt ölçeğinde romatologlar endokrinologlardan anlamlı derecede yüksek puan almıştır (p=0,034).
Sonuç: OSTREQ anketinin Türkçe versiyonu, osteoporoz tedavisi kararlarında dikkate alınan faktörleri değerlendirmede geçerli ve güvenilir bir araçtır. Minimal modifikasyonlarla, spesifik anti-osteoporotik ajanlarla ilgili klinisyenlerin görüşlerini değerlendirmek için de kullanılabilir ve sağlık hizmetleri ile ilaç sektörü için yol gösterici olabilir.
Anahtar kelimeler: Osteoporoz, anketler ve soru formları, tedavi

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Introduction

Osteoporosis is a progressive metabolic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone, leading to an enhanced susceptibility to fractures (1). The prevalence of osteoporosis is growing with the aging of the world's population (2). It is a common skeletal pathology with an enormous potential burden of complications, especially among older individuals. The projections are that by the year 2035, the population of Türkiye will rise by 23% to 92.9 million and the population over 50 years will nearly double. The male population over 50 years will increase from 6.4 million to 13.9 million and females from 7 million to 15 million. Because osteoporotic hip fractures are so closely related to age, such fractures are forecasted to increase significantly by the year 2035, beyond that accountable by population growth alone (2). The goal of treatment is the improvement of the quality of life and health standard for patients suffering from osteoporosis and fractures, and for this, a tailored approach is considered optimum.

After that, physicians select the most appropriate regimen based on the patient's medical history and fracture risk assessment, as well as any previous anti-osteoporotic treatments. Meanwhile, the risk-benefit ratio must always be considered in this regard (3). In the management of osteoporosis, there are several lifestyle modifications that include adequate intake of vitamin D and calcium, proper nutrition, appropriate weight-bearing exercises, cessation of smoking, and fall prevention (4). The current study aimed to adapt the OSTREQ questionnaire by Makras et al. (5) into Turkish and to evaluate factors affecting clinicians' decisions regarding the treatment of osteoporosis among Turkish specialists in physical therapy and rehabilitation, endocrinology, and rheumatology.

Materials and Methods

Our study was conducted at İzmir Katip Çelebi University, Atatürk Training and Research Hospital between April 2018 and October 2019. Ethical approval was obtained from the Scientific Research Ethics Committee of İzmir Katip Çelebi University (decision no: 397, dated: 26.09.2019).

The survey was administered to 170 physicians, either in person or via e-mail. A total of 206 responses were collected; however, due to 18 participants submitting the survey twice, their responses were excluded from the study.

The aim of this study is to examine the Turkish adaptation of the OSTREQ questionnaire, developed by Markas et al. (5), for its applicability in Türkiye. The questionnaire includes eight sections: Health system, usage, cost, disease severity, treatment efficacy, safety profile, and pharmaceutical industry, with a total of 17 questions. The responses are evaluated on a 5-point Likert scale: "definitely inhibitory", "partially inhibitory", "neither inhibitory nor supportive", "partially supportive" and "definitely supportive".

Statistical Analysis

The statistical analysis of the study was performed using the IBM SPSS 22 statistical program. Since the data did not conform to a normal distribution, non-parametric tests were utilized. The normality of the data was assessed using histograms, plot charts (probability plots), skewness/kurtosis coefficients, and normality tests.

For the statistical analysis, Kruskal-Wallis, Cronbach's alpha, and confirmatory factor analysis (CFA) were conducted. A Type 1 error level of 5% was used for statistical significance, and a p-value of less than 0.05 was considered statistically significant. The CFA was performed using the AMOS SPSS 24 statistical program. To evaluate the construct validity and the fit of the tested model to the data, several indices were calculated: Chi-square, chi-square/degrees of freedom, comparative fit index (CFI), root mean square residual (RMR), normed fit index (NFI), root mean square error of approximation (RMSEA), goodness of fit index (GFI), and adjusted goodness of fit index (AGFI).

