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AMAÇ VE KAPSAM

Türk Osteoporoz Dergisi, Türkiye Osteoporoz Derneği'nin süreli yayın organı olup, osteoporoz ve metabolik kemik hastalıkları içerikli, yayın dili Türkçe ve İngilizce olan, bağımsız ve önyargısız hakemlik (peer-review) ilkelerine dayanan uluslararası, periyodik bir dergidir. Türk Osteoporoz Dergisi, Nisan, Ağustos ve Aralık aylarında olmak üzere yılda 3 sayı çıkar.

Türk Osteoporoz Degisi'nin hedefi uluslararası düzeyde nitelikli, sürekli ve osteoporoz konusunda özgün bir periyodik olarak klinik ve bilimsel açıdan en üst düzeyde orijinal araştırmaları yayınlamaktır. Bununla birlikte eğitim ile ilgili temel yenilikleri kapsayan derlemeler, editöryel kısa yazılar, olgu sunumları, orijinal görüntüler ve geniş fiziksel tıp, romatoloji, rehabilitasyon ve jinekoloji kesimlerinin konular hakkındaki deneyimlerini ve eleştirilerini içeren mektuplar ve sosyal konulu yazılar yayınlamaktır.

Osteoporoz ve kemik hastalıklarına ilgi duyan birinci basamak tıp hizmeti veren pratisyen hekim, iç hastalıkları, jinekoloji, romatoloji ve fiziksel tıp ve rehabilitasyon uzmanlarının "bilmesi gerekli olanları" iyice saptayarak; bunları Türk Osteoporoz Dergisi'nde bulmaları için gerekli düzenlemeler yapılacaktır.

Türk Osteoporoz Dergisi, **Emerging Sources Citation Index (ESCI), DOAJ, EBSCO Database, Gale/Cengage Learning, CINAHL, CABI, Index Embase, Scopus, ProQuest, J-Gate, IdealOnline, TÜBİTAK/ULAKBİM, Hinari, GOALI, ARDI, OARE, AGORA, Türk Medline, Türkiye Atıf Dizini** tarafından indekslenmektedir.

Açık Erişim Politikası

Derginin açık erişim politikası 'Budapest Open Access Initiative(BOAI) kuralları esas alınarak uygulanmaktadır.

Açık Erişim, "[hakem değerlendirmesinden geçmiş bilimsel literatürün], İnternet aracılığıyla; finansal, yasal ve teknik engeller olmaksızın, serbestçe erişilebilir, okunabilir, indirilebilir, kopyalanabilir, dağıtılabilir, basılabilir, taranabilir, tam metinlere bağlantı verilebilir, dizinlenebilir, yazılıma veri olarak aktarılabilir ve her türlü yasal amaç için kullanılabilir olması"dır. Çoğaltma ve dağıtım üzerindeki tek kısıtlama yetkisi ve bu alandaki tek telif hakkı rolü; kendi çalışmalarının bütünlüğü üzerinde kontrol sahibi olabilmeleri, gerektiği gibi tanınmalarının ve alıntılanmalarının sağlanması için, yazarlara verilmelidir.

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Türk Osteoporoz Dergisi, ülkemizde görev yapan fiziksel tıp ve rehabilitasyon uzmanlarına, akademisyenlerine ve osteoporoz'a ilgi duyan diğer tüm tıp branşlarına mensup uzmanlara ücretsiz olarak dağıtılmaktadır. Derginin tüm sayılarına ücretsiz olarak www.turkosteoporozdergisi.org adresinden tam metin ulaşılabilir. Dergiye abone olmak isteyen kişiler Türkiye Osteoporoz Derneği'ne başvurmalıdır.

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Materyal Sorumluluk Reddi

Türk Osteoporoz Dergisi yayınlanan tüm yazılarda görüş ve raporlar yazar(lar)ın görüşüdür ve Editör, Editöryel kurul ya da yayıncının görüşü değildir; Editör, Editöryel kurul ve yayıncı bu yazılar için herhangi bir sorumluluk kabul etmemektedir.

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AIMS AND SCOPE

Turkish Journal Of Osteoporosis is the regular publishing organ of the Turkish Osteoporosis Society. This periodical journal covers osteoporosis and metabolic bone diseases subjects. It is a periodic international journal, published in Turkish and English languages and is independent, being based on peer-review principles. The journal is published 3 times per year (April, August and December).

The aim of the journal "Turkish Journal Of Osteoporosis" is to continuously publish original research papers of the highest scientific and clinical values specifically on osteoporosis, on an international level. Additionally, reviews on basic developments in education, editorial short notes, case reports, original views, letters from the fields of physical medicine, rheumatology, rehabilitation, gynaecology containing experiences and comments as well as social subjects are published.

Thing that must be known' subjects for general practitioners giving first line medical service who are interested in osteoporosis and metabolic bone diseases, specialists in internal medicine, gynecology, rheumatology and physiotherapy will be determined It will then be possible to make the necessary adjustments to the journal "Turkish Journal Of Osteoporosis" according to their needs.

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Turkish Journal Of Osteoporosis is sent free to physiotherapy specialists, academicians in our country as well as other specialists in all branches of medicine interested in osteoporosis. All published volumes can be reached full text without fee through the web site www.turkosteoporozdergisi.org. Those who wish to subscribe to the journal should apply to the Turkish Osteoporosis Association.

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YAZARLARA BİLGİ

Türk Osteoporoz Dergisi, Türkiye Osteoporoz Derneği'nin resmi yayın organıdır.
Dergi, osteoporoz, metabolik kemik hastalıkları ve rehabilitasyon alanlarını ilgilendiren tüm konulardaki yazıları yayınlar. Dergide orijinal makalelerin dışında derleme yazıları, orijinal olgu sunumları, editöre mektuplar, bilimsel mektuplar, eğitim yazıları, yeni literatür özetleri ve gelecek kongre/toplantı duyuruları da yayınlanır.
Dergide yayınlanacak yazıların seçimine temel teşkil eden hakem heyeti, dergide belirtilen danışmanlar ve gerekirse yurt içi/dışı otörler arasından seçilir.
Yazılarda Türk Dil Kurumu'nun Türkçe Sözlüğü ve Yazım Kılavuzu temel alınmalıdır. İngilizce yazılan yazılar özellikle desteklenmektedir.
Makaleletin formatı 'Uniform requirements for Manuscripts Submitted to Biomedical Journals' (http.//www.icmje.org) kurallarına göre düzenlenmelidir.
Editör tarafından, etik kurul onayı alınması zorunluluğu olan klinik araştırmalarda onay belgesi talep edilecektir. İnsan üzerinde yapılan deneysel araştırmaların bildirildiği yazıların metnin içerisinde, yazarların bu araştırmanın prosedürünün sorumlu olan etik kurulun insan üzerine deney yapılma etik standartlarına (kurumsal ve ulusal) ve 2013 yılında revize edilen1964 Helsinki Deklarasyonuna uyulduğunu ve hastaların onaylarının alındığını belirtilmelidir. Hayvan üzerinde yapılan deneysel araştırmalarda, yazarlar yapılan prosedürlerin hayvanlar haklarına uygun olduğunu belirtilip (Guide for the care and use of laboratory animals. www.nap.edu/catalog/5140html) ayrıca etik kurulu onayı'nı alınmalıdır.
Yazıların içeriğinden ve kaynakların doğruluğundan yazarlar sorumludur.
Yazarlar, gönderdikleri çalışmanın başka bir dergide yayınlanmadığı ve/veya yayınlanmak üzere incelemede olmadığı konusunda garanti vermelidir. Daha önceki bilimsel toplantılarda 200 kelimeyi geçmeyen özet sunumlarının yayınları, durumu belirtilmek koşulu ile kabul edilebilir.
Tüm yazarların çıkar çatışma olmadığını, bilimsel katkı ve sorumluluklarını bildiren toplu imza ile yayına katılmalıdır.
Tüm yazılar, editör ve ilgili editör yardımcıları ile en az üç danışman hakem tarafından incelenir. Yazarlar, yayına kabul edilen yazılarda, metinde temel değişiklik yapmamak kaydı ile editör ve yardımcılarının düzeltme yapmalarını kabul etmiş olmalıdırlar.

Genel Kurallar

Yazılar sadece "online" olarak kabul edilmektedir. Yazarların makale gönderebilmesi için Journal Agent web sayfasına (www.journalagent.com/osteoporoz) kayıt olup şifre almaları gereklidir. Bu sistem on-line yazı gönderilmesine ve değerlendirilmesine olanak tanımaktadır. Makale gönderimi yapılırken sorumlu yazarın ORCID (Open Researcher ve Contributor ID) numarası belirtilmelidir. http://orcid.org adresinden ücretsiz olarak kayıt oluşturabilir.
Bu sistem ile toplanan makaleler ICMJE-www.icmje.org, Index Medicus (Medline/PubMed) ve Ulakbim-Türk Tıp Dizini kurallarına uygun olarak sisteme alınmakta ve arşivlenmektedir. Yayına kabul edilmeyen yazılar, sanatsal resimler hariç geriye yollanmaz.
Yazının tümünün 5000 kelimeden az olması gerekmektedir. İlk sayfa hariç tüm yazıların sağ üst köşelerinde sayfa numaraları bulunmalıdır. Yazıda, konunun anlaşılmasında gerekli olan sayıda ve içerikte tablo ve şekil bulunmalıdır.
Başlık sayfası, kaynaklar, şekiller ve tablolar ile ilgili kurallar bu dergide basılan tüm yayın türleri için geçerlidir.

Orijinal Makaleler

1) Başlık Sayfası (Sayfa 1)
Yazı başlığının, yazar(lar)ın bilgilerinin, anahtar kelimelerin ve kısa başlıkların yer aldığı ilk sayfadır.
Türkçe yazılarda, yazının İngilizce başlığı da mutlaka yer almalıdır; yabancı dildeki yayınlarda ise yazının Türkçe başlığı da bulunmalıdır. Türkçe ve İngilizce anahtar sözcükler ve kısa başlık da başlık sayfasında yer almalıdır.
Yazarların isimleri, hangi kurumda çalıştıkları ve açık adresleri belirtilmelidir. Yazışmaların yapılacağı yazarın adresi de ayrıca açık olarak belirtilmelidir. Yazarlarla iletişimde öncelikle e-posta adresi kullanılacağından, yazışmaların yapılacağı yazara ait e-posta adresi belirtilmelidir. Buna ek olarak telefon ve faks numaraları da bildirilmelidir.
Çalışma herhangi bir bilimsel toplantıda önceden bildirilen koşullarda tebliğ edilmiş ya da özeti yayınlanmış ise bu sayfada konu ile ilgili açıklama yapılmalıdır.
Yine bu sayfada, dergiye gönderilen yazı ile ilgili herhangi bir kuruluşun desteği sağlanmışsa belirtilmelidir.
2) Özet (Sayfa 2)
İkinci sayfada yazının Türkçe ve İngilizce özetleri (her biri için en fazla 200 sözcük) ile anahtar sözcükler belirtilmelidir.
Özet bölümü; Amaç, Gereç ve Yöntem, Bulgular, Sonuç şeklinde alt başlıklarla düzenlenir. Derleme, vaka takdimi ve eğitim yazılarında özet bölümü alt başlıklara ayrılmaz. Bunlarda özet bölümü, 200 kelimeyi geçmeyecek şekilde amaçlar, bulgular ve sonuç cümlelerini içermelidir.
Özet bölümünde kaynaklar gösterilmemelidir. Özet bölümünde kısaltmalardan mümkün olduğunca kaçınılmalıdır. Yapılacak kısaltmalar metindekilerden bağımsız olarak ele alınmalıdır.
3) Metin (Özetin uzunluğuna göre Sayfa 3 veya 4'den başlayarak)
Genel Kurallar bölümüne uyunuz.
Metinde ana başlıklar şunlardır: Giriş, Gereç ve Yöntem, Bulgular, Tartışma.
Giriş bölümü çalışmanın mantığı ve konunun geçmişi ile ilgili bilgiler içermelidir. Çalışmanın sonuçları giriş bölümünde tartışılmamalıdır.
Gereç ve yöntem bölümü çalışmanın tekrar edilebilmesi için yeterli ayrıntılar içermelidir. Kullanılan istatistik yöntemler açık olarak belirtilmelidir.
Bulgular bölümü de çalışmanın tekrar edilebilmesine yetecek ayrıntıları içermelidir.
Tartışma bölümünde, elde edilen bulguların doğru ve ayrıntılı bir yorumu verilmelidir. Bu bölümde kullanılacak literatürün, yazarların bulguları ile direkt ilişkili olmasına dikkat edilmelidir.
Teşekkür mümkün olduğunca kısa tutulmalıdır. Çalışma için bir destek verilmişse bu bölümde söz edilmelidir.
Çalışmanın kısıtlılıkları başlığı altında çalışma sürecinde yapılamayanlar ile sınırları ifade edilmeli ve gelecek çalışmalara ilişkin öneriler sunulmalıdır.
Sonuç başlığı altında çalışmadan elde edilen sonuç vurgulanmalıdır.
Metinde fazla kısaltma kullanmaktan kaçınılmalıdır. Tüm kısaltılacak terimler metinde ilk geçtiği yerde parantez içinde belirtilmelidir. Özette ve metinde yapılan kısaltmalar birbirinden bağımsız olarak ele alınmalıdır. Özet bölümünde kısaltması yapılan kelimeler, metinde ilk geçtiği yerde tekrar uzun şekilleri ile yazılıp kısaltılmalıdırlar.
4) Kaynaklar
Kaynakların gerçekliğinden yazarlar sorumludur.
Kaynaklar metinde geçiş sırasına göre numaralandırılmalıdır. Kullanılan kaynaklar metinde parantez içinde belirtilmelidir.
Kişisel görüşmeler, yayınlanmamış veriler ve henüz yayınlanmamış çalışmalar bu bölümde değil, metin içinde şu şekilde verilmelidir: (isim(ler), yayınlanmamış veri, 19..).
Kaynaklar listesi makale metninin sonunda ayrı bir sayfaya yazılmalıdır. Altıdan fazla yazarın yer aldığı kaynaklarda 6. isimden sonraki yazarlar için "et al" ("ve ark") kısaltması kullanılmalıdır. Dergi isimlerinin kısaltmaları Index Medicus'taki stile uygun olarak yapılır. Tüm referanslar Vancouver sistemine göre aşağıdaki şekilde yazılmalıdır.
a) Standart makale:
Intiso D, Santilli V, Grasso MG, Rossi R, Caruso I. Rehabilitation of walking with electromyographic biofeedback in foot-drop after stroke. Stroke 1994;25:1189-92.
b) Kitap:
Getzen TE. Health economics: fundamentals of funds. New York: John Wiley & Sons; 1997.
c) Kitap Bölümü:
Porter RJ, Meldrum BS. Antiepileptic drugs. In: Katzung BG, editor. Basic and clinical pharmacology. 6th ed. Norwalk, CN: Appleton and Lange; 1995. p. 361-80.
Birden fazla editör varsa: editors.
d) Toplantıda sunulan makale:
Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Reinhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561-5.
e) Elektronik formatta makale:
Morse SS. Factors in the emergence of infectious disease. Emerg Infect Dis [serial online] 1995 1(1):[24 screens]. Available from:s URL:http://www/cdc/gov/ncidoc/ EID/eid.htm. Accessed December 25, 1999.
f) Tez:
Kaplan SI. Post-hospital home health care: the elderly access and utilization (thesis). St. Louis (MO): Washington Univ; 1995.
5) Tablolar-grafikler-şekiller-resimler
Tüm tablolar, grafikler veya şekiller ayrı bir kağıda basılmalıdır. Her birine metinde geçiş sırasına göre numara verilmeli ve kısa birer başlık yazılmalıdır. Kullanılan kısaltmalar alt kısımda mutlaka açıklanmalıdır. Özellikle tablolar metni açıklayıcı ve kolay anlaşılır hale getirme amacı ile hazırlanmalı ve metnin tekrarı olmamalıdır. Başka bir yayından alıntı yapılıyorsa yazılı baskı izni birlikte yollanmalıdır. Fotoğraflar parlak kağıda basılmalıdır. Çizimler profesyonellerce yapılmalı ve gri renkler kullanılmamalıdır.

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Derginin ilgi alanına giren tüm derlemeler editörlerce değerlendirilir; editörler ayrıca konusunda uzman ve deneyimli otoritelerden dergi için derleme talebinde bulunabilir.
2) Olgu Sunumları:
Nadir görülen ve önemli klinik deneyimler sunulmalıdır. Giriş, olgu ve tartışma bölümlerini içerir.
3) Editöre Mektuplar:
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4) Bilimsel Mektuplar:
Bu yazılar orijinal araştırma yapısında olmayan bilimsel ilgi uyandırabilen yeni fikir, buluş ve verilerin sunulduğu ön bildirilerdir. Bu konuyla ilgili gelecekteki yayınlara merak uyandırmayı amaçlar. Metnin bölümleri yoktur.
5) Eğitim Yazıları:
Bu kategoride otörler osteoporoz, metabolik kemik hastalıkları ve rehabilitasyon konularındaki güncel bilgileri özetlerler.

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Tüm yazışmalar dergi editörlüğünün aşağıda bulunan posta veya e-posta adresine yapılabilir.

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Türk Osteoporoz Dergisi

TURKISH JOURNAL OF OSTEOPOROSIS

INSTRUCTIONS TO AUTHORS

The 'Turkish Journal of Osteoporosis' is an official journal of the Turkish Society of Osteoporosis. An additional supplement is also published on the occasion of the National Osteoporosis Congress.
The Journal publishes papers on all aspects of osteoporosis, metabolic bone diseases and its rehabilitation. In addition to original articles, review articles, original case reports, letters to the editor, scientific letters, educational articles, abstracts from new literature and announcements of future congresses and meetings are also published.
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Acknowledgements should be as brief as possible. Any grant that requires acknowledgement should be mentioned.
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5) Educational articles:

In this category, authors summarize the present state of knowledge regarding physical medicine, rheumatology and rehabilitation.

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Türk Osteoporoz Dergisi
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Editorial / Editörden

Sevgili Meslektaşlarımız,

Değerli meslektaşlarımıza Emerging Sources Citation Index (ESCI) tarafından indekslenen dergimize araştırma makalesi ve olgu sunumları şeklinde çalışmalarını yayınlanmak üzere düzenli olarak ilettikleri için çok teşekkür ederiz.

4-7 Mayıs 2023 tarihleri arasında gerçekleştirilmiş olan Dünya Osteoporoz Kongresi (World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases) sırasında Türkiye, Osteoporoz Derneği Dernekler Köyü'nde bir stand ile temsil edilmiş ve 2022-2023 yıllarında yapılan aktiviteler tanıtılmıştır. Ayrıca standı ziyaret eden osteoporoz hastalığı ile ilgilenen hekim ve sağlık personelinin hastaları değerlendirmede kullandıkları yaşam kalitesi ölçekleri ve risk değerlendirme araçları sorgulanmış ve sonuçlar bu sayıda kısa bir rapor olarak paylaşılmıştır. Bu kongre sırasında dernek başkanımız Prof. Dr. Şansın Tüzün osteoporoz alanında yapmış olduğu çalışmalar nedeniyle ESCEO Medal of Excellence ile ödüllendirilmiştir.

Türkiye Osteoporoz Derneği tarafından osteoporoz, osteoartrit ve kas-iskelet sistemi ağrıları ile ilgili bilgilerimizi güncellemek amacıyla düzenlenen; OSTEOAKADEMİ 2023 Sempozyumu Prof. Dr. Yeşim Gökçe Kutsal başkanlığında 12-14 Haziran 2023 tarihlerinde Crowne Plaza Otel-Kapadokya'da gerçekleşmiştir.

Sempozyumun içeriğinde gerek akademik çalışma ve araştırmalarda gerekse günlük hekimlik uygulamalarında sıklıkla karşılaşılan; "Osteoporozda karmaşık olgular-sorular ve yanıtlar, kas-iskelet ağrısında klinik yaklaşım nasıl olmalı? Nöropatik ağrıya klinik yaklaşımda yeni ne var? Sarkopenide güncelleme-tanım ve değerlendirme, osteoporoz tedavilerinde yenilikler, fiziksel aktivite: Ne kadarı çok? Düşmelerin öngörülmesi ve önlenmesi, osteoporoz ve osteoartritte yaşam kalitesi nasıl değerlendirilmeli? Osteoporoz ve osteoartritte obezite ve kilo kaybı, D vitamini ile kas-iskelet sistemi hastalıkları ilişkisi, osteoartrit tedavilerinde yenilikler, osteoartritte PRP, kök hücre tedavileri, osteoporozda kişiselleştirilmiş yönetim, osteoartritte kişiselleştirilmiş yönetim, osteoporozda sürekli veya aralıklı tedaviler, osteoporotik kırık sonrası yaklaşım nasıl olmalı?" konularına yönelik bir program hazırlanmış, osteoporoz ve osteoartrit yanında ağrıya, yaşam kalitesinde olumsuz etkilenmelere ve iş gücü kaybına neden olan farklı kas-iskelet sistemi sorunlarına da yer verilmiştir. Yüz altmış beş katılımla gerçekleşen OSTEOAKADEMİ 2023 kapsamında 4 ana konferans, 4 tartışmalı yuvarlak masa oturumu, 2 uzmanına danış toplantısı, 5 panel formatında deneyim paylaşımı oturumu, 4 uydu sempozyum yapılmış ve 33 bildiri sunulmuştur.

Siz değerli meslektaşlarımıza çalışmalarınızda kolaylıklar dileyerek, sevgi ve saygılarımı sunarım.

Editör
Prof. Dr. Yeşim Kirazlı

Review / Derleme

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The Exercise Recommendation for Patients with Osteoporosis: Which Type of Exercise and When?

Osteoporoz Hastaları için Egzersiz Önerileri: Hangi Egzersiz Türü? Ne Zaman?

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Abstract

Exercises are crucial for enhancing and maintaining bone and muscle health. 'Preventative Strategies' including certain exercises are fundamental in osteosarcopenia's management. Determining the Frequency, Intensity, Time, and Type are major elements of prescribing an effective exercise program for osteoporosis. Patients with osteoporosis may need modifications in exercise programs due to pain, kyphosis, poor balance, arthritis, frailty, neuromuscular impairments, and cardiovascular and/or pulmonary diseases. In addition, specific exercises for accompanying disorders should be given priority. Consequently, exercise recommendations for osteoporosis must be target-specific, safe, effective, and tailored to patients' needs.

Keywords: Osteoporosis, exercise, prevention of bone health

Öz

Egzersizler kemik ve kas sağlığını korumak ve geliştirmek için çok önemlidir. Belirli egzersizleri içeren 'Önleyici Stratejiler' osteosarkopeni yönetiminde esastır. Sıklık, yoğunluk, zaman ve egzersiz türünün (*Frequency, Intensity, Time, Type*) belirlenmesi, osteoporoz için etkili bir egzersiz programının reçete edilmesinin ana unsurlarıdır. Osteoporozlu hastalar ağrı, kifoz, denge bozukluğu, artrit, kırılganlık, nöromusküler bozukluklar ve kardiyovasküler ve/veya pulmoner hastalıklar nedeniyle egzersiz programlarında değişikliklere ihtiyaç duyabilir. Ayrıca, eşlik eden bozukluklara yönelik özel egzersizlere öncelik verilmelidir. Sonuç olarak, osteoporoz için egzersiz önerileri hedefe özgü, güvenli, etkili ve hastaların ihtiyaçlarına göre uyarlanmış olmalıdır.

Anahtar kelimeler: Osteoporoz, egzersiz, kemik sağlığının korunması

Introduction

Osteoporosis (OP) and sarcopenia are growing public health problems in parallel with the increase in the elderly population. Certain genetic, mechanical, nutritional and endocrine factors are blamed in the development of these two diseases, which often accompany each other. Dietary supplements and exercises focused on the preservation of bone mineral density (BMD) and muscle health are crucial in healthy aging. This is named as 'Preventative Strategy' (1).

Mechanical, biochemical and endocrine interrelations have been described between muscle activity and bone metabolism. Especially, progressive resistance exercises stimulate osteoblastogenesis and muscle protein synthesis, leading to better bone microarchitecture, improved muscle mass and strength, and higher functional capacity, in older individuals (1). Moreover, exercises benefit by increasing mobility and functional capacity through endothelial, myocardial and cognitive adaptations (1).

Exercises modulate the dynamic balance between bone formation and resorption by creating mechanical stimuli. Mechanical forces such as compression, strain, tension, and fluid shear stress promote osteoblast differentiation and mineralization, reduce bone loss, increase bone strength and prevent OP in older adults (2). The effects of gravity and appropriate mechanical stimuli are crucial in bone metabolism.