Results

When examining the specialties of the physicians participating in our study, it was found that 37 (21.8%) were endocrinologists, 49 (28.8%) were rheumatologists, and 84 (49.4%) were specialists in physical medicine and rehabilitation (Figure 1).

When examining the distribution of responses given by the physicians participating in our study to the questionnaire on criteria for osteoporosis treatment preferences, it was found that the top three items most frequently rated as "definitely inhibitory" were as follows:

- Cost (patient) (24.9%) (Figure 2)
- Usage (storage requirements) (18.8%) (Figure 3)
- Cost (health system) (12.9%) (Figure 4).

The top three items most frequently rated as "definitely supportive" were as follows:

- Disease severity (current osteoporotic fractures) (Figure 5)
- Treatment efficacy (fracture risk reduction) (Figure 6)
- Treatment efficacy (bone mineral density) (Figure 7).

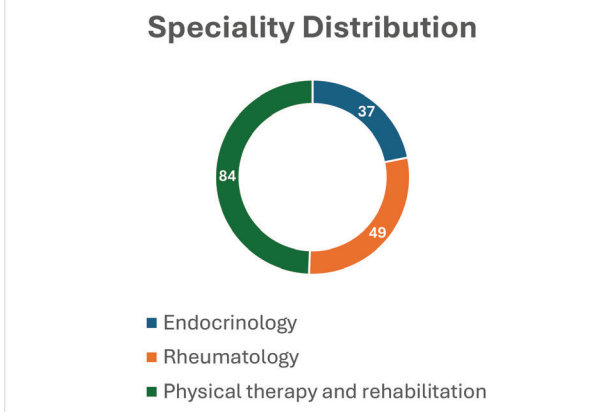

Figure 1. Speciality distribution

Validity and Reliability Analysis of the Questionnaire for the Evaluation of Factors Affecting Osteoporosis Treatment Selection

Factor Analysis

Factor analysis is a means through which the relationships between various factors are gauged. CFA, on the other hand, is a type of structural equation modeling that measures the relationship of one variable with all other observed variables. While a large number of goodness-of-fit indices is available in the literature, no consensus is arrived at as to which ones have to be satisfied. CFA tests the structural integrity of either a previously developed or a newly developed scale. It is recommended that when a previously validated scale is adapted into a new culture or language, CFA should be directly conducted without carrying out exploratory factor analysis. In CFA, the factor loadings

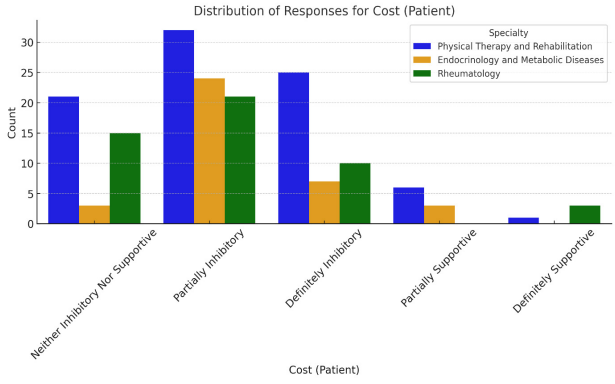

Figure 2. Distribution of responses for cost (patient)

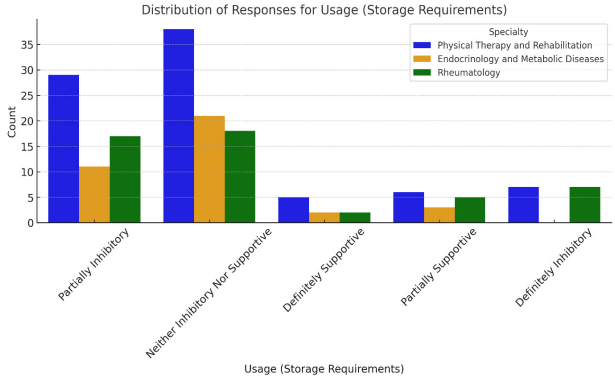

Figure 3. Distribution of responses for usage (storage requirements)