Estrogen, parathyroid hormone, and glucocorticoids play a key role in bone metabolism and remodeling (3-6). Estradiol inhibits

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TRPV5 RANKL expression and promotes OPG expression (2). Exercise could increase serum estradiol and serum testosterone levels (7-9). Moderate intensity exercises reduce proinflammatory cytokines such as IL-1, IL-6, and TNF-α, which can increase bone resorption, while promoting anti-inflammatory cytokines that support bone mineralization such as IL-2, IL-19, IL-12, IL-13, IL-18, and IFN-α (10).

Exercise may have cellular effects on bone metabolism. It leads to osteoblast differentiation and osteoclast inhibition via Wnt/β-catenin, BMP and OPG/RANKL/RANK signaling pathways (11,12). Also, it regulates noncoding RNAs (siRNA, microRNAs, lncRNA, and circRNA) activating bone formation (13). Bone remodeling is closely related to vascularity in terms of the microenvironment in which it occurs. Vascular endothelial growth factor, hypoxia-inducible factor 1, epidermal growth factor-like, nephronectin, FGF, matrix metalloproteinase and Notch signaling pathways have been reported to be involved in communication between osteoblasts/osteoclasts and angiogenesis (12,13). Another effect of exercise on bone formation could be regulating angiogenic factors. Mechanical loading has been shown to increase periosteal vascularity (12). The mechanisms of the effects of exercise on bone metabolism are summarized in Figure 1.

Exercise recommendations aiming at the prevention of osteoporotic fracture should address not only bone quality but also fall-related risk factors. This can be achieved by multimodal exercise approaches involving at least two activity modes including weight-bearing impact exercises (WBIEs), progressive resistance or high-velocity power training, interventions enhancing balance, posture and functional task activities (14). Besides, an exercise prescription must describe the appropriate dose, modality and intensity. Frequency, Intensity, Time and Type are major domains of an effective exercise program.

Exercise Modalities

a) Weight-bearing Impact Exercises

The close relationship between the reduced effect of gravity and bone mass loss underpins the importance of impact loading exercises in preventing OP. Bone responds well to intermittent, rapid, high magnitude and multidirectional dynamic forces (the adequate load) (14). On the other hand, bone cells desensitize to continuous forces or uniform repetitive cycles of loading over time (15). This perspective should be considered when prescribing a clinical exercise program for OP (16). The response of bone metabolism to a resistance or loading exercise is based on the principles of specificity, progressive overload, reversibility, initial values and diminishing returns (17).

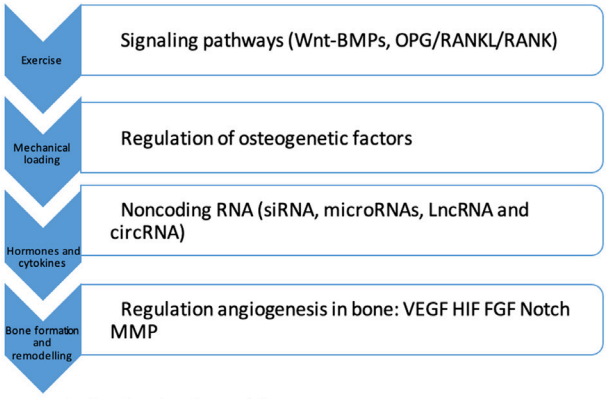

Figure 1. The effects of exercise on bone metabolism

Principle of specificity: Exercise is not systemic in nature and should be planned according to the region. Therefore, the exercise prescription should include activities known to load the relevant skeletal region (14).

Principle of progressive overload: During an exercise, the load exerted on the bone by gravity or muscle forces must be further than the loading encountered during daily activities. The loading stimulus must be increased gradually as the bone adapts (14).

Principle of reversibility: The skeletal benefits of exercise are gradually lost when the exercise program is discontinued but it is not yet clear what minimum exercise dose is required to maintain skeletal gains (14).

Principle of initial values: With loading, the most significant changes in bone occur in those with the lowest initial BMD (18).

Principle of diminished returns: Once skeletal adaptation is gained after the first exercise, subsequent adaptations are likely to be slower with a similar loading mode and intensity. This is an example of the "Principle of Cellular Adaptation", in which bone initially responds strongly to a sufficient load, but this response will gradually decrease as cells adapt to new mechanical forces (19).

When determining the duration of the exercise program, it should be noted that the response of bone is late, as the typical remodeling cycle takes 3-8 months (14). Therefore, interventions should last at least 6-9 months (preferably 12 to 24 months) (14). It has been reported that the greatest changes in BMD occur in the first 5-6 months over 12-18 months with various exercise interventions (20,21). However, there is also research showing a linear increase in BMD with continuous exercise training (22,23). Consequently, an exercise program for OP should be long-term and gradually increase in intensity.

At least weekly 4 sessions of WBIEs including versatile movement patterns are recommended to prevent bone loss in older adults (16). Several exercise trials involving 2-3 sessions of progressive stepping and jumping training per week or weighted vest jumping (average of 52 jumps per session) have been reported to improve proximal femoral BMD in postmenopausal women compared to controls (24,25). However, to increase peak bone density, it is recommended to perform weight-bearing and impact loading exercises from childhood and young adulthood (26). Exercises applied in early ages provide lifelong gains, unlike those started at older ages (23). Bassey et al. (27) reported that 50 vertical jumps (aiming to load 4 times the body weight) per day, 6 days a week for 12 months had no significant effect in postmenopausal women, despite its benefits in the premenopausal period.

The loads applied in weight-bearing exercises must exceed the usual forces in daily living activities to create adequate response in the bone structure. In a study of 14 postmenopausal elderly women evaluating the osteogenic effects of different exercises at various intensities on the femoral neck; jumping, running (5-9 km/h) and fast walking (5-6 km/h) exercises were founded to have more compressive and tensile strains than walking at 4 km/h, which was considered the minimal loading level for bone preservation (28).

During WBIEs, strains emerging from accompanying muscular activity contribute to osteogenic effects of ground reaction forces. A study of 20 postmenopausal women used computational modeling to predict specific muscles loaded in the femoral neck during various activities (normal walking, brisk walking, stair climbing and descending, and vertical jumping) using strain-distribution models along the proximal femur; and found a number of key findings that could be used to guide the design of future exercise programs for older adults (29). These findings can be listed as follows: a) trochanteric region subjects to highest strains for all activities, b) stair ambulation and vertical jump causes higher strains on the anterior and upper parts of the femoral neck (key areas prone to weakness and fracture) than walking, c) hip extensors are responsible for inducing strains in the femoral neck during stair ambulation and jumping, as opposed to inducing the iliopsoas muscle with walking, d) the ground reaction forces associated with each exercise are closely related to the stretch level. The peak vertical ground reaction forces of common weight bearing activities are given in Figure 2 (14,30-32).

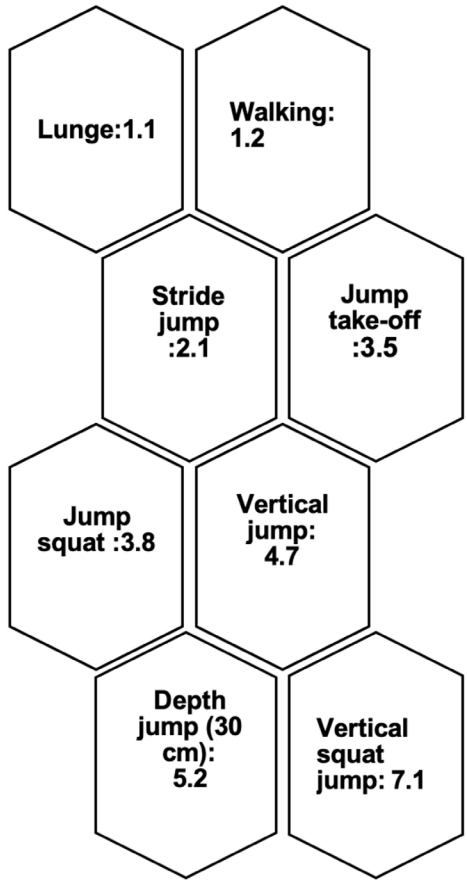

Figure 2. The peak vertical ground reaction forces of common weight bearing activities (normalized to body weight) (14,30-32)

b) Progressive Resistance Training

Resistance exercises have various mechanical effects on bones. Muscle contractions impose compressive, bending, and rotational loads on the skeletal areas they cross over; but distraction on cortical bone in the enthesis areas (33). Bone formatting effects of progressive resistance exercises are limited areas where they create mechanical load rather than the whole skeleton. Therefore, exercise protocols should include muscles related to or crossing over the areas at high risk for fragility fractures, such as the spine and hips (14).

Resistance training exercises (hip extension and flexion, hip abduction and adduction) performed at 40-60% of maximum muscle strength induce bone stresses equivalent to less than that reported during walking at normal speed (28). Therefore, it is recommended that resistance exercises that address osteoporosis should be applied at a high intensity (80-85% of 1 repetetif maximum) and speed (high-velocity power exercises). High-velocity and vigorous muscle activities may reduce exercise compliance in elderly patients due to pain, degenerative joint diseases, and sarcopenia. This may also explain the mixed findings regarding the effects of resistance training on hip BMD in older women (14). For safe and effective exercise protocol for elderly and frail patients, moderate-intensity and smooth strengthening exercises are recommended to control pain and increase muscle strength at the beginning, followed by a gradual increase in resistance and velocity (16).

c) Posture, Balance, and Mobility Exercises

The clinical significance of OP is associated with an increased risk of fracture. In this context, strategies to prevent trauma such as falling should not be ignored in the management of OP. Fall prevention requires proper postural control, sufficient dynamic and static balance abilities, and safe mobility (34).

OP may cause kyphotic posture disorder as a result of asymmetric deformities on the thoracolumbar vertebrae. Increased thoracic kyphosis and forward head posture may adversely affect postural control and mobility in elderly patients (35,36). Back muscle strengthening exercises can prevent vertebral anterior compression fracture and reduce the progressive kyphotic deformity (14).

Tai-Chi may be a good choice for balance training in elderly patients with OP (37). The difficulty levels of balance exercises should be modified considering the accompanying muscle weakness, pain and degenerative joint problems. Balance exercises should be started after the sufficient muscle activity level is achieved with progressive strengthening exercises in fragile patients. On the other hand, weight-bearing activities are

unsafe unless the patient has adequate balance and postural control (14).

Graded mobility exercises implemented in the balance training may be beneficial for the functionality of the patient. Lower extremity muscle strength is crucial for effective mobility whereas upper extremity extensor muscles gain importance in transfer activities (38,39). Progressive strengthening and neuromuscular control exercises targeting selected muscle groups contribute to mobility (40).

Conclusion

Exercise recommendations for OP are summarized in Table 1. WBIEs could be performed as 10-20 repetitions of vertical, multidirectional jumps, hopping, bounding or drop jumps in 3 to 5 sets with 1 to 2 minutes of rest periods in 4 to 7 sessions per week. Weight-bearing activities such as tennis, dancing, and football could be incorporated into impact exercises for appropriate individuals (14,16,40). Progressive resistance exercises should include major muscle groups such as iliopsoas, quadriceps femoris, erector spinae, gluteus maximus and hip abductors. Intensity and frequency could be determined as a load of 80-85% of a maximum repetition or ≥16 points of perceived exertion on the Borg scale in 2 to 3 sets with 1 to 3 minutes of rest periods in 2 sessions per week. High velocity resistance exercises and functional training for lower extremities could be added (24,16,40). Another crucial component, balance training, should be implemented in the exercise program. Static and dynamic balance exercises such as single leg stance, tandem stance, and toe and heel walking could be applied while eyes open and closed. Posture exercises should be also included. Patients sholud avoid deep forward spine flexion (14). Mind-body exercises such as Tai-Chi may be a good option for balance and posture training. Modification is necessary for patients with pain, kyphosis, poor balance, arthritis, frailty or neuromuscular impairment, cardiovascular and/or pulmonary disease.

Consequently, it is crucial to develop comprehensive exercise programs in terms of preventing/delaying OP and preventing mortality and morbidity related to fragility fractures. Safe, effective, and patient-tailored exercises must be considered an essential part of OP treatment.

Table 1. Exercise recommendations for osteoporosis

Low risk indication • Asymptomatic osteoporosis • Normal bone mineral densitometry • T-score >-1 standard deviation (SD)	**Goal:** To maximize bone mass strength and to improve muscle strength • Weight-bearing impact exercise (WBIE) • Progressive resistance exercise • Power training • Balance training
Moderate risk indication • T-score: -1 to -2.5 SD • Clinical or functional risk factors	**Goal:** To enhance muscle power and function training in technique and supervision is essential. • WBIE • Progressive resistance exercise • Power training • Balance training *Similar to low risk indication
High risk indication • T-score <2.5 SD • Previous fracture or multiple risk factors for fracture	**Goal:** Moderate/low impact activities (2-3 body weight) within the limits of pain under supervision railing, secure support is necessary

Ethics

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: J.M., Concept: J.M., Design: D.E.B., Data Collection or Processing: L.K., Analysis or Interpretation: L.K., Literature Search: D.E.B., J.M., Writing: D.E.B., J.M.

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Geriatrik Bireylerde Koronavirüse Yakalanma Korkusunun Yaşam Doyumu ile İlişkisi

Relationship Between Fear of Coronavirus and Life Satisfaction in Geriatric Individuals

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Öz

Amaç: Bu çalışma geriatrik bireylerde koronavirüse yakalanma korkusunun yaşam doyumu ile ilişkisini araştırmak amacıyla planlanmıştır.
Gereç ve Yöntem: Demografik bilgi formu, Koronavirüs Korkusu ölçeği (KKÖ) ve Yaşam Doyumu ölçeği (YDÖ) veri toplama aracı olarak kullanılmıştır. Çalışmaya 65 yaş üstü 79 kişi dahil edilmiştir.
Bulgular: Çalışmanın sonucunda yaşam doyumu ile koronavirüs korkusu arasında düşük düzeyde pozitif ilişki olduğu görülmüştür ($p<0,05$). YDÖ üzerinde KKÖ'nün %7'lik etkisi istatistiksel olarak anlamlıdır (F5,504 $p=0,022$). YDÖ'yü bir birimlik artış KKÖ'yü 0,210 birim istatistiksel olarak anlamlı şekilde artırmaktadır ($p<0,05$).
Sonuç: Pandeminin sonlarında yapılan bu çalışma geriatrik bireylerin hayatın içinde olmasının ve günlük yaşamda fiziksel olarak aktif olmasının yaşam doyumunu olumlu yönde etkilediğini göstermektedir.
Anahtar kelimeler: Geriatri, koronavirüs, korku, yaşam doyumu

Abstract

Objective: This study was planned to investigate the relationship between the fear of coronavirus and life satisfaction in geriatric individuals.
Materials and Methods: Demographic information form, Coronavirus Fear scale (CFS), and Life Satisfaction scale (LSS) were used as data collection tools. Seventy-nine people over the age of 65 were included in the study.
Results: As a result of the study, there was a low level of positive correlation between life satisfaction and fear of coronavirus ($p<0.05$). The 7% effect of CFS on LSS was statistically significant (F5,504 $p=0.022$). A one-unit increase in the LSS significantly increased the CFS by 0.210 units statistically significantly ($p<0.05$).
Conclusion: This study conducted at the end of the pandemic shows that the presence of geriatric individuals in life and being physically active in daily life positively affects life satisfaction.
Keywords: Geriatrics, coronavirus, fear, life satisfaction

Giriş

Koronavirüs hastalığı-2019 (COVİD-19), dünya genelinde karmaşık, sürekli gelişen ve değişen bir durum yaratmıştır. Bu durum, insanların kendilerini ya da sevdiklerini kaybetme korkusu, sağlık kurumlarına ulaşamama endişesi, gıda sıkıntısı yaşama korkusu, enfekte olma veya başkasına virüs bulaştırma korkusu, işsiz kalma korkusu gibi pek çok kaygıya yol açmaktadır. Bu korkular, fiziksel sağlıklarını olumsuz etkilemenin yanı sıra, kaygı ve depresyon gibi çeşitli psikolojik sorunları da tetiklemektedir. COVİD-19'un ilanından sonra negatif duyguların (kaygı, depresyon ve öfke) arttığı ve olumlu duyguların ve yaşam doyumu puanlarının azaldığı görülmüştür (1).

Yaşam doyumu, belirli bir duruma yönelik değil, genel olarak tüm yaşantıda kişinin iyi hissetme durumunu ifade eder. Araştırmalar, yaşlı bireylerde cinsiyet (kadın olma), depresyon, fonksiyonel durum, mali durum, sosyal destek, günlük yaşam aktiviteleri performansı gibi faktörlerin yaşam kalitesi ve doyumu üzerinde etkili olduğunu göstermektedir (2). Yaşlı bireylerin yaşam doyumları ile yaşam tutumları arasında olumlu yönde anlamlı bir ilişki olduğu belirlenmiştir (3). Yapılan araştırmalar, yaşam doyumu yüksek bireylerin sağlıklı bir yaşam tarzına, yüksek

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düzeyde sosyal işlevselliğe, olumlu sosyal ilişkilere, uyumlu bir kişilik yapısına ve kişisel gelişime açık bir zihinsel yapıya sahip olduğunu göstermektedir (4).

COVİD-19 ile artan korkunun, endişenin insanların davranışlarına yansıdığı gözlemlenmiştir. COVİD-19 sürecinde kaygılı bireylerin yaşam doyumu düzeylerinin düşük olduğu ve depresyon belirtilerinin arttığı görülmüştür (5). Bu çalışmanın amacı, geriatrik bireylerde COVİD-19'a yakalanma korkusunun yaşam doyumu üzerindeki etkisini araştırmaktır.

Gereç ve Yöntem

Bu çalışma, Alanya Alaaddin Keykubat Üniversitesi Eğitim ve Araştırma Hastanesi'nde gerçekleştirilen bir kesitsel araştırmadır ve 65-85 yaş arası bireyler üzerinde yapılmıştır. Çalışmaya, ciddi mobilite sorunları yaşayanlar, görme kaybı olanlar, nörolojik ve mental problemi olan bireyler dahil edilmedi. Helsinki Deklarasyonu ilkelerine uygun olarak yürütülen bu çalışma İstanbul Okan Üniversitesi Etik Kurulu tarafından onaylanmıştır (karar no: 9, tarih: 10.11.2021). Tüm hastalar bu çalışmaya katılmadan önce yazılı bilgilendirilmiş onam vermişlerdir.

Çalışmaya katılan bireylerin sosyodemografik özellikleri kaydedildi. Karşılıklı soru cevap yoluyla katılımcıların Koronavirüs Korkusu ölçeği (KKÖ) ve Yaşam Doyum ölçeği (YDÖ) anketlerini doldurmaları sağlandı.

Hasta Değerlendirme Formu: Araştırmacı tarafından tasarlanan bu form, katılımcıların sosyodemografik özelliklerini içeren 18 sorudan oluşmaktadır. Yaş, cinsiyet, boy, vücut ağırlığı, meslek, öğrenim durumu, sosyal güvence ve medeni durum gibi bilgilerin yanı sıra genel hastalık bilgileri, düşme öyküsü, özgeçmiş ve yardımcı cihaz kullanımı da kaydedildi.

KKÖ: Bu ölçek tek boyutlu olup 7 maddeden oluşmaktadır ve ters maddesi bulunmamaktadır. Toplam puan, bireyin yaşadığı COVİD-19 korkusunu yansıtmaktadır ve 7 ile 35 arasında değişen puanlar alınabilmektedir. Yüksek puanlar, yüksek düzeyde COVİD-19 korkusu yaşandığını gösterir (6).

YDÖ: YDÖ, yetişkin bireylerin yaşam doyumunu ölçmek amacıyla kullanılır. Toplam 21 madde içerir ve Likert tipinde beşli derecelendirme kullanılmıştır (1= Hiç uygun değil, 2= Uygun değil, 3= Kısmen uygun, 4= Uygun, 5= Tamamen uygun). Ayrıca 6. madde tersinden puanlanır. Puan aralığı 21 ile 105 arasında değişir ve yüksek puanlar, bireyin yaşamına olumlu bir şekilde baktığını gösterir (4).

İstatistiksel Analiz

Veriler, IBM SPSS Statistics for Windows, Version 25.0 programı kullanılarak analiz edildi. Çalışmada, kategorik ve sürekli değişkenler için tanımlayıcı istatistikler (ortalama, standart sapma, ortanca değer, minimum, maksimum, sayı ve yüzdelik dilim) hesaplandı. Parametrik testlerin ön şartlarından varyansların homojenliği Levene testi ile kontrol edildi ve normallik varsayımı Shapiro-Wilk testi ile incelendi. İki grup arasındaki farklılıklar değerlendirilmek için Mann-Whitney U testi kullanıldı. Sürekli iki değişken arasındaki ilişki, Pearson korelasyon katsayısı ile değerlendirildi. Yordanan ve yordayıcı değişkenlerin en az eşit aralık ölçeğinde ölçülen sürekli değişken olmaları ve normal dağılım göstermeleri gereklidir (7). Çalışmada, YDÖ'nün KKÖ üzerindeki etkisini değerlendirmek için regresyon analizi tekniği kullanıldı ve $p<0,05$ düzeyi istatistiksel olarak anlamlı kabul edildi.

Bulgular

Katılımcıların demografik özellikleri Tablo 1'de gösterilmiştir.

Tablo 2 incelendiğinde KKÖ minimum 7 maksimum 27 puan almaktadır. Puan ortalaması 16,52±6,719 olarak bulunmuştur. YDÖ minimum 70 maksimum 100 puan almaktadır. Puan ortalaması ise 83,27±8,165 olarak bulunmuştur.

KKÖ cinsiyete göre istatistiksel olarak anlamlı farklılık göstermemektedir ($p>0,05$) (Tablo 3).

YDÖ ile KKÖ arasında pozitif yönlü düşük düzeyde istatistiksel olarak anlamlı ilişki vardır ($p<0,05$). YDÖ üzerinde KKÖ'nün %7'lik etkisi istatistiksel olarak anlamlıdır ($F5,504$ $p=0,022$). Katsayılar incelendiğinde YDÖ'deki bir birimlik artış KKÖ'yü

Tablo 1. Demografik özellikler (n=79)

		Ortalama ± SS	Min-maks
Yaş (yıl)		68,65±4,46	62-88
Boy (cm)		163,01±7,43	150-184
Kilo (kg)		71,43±11,61	40-107
		n	**%**
Cinsiyet	Erkek	41	52
	Kadın	38	48
Meslek	Çalışmıyor	6	8
	Emekli	43	54
	Ev hanımı	19	24
	Serbest meslek	8	10
	Devlet	3	4
Öğrenim durumu	İlkokul	45	57
	Orta öğretim	13	16
	Lise	17	22
	Üniversite	4	5
Medeni durum	Bekar	11	14
	Evli	68	86
Dominant el	Sağ	63	80
	Sol	16	20
Düşme öyküsü	Hiç yok	23	29
	1-2 kez	41	52
	2'den fazla kez	15	19
Sigara	Hayır	68	86
	Evet	11	14
Yardımcı cihaz	Yok	79	100

Özet istatistikler sayısal veriler için ortalama ± standart sapma, kategorik veriler için sayı (yüzdelik) değer olarak verilmiştir. Min-maks: Minimum-maksimum, SS: Standart sapma

0,210 birim istatistiksel olarak anlamlı şekilde artırmaktadır (p<0,05) (Tablo 4).

Tartışma

Geriatrik bireylerde koronavirüse yakalanma korkusunun ve yaşam doyumunun incelendiği bu çalışmanın sonucunda eğitim düzeyi arttıkça yaşam doyumunun arttığı, yaşam doyumu ile koronavirüs korkusu arasında düşük düzeyde pozitif ilişki olduğu görülmüştür.

Arısoy ve Çay (2021) (8) yaptıkları çalışmada sosyo-demografik özelliklerle COVİD-19 korkusunun ilişkisine bakmışlardır. Yaş ve COVİD-19 korkusu arasında orta düzey ve pozitif yönlü bir ilişki bulunmuştur. Ayrıca COVİD-19 korku düzeyi; eğitim seviyesi, bireylerin cinsiyeti, evli olunup olunmaması, çocuk sahibi olunup olunmaması ve ikamet edilen yere göre farklılık göstermiştir. Eğitim düzeyi düştükçe COVİD-19 korkusu artmıştır (8). Bu çalışmada da cinsiyet ile COVİD-19 korkusu ilişkisine bakılmıştır fakat anlamlı bir farklılık görülmemiştir.

Türkiye'de yapılan bir çalışmaya göre sosyal izolasyon kurallarına uymak zorunda olan yaşlı bireylerin koronavirüs nedeniyle korku ve yalnızlıklarının arttığı ortaya konulmuştur (9).

Türkiye'de COVİD-19 pandemisinin başında yaşlı bakımevinde yapılan bir çalışmanın sonuçlarına göre KKÖ ortalamaları 9,13±4,28 bulunmuş bunun da ortalama bir değer olduğu bildirilmiştir (10).

Tablo 2. Ölçek özellikleri (n=208)

	Ortalama ± SS	Min-maks
KKÖ	16,52±6,71	7-27
YDÖ	83,27±8,16	70-100

Özet istatistikler ortalama ± standart sapma; minimum ve maksimum değer olarak verilmiştir. KKÖ: Koronavirüs Korku ölçeği, YDÖ: Yaşam Doyumu ölçeği, SS: Standart sapma, Min-maks: Minimum-maksimum

Yunanistan'da yine pandeminin başında yapılan bir çalışmada aynı ölçeğin ortalama skorları 18,48±5,32 olarak rapor edilmiş (11). Türkiye'de Haziran 2022'de yapılan başka bir çalışmada ise orta düzey COVİD-19 korkusu bildirilmiştir (12).

Her üç çalışmanın sonuçları da bu çalışmanın sonuçlarına benzerdir. Bu çalışmada da orta düzeyde korku bulunmuştur. Çalışmanın verileri pandeminin son dönemde toplanması, bireylerin COVİD-19 ile ilgili bilgi sahibi olması ve artık 3. doz aşılama çalışmalarının başlaması nedeniyle orta düzeyde korku düzeyi çıkmış olabileceği düşünülmüştür.

Sosyodemografik faktörler, sağlık koşulları ve ruh sağlığı dahil olmak üzere birçok farklı faktör, COVİD-19 pandemisi nedeniyle korku ve endişe algısına katkıda bulunur.

Polonya'da Kasım-Aralık 2020'de 60 yaş üstü bireylerde yapılan bir çalışmada COVİD-19 korkusunun kadınlarda yüksek olduğu bildirilmiştir (13).

KKÖ'nün belirlenmesinin en önemli belirleyicilerinden ikisi kaygı ve cinsiyettir. Erkekler, COVİD-19 enfeksiyonuna yakalanma konusunda kadınlara göre daha az endişe duymaktadırlar. Kadınlarda bu endişenin yüksek oluşunun sebebi depresyon, kaygı ve stres gibi fonksiyonlarla yaşadıkları endişenin bağlantılı olmasıdır. Çeşitli çalışmalardan elde edilen bu sonuç diğer bilimsel verilerle ve yayınlarla tutarlıdır (10).

Bu çalışmada da kadınlarda COVİD-19 korku düzeyi yüksek çıkmıştır. Erkeklerin COVİD-19 korku düzeyi ölçeklerinin düşük olma sebebi, pandemi halini çok önemsememeleri olabilir.

Duong'un (2021) (14) yaptığı çalışma da COVİD-19 korkusu ve kaygısının psikolojik sıkıntı ve uyku bozukluğu ve yaşam doyumu ile güçlü bir şekilde ilişkili olduğunu ortaya koymuştur. Bu çalışmada COVİD-19 korkusu ile yaşam doyumu arasında düşük düzeyde pozitif ilişki bulunmuştur. Bu bize COVİD-19 pandemisi ve yaşanan sıkıntıların aslında geriatrik bireylerde daha çok yaşama bağlandığını düşündürdü. Pandeminin başında yaşam

Tablo 3. Ölçeklerin demografik özelliklere göre değerlendirilmesi (n=79)

		KKÖ		YDÖ	
		Ortalama ± SS	Min-maks	Ortalama ± SS	Min-maks
Cinsiyet	Erkek (n=41)	15,41±5,97	7-26	84,93±8,09	71-100
	Kadın (n=38)	17,71±7,33	7-27	81,47±7,96	70-100
Test istatistiği		-1,580[1]		-1,838[1]	
p		0,114		0,066	

[1]Mann-Whitney U test (z); özet istatistikler ortalama ± standart sapma; minimum ve maksimum değer olarak verilmiştir. KKÖ: Koronavirüs Korku ölçeği, YDÖ: Yaşam Doyumu ölçeği, SS: Standart sapma, Min-maks: Minimum-maksimum

Tablo 4. Yaşam Doyumu ölçeğinin Koronavirüs Korku ölçeği üzerindeki etkisinin değerlendirilmesi (n=79)

		Standardize edilmemiş		Standardize edilmiş	t	Model anlamlılığı
		B ± SE	(%95 GA)	Beta		
KKÖ	Sabit	-0,917±7,469	-15,789;13,955		-0,123	**F=5,504 p=0,022*** R^2=0,067
	YDÖ	0,210±0,090	0,032;0,388	0,258	2,346*	

*p<0,05; özet istatistikler β katsayısı (%95 güven aralığı) değer olarak verilmiştir. GA: Güven aralığı, KKÖ: Koronavirüs Korku ölçeği, YDÖ: Yaşam Doyumu ölçeği, SE: Standart hata

doyumunu negatif yönde etkilemiş olsa bile daha sonrasında bu yaşananlar geriatrik bireylerde daha çok yaşam doyumunu az da olsa olumlu etkilemiş olabilir.

Pandemi öncesi yapılan bir çalışmada geriatrik bireylerin hareketsiz kalması ve fiziksel aktivitelerinin azalmasının iyilik halini etkilediği belirtilmiştir (15). Pandeminin başında 65 yaş üstü bireyler zorunlu sosyal izolasyona alınmıştır. Bu çalışmanın yapıldığı dönemde ise izolasyon olmadığı için ve kişiler normal yaşantısına döndüğü için yaşam doyumu ortalamaları ortalamanın üzerinde bulunmuş olabilir. Çalışmaya katılan bireylerde sosyal ortamlara ve sevdiklerine kavuşmanın yaşam doyumu üzerinde pozitif etkili olduğunu düşünmekteyiz. Arpacıoğlu ve ark.'nın (2021) (16) huzurevinde yaşayan yaşlı bireylerde yaptığı çalışmanın bulguları uzun süreli karantinaların neden olduğu sosyal izolasyon nedeniyle geriatrik bireylerin yüksek psikolojik sıkıntıya ve düşük yaşam memnuniyetine sahip olduğunu göstermiştir. Çocukları ve torunları ile 2 haftadan uzun süre görüşmeyenlerde daha düşük yaşam doyumu ortalamaları görülürken, yüksek depresyon skorları saptanmıştır (16).

Kadınlar, erkeklere göre COVİD-19 salgınından daha olumsuz yönde etkilenmişlerdir. Aynı şekilde yaşlılar da yetişkinlere göre COVİD-19 korkusu, kaygı ve psikolojik rahatsızlık açısından olumsuz yönde etkilenmişlerdir (17). COVİD-19 sürecinde insanlar bu süreçle ilgili bilinçlenmiş, bu bilinçle birlikte insanların pandemiyle mücadele etme güçleri artmış ve insanlar mental olarak güçlenmişlerdir. Bu çalışmanın sonuçları pandemi başında yapılan çalışmalara göre farklılık göstermektedir. Pandeminin başında tüm bireylerde hastalık hakkında bilinmezliklerin olması ve aşılama başlamadığı için korku yüksek ve yaşam doyumu düşük iken pandeminin sonlarında hem bireylerin bilinçlenmesi hem de aşı ile COVİD-19 enfeksiyonu semptomlarının hafif atlatılmasını gözlemlemeleri sayesinde korku düzeyi çok değişmezken yaşam doyumunda artış olduğunu düşünmekteyiz.

Sonuç

Yaptığımız çalışma geriatrik bireylerde COVİD-19 korkusunun yaşam doyumuna etkisini değerlendirmektedir. Bu çalışmanın sonuçları; bu çalışmanın pandemi döneminde, özellikle sosyal izolasyonda yapılan benzer çalışmalardan farklı sonuçlar göstermesi geriatrik bireylerin hayatın içinde sevdikleri ile birlikte olmasının ve günlük yaşamda fiziksel olarak aktif olmasının yaşam doyumunu olumlu yönde etkilediğini göstermektedir.

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Retrospective Comparison of the Effect of IL-17 Blocker Therapy and Anti-TNF Agent Therapy on Bone Mineral Density in Axial Spondyloartropathy Patients

Aksiyel Spondiloartropatili Hastalarda IL-17 Bloker Tedavisi ve Anti-TNF Ajan Tedavisinin Kemik Mineral Yoğunluğu Üzerine Etkisinin Retrospektif Karşılaştırılması

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Abstract

Objective: Our aim was to compare the bone mineral density (BMD) levels in axial spondyloarthropathy (AxSpA) patients treated with tumor necrosis factor-α (TNFα) agents and interleukin-17 (IL-17) blockers.

Materials and Methods: This retrospective study was approved by the local ethics committee (07/01/2020, 7). We evaluated the medical records of AxSpA patients treated with either anti-TNFα or IL-17 blocker. Sixty-six patients with two consecutive dual energy X-ray absorptionmetry measurements (baseline and year one) were included. Twenty-seven patients were receiving anti-TNFα and 39 patients were receiving IL-17 blocker treatment. Outcome measures were compared between the IL-17 blocker and anti-TNFα agent treatment groups.

Results: Sixty-two percent of the patients were male and 38% were female. The mean lumbar region (L1-L4) BMD value of the patients was 1.19±0.15 gr/cm^2 and the mean femoral neck BMD value was 0.95±0.13 gr/cm^2 at baseline (p>0.05). A statistically significant increase in BMD values in the lumbar region (L1-L4, L2-L4), femoral neck and femur total was detected at the end of one year observation in patients using both anti-TNF and IL-17 blockers (p<0.05). The rate of increase in femoral total BMD was higher in patients receiving IL-17 blockers than in those receiving anti-TNF (p=0.013).

Conclusion: BMD is decreased in AxSpA patients due to inflammation. Our results showed that biological agents in AxSpA increase BMD values in addition to preventing bone loss. Femoral total BMD increase was found to be higher in patients using the IL-17 blocker.

Keywords: Axial spondyloarthropathy, ankylosing spondylitis, IL-17 blockers, bone mineral density, osteoporosis, TNF inhibitors

Öz

Amaç: Amacımız, tümör nekroz faktörü-α (TNFα) ajanları ve interleukin-17 (IL-17) blokerleri ile tedavi edilen aksiyal spondiloartropati (AxSpA) hastalarında kemik mineral yoğunluğu (KMY) düzeylerini karşılaştırmaktır.

Gereç ve Yöntem: Bu retrospektif çalışma yerel etik kurul tarafından onaylanmıştır (07/01/2020, 7). Anti-TNFα veya IL-17 bloker ile tedavi edilen AxSpA hastalarının tıbbi kayıtlarını değerlendirdik. İki ardışık dual enerjili X-ışını absorpsiyometri ölçümü (başlangıç ve yıl 1) olan 66 hasta dahil edildi. Yirmi yedi hasta anti-TNFα ve 39 hasta IL-17 bloker tedavisi alıyordu. Sonuç ölçümleri, IL-17 bloker ve anti-TNFα ajan tedavi grupları arasında karşılaştırıldı.

Bulgular: Hastaların %62'si erkek, %38'i kadındı. Hastaların ortalama lomber bölge (L1-L4) KMY değeri 1,19±0,15 gr/cm^2 ve ortalama femur boyun KMY değeri 0,95±0,13 gr/cm^2 olarak saptandı (p>0,05). Hem anti-TNF hem de IL-17 bloker kullanan hastalarda 1 yıllık gözlem sonunda lomber bölge (L1-L4, L2-L4), femur boynu ve femur total KMY değerlerinde istatistiksel olarak anlamlı artış saptandı (p<0,05). IL-17 blokerleri alan hastalarda femoral total KMY'deki artış oranı, anti-TNF alanlara göre daha yüksekti (p=0,013).

Sonuç: AxSpA hastalarında enflamasyon nedeniyle KMY azalmaktadır. Sonuçlarımız, AxSpA'daki biyolojik ajanların kemik kaybını önlemenin yanı sıra KMY değerlerini artırdığını gösterdi. IL-17 bloker kullanan hastalarda femoral total KMY artışı daha yüksek bulundu.

Anahtar kelimeler: Aksiyal spondiloartropati, ankilozan spondilit, IL-17 blokerleri, kemik mineral yoğunluğu, osteoporoz, TNF inhibitörleri

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Introduction

Axial spondyloarthropathy (AxSpA) is a chronic inflammatory disease mainly affects axial skeleton. Despite new bone formation, which is the characteristic finding of AxSpA, an important condition that occurs even in early mild forms and causes an increase in fractures is osteoporosis (1). Decreased bone mineral density (BMD) is a common clinical finding in patients with AxSpA (2). The prevalence of low BMD in patients with ankylosing spondyitis (AS) with a disease duration less than 10 years has been reported to be as high as 54% at the spine and 51% at the femoral neck (3). In the early period at the disease, the inflammatory process is mainly responsible for the decrease in BMD. In addition, increase in bone turnover, immobilization and drugs are also responsible for osteopenia and osteoporosis in patients (4).

Tumor necrosis factor-α (TNFα) which plays an essential role in inflammation, is also a well-known osteoclast activator. In addition to the proven effect of TNFα inhibitors in the treatment of AxSpA on disease activity and progression, many studies have shown that these drugs also positively affect BMD values (5-7). Interleukin-17 (IL-17) blockers have been shown to improve symptoms and significantly reduce inflammation in AxSpA (8). IL-17 is also involved in the inflammatory process that causes BMD loss in AxSpA patients (9,10). Studies showed that anti-TNF treatment increases BMD in AxSpA patients although evidence is limited. However effects of IL-17 blockers on BMD are limited. In this study, we aimed to evaluate and compare the effects of TNFα inhibitors and IL-17 blockers on BMD in AxSpA with dual energy X-ray absorptiometry (DXA) measurements.

Materials and Methods

Ethics Committee

This retrospective study was approved by Okmeydanı Training and Research Hospital's Local Ethics Committee (decision no: 7, date: 07.01.2020). The study protocol was prepared in accordance with the Declaration of Helsinki. Informed written consent was obtained from the participants in the study.

Patient Selection and Data Collection

Medical records of the files of 170 patients aged 18-65 years, who were diagnosed with AxSpA according to the The Assessment of SpondyloArthritis International Society criteria, who applied to the Rheumatology Outpatient Clinic between 01/01/2018 and 30/09/2020 were recruited (Figure 1). Patients with a history of malignancy, pregnancy, patients under corticosteroid and osteoporosis medication, inflammatory rheumatic disease other than AxSpA or metabolic bone disease, and patients with insufficient medical records were excluded from the study. Since non-radiographic AxSpA (nr-AxSpA) patients had more inflammatory load we excluded nr-AxSpA patients that were receiving either IL-17 blockers or anti-TNF agents.

Sociodemographic data of all patients, (gender, age, height, body weight, smoking and alcohol use), erythrocyte sedimentation rate, C-reactive protein (CRP), 25-hydroxyvitamin D values were recorded. Anteroposterior lumbar, femoral neck and femoral total BMD taken by DXA at baseline (T0) and at year one (T1) were evaluated. During the T0 DXA evaluation, a total of 18 patients were using biological therapy of which 10 were using anti-TNF and 8 patients were using IL-17 blockers. Bath Ankylosing Spondylitis Disease Activity index and Bath Ankylosing Spondylitis Functional index evaluation scales, which are disease activity and function indices, were also recorded at baseline and at year one.

Outcomes were compared between those who received IL-17 blocker (secukinumab) therapy and those who received anti-TNF agent therapy.

Materials

Anteroposterior DXA imaging was performed from L1-L4, L2-L4, femur neck and femur total regions of the patients included in the study, and BMD was determined in g/cm^2. Measurements of each patient were made with the same DXA device (Osteosys Primus) by the same DXA technician.

Statistical Analysis

Statistical analysis were made with SPSS version 25.0 program. The conformity of the variables to the normal distribution was examined with the Kolmogorov-Smirnov test. Mean, standard deviation and median values were used for descriptive analyses. Categorical variables were compared with the Pearson chi-square test. Mann-Whitney U test was used for non-normally distributed variables and Student t-test was used for normally distributed variables. Cases with a p-value below 0.05 were considered statistically significant.

Results

The study included 66 patients, 41 men and 25 women. The mean age of the patients in the study was 45.02±8.21 years. The mean disease duration was 5.39±2.77 years. The demographic, clinical characteristics and baseline DXA values of the patients are given in Table 1.

BMI and CRP values were significantly higher and the duration of disease was shorter in the patient group using IL-17 blockers. In the initial BMD values, the femoral total initial BMD value was significantly lower in the IL-17 blocker group than in the anti-TNF group.

There was a significant increase in both lumbar region and femoral region BMD at the end of one year in all patients participating in the study (Table 2).

BMD increase rates at year 1 were compared between the patient groups receiving anti-TNFα and IL-17 blocker treatment (Table 3). The rate of increase in femoral total BMD values was significantly higher in the IL-17 blocker group.

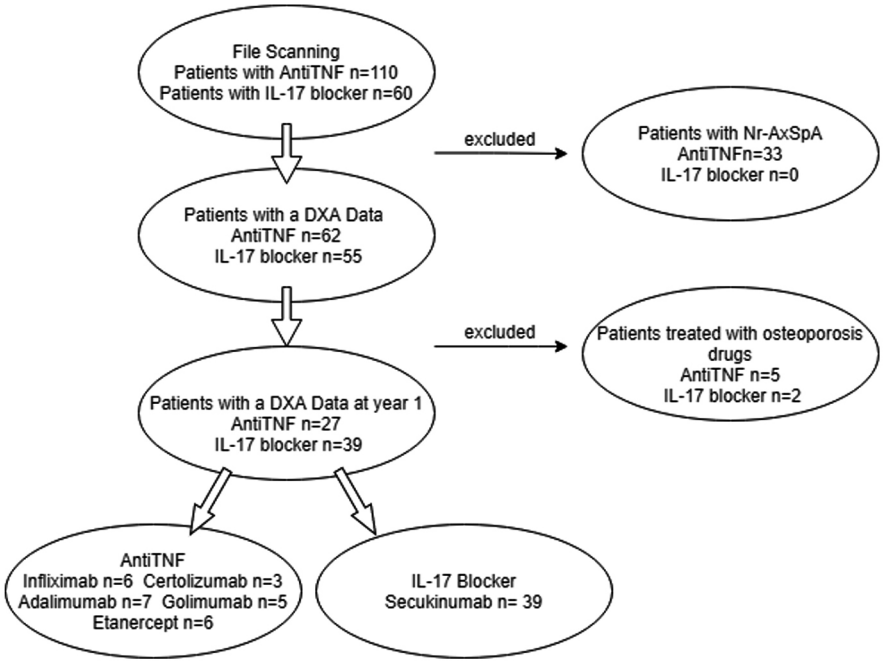

Figure 1. Patient selection flowchart
IL-17: Interleukin-17, AntiTNF: Anti-tumor necrosis factor, Nr-AxSpA: Non-radiographic AxSpA, DXA: Dual energy X-ray absorptiometry

Table 1. Baseline demographic and clinical characteristics of patients

	Total (n=66)	Anti-TNFα (n=27)	IL-17 blocker (n=39)	p-value
Gender[a]				
Female	41 (62.12)	11 (40.74)	14 (35.90)	0.690[1]
Male	25 (37.88)	16 (59.26)	25 (64.10)	
Postmenopause[a]	10 (40.0)	5 (45.5)	5 (35.71)	0.622[1]
Smoking[a]	24 (36.36)	12 (44.44)	12 (30.77)	0.256[1]
Drinking[a]	12 (18.18)	8 (29.63)	4 (10.26)	0.045[1]
Age[b] (year)	45.02±8.21	45.07±7.07	44.97±9.01	0.962[2]
BMI[b] (kg/cm^2)	27.39±5.02	25.71±4.86	28.54±4.86	0.023[2]
Disease duration[c] (year)	5.0 (1.00-12.00)	6.00 (2-10)	4.00 (1-12)	0.035[3]
BASDAI[c]	6.7 (5.40-8.60)	7.00 (5.4-8)	6.50 (5.5-8.6)	0.067[3]
BASFI[c]	6.7 (4.30-8.70)	7 (5-8.7)	6.7 (4.3- 8.2)	0.546[2]
ESR[b]	33.35±9.45	31.3±8.7	34.74±9.79	0.151[2]
CRP[c]	12.0 (2.00-90.00)	10.00 (4-33)	16.00 (2-90)	0.048[3]
L1-L4 BMD[c]	1.20 (0.89-1.44)	1.22 (0.89-1.44)	1.19 (0.91-1.44)	0.653[3]
L2-L4 BMD[c]	1.18 (0.88-1.88)	1.2 (0.89-1.40)	1.14 (0.88-1.88)	0.662[3]
Femur neck BMD[b]	0.95±0.13	0.95±0.14	0.94±0.12	0.930[2]
Femur total BMD[c]	0.90 (0.72-1.34)	0.92 (0.77-1.34)	0.89 (0.72-1.10)	0.047[3]

[1]Chi-square test, [2]Student t-test, [3]Mann-Whitney U test
[a] n (%), [b]Mean ± standard deviation, [c]Median (minimum-maximum)
BMD: Bone mineral density, BMI: Body mass index, BASDAI: Bath Ankylosing Spondylitis Disease Activity index, BASFI: Bath Ankylosing Spondylitis Functional index, ESR: Erythrocyte sedimentation rate, CRP: C-reactive protein, IL-17: Interleukin-17, anti-TNF: Anti-tumor necrosis factor

Discussion

Decreased BMD is a common clinical finding in patients with AxSpA (11). During inflammation, immune cells secrete many cytokines, including TNF, and IL-17, which shift the balance between bone formation and resorption in favor of osteoclast function and bone resorption. Anti-TNFα and IL-17 blockers used in the treatment of AxSpA are expected to decrease osteoclast

Table 2. Changes in DXA for all patients at year 1 (n=66)				
	T0 DXA	**T1 DXA**	**Difference (%)**	**p-value**
L1-L4 BMD[c]	1.20 (0.89-1.44)	1.24 (0.90-1.49)	2.81 (0.07-9.01)	<0.001[4]
L2-L4 BMD[c]	1.18 (0.88-1.88)	1.21 (0.90-1.47)	5.29 (-52.07-21.22)	<0.001[4]
Femur neck BMD[c]	0.92 (0.71-1.32)	0.93 (0.71-1.36)	0.89 (-4.4-9.9)	<0.001[4]
Femur total BMD[c]	0.90 (0.72-1.34)	0.92 (0.74-1.37)	1.11 (-0.78-21.7)	<0.001[4]
BMD: Bone mineral density, DXA: Dual energy X-ray absorptiometry, T0: Baseline BMD, T1: BMD at year 1, [4]Wilcoxon test, [c]Median (minimum-maximum)				

Table 3. Comparison of DXA change in percentages between groups			
	Anti-TNFα (n=27)	**IL-17 blocker (n=39)**	**p-value**
L1-L4 BMD[c]	2.9 (0.7-9)	2.7 (0.1-8.4)	0.46[3]
L2-L4 BMD[c]	4.8 (0.8-16)	5.4 (-52-21.2)	0.74[3]
Femur neck BMD[c]	0.9 (-0.1-9.8)	0.8 (-4.4-4.4)	0.73[3]
Femur total BMD[c]	1.0 (-0.5-21.7)	1.5 (-0.7-15.5)	0.01[3]
[3]Mann-Whitney U test, [c]Median (minimum-maximum). BMD: Bone mineral density, DXA: Dual energy X-ray absorptiometry, IL-17: Interleukin-17, anti-TNF: Anti-tumor necrosis factor			

function and increase BMD (12). Briot et al. (4) investigated the role of inflammation in bone loss and showed that the main risk factor associated with low BMD is inflammation visualized by magnetic resonance imaging and systemic inflammation. Although mechanical stress changes due to immobility and spinal stiffness in advanced AS are a cause of osteoporosis, it has been revealed that the main cause is the inflammatory process related to the disease itself, which affects bone metabolism. Based on this, it is expected that anti-inflammatory drugs will affect bone loss. In another study, IL-17 blockers were also shown to reduce inflammation in the sacroiliac joint (13). Thus, it is expected that IL-17 blocker treatment will also cause an increase in BMD values.