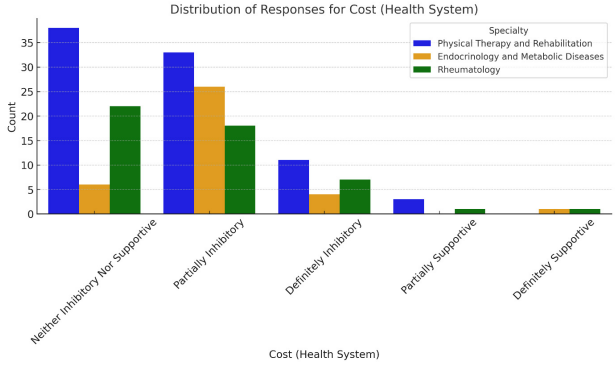

Figure 4. Distribution of responses for cost (health system)

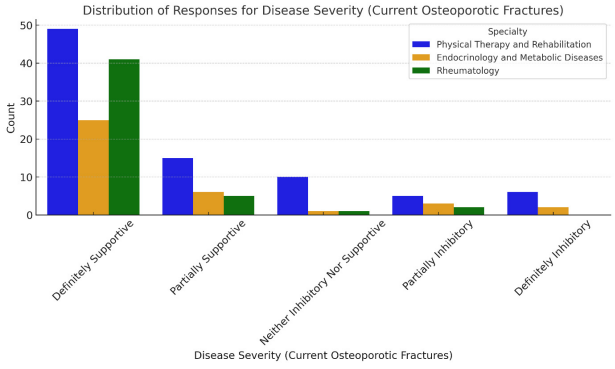

Figure 5. Distribution of responses for disease severity (current osteoporotic fractures)

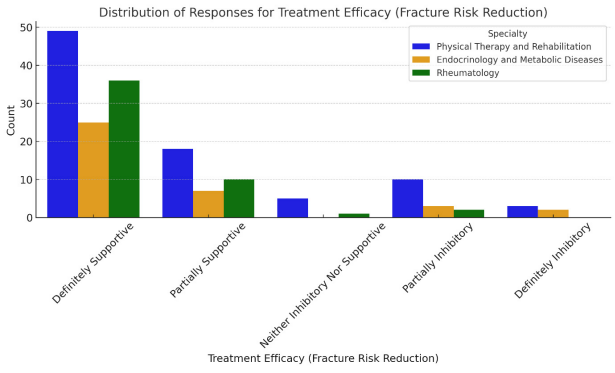

Figure 6. Distribution of responses for treatment efficacy (fracture risk reduction)

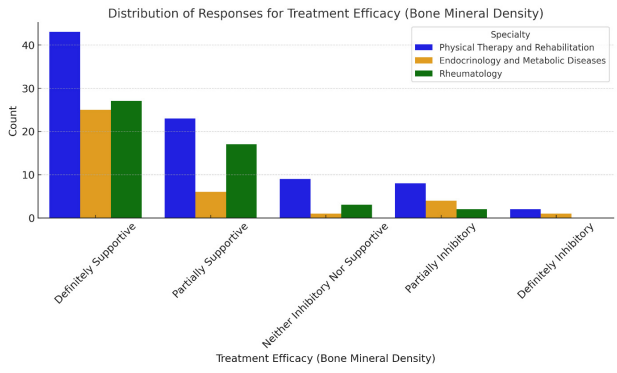

Figure 7. Distribution of responses for treatment efficacy (bone mineral density

should exceed 0.32 for validity. In the Turkish-adapted scale, factor loadings that ranged from 0.33 to 0.92 were above the threshold of acceptance of 0.32 (Figure 8).

The model fit of the key indices was assessed by χ^2/df (χ^2/df) (chi-square raito), RMSEA, GFI, AGFI, CFI, NFI and RMR. Accordingly acceptable fit was seen for χ^2/df, GFI, CFI, AGFI and RMR indices. On the other hand, it showed a poor fit in the NFI and RMSEA indices. In this respect, these indices revealed points of modification (Table 1).