A positive effect of anti-TNFα therapy on bone loss has been demonstrated in AS (5-7). Moreover, even short-term anti-TNFα therapy can cause an increase in spinal BMD (4). Many clinical studies have shown that anti-TNFα therapy can not only prevent loss of BMD but also stimulate an increase in BMD in AxSpA patients (1,14,15).

In our study, we compared the BMD values of AxSpA patients receiving anti-TNFα and IL-17 blockers at the end of one year follow-up. We found an increase in both lumbar and femoral BMD values in both groups. In the measurements after one year, a 3.4% increase in L1-L4 BMD and a 0.92% increase in femoral neck BMD were found in patients receving anti-TNF treatment.

In a study conducted by Haroon et al. (16) on 568 AS patients, lumbar BMD was increased by 5.1% after one year of treatment with anti-TNFα agents and by 8.6% after two years. Femoral total BMD was increased by 1.8% after one year of treatment and by 2.5% after two years. Durnez et al. (7) found that the increase in BMD in patients with AS treated with anti-TNFα was 11.8% in the lumbar spine and 3.6% in the greater trochanter, at a mean follow-up of 6.5 years. In our study, an increase was found in lumbar and femoral BMD values in patients receiving anti-TNF.

In addition to playing a role in the pathogenesis of AxSpA, IL-17 also plays a role in osteoporosis. In a study by Tyagi et al. (17), it was found that oophorectomy in mouse osteopenia model, anti-IL-17 antibody protects against bone loss by suppressing osteoclast function and promoting osteoblast differentiation. Higher levels of IL-17 was found in women with low BMD compared to women with normal BMD (18,19). Serum IL-17 levels were also found to be higher in AS patients (20). This explains the low BMD seen in AS.

There are limited data on the effects of IL-17 blockage on bone density, and the effects on markers of bone turnover and fracture risk are still unknown (12).

In a study 104 AS patients who were treated with 150 mg subcutan secukinumab for two years, it was reported that lumbar spinal BMD was increased by 2.6% and 4.7% from baseline at week 52 and 104, respectively; femur total 0.9% and 0.5%, respectively; and femur neck 0.8% and 0.2% respectively (2018 annual meeting) (21).

Although our follow up time was short, we also found an increase in BMD in patients receving IL-17 blocker treatment, there was an increase of 2.7% in L1-L4 BMD and 0.8% in BMD of the femoral neck at one year follow up. Compared to patients using anti-TNF, the rate of increase in total femoral BMD was greater in patients using IL-17 blockers (1.01%, 1.5%, respectively).

Study Limitations

The limitations of our study was a retrospective study. The follow-up time was short, patient number was low, and measurement error caused by the DXA machine. Patients were evaluated with anteroposterior DXA measurements. This may cause false high values due to syndesmophytes, ligament calcification, etc. in the lumbar region.

Conclusion

Biological treatments in patients with AxSpA caused a significant increase in BMD at one year follow-up. Femoral total BMD increase was found to be higher in patients using IL-17 blocker. There is a need for further studies on this subject with larger number of patients.

Ethics

Ethics Committee Approval: This retrospective study was approved by Okmeydanı Training and Research Hospital's Local Ethics Committee (decision no: 7, date: 07.01.2020). The study protocol was prepared in accordance with the Declaration of Helsinki.

Informed Consent: Informed written consent was obtained from the participants in the study.

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Authorship Contributions

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Relationship of Thenar and Hypothenar Muscle Thickness with Clinical Factors, Thigh Muscle Thickness and Physical Performance in Female Patients with Rheumatoid Arthritis

Romatoid Artritli Kadın Hastalarda Tenar ve Hipotenar Kas Kalınlıklarının Klinik Faktörler, Uyluk Kas Kalınlığı ve Fiziksel Performans ile İlişkisi

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Abstract

Objective: The aim of this study was to evaluate hand muscle thickness in patients with rheumatoid arthritis (RA) and to investigate the relationship between muscle thickness and clinical factors and physical performance indicators.
Materials and Methods: This cross-sectional study was conducted with 73 female participants between May 2022 and September 2022 (mean age: 60.83±9.73 years, range: 18-85). Among them, there were 37 RA patients (mean age: 60.8±9.9 years) diagnosed according to the 2010 American College of Rheumatology/European League Against Rheumatism RA classification criteria. The remaining 36 females were age- and sex-matched healthy subjects (mean age: 60.9±9.8 years). Thickness measurements of the thenar, hypothenar, and thigh muscles were obtained with ultrasound for all participants. In both groups, hand grip strength was measured using a hand dynamometer, and lower extremity performance assessments were made using 6-meter timed walk test (6MTWT) and a 5-time sit-to-stand test (5XSST). Disease activity score-28 (DAS-28), RA articular damage score (RA-ADS), and Duruöz Hand scale scores of RA patients were calculated.
Results: Compared with the control group, thenar (p=0.004), hypothenar (p=0.000), and thigh (p=0.006) muscle thickness values were lower in RA patients. The RA group showed lower mean hand grip strength, longer time to complete 5XSST, and slower gait speed on 6MTWT (all p<0.01). Hand muscle thickness was negatively correlated with disease duration, RA-ADS, Duruöz Hand scale, and positively correlated with hand grip strength. Thigh muscle thickness was negatively correlated with age and 5XSST and positively correlated with hand grip strength and gait speed. Thickness measurements from all three muscles were not correlated with DAS-28.
Conclusion: Hand muscle thickness of RA patients is affected by the disease regardless of age. Disease duration, articular damage, and decreased hand functions are closely related to muscle thickness. Low muscle thickness indicates reduced physical performance.
Keywords: Hand function, muscular atrophy, rheumatoid arthritis, sarcopenia, ultrasonography

Öz

Amaç: Bu çalışmada romatoid artritli (RA) hastalarda el kas kalınlıklarının değerlendirilmesi ve kas kalınlıkları ile klinik faktörler ve fiziksel performans göstergelerinin ilişkisinin araştırılması amaçlandı.
Gereç ve Yöntem: Bu kesitsel çalışma Mayıs 2022-Eylül 2022 tarihleri arasında 73 kadın katılımcı ile yapıldı (ortalama yaş: 60,83±9,73 yıl, aralık:18-85). Bunlardan 37'si 2010 American College of Rheumatology/European League Against Rheumatism RA sınıflama kriterlerine göre tanı konulan RA'lı hastalardı (ortalama yaş: 60,8±9,9 yıl). Otuz altı tanesi yaş ve cinsiyet olarak eşleştirilmiş sağlıklı kişiler idi (ortalama yaş: 60,9±9,8 yıl). Tüm katılımcıların ultrason ile tenar, hipotenar ve uyluk kas kalınlıkları ölçüldü. Her iki grupta el dinamometresi ile el grip gücü ölçümü, 6 metre yürüme testi (6MYT) ve 5 tekrarlı otur kalk testi (5XOKT) ile alt ekstremite performans değerlendirmeleri yapıldı. RA'lı hastaların hastalık aktivite skoru-28 (DAS-28), RA artiküler hasar skoru (RA-AHS) ve Duruöz El skalası skorları hesaplandı.
Bulgular: RA'lı hastaların tenar (p=0,004), hipotenar (p=0,000), ve uyluk (p=0,006) kas kalınlıklarının kontrol grubuna göre düşük olduğu görüldü. RA'lı grubun el sıkma güçleri ortalamasının düşük, 5XOKT sürelerinin uzun, 6MYT hızlarının düşük olduğu saptandı (tüm p<0,01). El kas kalınlıkları hastalık süresi, RA-AHS, Duruöz El skalası ile negatif, el grip gücü ile pozitif yönde ilişkili idi. Uyluk kas kalınlıkları ise yaş ve 5XOKT ile negatif, el sıkma gücü ve yürüme hızı ile pozitif yönde ilişkili bulundu. Her üç kas bölgesinden yapılan kalınlık ölçümleri de DAS-28 ile ilişkili değildi.

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Sonuç: RA'lı hastaların el kas kalınlıkları yaştan bağımsız olarak hastalıktan etkilenmektedir. Hastalık süresi, artiküler hasar ve azalmış el fonksiyonları kas kalınlıkları ile yakından ilişkilidir. Düşük kas kalınlıkları fiziksel performansta azalmaya işaret etmektedir.
Anahtar kelimeler: El fonksiyonu, kas atrofisi, romatoid artrit, sarkopeni, ultrasonografi

Introduction

Rheumatoid arthritis (RA) is a chronic, systemic, autoimmune disease characterized by synovial inflammation and bone erosions. RA negatively affects the quality of life by causing structural damage in the joints involved and surrounding tissues (1). Loss of muscle mass is known to occur in patients with RA (2). Elevated cytokine levels and associated inflammation have adverse effects on muscle structure and muscle mass (3). Decreased physical activity due to pain and loss of joint function contributes to considerable reductions in muscle mass and muscle function in RA patients (4,5).

In these patients, the occurrence of sarcopenia defined as generalized loss of skeletal muscle mass beyond critical limits was examined in various aspects. It was demonstrated that 37.1% of patients with RA have sarcopenia, and although some of them did not meet the criteria for sarcopenia, 49% had reduced muscle mass (2). It is known that ultrasound (US) is a very effective method in detecting changes in muscle structure and mass in sarcopenic RA patients. In these patients, US imaging revealed reductions in the thickness of the biceps, vastus medialis and rectus femoris muscles (4). It has been reported that muscle thickness measured by US shows a linear relationship with muscle volume (6). In RA patients, thigh muscle thickness as assessed by US was found to be lower in patients with sarcopenia than in those without sarcopenia. It has been shown that sarcopenia diagnosed using bioelectrical impedance analysis is correlated with muscle thickness values obtained by US (7).

It has been previously shown that vastus lateralis muscle thickness, lower extremity performance, and knee extensor strength are lower in RA patients versus controls (8). In another study, reduced functional surface cross-sectional area of the vastus lateralis muscle was shown in patients with RA compared to controls. In that study, lower limb physical performance and balance of the patients were also poor (9). Parameters such as gait speed, sit-to-stand test, and hand grip strength are among the criteria for the diagnosis of sarcopenia (10).

RA most commonly affects the joints of the hand. In the rheumatoid hand, loss of muscle mass occurs due to the effects of local inflammatory mechanisms as well as disuse as a result of joint pain. However, there are only a few studies examining the amount of muscle loss in the rheumatoid hand and its consequences. In a recent study in which muscle volume was measured with magnetic resonance imaging (MRI), lower hand muscle volume was demonstrated in patients with RA than in patients with psoriatic arthritis (PsA), irrespective of age (11).

A literature search conducted by the authors of the current study did not identify any study that reported on US-detected hand muscle loss in RA. In this study we aimed to examine possible reduction in muscle mass by measuring the thickness of thenar and hypothenar muscles in patients with RA by US, to determine changes in anterior mid-thigh muscle thickness, hand grip strength and lower extremity performance tests, which are also considered as indicators of sarcopenia, and to assess the relationship of hand muscle thickness with clinical parameters and indicators of functional capacity.

Materials and Methods

This cross-sectional, analytical study was conducted with 73 female participants (mean age: 60.83±9.73 years, range:18-85) between May 2022 and September 2022 at the outpatient clinics of the Department of Physical Medicine and Rehabilitation at İstanbul Medeniyet University Faculty of Medicine. Approval for the study was obtained from the Clinical Research Ethics Committee of the İstanbul Medeniyet University Göztepe Training and Research Hospital (decision no: 2022/0259, date: 27.04.2022). Signed written informed consent was obtained from all subjects prior to enrollment in the study. Among the participants, there were 37 patients (mean age: 60.8±9.9 years) diagnosed with RA who were being followed at the outpatient clinics and 36 age- and sex-matched healthy females (mean age: 60.9±9.8 years). Patients diagnosed with RA according to the 2010 American College of Rheumatology/European League Against Rheumatism RA classification criteria were included in the study (12).

Individuals with neurological, malignant, severe psychiatric and/or cardiac diseases, prior orthopedic surgery and those refusing to sign written informed consent were excluded from the study. Age, height, body weight, body mass index (BMI) and dominant hand of the patients were noted. Antirheumatic drug use and disease duration were questioned. The tender joint count and swollen joint count were obtained on physical examination. During the follow-up of the patients, erythrocyte sedimentation rate and C-reactive protein (CRP) values were retrieved from the most recent laboratory tests.

Visual Analog Scale (VAS): For all patients, the severity of pain on movement was assessed using a 0-10 cm VAS.

Disease Activity Score-28 (DAS-28): Disease activity was assessed on the basis of DAS-28 (DAS in 28 joints) scores. The DAS-28 CRP score was calculated using a formula that includes the number of tender joints, the number of swollen joints, patient's global assessment and CRP level (13).

Rheumatoid Arthritis Articular Damage Score (RA-ADS): The RA-ADS was developed to measure irreversible long-term joint damage due to RA. In this scale, 35 joints are individually examined and assigned a score between 0 and 70. Higher scores indicate greater joint damage (14).

Duruöz Hand Scale: Duruöz Hand scale consists of 18 questions used for the assessment of hand functions in patients with RA. It is a simple, useful and reliable tool that questions daily hand activities. Questions are scored on a Likert scale, with scores ranging from 0 to 5 points. Lower scores indicate better functional status (15).

Hand Grip Strength: Hand grip strength was measured on the dominant hand of the patients using the Baseline Hydraulic Hand Dynamometer (Irvington, NY 10533, USA) with 90-kilogram (kg) capacity.

6-meter Timed Walk Test (6MTWT): In order to evaluate the functional capacity of the lower extremities, gait speed was measured using the 6MTWT. For this test, the patient walked on a smooth surface, where 0, 2, 8 and 10 meters were previously marked. Time recording was started at the 2nd meter and ended at the 8th meter. The gait speed measured for 6 meters when the patient walked at a constant pace was taken into account. This way, the potentially confounding effect of acceleration and deceleration in the first 2 meters and last 2 meters was eliminated. Results were recorded in meters/second (m/s). The average of the two velocity values obtained with a 10-minute break between measurements was taken into consideration (16).

Five Times Sit-to-stand Test (5XSST): 5XSST was used to evaluate functional capacity of the lower extremities. This test measures the time in seconds taken to stand five times from a chair (17).

Ultrasonographic Assessment: Thenar and hypothenar muscle thickness and mid-thigh muscle thickness of the patients were measured using US on the dominant side. Measurements were obtained by a physiatrist with 10 years of experience in musculoskeletal US. DC-T6 (Mindray, China) US device with a 5-10 mHz linear probe were used for the measurements.

Hand muscle thickness measurements were performed with the patient in the supine position, forearm supinated, wrist and fingers in neutral position, and the back of the hand contacting the examination table. For the measurement of thenar muscle thickness, the probe was placed longitudinally over the thenar area to visualize the first metacarpal bone (18). The distance between the fascia and the metacarpal bone was recorded as the thenar muscle thickness (Figure 1). For the measurement of hypothenar muscle thickness, the probe was placed longitudinally over the hypothenar area, parallel to the fifth metacarpal bone. The distance between the fascia and the metacarpal bone was measured and recorded (Figure 2).

Thigh muscle thickness was measured with the patient lying in the supine position with the knee extended. The probe was placed in the transverse plane over the anterior thigh of the dominant side, at the midpoint between the spina iliaca anterior superior and the upper border of the patella (19). During muscle thickness measurements, care was taken not to apply pressure in order to avoid depression of the skin surface. The distance from the beginning of the fascia of the rectus femoris muscle to the femur was recorded as the mid-thigh muscle thickness (Figure 3).

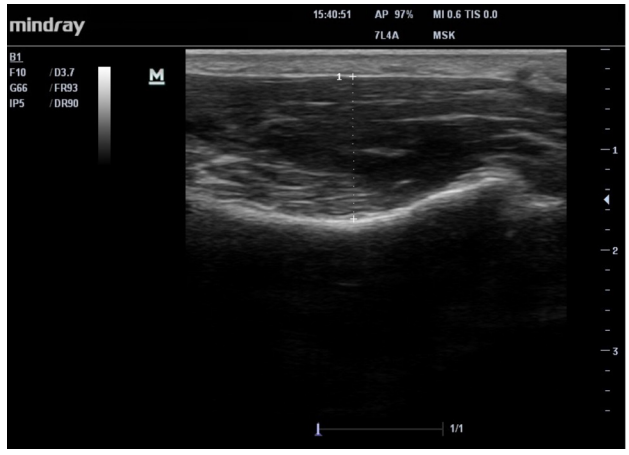

Figure 1. Thenar muscle thickness as measured by ultrasound

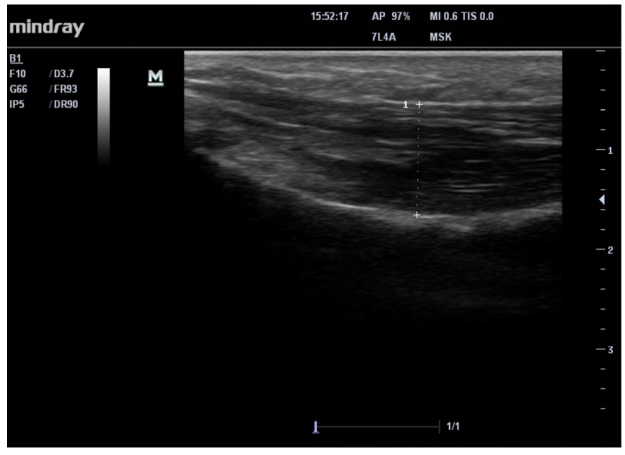

Figure 2. Hypothenar muscle thickness as measured by ultrasound

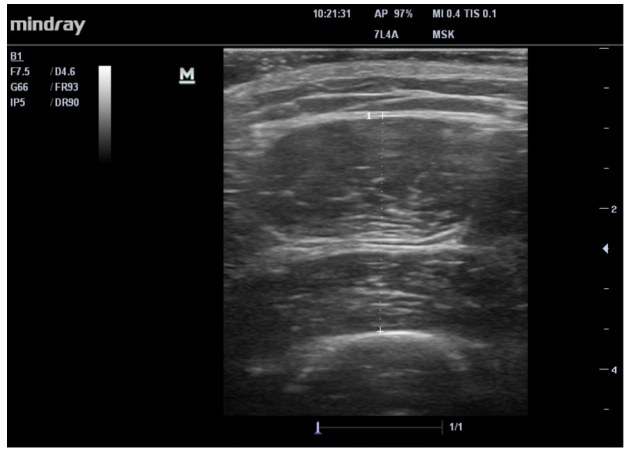

Figure 3. Anterior mid-thigh muscle thickness as measured by ultrasound

Statistical Analysis

SPSS (Statistical Package for Social Sciences) for Windows, version 22.0 was used for statistical analysis of the study data. In addition to descriptive statistics (mean, median, standard deviation, minimum-maximum), comparisons between the groups were made using Student's t-test for normally distributed

numerical data, and Mann-Whitney U test for non-normally distributed numerical data. Relationships between muscle thickness and normally distributed variables were analyzed using Pearson correlation analysis, and correlations between non-normally distributed variables were examined with Spearman correlation analysis. The results were considered significant at the $p<0.05$ level with a 95% confidence interval. Power analysis was performed using the G*Power software to determine the sample size. The effect size for hypothenar muscle thickness was estimated at 0.79, based on preliminary data from 15 patients and 15 controls. Assuming alpha =0.05 and 1-beta =0.90, it was calculated that 35 individuals per group would be needed. Intraclass correlation coefficients were calculated to evaluate intra-rater reliability for US measurements of muscle thickness.

Results

The two groups did not differ in terms of mean age and BMI. The mean age was 60.8±9.9 years in the RA group and 60.9±9.8 years in the control group (p=0.964). The mean BMI of the RA patient group (29.2±4.5 kg/m^2) was similar to that of control group (28.3±4.6 kg/m^2) (p=0.368). Twenty four patients were receiving biological disease-modifying antirheumatic drugs (DMARDs) and 13 patients were using synthetic DMARDs. The median disease duration was 18 years (minimum: 3-maximum: 30). The mean hand grip strength of the RA group (15.8±4.7 kg) was significantly lower compared to the control group (20.0±3.7 kg) (p<0.001). Longer 5XSST times and slower gait speed (6MTWT) were observed in RA patients than in the control group (Table 1).

Table 1. Characteristics of rheumatoid arthritis and control groups

	RA group	Control group	p-value
Age (years, X±SD)	60.8±9.9	60.9±9.8	0.964
BMI (kg/m^2, X±SD)	29.2±4.5	28.3±4.6	0.368
Grip strength (kg, X±SD)	15.8±4.7	20.0±3.7	0.000**
5XSST (s, X±SD)	18.1±4.4	11.3±3.0	0.000**
6MTWT (m/s, X±SD)	0.8±0.2	1.1±0.5	0.002**
DAS-28 (X±SD)	3.8±1.2	-	-
Duruöz Hand scale	10 (0-72)[a]	-	-
RA-ADS	3 (0-33)[a]	-	-
Disease duration, years	18 (3-30)[a]	-	-
Treatment, n (%)			
Synthetic DMARDs	13 (35.1%)	-	-
Biological DMARDs	24 (64.9%)	-	-

**p<0.01, [a]Median (minimum-maximum). BMI: Body mass index, SD: Standard deviation, 5XSST: Five times Sit-to-stand test, 6MTWT: 6-meter timed walk test, DAS-28: Disease activity score-28, RA-ADS: Rheumatoid arthritis articular damage score, DMARDs: Disease-modifying antirheumatic drugs, RA: Rheumatoid arthritis

Comparisons of thenar, hypothenar and thigh muscle thickness values of the two groups are presented in Table 2. Measurements from all three regions showed reduced muscle thickness in the RA group compared to controls (Table 2).

In RA patients, a negative correlation was found between age and anterior mid-thigh muscle thickness (p=0.003). Hand muscle thickness measured from thenar and hypothenar areas was not correlated with age but showed a negative correlation with disease duration (Table 3). Thickness measurements from all three muscles were not correlated with disease activity indicators including VAS and DAS-28. On the other hand, the RA articular damage score was not correlated with thigh muscle thickness, but showed a significant negative correlation with thenar and hypothenar muscle thickness values (Table 3).

In patients with RA, there was a negative correlation between hand muscle thickness and Duruöz Hand index, which was more evident in hypothenar muscles (Table 4). Hand grip strength scores were positively correlated with all muscle thickness measurements. 5XSST times were negatively correlated with thenar and thigh muscle thickness (Table 4). 6MTWT scores showed a positively correlation only with thigh muscle thickness (p=0.005).

Discussion

Rheumatoid hand is one of the leading causes of functional loss in patients with RA. Although hand joints are most commonly affected by the disease, little information is available about the extent of hand muscle atrophy in patients with RA. The data from the present study show that there are significant losses in the thenar and hypothenar muscles in RA patients. Thigh muscle thickness of the patients was also found to be reduced when compared with the controls. As a remarkable finding, while thigh muscle thickness decreased with age, the reduction in hand muscle thickness was not correlated with age. In addition, although thinning of the hand muscles was associated with disease duration, there was no such correlation with the thickness of the thigh muscle. This suggests that the decrease in the hand muscles begins with the onset of the disease and in the early period, and the loss of thigh muscles becomes more pronounced with the effect of advancing age.

Table 2. Comparison of muscle thickness measurements between the groups

	RA group mean ± SD (mm)	Control group mean ± SD (mm)	p-value
Thenar	13.7±1.0	14.4±1.1	0.004**
Hypothenar	11.5±1.2	12.5±0.9	0.000**
Mid-thigh Mid-thigh	28.7±6.4	32.7±5.6	0.006**

**p<0.01. SD: Standard deviation, RA: Rheumatoid arthritis

Table 3. Relationships between muscle thickness and demographic and clinical parameters in RA patients

		Age	Disease duration	VAS	RA-ADS	DAS-28
Thenar	rho	-0.324	-0.375*	-0.112	-0.447**	-0.131
	p-value	0.050	0.022	0.510	0.005	0.440
Hypothenar	rho	-0.204	-0.383*	-0.256	-0.482**	-0.274
	p-value	0.225	0.019	0.126	0.003	0.101
Thigh	rho	-0.504**	-0.280	0.121	-0.260	0.126
	p-value	0.003	0.093	0.475	0.121	0.459

*Significant at the 0.05 level, **Significant at the 0.01 level; RA: Rheumatoid arthritis, RA-ADS: Rheumatoid arthritis articular damage score, DAS-28: Disease activity score-28, VAS: Visual analog scale

Table 4. Relationships between muscle thickness and physical function parameters in RA patients

		Duruoz index	Grip strength test	5XSST	6MTWT
Thenar	rho	-0.382*	0.525**	-0.384*	0.085
	p-value	0.020	0.001	0.019	0.617
Hypothenar	rho	-0.559**	0.592**	-0.240	0.038
	p-value	0.000	0.000	0.152	0.825
Thigh	rho	-0.303	0.325*	-0.350*	0.454**
	p-value	0.068	0.049	0.034	0.005

*Significant at the 0.05 level, **Significant at the 0.01 level; RA: Rheumatoid arthritis, 5XSST: Five times Sit-to-stand test, 6MTWT: 6-meter timed walk test

Although a limited number of studies are available on muscle atrophy in the rheumatoid hand, there are data supporting our findings. To the best of our knowledge, Friedberger et al.'s (11) study was the first study to objectively evaluate hand muscle wasting in RA patients using imaging modalities. In that study, it was reported that hand muscle volumes measured by MRI were lower in RA patients than in patients with psoriasis and PsA, after the age of 50. In the same study, it was shown that the difference among the three groups of patients disappeared in the 7th and 8th decades because the muscle volume of female patients with psoriasis and PsA decreased gradually with age (11).

In a study of Abe et al. (20), it was found that forearm muscle thickness in the general population decreased significantly after 70 years of age in males and 80 years of age in females compared to younger age groups. Although there is not much data on hand muscles, convincing data exists for lower extremity muscles, showing that muscle wasting starts at an earlier age in patients with RA compared to healthy controls (8). Farrow et al. (21) reported that the decrease in thigh muscle volume started in the early stages of the disease in patients with RA.

In the literature, there are also studies evaluating the reduction in lower limb muscle thickness irrespective of age. In a study by Blum et al. (8), age was found to be correlated with muscle thickness, pennation angle and muscle strength in the control group but not in RA patients. The authors suggested that muscle loss and associated problems occur due to the effects of the disease itself, independent of the aging process in patients with RA (8).

Our findings suggest that muscle thickness is not correlated with DAS-28 and VAS scores, which are indicators of current disease activity. A high articular damage score is associated with low thenar and hypothenar muscle thickness. This reveals the relationship of muscle thickness with the long-term outcomes of high disease activity that continues throughout the course of the disease, rather than current disease activity. Higher Sharp scores have been shown to be associated with lower calf muscle mass in patients with RA (22).

Our study demonstrated that low muscle thickness is associated with functional loss. Reduced hand muscle thickness in both thenar and hypothenar areas is correlated with a decrease in hand grip strength as well as impairment of hand functions as measured by the Duruöz Hand scale. There was no correlation between gait speed (6MTWT) and hand muscle thickness. Reduced thigh muscle thickness resulted in longer time to complete 5XSST, slower gait speed and a decrease in hand grip strength. Data from studies in the general population also demonstrate the relationship between upper and lower extremity muscle thickness and hand grip strength (23). It has been shown that there is a positive correlation between upper and lower limb muscle thickness measured by US and gait speed in patients with RA. This relationship is more pronounced in lower extremity muscles such as the rectus femoris than in the biceps (4). Matschke et al. (9) showed that functional surface cross-sectional area of the vastus lateralis and lower extremity physical performance were lower in RA patients compared to controls. It is known that low muscle mass results in decreased muscle strength in patients with RA (8,21,22).

In recent years, muscle involvement has been increasingly cited among the factors that cause a reduction in physical and functional capacity in RA patients. It has been demonstrated that intramuscular cytokine concentrations are very high in patients

with RA and are not correlated with serum cytokine levels (24). Although exercise is generally recommended to patients with RA, there are many questions that remain to be answered, such as which exercise should be prescribed to which area, for how long and at what intensity (5). According to Farrow et al. (21), medical treatment does not affect the ongoing pathological process in the muscles in RA patients. As such, it was recommended that muscle strengthening interventions be included in the treatment approaches for RA (21). In patients with RA, it is important to objectively evaluate the hand, which is an area where physicians and patients mostly avoid exercise due to active joint involvement and pain. Our findings demonstrated that the loss of hand muscles in patients with RA can be evaluated with US. Detection and follow-up of muscle atrophy in patients with RA will contribute to the development of preventive and therapeutic strategies such as exercise, joint protection techniques and use of assistive devices.

Study Limitations

The strength of our study lies in the fact that it is the first study to reveal reduced hand muscle thickness with US and its relationship with functional loss in patients with RA. However, our study has a number of limitations. First, lower limb muscle performance was not evaluated with an objective method such as dynamometer. Secondly, since this was a cross-sectional study, we were not able to demonstrate the rate of muscle loss over a long-term.

Conclusion

The thenar and hypothenar muscle thickness of patients with RA are significantly reduced compared to healthy population. This decrease is correlated with disease duration, but not with age. It seems that muscle loss in the hand starts in the early period with the effect of the disease process. It is possible to detect decreases in muscle thickness with musculoskeletal US examination. Assessment of muscle thickness with US during follow-up of hand involvement, which is often neglected in exercise programs and is one of the leading causes of disability in RA patients, can enable timely intervention with individualized rehabilitation approaches before severe muscle loss occurs.

Ethics

Ethics Committee Approval: Approval for the study was obtained from the Clinical Research Ethics Committee of the İstanbul Medeniyet University Göztepe Training and Research Hospital (decision no: 2022/0259, date: 27.04.2022).

Informed Consent: Signed written informed consent was obtained from all subjects prior to enrollment in the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: E.M., N.M., Design: E.M., Data Collection or Processing: E.M., N.M., Analysis or Interpretation: E.M., Literature Search: E.M., N.M., Writing: E.M., N.M.

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Turkish Version of Functional Evaluation of Physical Performance for the Geriatric Population: A Reliability and Validity Study

Geriatrik Popülasyon için Fiziksel Performansın Fonksiyonel Değerlendirme Ölçeği Türkçe Versiyonu: Güvenirlik ve Geçerlilik Çalışması

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Abstract

Objective: To translate the "Functional Evaluation of Physical Performance for the Geriatric Population (Alusti test)" into Turkish to examine validity and reliability.
Materials and Methods: During the translation period, the cross-cultural adaptation design proposed using the guideline was used. The patients evaluated the Turkish version of the Alusti test and it was applied again a week later. To determine the reliability and internal consistency, Cronbach's alpha coefficient was calculated. Test-retest reliability was determined using intraclass correlation coefficient (ICC) and Pearson's correlation analysis. Construct validity was examined with factor analysis. Convergent validity was examined by comparing Alusti test with Short Physical Performance Battery (SPPB) and Barthel index (BI), and criterion validity was examined by comparing Alusti test with Tinetti balance and gait assessment, timed up and go test (TUGT), 6-meter walking speed test, and Rivermead mobility index (RMI) scores.
Results: Cronbach's alpha coefficient was 0.701. The ICC for the test-retest reliability was 0.948. The Alusti test was explained by four factors. SPPB (r=0.586, p=0.000), BI (r=0.321, p=0.005) and Tinetti gait test (r=0.512, p=0.000) were moderately positively correlated with the Alusti test total score. The Tinetti balance test (r=0.662, p=0.000), Tinetti balance and gait assessment total score (r=0.655, p=0.000) and RMI (r=0.715, p=0.000) were highly positive correlated.
Conclusion: The Turkish version of the Alusti test is a valid and reliable scale for the geriatric population.
Keywords: Physical performance, functional assessment, older people, validity, reliability

Öz

Amaç: "Geriatrik Popülasyon için Fiziksel Performansın Fonksiyonel Değerlendirme Ölçeği (Alusti test)"nin Türkçeye çevrilmesi, geçerlik ve güvenirliğinin incelenmesidir.
Gereç ve Yöntem: Çeviri sürecinde prensipler tarafından önerilen kültürler arası uyum modeli kullanıldı. Hastalar Alusti testinin Türkçe versiyonu ile değerlendirildi ve bir hafta sonra tekrar uygulandı. Güvenirliği ve iç tutarlılığı belirlemek için Cronbach alfa katsayısı hesaplandı. Test-tekrar test güvenirliği, sınıf içi korelasyon katsayısı (ICC) ve Pearson korelasyon analizi kullanılarak belirlendi. Yapı geçerliliği faktör analizi ile incelendi. Benzer ölçek geçerliği Alusti testi ile Kısa Fiziksel Performans Bataryası (KFPB) ve Barthel indeksi (Bİ) karşılaştırılarak, kriter geçerliği ise Alusti testi ile Tinetti Denge ve Yürüme Değerlendirmesi, zamanlı kalk ve yürü testi (ZKYT), 6 metre yürüme hızı testi ve Rivermead mobilite indeksi (RMİ) puanları karşılaştırılarak incelendi.
Bulgular: Cronbach alfa katsayısı 0,701'dir. Test-tekrar test güvenilirliği için ICC 0,948'dir. Alusti test dört faktörle açıklanmıştır. KFPB (r=0,586, p=0,000), Bİ (r=0,321, p=0,005) ve Tinetti yürüme testi (r=0,512, p=0,000) Alusti test toplam puanı ile orta derecede pozitif korelasyona sahipti. Tinetti denge testi (r=0,662, p=0,000), Tinetti denge ve yürüme değerlendirmesi toplam puanı (r=0,655, p=0,000) ve RMİ (r=0,715, p=0,000) yüksek oranda pozitif korelasyona sahipti.
Sonuç: Alusti testin Türkçe versiyonu geriatrik popülasyon için geçerli ve güvenilir bir ölçektir.
Anahtar kelimeler: Fiziksel performans, fonksiyonel değerlendirme, yaşlı birey, geçerlik, güvenirlik

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Introduction

Advancing age is accompanied by loss of muscle strength and limitations in balance and mobility. The latter of these negatively impact physical performance (1) which then has a negative impact on the activities of daily life. This is significant health-related physical fitness parameters among older individuals (2).

Measuring physical fitness is a common practice in preventative and rehabilitative exercise programs aimed at improving health (3). Applicable and reliable tests are needed to detect older people at risk of losing their daily functions and hence their independence. The term "applicable" refers to the fact that tests are easy for older people people with various medical conditions and different functional levels that are considered acute. Moreover, consistent test results are necessary to effectively assess patient requirements and treatment effects in research as well as clinical contexts; therefore, acceptable reliability is a prerequisite for a valid test (4).

Many tests are used to assess functional performance, including the walking speed test, timed up and go (TUG) test, short physical performance battery (SPPB), and Tinetti test. The effectiveness and applicability of these tests, however, are constrained by the physical and cognitive state of the patient. Therefore, feasible, competent, tolerable, and reliable tests that produce consistent results and allow for a thorough evaluation of functional status and treatment effects are needed (5).

The Alusti test, designed by Josu Alustiza Navarro and based on existing tests, can be used to evaluate the physical performances of geriatric adults with various levels of functional and cognitive capacity in a short time without exhausting the patient. This test is available in two versions: short and full. The short version is applicable to 100% of a large elder population, including those with functional and cognitive impairment, whereas the full version has an applicability of approximately 85-90% (5).

The purpose of this study was to analyze the validity and reliability of the functional assessment scale for physical performance using the Alusti test for a geriatric population in Turkey as well as to provide researchers with a measurement tool to use in the Turkish literature.

Materials and Methods

Participants

Between August 2020 and April 2021, 75 volunteers participated in the study. The İstanbul Okan University ethics committee approved the present study (decision no: 17, date: 29.04.2020), which was conducted in accordance with the principles of the Declaration of Helsinki. All the patients had provided written informed consent before their enrollment in the present study. The inclusion criteria were as follows: age >65 years, willing to participate, and able to read and write in Turkish. There were no exclusion criteria.

Procedure

This study was conducted in two stages: the first stage involved translating the Alusti test into Turkish, and the second stage involved statistical analysis of the Turkish Alusti test's reliability and validity.

Stage 1: Translating the Alusti test into Turkish

The guidelines established by Beaton et al. (6) were followed during the translation phase.

Step 1: Contacting the developer of the original version of the Alusti test

Josu Alustiza Navarro, who created the Alusti test in 2018, was contacted via e-mail before the research started. The objective of this step was to see if any other researchers had already obtained permission for the Turkish validity and reliability study of the Alusti test as well as to get written authorization from the creator.

Step 2: Translation from Spanish to Turkish

A five-person translation team including two Turkish-speaking and two bilingual (Turkish and Spanish) physiotherapists and a bilingual (Turkish and Spanish) Spanish teacher was assembled. The four physiotherapists independently and individually translated the original Alusti test from Spanish to Turkish. Then, the four translations were compared, and a draft Turkish version was created.

Step 3: Back-translation from Turkish to Spanish

To ensure the accuracy of the translation, the draft version was back-translated from Turkish to Spanish by the Spanish teacher who is fluent in both languages.

Step 4: Synthesis

The original and the translated Spanish versions were compared in terms of content and discrepancies were documented. All versions were reviewed by the translation team and the Turkish version was discussed. The disparities were discussed by the reviewers, and synthesis was established.

Step 5: Achieving consensus

The translation team evaluated all versions, including the original Spanish, Turkish, and translated Spanish versions, and the synthesis of translation disparities. The test was finally amended into Turkish and the final version of the scale was developed.

Step 6: Pilot test

A pilot study involving eight patients was undertaken to examine the final version of the scale.

Stage 2: Statistical analysis of the reliability and validity of the Turkish Alusti test

Reliability: The Cronbach's alpha coefficient of the complete scale were determined to assess the reliability and internal consistency of the Alusti test. To check for consistency, the test-retest method was used, wherein the test was administered twice to the same participants after a 7-day gap. The total score and sub-parameters of the first test were compared to those of the retest. Intraclass correlation coefficient (ICC) was used to measure test–retest reliability.

Validity: The validity of the Alusti test was assessed using construct and criterion validity. Factor analysis and other scale validity approaches were used to assess the construct validity. The Barthel index (BI), which indicates the level of daily living activities and is associated with the functional level, and the SPPB, which indicates the degree of physical fitness, were utilized for similar scale validity. Scales and functional level tests used in the literature to measure ambulation and functional level were utilized to demonstrate the criterion validity of the Alusti test.

Outcome Measures

The patient evaluation form was used to collect the sociodemographic data and health condition of all participants.

The Turkish Version of the Functional Evaluation Scale of Physical Performance in the Geriatric Population (the Alusti Test)

The Alusti test is a 10-item test that is used to assess physical performance in the geriatric population and can have a total score of 100. This test is performed in the supine position. Upper and lower extremity range of motion (item 1), upper and lower extremity muscle strength (item 2), and the ability to transition from a supine to a sitting position (item 3) are all assessed in this posture. Then, sitting balance (item 4), standing from sitting (item 5), standing (item 6), walking (item 7), walking distance (item 8), standing in tandem with eyes closed (item 9), and standing on one leg with eyes closed (item 10) are assessed in the standing position (5).

The score indicates the level of activity of the patient. Movements were rated as follows based on the overall scores: 0-30, completely dependent; 31-40, severely dependent; 41-50, moderately dependent, 51-60, mildly dependent; 61-75, good degree of movement; 76-90, very good movement; and 91-100, excellent degree of movement (5).

Cognitive Assessment

Mini mental test: Orientation, registration, attention and calculation, recall, and language are the five key areas of cognitive function assessed using a mini mental test and are graded on a scale of 0-30 (7). The maximum score is 30, with a score of ≥24 indicating normal cognition. Cognitive impairment is indicated by a score of 0-23 (8).

Evaluation of Activities of Daily Living

BI: BI was created to measure care needs by evaluating personal care, bathing, feeding, grooming, going up and down the stairs, dressing, walking, bladder and bowel control, and other activities of daily living (9). The scale has a total of 10 items, with scores ranging from 5 to 15 points (between 0-15 points with 5-point increments according to the question) (10). In studies that employed the BI, the cutoff was set at 60 points, and scores >60 explained the ability to operate independently (11).

Evaluation of Physical Performance

SPPB: SPPB assesses the physical capabilities of the lower limbs of older adults (12). Walking speed, ability to get up from a chair, and ability to keep balance in increasingly difficult positions are assessed using SPPB. According to the duration of the exercise, all three physical performance measures (walking speed, balance, and getting up from a chair) are scored between 0 and 4. Summing the results of the three tests yields a total score ranging from 0 (poor) to 12 (excellent) (3). Good lower extremity function and a low risk of falling are indicated by high scores (13).

Tinetti balance and gait test (TBGT): TBGT was created for utilization in the older people population (14) and is used to assess the balance and walking abilities in two areas. The first nine questions are regarding balance followed by seven questions regarding walking abilities. A total score of ≤18 indicates a high risk of falling, 19-24 suggests a moderate risk of falling, and ≥24 shows a low risk of falling (15).

TUG test: In this test, participants are instructed to stand up from sitting in a regular chair without using their arms, walk a distance of 3 meters on the ground at a moderate speed, turn, walk backward, and sit. A stopwatch is used to time how long it takes to complete the instructions (16). There is a high chance of falling if the duration is 14 seconds or longer (17). Evidence suggests that older adults with longer durations are more prone to fall than those with shorter durations (18).

Rivermead mobility index (RMI): RMI is a metric that assesses a patient' as mobility (19). It includes 14 questions as well as an observation section. This index assesses the activities of an individual such as turning in bed, sitting balance, standing up, standing without support, changing locations, walking indoors and outdoors, going up and down stairs, picking something up off the floor, bathing, and running. If possible, a point is given for each activity. A score of ≤14 indicates the presence of mobility issues, whereas a score of 15 indicates that they do not have any issues (20).

Six-meter gait speed test: In this test, subjects are instructed to walk for 6 meters at their usual comfortable pace and the time taken is recorded. Gait speed is calculated by dividing the distance traveled (6 meters) by the total time in seconds. The gait speed is expressed in m/s (21).

Statistical Analysis

The SPSS software version 22 was used to conduct statistical analyses. Visual (histograms and probability graphs) and analytical (Kolmogorov-Smirnov or Shapiro-Wilk tests) methods were used to assess the conformity of the variables to the normal distribution. For normally distributed values, data was presented as mean and standard deviation, whereas for non-normally distributed variables, the median and interquartile ranges were given. For ordinal and nominal variables, numbers and percentages were provided. Mann-Whitney U and Kruskal-Wallis tests were used to compare groups. The relationship between categorical variables was investigated using the chi-square test (Pearson chi-square, Yates corrected chi-square, or Fisher's exact chi-square). The test-retest method and internal consistency analysis were used to assess the reliability of the Turkish version

of the Alusti test. The Cronbach's alpha coefficient was used to measure internal consistency. Cronbach's alpha coefficient and an ICC value of >0.70 were deemed adequate. The retest reliability was assessed using Spearman's correlation analysis and ICC. Factor analysis and related scale and criterion validity were used to assess construct validity. A strong relationship had an r value of >0.60 correlation coefficient, a moderate relationship had r=0.3-0.6, and a weak relationship had r<0.3. Results with a p-value of <0.05 were considered statistically significant (22). For normally distributed and non-normally distributed variables, Pearson and Spearman's correlation analyses were used, respectively. The total type-1 error threshold was determined to be 5% for statistical significance.

Sample Size Calculation

Spearman's correlation test with 80% power and 0.05 type-1 error was used to determine the sample size and was used for criterion and similar scale validity. The results showed that 75 people should be included in the study to obtain a significant correlation (r=0.31). It was concluded that reapplication of the test on 47 participants would be adequate to yield a moderate correlation (r=0.4) value in the Pearson correlation test for the Turkish version of the Alusti test's test-retest reliability (23).

Results

Table 1 summarizes the sociodemographic, physical features and clinical data of the cases of the 75 patients included in this study.

Reliability of the Turkish Version of the Alusti Test

Cronbach's alpha coefficient for the entire scale was determined to be 0.701 (Table 2). Furthermore, the Cronbach's alpha coefficient for each question in the Alusti test was shown to be lower than the overall Cronbach's alpha coefficient. In the reliability analysis, the relationship between the Alusti test items and the overall score was evaluated. Accordingly, the correlation coefficients of the items with the overall score were 0.348 and 0.695.

The relationship between the item sub-dimension total score of the Alusti test is shown in Table 3.

Pearson correlation analysis was used to establish the test-retest reliability of the Turkish version of the Alusti test by comparing the overall results of the first test with the second test one week later. The results revealed a strong correlation (r>0.80) between the total scores as well as a high level of reliability (Table 4).

The ICC for the test-retest reliability of the Turkish version of the Alusti test was 0.948 (Table 4).

Construct Validity of the Turkish Version of the Alusti Test

The KMO (0.655) value and Bartlett test (p=0.00) obtained in the construct validity analysis indicated that the Turkish version of the Alusti test was suitable for factor analysis. The total variance explained was examined. Accordingly, there were four factors with Eigenvalues above 1. In addition, when the Scree plot graph is examined, it is seen that the number of factors is four (Figure 1). In this study, the Varimax rotation method was applied. The results were interpreted to demonstrate that four factors explained the 10 items contained in the Alusti test scale score (Table 5).

Discussion

The Turkish validity and reliability of the Functional Assessment of Physical Performance scale for the Geriatric Population were explored in the present study. Our findings demonstrated that the Turkish version of the Alusti test is a valid and reliable measure for assessing physical performance in the geriatric population.

Table 1. Sociodemographic and physical characteristics of the patients

Variable	n	Min-max	X ± SD
Age	75	65-82	70.53±4.59
Length (cm)	75	140-185	163.49±7.32
Weight (kg)	75	56-111	77.91±11.26
BMI (kg/cm^2)	75	19.38-45.61	29.24±4.53
Mini mental test	75	13-29	21.80±3.80
Alusti test	75	57-80	72.65±5.64

Variable		n	%
Gender	Female	46	61.3
	Male	29	38.7
Classification according to mini mental test score	Normal (25 and over)	17	22.7
	Early dementia (19-24)	40	53.3
	Moderate dementia (10-19)	18	24.0
Classification by Barthel index total score	Moderately dependent	7	9.3
	Mildly dependent	10	10.3
	Fully independent	58	77.3
Classification by Tinetti balance and gait test total score	18 and under (high risk of falling)	3	4.0
	19-24 (fall risk moderate)	12	16.0
	24 and over (low risk of falling)	60	80.0
Classification based on timed up and go test results	14 and over (high risk of falling)	21	28.0
	Below 14 (low risk of falling)	54	72.0
Classification by Rivermead mobility index score	15 and over	36	48.0
	14 and under	39	52.0
Classification by Alusti test total score	51-60	2	2.7
	61-75	44	58.7
	76-90	29	38.7

Min-max: Minimum-maximum, SD: Standard deviation, BMI: Body mass index

Table 2. Reliability and internal consistency of the Turkish version of the Alusti test

Alusti test	Item-total relationship	If item deleted Cronbach's alpha coefficient	Cronbach's alpha coefficient of the whole scale
1. Passive joint movement in extremities	0.376	0.701	0.701
2. Active muscle strength in the extremities	0.641	0.622	
3. Transition from back to sitting	0.462	0.685	
4. Body control while sitting	0.348	0.700	
5. Transition from sitting to standing	0.344	0.699	
6. Standing position	0.377	0.698	
7. Walk	0.695	0.610	
8. Walking distance	0.542	0.678	
9. Tandem standing on two legs with eyes closed	0.523	0.687	
10. Standing on one legs with eyes closed	0.522	0.693	

Table 3. Item-total score relationship of Alusti test subscales

Alusti test substances		Alusti test total score
1. Passive joint movement in extremities	r	0.303*
	p	0.030
2. Active muscle strength in the extremities	r	0.793**
	p	0.000
3. Transition from back to sitting	r	0.536**
	p	0.000
4. Body control while sitting	r	0.375*
	p	0.021
5. Transition from sitting to standing	r	0.320**
	p	0.005
6. Standing position	r	0.381**
	p	0.001
7. Walk	r	0.780**
	p	0.000
8. Walking distance	r	0.524**
	p	0.000
9. Tandem standing on two legs with eyes closed	r	0.553**
	p	0.000
10. Standing on one legs with eyes closed	r	0.554**
	p	0.000

Spearman's correlation: *p<0.05; **p<0.01

Table 4. Test-retest reliability correlation and ICC coefficient of Turkish version of Alusti test

Test	Re-test	R	95% CI	p-value
Alusti test total score1	Alusti test total score2	0.952**	0.925-0.969	0.000
	Cronbach's	ICC	95% CI	
Test-retest	0.973	0.948	0.909-0.971	

Spearman's correlation: p<0.05; p<0.01; CI: Confidence interval, ICC: Intraclass correlation coefficient

Physical performance evaluation in the geriatric population gives information about everyday activities and helps to develop a rehabilitation program. It has been stated that evaluating older adults only primarily on physical performance exams or questionnaires based on self-reports would not produce valid results (24).