Internal Consistency Reliability

The internal consistency of the clinicians' preference for osteoporosis treatment survey was evaluated using Cronbach's alpha, with subscale values ranging from 0.698 to 0.940 and an overall alpha of 0.855, indicating high reliability. No items significantly increased internal consistency upon removal. A Cronbach's alpha above 0.700 indicates reliability, and above 0.800 suggests high reliability. Additionally, t-tests for the top and bottom 27% groups showed significant differences for all items, with t-values between 2.711 and 10.030. Therefore, no items were removed based on factor analysis and internal consistency results.

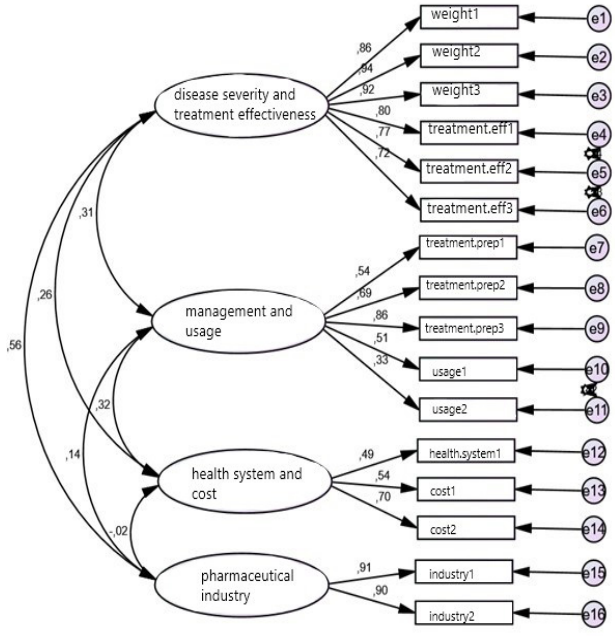

Figure 8. Diagram of confirmatory factor analysis for the evaluation of clinicians' preference criteria in osteoporosis treatment with a survey

Analysis of Physicians' Responses to the Osteoporosis Treatment Preference Survey Based on Their Areas of Specialization

In our study, the responses of specialist physicians to the osteoporosis treatment preference survey were analyzed according to their fields of specialization. No statistically significant differences were found between the subscales of disease severity and treatment efficacy, management and usage, and the pharmaceutical industry across specialties. However, a statistically significant difference was observed in the healthcare system and cost subscale across specialties (p=0.013) (Table 2).

In the post-hoc test (LSD) conducted to identify the group responsible for the significant difference, it was found that rheumatology specialists scored statistically significantly higher than endocrinology specialists in the healthcare system and cost subscale (p=0.034) (Table 3).

In our study, when the responses of specialist physicians to the Osteoporosis Treatment Preference Survey were analyzed according to their fields of specialization, no statistically significant differences were found in the total survey score across specialties (Table 4).

Discussion

Osteoporosis is a gradually advancing disease marked by reduced bone density, poorer bone quality, and cellular-level damage to bone structure. As life expectancy increases and the elderly population grows, the occurrence of osteoporosis is becoming more common worldwide and in Türkiye (2). This silent disease often is asymptomatic until fractures occur and, by this point, places significant burdens on both individuals and the economy.

Table 1. Evaluation of the fit indices of the clinicians' preference criteria survey in osteoporosis treatment

Index	Good fit	Acceptable fit	Survey of clinicians' preference criteria in osteoporosis treatment
CMIN/D (χ^2/SD)	<2	<5	**2.221**
GFI	>0.95	>0.85	**0.874**
CFI	>0.95	>0.90	**0.927**
NFI	>0.95	>0.90	0,875
AGFI	>0.95	>0.85	**0.864**
RMSEA	<0.05	<0.08	0.085
RMR	<0.05	<0.08	**0.063**

GFI: Goodness of fit index, CFI: Comparative fit index, NFI: Normed fit index, AGFI: Adjusted goodness of fit index, RMSEA: Root mean square error of approximation, RMR: Root mean square residual

Table 2. Comparison of sub-factors of the preference criteria questionnaire in osteoporosis treatment according to specialty area

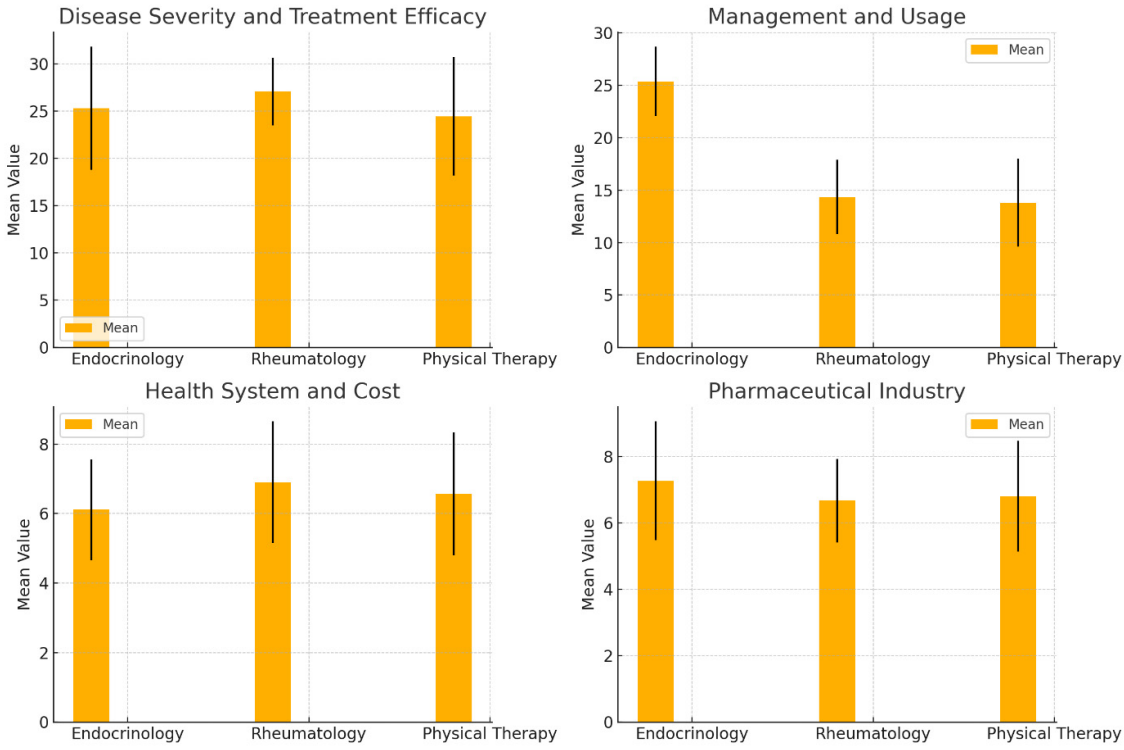

Table 3. Post-hoc test of health system and cost sub-dimension

		Mean difference	Standard deviation	p	95% Confidence interval	
					Lower limit	Upper limit
Endocrinology	Rheumatology	-0.78	0.37	**0.034**	-1.52	-0.05
	Physical therapy and rehabilitation	-0.46	0.33	0.169	-1.12	0.19
Rheumatology	Endocrinology	0.07	0.37	0.034	0.05	1.52
	Physical therapy and rehabilitation	0.32	0.30	0.287	-0.27	0.92
Physical therapy and rehabilitation	Endocrinology	0.46	0.33	0.169	-0.19	1.12
	Rheumatology	-0.32	0.30	0.287	-0.92	0.27

Table 4. Comparison of the total score of the preference criteria questionnaire in osteoporosis treatment according to specialty

		n	Mean	SD	x^2	p
Total survey score	Endocrinology	37	54.05	9.21	0.119	0.730
	Rheumatology	49	54.98	6.63		
	Physical therapy and rehabilitation	86	51.63	10.20		

SD: Standard deviation

Lifestyles involving proper nutrition, exercising that strengthens the bones, and fall prevention are some of the ways the disease is prevented and treated. In the use of pharmacological agents in managing the disease, clinicians consider many factors.