The Alusti test is a new physical and functional assessment test that meets the criteria of simplicity, application, reproducibility, validity, and acceptability, and may be used by the entire geriatric population (5). Furthermore, the Alusti test is a cognitive test that may be used in any cognitive state. The Alusti test results are not affected by the person's cognitive state because scoring solely depends on the practitioner. In this study, it was discovered that 68% of the patients had dementia, with early (40%) and moderate (18%) dementia.

The Alusti test has not yet been subjected to a validity and reliability assessment in another language. The Cronbach's alpha coefficient of the scale in our study was 0.701 in the evaluation of the Alusti test's reliability, and the scale was determined to have appropriate reliability because the Cronbach's alpha coefficient was larger than 0.70. Furthermore, the If Item-Deleted Cronbach's alpha coefficient for each item in the Alusti test was lower than the Cronbach's alpha coefficient for the entire scale, indicating that each question contributed to the

Table 5. Factor analysis of the Alusti test				
Questions of Alusti test	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
10. Standing on one legs with eyes closed	**0.953**			
9. Tandem standing on two legs with eyes closed	**0.951**			0.102
2. Active muscle strength in the extremities	**0.569**	0.107	0.373	
4. Body control while sitting		**0.849**	-0.237	
5. Transition from sitting to rating		**0.816**	0.213	0.162
3. Transition from back to sitting	0.301	**0.554**	0.28	-0.121
6. Standing position		**0.432**	0.358	0.419
7. Walk	0.186		**0.845**	
8. Walking distance			**0.840**	
1. Passive joint movement in extremities				**0.903**

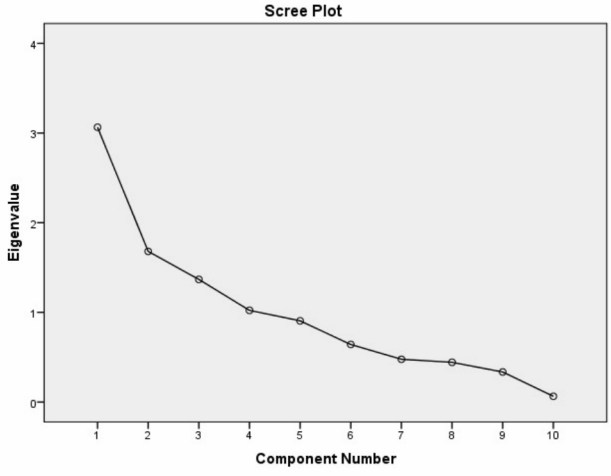

Figure 1. Scree plot chart of the Alusti test

scale's internal consistency and should not be deleted. In the reliability analysis, the item-total correlation of the Alusti test was examined. The correlation coefficients of the items with the total score ranged from 0.348 to 0.695. The total score of the items, which ranged from moderate to good, was found to have a statistically significant correlation. This contributes to the scale's internal consistency. The Alusti test item-total score had a correlation coefficient ranging from 0.303 to 0.793, indicating a moderate to high correlation near to perfect.

Test-retest reliability is measured using the ICC value. If this value is >0.80, it is considered proof of good reliability. The Turkish version of the Alusti test was shown to have a high level of test-retest reliability and a great correlation between total scores. It was determined that the ICC was 0.948. As a result, it can be said that the Alusti test is highly reliable.

Factor analysis was employed to assess the validity of the Alusti test in our study since a significant sample size was attained for construct validity. The loading of all questions in the Alusti test was determined to be >0.30, and the analysis should be continued with all of the items, according to the results of the study. The ninth item of the Alusti test had the highest effect on the total factor structure with a rate of 92.1%, and the 2nd item of the Alusti test was the question that contributed the least to the total factor with a rate of 47.7%. The 10 questions contained in the score of the Alusti test should be explained using four factors, according to the Scree Plot graph. The Alusti test was shown to have construct validity based on these findings.

To demonstrate similar scale validity in the Turkish version of the Alusti test, BI, which is connected with functional level and indicates the level of daily living activity, and SPPB, which measures physical fitness level, were utilized. The Alusti test total score and BI had a moderately positive and substantial correlation. The overall score of the SPPB and the total score of the Alusti test were found to have a positive and significant correlation. The validity and reliability of the Alusti test were assessed in the first study on the original version. Five scales were compared to the Alusti test (BI, walking speed test, TUG, SPPB, and TBGT). In its full version, the Alusti test demonstrated a good correlation with BI and TBGT. The test also met the requirements for assessing physical performance in the entire geriatric population. Both the short and long versions of the test have great reliability (ICC =0.99) (5).

The scales used in the literature to measure ambulation and functional level, as well as functional level tests, were utilized to demonstrate the criterion validity of the Turkish version of the Alusti test. The Alusti test total score, Tinetti balance subdimension score, Tinetti walking subdimension score, TBGT total score, and RMI score had a highly positive and significant correlation, although there was no significant relationship between TUG and walking speed test results. The Turkish version of the Alusti test was found to have criterion validity based on these findings.

The short form of the Alusti test is straightforward to administer and use, and its application is possible in all groups of the psychogeriatric population, according to a previous study (25).

The Alusti test has been used in several studies, and the consensus is that it is an easy instrument to employ with older adults. The test can be performed with just a stretcher, chair, stopwatch, and a qualified practitioner. The test may be administered to

all geriatric adults within 3–6 minutes, including the cognitive population (5,25).

Study Limitations

Our research has certain limitations as well. Although we employ multiple methods to demonstrate validity and reliability, it will be important to compare the Alusti test to an objective measurement such as balance systems or isokinetic measures that indicate functional capacity. Although our sample size is large enough to establish statistically significant comparisons, a larger sample may be investigated. However, ours is the first of its sort, as there is no scale for evaluating functional physical performance in the geriatric population that has been translated into Turkish. Our research serves as a model for future version studies.

Conclusion

As a result, the Turkish version of the Alusti test, which is used to assess functional physical performance in the geriatric population, is a valid and reliable functional scale that is simple to use. The Turkish version of the Alusti test can be utilized in research involving the functional evaluation of physical performance in geriatric adults. It will be a useful measurement tool in clinics for patient evaluation. In addition, detailed information on the strategies that can be adopted to assist these patients will be provided.

Ethics

Ethics Committee Approval: The İstanbul Okan University Ethics Committee approved the present study (decision no: 17, date: 29.04.2020), which was conducted in accordance with the principles of the Declaration of Helsinki.

Informed Consent: All the patients had provided written informed consent before their enrollment in the present study.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: J.A.N., Design: J.A.N., Data Collection or Processing: B.K., E.A., Analysis or Interpretation: B.K., E.A., Literature Search: B.K., E.A., J.A.N., Writing: B.K., E.A., J.A.N.

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The Evaluation of the Frequency of Benign Joint Hypermobility in Patients with Myofascial Pain Syndrome

Miyofasiyal Ağrı Sendromlu Hastalarda Eklem Hipermobilitesi Sıklığının Değerlendirilmesi

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Abstract

Objective: The purpose of this study was to determine the prevalence of benign joint hypermobility syndrome (BJHMS) in patients suffering from myofascial pain syndrome (MPS) and whether BJHMS is a risk factor for MPS.

Materials and Methods: Forty-two patients who met the diagnostic criteria for MPS and 39 healthy volunteers with no musculoskeletal pain were included in the study. The Bringhton 1998 criteria were used to assess all participants for BJHMS. The short life scale was used to assess all patients' daily living activities (SF-36).

Results: The case group's mean age was 30,874 years, the control group's mean age was 28.4±4.8 years, and there was no significant difference in age between the groups (p=0.084). In terms of body mass index (p=0.092), gender (p=0.805), and employment status (p=0.296), there was no significant difference between the groups. The rate of hypermobility in the case group (69%) was significantly higher than that in the control group (23.1%) (p<0.001).

Conclusion: BJHMS can cause injuries by opening up tissues to trauma. This can lead to MPS by triggering trigger points, spasms, or degenerative changes in the tissues.

Keywords: Myofascial pain syndrome, benign joint hipermobility syndrome, trigger point, cronic pain

Öz

Amaç: Bu çalışmanın amacı, miyofasiyal ağrı sendromlu (MAS) hastalarda benign eklem hipermobilite sendromunun (BEHMS) sıklığını ve BEHMS'nin MAS için bir risk faktörü olup olmadığını araştırmaktır.

Gereç ve Yöntem: MAS tanı kriterlerini sağlayan 42 tane hasta ve kas iskelet sisteminde herhangi bir ağrısı olmayan 39 tane sağlıklı gönüllü dahil edildi. Tüm katılımcılara Bringhton 1998 kriterleri kullanarak BEHMS için değerlendirildi. Tüm hastaların günlük yaşam aktiviteleri kısa yaşam ölçeği (SF-36) ile değerlendirildi.

Bulgular: Olgu grubunun yaş ortalaması 30,8±7,4 yıl, kontrol grubunun yaş ortalaması 28,4±4,8 yıl olarak bulunmuş olup gruplar arasında yaş açısından anlamlı farklılık görülmemiştir (p=0,084). Gruplar arasında vücut kitle indeksi (p=0,092), cinsiyet (p=0,805) ve çalışma durumu (p=0,296) açısından anlamlı farklılık görülmemiştir. Olgu grubunda bulunanların hipermobilite olma oranı (%69) kontrol grubunda bulunanların oranından (%23,1) anlamlı şekilde yüksek bulunmuştur (p<0,001).

Sonuç: BEHMS dokuları travmalara açık hale getirerek yaralanmalara sebep olabilir. Bu da dokularda kısır döngü oluşturarak tetik nokta, spazm veya dejeneratif değişiklikler meydana getirerek MAS sendromuna neden olabilir.

Anahtar kelimeler: Miyofasiyal ağrı sendromu, benign eklem hipermobilite sendromu, tetik nokta, kronik ağrı

Introduction

The most frequent reason for musculoskeletal pain is myofascial pain syndrome (MPS), one of the soft tissue rheumatic illnesses of the musculoskeletal system. Hypersensitive trigger points in tense bands of muscle and/or connective tissue are a defining feature of MPS. These trigger points may result in discomfort, muscular spasm, soreness, stiffness, exhaustion, restriction of the joints motion, weakness, sleeplessness and in rare cases autonomic dysfunction. It can affect any muscle group, even though the shoulder, neck, and waist areas are more affected. Trigger points in the muscle or fascia are the main characteristic of MPS that sets it apart from other musculoskeletal illnesses. A

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trigger point may develop in the muscle or fascia as a result of macro or micro traumas under conditions like protracted tension, spasm, pressure, weariness, chronic stress, and cold weather periods. When a tight band applies pressure to its location, it may induce pain that is felt both nearby and farther away. Unusual nociception mechanisms, neurohormonal problems, and disorders of muscle metabolism may contribute to the disease's occurrence even if the etiopathogenesis is unclear. Although it affects more women than males, the condition can strike anyone of any age and sex (1,2).

A genetically inherited condition known as benign joint hypermobility syndrome (BJHMS) is characterized by increased joint amplitude and connective tissue fragility brought on by anomalies in collagen tissue. There is a tendency for degeneration and tissue damage in the joint, depending on the joint stability problem. Due to a lack of collagen-based connective tissue support, BJHMS can impair the musculoskeletal system's tendons, ligaments, bones, and joints as well as induce symptoms in other tissues and organs. The most prevalent symptom is pain, but other symptoms include flu-like symptoms, stress incontinence, anxiety, clumsiness during daily activities, susceptibility to injury, myalgia, muscle cramps, delayed walking, varicose veins, palpitations, arrhythmia, paresthesia, low bone density, and impaired balance and coordination (3,4).

Although the prevalence of BJHMS varies by age, gender, and ethnicity, women are more likely to develop it. The condition is more prevalent in people between the ages of 30 and 60, but as people get older, its prevalence declines (3).

BJHMS slows tissue repair and traumatizes the musculoskeletal system. By causing ischemia, trigger points, and tight bands in the tissue, this might result in chronic pain. BJHMS is one of the main contributors of chronic pain. The literature only has one research that looked into the connection between BJHMS and pelvic discomfort. There isn't enough clinical evidence to prove that BJHMS may be a risk factor for pelvic discomfort, despite suggestions to this effect (5). We were unable to locate any study in the literature that suggests BJHMS is a risk factor for MPS or that looks at the connection between these two disorders. As a result, the current study is the first clinical investigation into the incidence of BJHMS in MPS patients and the connection between the two disorders.

Materials and Methods

Patients with MPS who applied to the Physical Therapy and Rehabilitation Outpatient Clinic between November 2021 and June 2022 were included in the study after the study was approved by the Harran University Clinical Research Ethics Committee (protocol no: HRÜ.22/04/22, date: 21.02.2022). Families of the patients who were in good health and hospital workers made up the control group. Both groups provided their written, informed permission to take part in the investigation.

Patients

The study comprised 42 patients who satisfied the diagnostic criteria for MPS and 39 healthy volunteers who served as the control group. Major and minor criteria make up the diagnostic standards for MPS, and the diagnosis of MPS requires the fulfillment of five major and at least one minor criterion (Table 1). The study excluded people with conditions including fibromyalgia, viral infections that might cause chronic pain in the musculoskeletal system, heart failure, hypertension, renal failure, hematological, gastrointestinal, endocrinological, and rheumatic disorders, as well as physically demanding employment. Participants in the research were those who had only MPS and no other diseases. According to the Brighton 1998 hypermobility criteria, all individuals were assessed. A health status survey is also included.

Scale Used to Measure Benign Joint Hypermobility

Criteria for assessing generalized joint laxity were first defined by Carter and Wilkinson (6) in 1964, modified by Beighton and Horan (7) in 1969, and revised in 1973 by Beighton et al. (8). The Beighton and Horan index is easy to use, requires no special equipment other than a goniometer, and takes 1 minute to complete. The index includes 5.methocarpal joint dorsiflexion >90°, passive thumb touches the inner surface of the forearm, hyperextension of elbow >10°, knee hyperextension >10° and

Table 1. Diagnostic standards for MPS

Major criteria
1. Localized pain
2. The trigger point to a specific point reflected pain and sensory alterations
3. Feeling the muscle's tight band with your hand
4. The taut band has trigger points at any location
5. Reduced range of motion in regions that can be evaluated
Minor criteria
1. Trigger point pressure palpation, the presence of clinical pain, and/or sensory alterations
2. Retrieving the local twitching reaction by palpating or needling the tight band's sensitive spot
3. Injection of trigger points or muscle stretching to reduce pain

MPS: Myofascial pain syndrome

Table 2. Beigthon diagnostic scoring for benign joint hypermobility syndrome

	Left	Right
5.methocarpal joint dorsiflexion >90°	1	1
Passive thumb touches the inner surface of the forearm	1	1
Hyperextension of elbow >10°	1	1
Knee hyperextension >10°	1	1
The palm of the hand touches the ground while standing and knee extended	1	
	9	

the palm of the hand touches the ground while standing and knee extended (8).

The Beighton Scoring System were developed to diagnose hypermobility and have been widely accepted due to their ease of use (Table 2). The Beighton Scoring System measurement tool consists of five items. The first four items are evaluated separately as the right and left sides, and each item related to hypermobility is scored as 0 or 1 point. A score of 4 out of 9 points is considered hypermobile. We applied the above index to our patients. We gave 1 point for each criterion to be positive and zero point for it to be negative.

This scoring system was changed in 1998 and the Brighton diagnostic criteria were formed since it only evaluates certain body regions (Table 3). According to the Brighton criteria, BJHMS is diagnosed when 2 major or 1 major + 2 minor or 4 minor or 2 minor criteria are present in first-degree relatives.

Table 3. Brighton diagnostic criteria for benign joint hypermobility syndrome

Major criteria
1. Beighton criteria scoring 4/9 and above (+)
2. Presence of arthralgia lasting more than 3 months in more than 4 joints
Minor criteria
1. Beighton score 1, 2 or 3/9 (0.1.2 or 3/9 if age 50+)
2. Joint or back pain in one of the three joints or spondylosis, spondylolisthesis
3. Dislocation, subluxation in more than one joint
4. Three or more soft tissue disorders (bursitis, tenosynovitis, epicondylitis)
5. Marfanoid appearance (tall, thin, long sleeved, upper extremity/lower extremity ratio less than 0.89, arachnodactyly)
6. Striaes on the skin, hyperextensibility, thin skin, abnormal scarring
7. Eye symptoms: droopy eyelid or myopia or antimongoloid slope
8. Varicose veins or hernia or uterine/rectal prolapse

Statistical Analysis

Analysis results were assessed using 22 SPSS package modules (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL). In the study, descriptive data were presented as n and % values for categorical data and mean standard deviation and median interquartile range (numbers between the 25th and 75th percentiles) for continuous data. To compare categorical variables between groups, Pearson chi-square analysis was performed. The Shapiro-Wilk test was used to assess how closely continuous variables adhered to the normal distribution. In the comparison of paired groups, Student's t-test was used for normally distributed variables, and Mann-Whitney U test was used for non-normally distributed variables. Pearson correlation test was used for those with normal distribution, and Spearman correlation test was used for those who did not show normal distribution. The statistical significance level in the analyzes was accepted as $p<0.05$.

Power Analysis

Power analysis is used in medical research to determine the smallest sample size required to detect a clinically significant effect at a given statistical significance level. We used to post-hoc power analysis program. According to the post-hoc power analysis performed using the G*Power 3.1.9.2 program, the actual power was found to be 0.989 with a 5% margin of error.

Results

The research comprised 81 people in all, 42 cases and 39 controls. There was no discernible difference in age between the groups (p=0.084) as the mean age of the case group was 30.8±7.4 years and the mean age of the control group was 28.4±4.8 years. Body mass index (BMI), gender, and work status did not significantly differ across the groups (p=0.092, p=0.805, and p=0.296, respectively).

It was discovered that the case group's rate of hypermobility (69%) was substantially greater than the control group's rate of 23.1% (p<0.001) (Table 4, Figure 1).

Men in the case group had substantially higher sub-dimension ratings for physical function (p=0.004), social health (p=0.011), and general health (p=0.014) than women. Regarding other

Table 4. Comparison of the sociodemographic characteristics of the groups and the presence of hypermobility

		Case (n=42)		Control (n=39)		Total (n=81)		p-value
		Number	%	Number	%	Number	%	
Age, mean ± SD		30.8±7.4		28.4±4.8		28.8±6.7		0.084*
BMI, mean ± SD		24.0±3.7		22.6±3.6		23.3±3.7		0.092*
Gender	Male	14	33.3	12	30.8	26	32.1	0.805**
	Female	28	66.7	27	69.2	55	67.9	
Working status	Yes	21	50.0	24	61.5	45	55.6	0.296**
	No	21	50.0	15	38.5	36	44.4	
Hypermobility	Yes	29	69.0	9	23.1	38	46.9	<0.001**
	No	13	31.0	30	76.9	43	53.1	

*Student's t-test, **Chi-square analysis was performed. SD: Standard deviation, BMI: Body mass index

sub-dimensions, there was no discernible gender difference (Table 5).

There was no discernible difference between working status and the quality of life sub-dimensions in the case group studied (p>0.05) (Table 6).

Regarding the sub-dimensions of quality of life, there was no statistically significant difference between the case group studied and the presence of hypermobility (p>0.05) (Table 7).

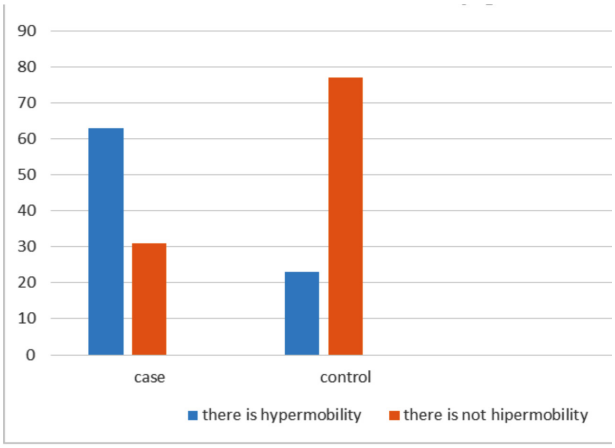

Figure 1. Comparison of hypermobility frequency between both groups

In the case group, there was a sizable positive connection between age and BMI. Physical function sub-dimension and physical role difficulty, emotional role difficulty, energy vitality, social health, pain, and overall health were found to be positively and significantly correlated. Physical and emotional role challenges, as well as mental and social health, were found to be positively and significantly correlated. The energy vitality sub-dimension and pain, general health, social health, and mental health were found to be positively and significantly correlated. The association between the mental health sub-dimension, social health, and overall health was shown to be both favorable and substantial. The social health sub-dimension, pain, and overall health were found to have a favorable and substantial association (Table 8).

When the whole cohort was analyzed, there was no discernible difference in the presence of hypermobility between the sexes (p=0.295), with hypermobility being found in 38.5% of males and 50.9% of women.

Males in the case group had a rate of hypermobility of 57.1%, which was determined to be substantially greater than the rate of hypermobility in the control group of men (16.7%) (p=0.034). Women in the case group had a rate of hypermobility of 75%, which was determined to be considerably greater than the rate of hypermobility in the control group of women (24.9%) (p<0.001) (Table 9).

Table 5. Comparison of the quality of life scores of those in the case group by gender

	Male (n=14)	Female (n=28)	p-value
	Median (IQR)	Median (IQR)	
Physical function	90.0 (80.0-95.0)	55.0 (50.0-82.5)	**0.004***
Physical role difficulties	37.5 (0-75.0)	25.0 (0-75.0)	0.722*
Emotional role difficulties	33.3 (33.3-100.0)	33.3 (0-66.6)	0.553*
Energy vitality vitality	46.4±10.1	42.7±18.5	0.400**
Mental health	57.4±17.5	52.1±20.4	0.413**
Social health	64.3±18.3	47.3±19.9	**0.011****
Pain	40.7±22.3	32.3±17.8	0.193**
General health	62.5 (60.0-75.0)	47.5 (30.0-60.0)	**0.014***

*Mann-Whitney U test, **Student's t-test done. IQR: Interquartile range

Table 6. Comparison of the quality of life scores of those in the case group by gender

	Working (n=21)	Not working (n=21)	p-value
	Median (IQR)	Median (IQR)	
Physical function	80.0 (55.0-90.0)	55.0 (50.0-85.0)	0.138*
Physical role difficulties	25.0 (0-75.0)	25.0 (0-75.0)	0.765*
Emotional role difficulties	33.3 (0-66.6)	33.3 (0-33.5)	0.764**
Energy vitality vitality	44.3±13.6	43.6±18.7	0.888**
Mental health	54.9±19.7	53.0±19.6	0.755**
Social health	54.2±22.5	51.8±19.5	0.716**
Pain	35.0±15.9	35.2±23.1	0.967**
General health	55.0 (45.0-60.0)	55.0 (30.0-75.0)	0.950*

*Mann-Whitney U test, **Student's t-test done. IQR: Interquartile range

Table 7. Comparison of the quality of life scores of those in the case group according to the presence of hypermobility

	There is hypermobility (n=29)	No hypermobility (n=13)	p-value
	Median (IQR)	Median (IQR)	
Physical function	75.0 (50.0-85.0)	90.0 (55.0-95.0)	0.122*
Physical role difficulties	25.0 (0-75.0)	50.0 (0-100.0)	0.280*
Emotional role difficulties	33.3 (0-66.6)	33.3 (33.3-100.0)	0.519*
Energy vitality vitality	42.4±14.1	47.3±20.2	0.370**
Mental health	51.3±16.8	59.7±24.1	0.200**
Social health	50.4±18.1	58.7±25.7	0.241**
Pain	35.9±18.6	33.5±22.3	0.719**
General health	55.0 (30.0-65.0)	60.0 (45.0-65.0)	0.872*

*Mann-Whitney U test, **Student's t-test done. IQR: Interquartile range

Table 8. Correlation of age, BMI and scale scores of those in the case group

		Age	BMI	FF	FRG	ERG	EVV	MH	SH	p-value
BMI	r	**0.468**								
	p	**0.002**								
Physical function	r	-0.148	0.130							
	p	0.350	0.414							
Physical role difficulty	r	-0.189	0.111	**0.474**						
	p	0.231	0.482	**0.002**						
Emotional role difficulty	r	-0.152	0.145	**0.330**	0.627					
	p	0.335	0.358	**0.033**	0.000					
Energy vigor vitality	r	0.091	0.099	**0.325**	0.297	-0.028				
	p	0.565	0.535	**0.036**	0.056	0.858				
Mental health	r	0.110	0.211	0.222	**0.307**	0.058	**0.546**			
	p	0.489	0.180	0.158	**0.048**	0.717	**0.000**			
Social health	r	-0.012	0.232	**0.561**	**0.454**	0.280	**0.386***	**0.357**		
	p	0.939	0.140	**0.000**	**0.003**	0.072	**0.012**	**0.020**		
Pain	p	-0.086	0.289	**0.376**	0.107	0.014	**0.376**	0.295	**0.492**	
	r	0.590	0.064	**0.014**	0.499	0.928	**0.014**	0.058	**0.001**	
General health	r	-0.022	0.128	**0.528**	0.203	-0.021	**0.555**	**0.390**	**0.545**	**0.431**
	p	0.888	0.417	**0.000**	0.197	0.894	**0.000**	**0.011**	**0.000**	**0.004**

BMI: Body mass index

Table 9. Comparison of hypermobility status by gender

		There is hypermobility		No hypermobility		p-value*
		Number	%	Number	%	
Male	Case	8	57.1	6	42.9	0.034
	Control	2	16.7	10	83.3	
Female	Case	21	75.0	7	25.0	<0.001
	Control	7	25.9	20	74.1	

*Chi-square analysis was done

Discussion

BJHMS is a disease that occurs due to increased fragility of connective tissue and fibrogenic tissue disorder. These illnesses cause joints, tendons, and muscles to become more flexible, making the tissues more susceptible to micro and macro traumas. This may cause in tissue degeneration, ischemia, spasm, and inflammation (9). BJHMS is an important cause of musculoskeletal pain and may be an important risk factor for MPS.

In this investigation, the incidence of BJHMS in MPS patients and healthy controls with comparable sociodemographic features was evaluated. According to our findings, the case group had considerably higher rates of hypermobility, which had a strong statistical significance.

MPS can be brought on by a variety of conditions, including diabetes, hypothyroidism, infection, electrolyte imbalances, endochronological, hematological, rheumatological, and cardiovascular illnesses. Additionally, physical employees performing demanding professions might be tested for MPS (10). Anyone with a sickness or who does hard work was excluded from the research in order to better understand the association between MPS and BJHMS. MPS and BJHMS can affect either gender, albeit they are more frequent in women. By adding men and women with MPS in the research, we hoped to strengthen the link between MPS and BJHMS. The prevalence of BJHMS was observed to be higher in our study's case group of both men and women, indicating the link between MPS and BJHMS.

Many studies have found that hypermobility is common in females (11,12). However, when the whole group was evaluated in our study, hypermobility was observed in 38.5% of men and 50.9% of women, and no significant difference was found between the genders in terms of the presence of hypermobility. In the literature, only one study investigated the relationship between pelvic pain and BJHMS, and it was suggested that BJHMS may be a predisposing factor for pelvic pain (5). In our study, an increase in the frequency of BJHMS was found in people with regional pain syndrome, indicating that it is a risk factor for MPS.

Numerous studies demonstrate that people with MPS have much lower quality of life than healthy controls (13). In contrast, neither men nor women in our research performed significantly worse on the short-life function test than the healthy group. The physical function, social health, and general health sub-dimension scores of the males in the case group were found to be considerably higher than the scores of the women when we analyzed both sexes separately. Additionally, we did not discover a connection between hypermobility and the efficiency of living functions.

Study Limitations

The limitations of our study are the small number of patients and the limited number of studies on this subject in the literature. Studies with a large patient group will help to clarify the relationship between MPS and BJHMS.

Conclusion

In patients with MPS, we observed an increase in the incidence of BJHMS. BJHMS may harm tissues by making them more susceptible to damage. This can result in a vicious cycle in the tissues, triggering trigger points, spasms, or degenerative changes that can lead to MPS.

Ethics

Ethics Committee Approval: Patients with MPS who applied to the Physical Therapy and Rehabilitation Outpatient Clinic between November 2021 and June 2022 were included in the study after the study was approved by the Harran University Clinical Research Ethics Committee (protocol no: HRÜ.22/04/22, date: 21.02.2022).

Informed Consent: Families of the patients who were in good health and hospital workers made up the control group. Both groups provided their written, informed permission to take part in the investigation.

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Osteoporoz ile İlgili Türkçe Web Sitelerinin Bilgi İçeriği, Okunabilirlik, Güvenilirlik ve Kalitesinin Değerlendirilmesi

Evaluating the Information Content, Readability, Reliability and Quality of Turkish Websites on Osteoporosis

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Öz

Amaç: Osteoporoz (OP) ile ilgili Türkçe online bilgi sunan web sitelerinin bilgi içeriği, okunabilirlik, güvenilirlik ve kalite düzeyinin incelenmesi amaçlanmıştır.

Gereç ve Yöntem: Eylül 2022 tarihinde Google arama motoruna "osteoporoz, kemik erimesi" kelimeleri yazılarak tarama yapılmış ve ilk 20 sayfadaki web siteleri incelenmiştir. Web siteleri hazırlayıcısına göre üç gruba [grup 1= hastaneler, dernekler, resmi kurumlar; grup 2= sağlık profesyonelleri; grup 3= diğer (haber siteleri, blog, vb.)] ayrılmıştır. Okunabilirlik düzeyi Ateşman ve Bezirci-Yılmaz formülüne göre, güvenilirlik ve kalite The Journal of the American Medical Association (JAMA) skoru, Quality Criteria for Consumer Health Information (DISCERN) ölçeği, Genel Kalite skoru (GKS) ve Hekim Global Kalite değerlendirmesi (HGKS) ile yapılmıştır. Bilgi içeriği ise Türkiye Osteoporoz Derneği'nin resmi internet sitesindeki hasta bilgilendirme metinlerindeki konu başlıkları referans alınarak incelenmiştir.

Bulgular: Çalışmaya dahil edilen 160 web sitesinin 62'si (%38,8) 1. grupta, 58'i (%36,2) 2. grupta ve 40'ı (%25,0) ise 3. grupta idi. Ateşman değerinin medyanı 48,2 (17,4-69,4) ile zor okunabilir düzeyde; Bezirci-Yılmaz değerinin medyanı 12,6 (6,0-37,7) ile lisans düzeyinde okunabilir bulunmuştur. JAMA skoru 1,0 (0-3) saptanmış olup, web sitelerin tamamına yakını (%98,7) düşük güvenilir saptanmıştır (JAMA skoru ≤2). Web sitelerinden sadece 10'unun (%5) bilgi içeriği tamdı. DISCERN skoru medyanı 29 (19-61) ile, HGKS medyanı 2 (1-5) ile yetersiz kalitede; GKS medyanı 3 (1-5) ile orta kalitede izlenmiştir. Gruplar arasında ve ilk iki sayfa ile son 18 sayfa arasında okunabilirlik, güvenilirlik ve kalite ölçekleri açısından fark saptanmamıştır.

Sonuç: Mevcut bulgular, Türkçe web sitelerinin, OP konusunda yeterli düzeyde ve kalitede bilgi sunmaktan oldukça uzak olduğunu göstermektedir. OP tedavisi yönetiminde risk faktörlerinin bilinmesi, primer ve sekonder korunma yöntemlerinin uygulanarak tedavi açığının kapatılmasında nitelikli hasta eğitiminin önemi dikkate alındığında, elde edilen sonuçlar oldukça yetersiz boyuttadır. Hekimler ve hastalar bu durumun farkında olmalı; ilgili kurumlar ise sorunun çözümü için gerekli düzenlemeleri ve sağlık politikalarını geliştirmelidir.

Anahtar kelimeler: Osteoporoz, internet, bilgi kalitesi, okunabilirlik, güvenilirlik

Abstract

Objective: To investigate the information content, readability, reliability, and quality level of websites that provide online information in Turkish about osteoporosis (OP).

Materials and Methods: In September 2022, the words "osteoporosis, bone melt" were scanned on Google search and the first 20 websites were investigated. The websites were divided into three groups according to the creator: Group 1= hospitals, associations, and official institutions; group 2= health professionals; and group 3= others. The readability level was evaluated according to the Ateşman and Bezirci-Yılmaz formula; the reliability and quality were evaluated according to the Journal of the American Medical Association (JAMA) score, the Quality Criteria for Consumer Health Information (DISCERN) scale, the Global Quality scale (GQS), and the Physician Global Quality assessment (PGQA). The information content was analyzed with reference to the subject headings in the patient information texts on the official website of the Turkish Osteoporosis Association.

Results: One hundred sixty websites were included in the study; 62 were in group 1, 58 were in group 2, and 40 were in group 3. The median of the Ateşman value is 48,2, which is difficult to read; the Bezirci-Yılmaz value was a median of 12,6. The JAMA score was 1,0 and almost all (98,7%) websites were found to be low reliable. Only 10 of the websites had complete information content. The DISCERN score was of

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poor quality, with a median of 29. It was also found to be of insufficient quality for PGQA and GQS. There was no significant difference between the groups in terms of readability, reliability, and quality criteria.
Conclusion: Current findings show that Turkish websites are far from providing sufficient and quality information on osteoporosis. Considering the importance of patient education in the management of OP treatment, the results obtained are quite inadequate. Physicians and patients should be aware of this situation; relevant institutions should develop the necessary health policies to solve the problem.
Keywords: Osteoporosis, internet, information quality, readability, reliability

Giriş

Osteoporoz (OP), düşük kemik kütlesi ve kemik dokusunun mikromimarisinde bozulma sonucu kemik kırılganlığında ve kırık riskinde artış ile karakterize sistemik metabolik bir hastalıktır (1). OP tanısı klinik pratikte lomber omurga ve femur boyun veya femur total kemik mineral dansitesi ölçümü ile konmaktadır. Dünyada her geçen gün artan yaşam ömrü, yaşla beraber prevalansı artan OP'yi, önemli bir küresel sağlık ve ekonomik sorun haline getirmiştir (2). Türkiye'de 50 yaş üstü bireylerde OP prevalansının %20'lerin üzerinde olduğu hesaplanmış olmasına rağmen, tanı oranının oldukça düşük (%25) olduğu ve hastaların %75-90'ının farmakolojik tedavi almadığı bildirilmiştir (3,4).

OP tedavisi yönetiminde, risk faktörlerinin bilinmesi, primer ve sekonder korunma yöntemlerinin uygulanması kritik öneme sahiptir. Nitekim Kirazlı ve ark. (4) Türkiye'deki OP tedavisi yönetimine dair yayınladıkları güncel konsensus önerilerinde, medya aracılığıyla OP konusunda eğitim verilmesi gerekliliğine vurgu yapmıştır.

İnternet kullanımı gelişen teknolojik imkanlar ile son yıllarda tüm dünyada oldukça yaygınlaşmıştır. İnternet kullanıcılarının tamamına yakını bilgiye erişim sürecinde arama motorlarına yönelmektedir. Türkiye İstatistik Kurumu, Türkiye'de internet erişim imkanı olan hane oranının 2022 yılında %94,1'e çıktığını ve interneti sağlıkla ilgili bilgi aramak için kullananların oranının %70'lere ulaştığını bildirmiştir (5). Özellikle son yıllarda, ani gelişen koronavirus hastalığı-2019 pandemisinin de travmatik sosyopsikolojik etkileri, sağlık okuryazarlığının önemli bir sorun olduğunu gün yüzüne çıkarmıştır (6).

Birçok OP'li bireyin hastalığın risk faktörlerinden, korunma yollarından ve potansiyel morbidite ve mortaliteye neden olan sonuçlarından habersiz olduğu bilinmektedir (7). Bu nedenle, sağlıkla ilgili online bilgiyi oldukça yoğun olarak kullanan günümüz dünyasında, OP ile ilgili online bilgi kaynakları ile sağlanabilecek hasta eğitimi, OP'nin önlenmesinde ve tedavi sürecinin yönetilmesinde önemli bir basamak haline gelmiştir (8,9). Ne var ki, OP ile ilgili online bilginin içerik, güvenilirlik ve okunabilirlik açısından yetersiz ve endişe verici düzeyde olabileceği bildirilmiştir (9,10).

Okunabilirlik, metinlerin okuyucular tarafından "kolay veya zor anlaşılması" durumunu ifade eden dilbilimi ile ilgili niceliksel teknik bir kavramdır. OP dahil birçok hastalıkla ilgili farklı dillerdeki online bilgilerin incelendiği araştırmalarda, içerik, güvenilirlik ve okunabilirlik düzeylerinin yetersiz olduğu bildirilmiştir (9,11). Okunabilirliğin dile ve topluma özgü teknik bir değerlendirme olduğu ve herhangi bir kontrol-denetim mekanizmasının olmadığı internet ortamındaki online bilgilerin de ülkelere göre oldukça farklılık gösterebileceği dikkate alındığında; her ülke için online bilgi içeriğinin okunabilirlik ve güvenilirlik açısından ayrı ayrı incelenmesi gerekliliği açıktır. Ne var ki, bildiğimiz kadarıyla literatürde OP ile ilgili Türkçe web sitelerinin niteliğinin incelendiği bir araştırma bulunmamaktadır. Bu çalışmanın amacı, OP ile ilgili bilgilendirme içeren Türkçe web sitelerinin okunabilirlik, güvenilirlik, kalite ve bilgi içeriği düzeylerinin incelenmesidir.

Gereç ve Yöntem

Çalışma Dizaynı ve Verilerin Toplanması

Bu araştırma internet ortamında verilerin tarandığı, tanımlayıcı, kesitsel bir çalışmadır. Çalışmaya başlamadan önce Sağlık Bilimleri Üniversitesi, Hamidiye Bilimsel Araştırmalar Etik Kurulu onayı alınmıştır (karar no: 33/18, tarih: 22.10.2021).

Eylül 2022 tarihinde, Türkiye'de en sık (%99) kullanılan internet arama motoru olan Google'a (https://www.google.com.tr) "osteoporoz, kemik erimesi" anahtar kelimeleri yazılarak tarama yapıldı (12). Çalışma sonuçlarına olası yanıltıcı etkisini engellemek için kişisel Google hesabından çıkıldı, bilgisayarın önbelleğindeki tarama geçmişi ve çerez ayarları silindi. Online bilginin incelendiği çalışmalara benzer doğrultuda, ilk 20 sayfadaki 200 web sitesi taranmıştır (13). Hastalık hakkında bilgi içermeyen siteler, sohbet-forum siteleri, reklam siteleri, magazin siteleri, sadece resim veya video içeren siteler, akademik makale içeren siteler, çok az (<10 cümle) içeriğe sahip siteler ve tekrarlı sayfalar çalışmaya dahil edilmedi. İnternet siteleri hazırlayıcısına göre üç gruba ayrıldı: 1) Hastane, üniversite, tıp merkezi, sağlık ile ilgili derneklerin veya diğer resmi kurumların hazırladığı, 2) uzman sağlık profesyonellerinin hazırladığı, 3) diğer (haber siteleri, blog, anonim ve diğer sınıflandırılamayan).

Bilgi İçeriği

Web sitelerinin bilgi içeriği, Türkiye Osteoporoz Derneği'nin resmi internet sitesindeki "Osteoporoz hakkında bilmek istedikleriniz" başlıklı bilgilendirme metinlerindeki konu başlıkları referans alınarak incelendi (14). Buna göre; OP'nin tanımı, tanısının nasıl konduğu, semptom ve bulguları, risk faktörleri, korunma ve beslenme, egzersiz, düşmenin önlenmesi, sıklığı ve farmakolojik tedavisi hakkında bilgi verilip verilmediği incelendi. Bilgi içeriğindeki 9 madde, bir araştırmacı (R.Y.) tarafından, içeriğin akademik nitelikleri dikkate alınmaksızın, metinde bulunup bulunmamasına göre "var" veya "yok" şeklinde kaydedilmiştir.

The Journal of the American Medical Association (JAMA) Skoru

JAMA kriterleri, internetteki medikal bilginin kalitesini, güvenilirliğini ve kullanılabilirliğini değerlendirmek amacıyla kullanılan uluslararası bir skordur (15). Değerlendirmede dört

ana unsur incelenmektedir: 1) Yazar bilgileri, 2) atıf (referans, telif hakkı bilgileri), 3) şeffaflık (sponsorluk, reklam, çıkar çatışması), 4) güncellik. Her bir kriterin yokluğunda 0, varlığında 1 puan verilmektedir. Toplam puan 0-4 arasında değişir. ≥3 puan "yüksek güvenilirlik", ≤2 puan ise "düşük güvenilirlik" olarak kabul edilmektedir. Bu çalışmada, JAMA skorlaması bağımsız iki araştırmacı (R.Y., S.K.) tarafından yapıldı. Puanlamada araştırmacılar arasında tutarsızlık olduğunda, üçüncü bağımsız araştırmacı tarafından (İ.S.) incelenerek nihai karar ortak konsensüs ile verildi.

Okunabilirlik

Web sitelerinde yer alan metinlerin okunabilirlik düzeyinin hesaplanmasında, Türkçe metinlerin okunabilirlik düzeyinin belirlenmesi için özel olarak geliştirilmiş Ateşman ve Bezirci-Yılmaz okunabilirlik formülleri kullanıldı (16,17). Web sitesindeki bilgilendirme içeren metinler, sayfadaki alakasız yazılar ayıklanarak kopyalandı ve özel bir bilgisayar programına aktarılmak suretiyle okunabilirlik hesaplamaları yapıldı.

Ateşman Okunabilirlik Formülü

Ateşman formülü, İngilizce okunabilirliğin değerlendirildiği Flesch Ease of Reading formülünün Türkçeye uyarlanmasıyla geliştirilmiştir (16). Cümle uzunluğunu ve kelimelerdeki hece sayısını temel alan bir formüldür. Bu formüle göre cümle uzunluğu ve kelimelerdeki hece sayısının artışı metinlerin okunabilirliklerini azaltmaktadır. Ateşman formülüne göre bir metin, okunabilirlik değeri 90-100 arasında ise "çok kolay", 70-89 arasında "kolay", 50-69 arasında "orta zor", 30-49 arasında "zor" ve 1-29 arasında ise "çok zor" okunabilir olarak sınıflandırılmaktadır.

Bezirci-Yılmaz Okunabilirlik Formülü

Bezirci-Yılmaz okunabilirlik formülü, daha önce geliştirilmiş uluslararası okunabilirlik ölçekleri ve Türkçenin spesifik özelliklerine dayanarak 2010 yılında geliştirmiştir (17). Ateşman formülüne benzer şekilde, cümledeki kelime ve hece sayıları dikkate alınarak formüle edilmiştir. İngilizce metinlerin okunabilirlik değerlendirmesinde yaygın kullanılan "the Simple Measure of Gobbledygook" skoruna benzer şekilde, bir metni anlamak için tahmini kaç yıllık eğitime ihtiyaç olduğu ortaya konmaktadır. Hesaplama sonucunda çıkan rakam, Türkiye'deki eğitim sistemine göre hangi sınıf düzeyine denk geldiğini göstermektedir. Buna göre 1-8 arası ilköğretim, 9-12 arası orta öğretim, 12-16 arası üniversite (lisans) ve ≥16 ise akademik düzeye karşılık gelmektedir.

Quality Criteria for Consumer Health Information (DISCERN) Ölçeği

DISCERN ölçeği, Charnock ve ark. (18) tarafından tedavi seçenekleri ile ilgili metinlerin yeterliliğini ve kalitesini değerlendirmek amacı ile geliştirilmiş ve Gökdoğan (19) tarafından Türkçeye çevrilmiştir. Üç bölümde toplam 16 sorudan oluşmaktadır. İlk bölümde güvenilirlik ve bağımsızlığı sorgulayan 8 soru, ikinci bölümde tedavi seçeneklerinin yeterliliği ile ilgili 7 soru bulunmaktadır. Ayrıca değerlendirilen üçüncü bölümdeki son soru ise; diğer soruların yanıtına dayanarak, sezgisel kanaati de içine katan özet genel kaliteyi sorgulamaktadır. Son soru, tek başına, tedavi seçenekleri ile ilgili kaliteyi değerlendirmek amacıyla da kullanılabilmektedir. Her soru "hayır"dan "evet"e kadar 1-5 arası puanlanır. Cevap kesinlikle evetse 5 puan, kesinlikle hayırsa 1 puan veya ilgili soruyu karşılama oranına göre 2-4 arası puan verilir. İlk 15 sorunun toplam puanın 63-75 puan arası olması mükemmel, 51-62 arası iyi, 39-50 arası orta, 28-38 arası yetersiz, 15-27 arası çok yetersiz olarak sınıflanmaktadır (20). DISCERN skoru R.Y. tarafından puanlanmıştır.

Health on the Net Foundation Code of Conduct (HONcode) Sertifikası

HONcode, sağlıkla ilgili web sitelerinin niteliğini, güvenilirlik ve kalitesini değerlendiren, kar amacı gütmeyen uluslararası bir organizasyon (Health on the Net Foundation: Nette Sağlık Vakfı) tarafından sağlanan bir sertifikadır. Web siteleri 8 maddeden oluşan (yazarların yetkinliği, tamamlayıcılık, gizlilik, atıfta bulunma, doğrulanabilirlik, şeffaflık, sponsorluğun beyanı ve reklam politikasında dürüstlük) HONcode standartlarına sahip oldukları ve onaylanmaları halinde bu sertifikayı alabilmektedirler (21). Prosedür ve maliyeti nedeniyle Türkiye dahil birçok ülkede çok kısıtlı kullanımı olan HONcode sertifikası, internet sitelerinin ana sayfasında ve arama motorlarının araç çubuğunda otomatik olarak gözükmektedir. Bu çalışmada, tüm web siteleri HONcode sertifikası mevcudiyeti açısından (R.Y.) incelendi.

Global Kalite Skoru (GKS) ve Hekim Genel Kalite Değerlendirmesi

GKS, ilk defa Bernard ve ark. (22) tarafından web sitelerinin enflamatuvar bağırsak hastalıkları konusundaki kalitesini değerlendirmek için doğaçlama, subjektif olarak geliştirilmiş ve sonrasında başka çalışmalarda da kullanılmıştır (23,24). Genel kalitenin yanında, sayfa akışı ve kullanım kolaylığını da hesaba katan, 1-5 arası beş noktalı puanlamanın yapıldığı bir ölçektir. Bir-2 puan düşük kaliteyi, 3 puan orta kaliteyi, 4-5 puan ise yüksek kaliteyi göstermektedir. Bu araştırmada ayrıca, OP tedavisiyle en az 10 yıldır aktif olarak ilgilenen iki fizyoterapist tarafından web sitelerinin doğruluk, güncellik, görsellik, anlaşılabilirlik ve konu bütünlüğü dikkate alınarak, kendi genel kanaatleri çerçevesinde 1-5 puanlık Likert ölçeği puanlaması yapılmıştır. Hekim Genel Kalite skoru (HGKS) olarak tanımladığımız bu skorlama ve GKS bağımsız iki araştırmacı (R.Y., S.K.), tarafından puanlandı ve uyumsuzluğun olduğu durumlarda üçüncü bir araştırmacı tarafından (H.Y.) nihai karar verildi.

İstatistiksel Analiz

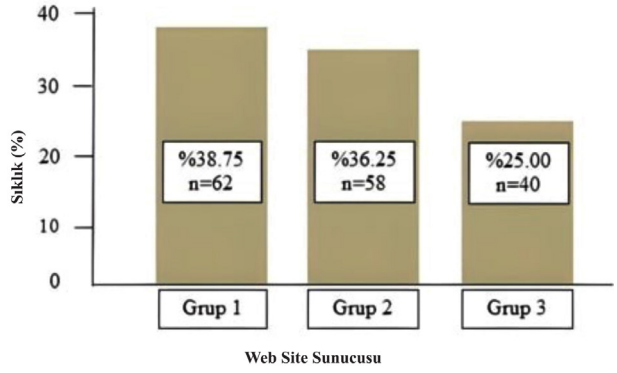
İstatistiksel analizler IBM® SPSS Statistics 22 yazılımı (Armonk, NY, ABD) kullanılarak yapıldı. Kategorik veriler frekans ve yüzde [n (%)], sayısal veriler medyan (minimum-maksimum) olarak verildi. Ordinal verilerin değerlendiriciler arası tutarlılığını belirlemek için Cohen'in kappa katsayısı (κ) kullanıldı. Verilerin normal dağılıp dağılmadığı Shapiro-Wilks testi ile değerlendirildi. Normal dağılım göstermeyen, bağımsız iki grup arasındaki sayısal (non-parametrik) verilerin karşılaştırmalarında Mann-Whitney U

testi, kategorik değişkenlerin karşılaştırmalarında ki-kare testi kullanıldı. İkiden fazla bağımsız grupların karşılaştırılmasında, non-parametrik Kruskal-Wallis testi uygulandı. Normal dağılım göstermeyen verilerin korelasyonu için Spearman'ın rho testi kullanıldı. Tüm istatistiksel analizler çift yönlü, %5 anlamlılık sınırında ve %95 güven aralığında gerçekleştirildi.