Management of osteoporosis needs to be highly individualized. When treatment is indicated, physicians should select the most appropriate regimen, considering the medical history of the patient, fracture risk, and previously applied anti-osteoporotic therapies. Maximum patient benefit should be assured while designing the therapeutic approach. Other than patient factors, starting, switching, or continuing a treatment is influenced by the physician's strategy, rules of the healthcare system, and the role of the pharmaceutical industry. Treatments for osteoporosis are varied, so that not all factors guiding physicians' choices are fully known. This study tried to explore these factors using a simple survey.

In response to the development of many fracture risk assessment surveys that identify those patients with reduced bone mass requiring treatment, several studies have been carried out that evaluate such surveys based on patient preferences related to osteoporosis treatment (6-8). However, these studies are based upon the response of the patients themselves. The present study aimed to predict the factors likely to influence the treatment decisions of physicians from three medical specialties actively involved in osteoporosis management in Türkiye. Either via e-mail or in person, participants were contacted from different centers across Türkiye.

The OSTREQ survey, developed by Makras et al. (5), was originally written in Greek and was translated into English by the authors. Then, the survey was translated from English into Turkish and administered to endocrinology and metabolic disease specialists, rheumatologists, and physical medicine and rehabilitation clinicians who play a primary role in osteoporosis treatment. In this study, CFA of the validity and reliability of the scale was performed, and its reliability was tested by internal consistency. Whereas in the original OSTREQ study (5), the factor loadings were between 0.65 and 0.90, in our study, the factor loadings of items were between 0.33 and 0.92, above the acceptable threshold of 0.32.

Whereas in the original OSTREQ study (5), Cronbach's alpha internal consistency reliability coefficients ranged from 0.78 to 0.93, in our study, the Cronbach's alpha coefficient was found to be 0.855. The reliability of a scale was indicated when the Cronbach's alpha value was 0.70 and above. Values of $0.80 \leq a < 1.00$ indicated high reliability. Based on these findings, it can be concluded that the internal consistency of the scale is adequate and it has been shown to be a reliable scale that can be used in Türkiye.

The confirmatory factor analysis, internal reliability analysis, and subgroup analysis for 27% of subgroups performed in our study indicated that the items in the Clinicians' Osteoporosis Treatment Preference Survey are discriminative, show construct validity, and are reliable. If items were deleted, Cronbach's alpha values and t-test observed for item discrimination between the lower and upper subgroups ranged from 0.833 to 0.859 ($p<0.001$). These ranged from 0.890 to 0.925 in the original OSTREQ study (5), $p<0.001$ for each.

Results of ANOVA of survey responses by specialty showed no statistical differences of subscales of disease severity, treatment efficacy and management or pharmaceutical industry use. A statistically significant difference was found in the healthcare system and cost subscale, $p=0.013$. LSD post-hoc tests revealed that rheumatology specialists ranked this area significantly higher than endocrinologists, $p=0.034$. There were no statistical differences in total survey scores among the specialties.

Conclusion

This study was developed as a general osteoporosis treatment survey; however, it can be easily adapted and used with minimal modifications to evaluate physicians' views on specific anti-osteoporotic agents. This study can also help healthcare reimbursement systems and pharmaceutical companies understand the parameters that guide physicians' preferences in osteoporosis treatment decisions.

Ethics

Ethics Committee Approval: Our study was conducted at İzmir Katip Çelebi University, Atatürk Training and Research Hospital between April 2018 and October 2019. Ethical approval was obtained from the Scientific Research Ethics Committee of İzmir Katip Çelebi University (decision no: 397, dated: 26.09.2019).

Informed Consent: Il participants were informed about the purpose of the study and provided their voluntary consent prior to participation. Participation was entirely voluntary, and responses were anonymized to ensure confidentiality.

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Footnotes

Authorship Contributions

Concept: B.Ö.P., Design: E.G.K., B.Ö.P., S.A., A.T., Data Collection or Processing: E.G.K., B.Ö.P., S.A., A.T., Analysis or Interpretation: E.G.K., Literature Search: E.G.K., Writing: E.G.K.

Conflict of Interest: No conflict of interest was declared by the authors.

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