Bulgular

İncelenen 200 web sitesinden 10'u alakasız içerik, 8'i tekrar, 8'i ticari/reklam, 5'i çok kısa, 3'ü makale, 2'si video, 2'si Facebook, 2'si ise ulaşılamayan kategoride olduğu için dışlandı ve 160 tanesi dahil edilme kriterlerine uygun bulunarak çalışmaya alındı. Hazırlayıcısına göre bu sitelerden 62'si (%38,8) 1. grupta, 58'i (%36,2) 2. grupta ve 40'ı (%25,0) 3. grupta idi (Şekil 1). Grup 2'deki sağlık profesyonelleri tarafından oluşturulan 58 web sitesinin 56'sı uzman hekimlerce, biri fizyoterapist, diğeri ise diyetisyen tarafından oluşturulmuştu. En sık jinekolog (n=23) ve ortopedistlerce (n=14) hazırlanan web sitesi olduğu gözlendi.

Çalışmaya alınan web sitelerinin içerdikleri konu başlıkları toplamının medyan değeri 6 (0-9) idi. Web sitelerinin 150'si (%94,4) OP'nin tanımı, 103'ü (%64,4) tanısının nasıl konduğu, 142'si (%88,8) semptom ve bulguları, 138'i (%86,3) risk faktörleri, 131'i (%81,9) korunma ve beslenme, 101'i (%63,1) egzersiz, 38'i (%23,48) düşmelerin önlenmesi, 39'u (%24,4) görülme sıklığını ve 99'u (%61,9) medikal tedavi hakkında bilgi içeriyordu. En sık bulunan içerik "hastalığın tanımı", en az bulunan içerik ise "düşmelerin önlenmesi" idi. Sadece 10 (%5,0) sitenin konu kapsamının tam olduğu gözlendi. Gruplar arasında bilgi içeriği açısından fark saptanmadı (p=0,353) (Tablo 1).



Şekil 1. Web sitelerinin gruplara göre dağılımı

Web sitelerinin JAMA skorları medyanı 1 (0-3) idi. JAMA skoruna göre, tamamına yakını (%98,7) düşük güvenilir iken; sadece 2'si (%1,3) yüksek güvenilir (JAMA skoru ≥3) düzeye tekabül etmekteydi. Gruplar arasında JAMA skorları açısından, grup 3 lehine anlamlı fark saptandı (p<0,001) (Tablo 1). JAMA skoru puanlamasında, bağımsız değerlendiriciler arasında mükemmel düzeyde uyum gözlendi (Cohen'in κ=0,889, p=0,000). Tüm web sitelerinin DISCERN skoru medyanı 29 (19-61) ile yetersiz kalitede saptanmıştır. DISCERN ölçeği açısından gruplar arasında anlamlı fark gözlenmemiştir (p=0,23) (Tablo 1). Tüm gruplardaki HGKS medyanı 2 (1-5) ile yetersiz kalitede; GKS medyanı 3 (1-5) ile orta kalitede saptanmış olup, gruplar arasında HKGS (p=0,463) ve GKS (p=0,563) açısından anlamlı fark saptanmamıştır (Tablo 1).

Çalışmaya alınan web sitelerinin tamamının Ateşman okunabilirlik değerinin medyanı 48,2 (17,4-69,4), Bezirci-Yılmaz değerinin medyanı 12,6 (6,0-37,7) idi. Bu değerler, Ateşman formülüne göre "zor" okunabilir; Bezirci-Yılmaz formülüne göre ise Türk eğitim sistemine göre "lisans" düzeyindedir. Gruplar arasında Ateşman (p=0,109) ve Bezirci-Yılmaz (p=0,099) okunabilirlik değerleri arasında anlamlı fark saptanmadı (Tablo 1).

Ateşman formülüne göre okunabilirlik aralıkları incelendiğinde; web sitelerinin 91'i (%56,9) "çok zor veya zor", 69'u (%43,1) ise "orta zor" okunabilir düzeyde saptanmıştır. Gruplar arasında okunabilirlik aralığı açısından fark saptanmadı (p=0,243) (Tablo 2). Çalışmaya alınan web sitelerinin hiçbirisi Ateşman okunabilirlik aralıklarına göre "kolay" ve "çok kolay" grubuna girmemiştir. JAMA ve DISCERN kalite skorları ile Ateşman ve Bezirci-Yılmaz okunabilirlik değerleri arasında korelasyon izlenmemiştir (sırasıyla r=0,083, p=0,296; r=-0,097, p=0,222; r=0,141, p=0,075; r=-0,020, p=0,806).

İlk iki sayfadaki 20 web sitesinin çoğunun (%85) hazırlayıcısının grup 1 olduğu; buna karşın, son 18 sayfadaki web sitelerinde ise daha homojen bir dağılım sergilediği gözlendi. İlk iki sayfadaki web siteleri ile son 18 sayfadaki web siteleri karşılaştırıldığında; JAMA (p=0,937), ve DISCERN (p=0,522) skorları, Ateşman (p=0,710) ve Bezirci-Yılmaz (p=0,984) okunabilirlik değerleri arasında anlamlı fark saptanmamıştır (Tablo 3). Bilgi içeriğinin ise ilk iki sayfada biraz daha fazla olduğu gözlenmiştir (p=0,043). GKS ve HGKS açısından ilk iki sayfa ile diğer 18 sayfa arasında

Tablo 1. Web sitelerinin gruplara göre bilgi içeriği, okunabilirlik, güvenilirlik ve kalite düzeyleri

Web site tipi	Grup 1 (n=62)	Grup 2 (n=58)	Grup 3 (n=40)	p[a]
Bilgi içeriği	6 (1-9)	6 (0-9)	6 (1-9)	0,353
JAMA skoru	0 (0-3)	0 (0-2)	1 (0-3)	<0,001*
Ateşman değeri	45,8 (17,00-67,0)	50,5 (33,0-69,0)	48,4 (30,0-63,0)	0,109
Bezirci-Yılmaz değeri	13,4 (6,0-24,0)	11,9 (7,0-38,0)	12,4 (9,0-33,0)	0,099
DISCERN skoru	29 (19-61)	29 (20-60)	28 (20-35)	0,230
Hekim global kalite skoru	2 (1-5)	2,5 (1-5)	2 (1-4)	0,463
Global kalite skoru	3 (1-5)	3(1-5)	2 (2-4)	0,563

[a]Kruskal-Wallis testi, *p<0,05. JAMA: The Journal of the American Medical Association, DISCERN: The Quality Criteria for Consumer Health Information

Tablo 2. Çalışma gruplarının Ateşman'a göre okunabilirlik aralıklarının değerlenmesi				
	Grup 1 n=62	**Grup 2 n=58**	**Grup 3 n=40**	**p[a]**
Çok zor + zor	39 (%42,9)	28 (%30,8)	24 (%26,4)	0,244
Orta zor	23 (%33,3)	30 (%43,5)	16 (%23,2)	
[a]Ki-kare testi				

Tablo 3. İlk iki sayfadaki web siteleri ile sonraki 18 sayfalardaki web sitelerinin karşılaştırılması			
	İlk iki sayfa (n=20) Medyan (min-maks)	**Sonraki 18 sayfa (n=140) Medyan (min-maks)**	**p[a]**
Bilgi içeriği	7 (3-9)	6 (0-9)	0,043*
JAMA skoru	0 (0-2)	1 (0-3)	0,937
Ateşman değeri	47,1 (38,2-60,8)	48,1 (17,4-69,4)	0,710
Bezirci-Yılmaz değeri	12,7 (8,8-15,5)	12,6 (6,0-37,7)	0,984
DISCERN skoru	29 (25-43)	29 (19-61)	0,522
Hekim global kalite skoru	3 (1-4)	2 (1-5)	0,174
Global kalite skoru	3 (2-4)	2(1-5)	0,259
[a]Mann-Whitney U testi, *p<0,05. Min-maks: Minimum-maksimum, JAMA: The Journal of the American Medical Association, DISCERN: The Quality Criteria for Consumer Health Information			

anlamlı fark izlenmedi (sırasıyla p=0,259, p=0,174) (Tablo 3).
İncelenen web sitelerinin hiçbirinde HONcode sertifikası bulunmadığı gözlendi. GKS ve HGKS değerlendirmesi yapan değerlendiriciler arasındaki yüksek düzeyde tutarlılık mevcuttu (sırasıyla Cohen'in κ=0,830 ve 0,780; p=0,000). HGKS ile GKS ve DISCERN genel kalite skoru arasında güçlü korelasyon izlendi (sırasıyla r=0,930, p=0,000; r=0,810, p=0,000).

Tartışma

Çalışmamızın amacı OP ile ilgili bilgilendirme içeren Türkçe web sitelerindeki yazılı metinlerin okunabilirlik, güvenilirlik, kalite ve bilgi içeriğinin değerlendirilmesi idi. İncelenen 160 web sitesinin 158'i (%98,7) JAMA skoruna göre düşük güvenilirlik düzeyindeydi. Okunabilirlik açısından ise Ateşman formülüne göre zor anlaşılır, Bezirci-Yılmaz skoruna göre ise Türk eğitim sisteminde 12,6 yıllık öğrenim ile rahat okunabilir seviyeye tekabül ettiği saptanmıştır. Bilgi içeriği ve kalite parametreleri (DISCERN, GKS, HGKS) açısından da yetersiz olduğu gözlenmiştir. Bu çalışma OP ile ilgili Türkçe web sitelerindeki yazılı metinleri kapsamlı bir şekilde değerlendiren ilk çalışma olduğu için elde ettiği sonuçların önemli olduğunu düşünmekteyiz.
İnternet kullanımının özellikle son 10 yıldır hızla artmasıyla, insanlar sağlıkla ilgili birçok bilgiye internetten ulaşmaya çalışmaktadır. Büyük ölçüde arama motorları üzerinden yapılan bu süreçte, sıklıkla hastalıkların özellikleri, tanı yöntemleri, tedavi seçenekleri veya mevcut semptomlarının hangi hastalık olabileceği noktalarında bilgi edinmeye çalışılmaktadır (25). Web tabanlı sağlık bilgilerinin toplumun hastalıklarla baş etme yeteneklerini geliştirebileceği, kaygı ve korkularını azaltarak yaşam kalitelerini iyileştirebileceği bildirilmiş olsa da, yeterli ve doğru içeriği sahip, güvenilir ve anlaşılabilir bilgiye ulaşmak oldukça zor gözükmektedir (11,26). Bilgi kapsamı kısıtlı, kalitesi düşük ve bireysel olmayan genel tıbbi bilgiler doğru yorumlanamadığı için yanıltıcı ve kafa karıştırıcı olmakta, uyumsuz davranış ve kaygıya yol açabilmektedir (27).
OP tedavisi yönetiminde hasta eğitiminin kritik rolü bilinmektedir. Tüm dünyada olduğu gibi Türkiye'de de farklı nedenlerden ötürü farmakolojik OP tedavisi almayan birçok birey olduğu bildirilmiştir. Bu açığın kapatılması için başta OP tedavisinde tüm dünyada en sık reçete edilen bifosfonatlar olmak üzere tedavi hakkında yeterli bilincin yerleştirilmesine ihtiyaç vardır (28). Son yıllarda yapılmış çalışmalarda, prostat, meme kanseri, ovaryal yetmezlik, erken menopoz gibi osteoporotik hasta gruplarının online bilgi kaynaklarına ulaşmayı tercih ettikleri bildirilmiş ve online bilgi sunumundaki yetersizliğin yeni geliştirilecek kaliteli online bilgi araçları ile giderilmesi gerekliliğine vurgu yapılmıştır (4,29,30). Çalışmamızdaki bulgularda ise, bu ihtiyacın karşılanmasından uzak bir şekilde, tedavi gerekliliği ve seçeneklerinin kısıtlı anlatıldığı, yaklaşık yarısının bifosfonatlardan bahsetmediği ve düşmelerin önlenmesi gibi kritik bir hususa dahi değinilmediği gözlenmiştir.
Wallece ve ark. (9) en sık kullanılan üç arama motorundaki (Google, Yahoo, MSN) OP ilgili online bilgi sunan İngilizce web sitelerinden ilk 30'unun içindeki toplam 27 farklı web sitesini bilgi içeriği, uygunluk, okunabilirlik ve kalite açısından incelemiştir. Bilgi kapsamının çoğunlukla yeterli (%78) olmasına rağmen web sitelerinin ancak %48'inin yeterli uygunluk kriterlerini karşıladığı ve DISCERN ölçeğine göre 35,7±18,0 puan ile yetersiz güvenilirlik düzeyinde olduklarını bildirmiştir. Ayrıca metinlerin okunabilirlik düzeyi, ortalama Amerikan erişkin popülasyonunun eğitim düzeyi olan 8 yılın çok üstünde 11,5±2,8 (7-17 arası) saptanmıştır.
Güncel bir çalışmada, Yurdakul ve ark. (31) OP ile ilgili İngilizce bilgi sunan Google'daki ilk 200 web sitesini okunabilirlik ve

güvenilirlik açısından incelemiştir. JAMA skoru ortalaması 2,2±1,19 olan web sitelerinin %37,7'si JAMA skoruna göre yüksek güvenilirlik düzeyinde saptanmıştır. Web sitelerinin %12,6'sında HONcode sertifikası bulunduğu gözlenmiştir. Okunabilirlik düzeyi [Flesch-Kincaid Grade (FKG)] ortalaması 8,81±2,21 ile önerilen düzeyin altında, kolay okunabilir saptanmıştır. İlk iki sayfa ile sonraki sayfalar arasında JAMA ve FKG skorları arasında fark gözlenmemiş ancak kalitesi yüksek olan web sitelerinin daha zor okunabilir oldukları gözlenmiştir.

Çalışmamızda OP ile ilgili Türkçe web sitelerinin sadece iki tanesinin JAMA skoruna göre yüksek güvenilir saptanmış olması, İngilizce web siteleriyle kıyaslanamayacak kadar düşük JAMA kriterlerinin mevcudiyetini göstermektedir. Bunun yanında, beklendiği üzere hiçbir web sitesinde HONcode sertifikasyonu saptanmamış olması, online bilgi sağlayıcıların uluslararası kalite standartlarından kopuk bilgi paylaşımı yaptığını göstermektedir. HONcode sertifikasyonu prosedür ve maliyet nedeniyle Türkiye'deki internet sitelerinde yer bulamasa da JAMA kriterlerindeki sadece yazar bilgileri ve tarih/güncellik parametrelerinin bile çoğunlukla belirtilmemiş olması güvenilirlik noktasında somut zaaf oluşturmaktadır.

Dinçel ve ark. (32) OP ile ilgili YouTube'daki Türkçe videoların, JAMA skoru (1,66±0,66), GKS (1,99±1,10) ve DISCERN ölçeği (25,02±6,63) açısından düşük güvenilir ve kalitede olduğunu ortaya koymuştur. Bilgi içeriğinin 1-29 puan aralığında değişebilen "Osteoporoza Spesifik Skor" ile değerlendirildiği bu çalışmada, bilgi kapsamının (8,92±5,92) yetersiz olduğu saptanmıştır. Bu çalışmadaki JAMA skorunun çalışmamızdaki değerlere göre daha yüksek çıkmasının, videolarda sunucu bilgileri ve tarihin doğal olarak bulunmasına bağlı olduğunu düşünmekteyiz. Türkçe videoların aksine, Onder ve ark. (33) modifiye DISCERN ve GKS ile değerlendirdiği İngilizce videoların %48'inin kalitesini yüksek (GKS ≥4), %34'ünü ise orta kalitede (GKS =3) saptamıştır. Eski çalışmalara paralel doğrultuda, üniversitelerin ve profesyonel organizasyonların videolarının en yüksek güvenilirlik ve kaliteye sahip olduğunu vurgulamışlardır. Ancak, doğru içeriğe sahip kaliteli videolar ile yanıltıcı ve kalitesiz videolar arasında izlenme sayısı, video güç indeksi, beğeni gibi etkileşim parametreleri açısından fark saptanmamıştır.

2022 yılında Birleşmiş Milletler Kalkınma Programı tarafından yayınlanan İnsani Gelişme Raporu'na göre Türkiye'deki ortalama öğrenim süresi 8,7 yıldır (34). Çalışmamızda, Bezirci-Yılmaz okunabilirlik formülüne göre elde edilen düzey, ülke öğrenim süresi ortalamasının yaklaşık 4 yıl üzerinde bulunmuştur. Ortalama öğrenime sahip bireylerce metinlerin okunabilirliğinin çok zor olduğunu gösteren bu sonuç, Türkçe online bilgi kaynaklarındaki okunabilirliğin değerlendirildiği başka çalışmalarla örtüşmekle beraber, İngilizce web sitelerinin okunabilirliğine göre de oldukça yetersiz gözükmektedir (13,31).

İnternette arama motorları aracılığıyla yapılan sorgulamalarda, genellikle ilk iki sayfadaki en iyi 20 sonucun tıklandığı bilinmektedir (35). Bu davranış modeli dikkate alınarak, ilk iki sayfadaki web siteleri diğer sayfalardaki web siteleri ile kıyaslanmış ve ilk iki sayfadaki sitelerin büyük çoğunluğunun (%85) grup 1 olduğu gözlenmiştir. Bu heterojen dağılımın, hastanelerin bilinirliğine ve daha güvenilir bilgi kaynağı olabileceği kanaatine bağlı olduğunu düşünmekteyiz. Ne var ki beklenilenin aksine ilk iki sayfadaki sitelerin güvenilirlik, kalite ve okunabilirlik seviyeleri sonraki sayfalarla benzer düzeyde çıkmıştır. Basavakumar ve ark. (36) fibromiyalji ile ilgili 10 sitenin JAMA skoru ve bilgi kapsamını sonraki 138 siteye göre hafif yüksek, okunabilirlik düzeyini ise daha kolay anlaşılır saptamıştır. OP ile ilgili İngilizce web sitelerindeki durum ise, elde ettiğimiz sonuçlara benzer şekilde, ilk 10 web sitesi ile kalan 141 web sitesi arasında JAMA skoru ve okunabilirlik açısından fark gözlenmediği şeklinde bildirilmiştir (31).

Çalışmamızda sağlık profesyonellerinin hazırladığı web sitelerinin, incelenen parametreler açısından, diğer gruplardan farksız olması, şaşırtıcı ancak literatür ile uyumsuz değildir (31). Bu sitelerde akademik yazım ilkelerinin aksine yazar bilgileri ve tarihin bile belirtilmemiş olması JAMA skorunun oldukça düşük çıkmasına neden olmuştur. Ayrıca, bilgilendirme metinlerinin, daha önce yazılmış online kaynaklardan yararlanılarak hazırlanmış olması farklı site tiplerinde benzer sonuçlar elde edilmesine yol açmış olabilir. Türkiye'de OP reçetelerinin çok yüksek bir yüzdesinin fizik tedavi ve rehabilitasyon (FTR) uzman hekimlerince düzenlenmesine rağmen, web sayfalarının en sık jinekolog ve ortopedistlerce hazırlanmış olması dikkat çekicidir (4). Bu durumun, FTR hekimlerinin daha çok kurumsal hastanelerde çalışıyor olmasına bağlı olduğu düşünülebilir. En az bulunan bilgi içeriğinin düşmelerin önlenmesi olması da yine bu durumla ilişkili olabilir.

Güncel bir araştırmada, Türkiye'deki fibromiyalji ile ilgili online bilginin okunabilirlik, içerik ve kalitesi dört farklı arama motorundaki (Google, Yandex, Bing ve Yahoo) toplam 80 web sitesi üzerinde incelenmiştir (37). Çalışmamızdaki sonuçlara benzer şekilde web sitelerinin bilgi içeriğinin zayıf olduğu, DISCERN skoruna göre düşük kalitede (medyan =30), Ateşman skoruna göre ise hemen hemen zor anlaşılır (medyan =55,5) saptanmıştır. JAMA skoru ve Bezirci-Yılmaz'a göre karşılık gelen eğitim düzeyi ise incelenmemiştir. Çalışmamıza benzer şekilde web site tipleri arasında kalite ve okunabilirlik açısından fark gözlenmemiştir. Ülkemizde Google dışındaki arama motorlarının oldukça az kullanıldığı (12), kullanıcıların genellikle ilk 2 sayfadaki web sitelerini tıkladığı hususları dikkate alındığında bu çalışmamızdaki sonuçların, online spesifik bir hastalığı değerlendirme açısından daha kapsamlı ve güçlü olduğunu düşünmekteyiz.

Online bilginin kalitesinin incelendiği çalışmalarda, değerlendirme ölçütlerinin farklılığı ve konunun doğasından kaynaklanan subjektif yanı dikkati çekmektedir. DISCERN ölçeğinin öncelikle tedavi seçeneklerine odaklanmış olması, JAMA skorunun ise içeriğin kapsamı, görselliği ve doğruluğunu yansıtmamasının önemli birer eksiklik olduğu açıktır. Ayrıca FKG, Ateşman formülü gibi okunabilirlik formülleri de dil bilgisinin teknik yönünü ele alarak hesaplama yapmaktadır. Dolayısıyla, metinlerdeki kelimelerin teknik ve tıbbi terimlerden oluşması hesaplanan okunabilirlik değerini etkilememektedir. Başka bir ifadeyle, tıbbi terimlerin yoğun kullanıldığı anlaşılabilmesi zor bir akademik

metin, cümlelerdeki kelime ve hece sayısı az ise okunabilirlik formüllerine göre kolay okunabilir düzeyde hesaplanabilir. İşte bu kısıtlılıklara, yapılmış çalışmalarda çoğunlukla değinilmediği veya minimal vurgu yapıldığı düşünüldüğünde (24,31,32,35,37); bu araştırma için kullandığımız doğruluk, görsellik, anlaşılabilirlik unsurlarını da dikkate alan HGKS'nin bu noktadaki eksiklikleri tamamlayabileceğini düşünüyoruz. Çalışmamızda web sitelerinin HGKS medyanı 2 (1-4) ile yetersiz düzeyde saptanmış; DISCERN genel puanı ve GKS gibi standart ölçüm parametreleriyle de güçlü pozitif korelasyon göstermiştir.

Çalışmanın Kısıtlılıkları

Çalışmanın en önemli limitasyonu incelemenin belirli bir zaman dilimine ait olmasıdır. Kesitsel bir değerlendirme ile internetteki değişen trendler veya arama motorlarının farklı kullanıcılara farklı en iyi sonuçları sunabileceği göz ardı edilemez. Bu limitasyon, araştırmanın oldukça yakın bir tarihte yapılan online tarama sonuçlarını ortaya koyması açısından bakıldığında ise güçlü yönü haline gelmektedir. Yukarıda tartışıldığı üzere okunabilirlik formüllerinin mutlak surette "anlaşılabilirliği" ifade etmediği açıktır ve anlaşılabilirliğin sağlıklı bir şekilde değerlendirilebilmesi için farklı ölçeklere ihtiyaç vardır. Bir başka kısıtlılık ise, her ne kadar JAMA skoru ile güvenilirlik açısından kritik parametreler incelenmiş olsa da bu ve benzeri araştırmalar metodolojik yönüyle online bilginin akademik doğruluğunu ve kanıta dayalı güncelliğini kesin bir şekilde ortaya koyabilmekten uzaktır. Bunlarla beraber bu çalışmanın, kapsamlı bir taramanın güncel sonuçlarını, farklı standart değerlendirme ölçekleri ile birlikte, ilgili alandaki uzman hekimlerin bağımsız skorlama ve kişisel değerlendirmelerini de ortaya koyması bakımından literatüre önemli katkısının olabileceğini düşünüyoruz.

Sonuç

Bu çalışmada; OP ile ilgili bilgi sunan online Türkçe web sitelerinin içerik açısından kısmen yetersiz, zor okunabilir, kalitesiz ve güvenilir olmadığı saptanmıştır. Özellikle tedavi seçenekleri ile ilgili bilgi içeriğinin yetersizliği, kafa karışıklığı ve gereksiz anksiyeteye yol açarak maladaptif davranışlara neden olabilir. OP'nin korunma ve tedavisinde hasta eğitiminin temel bir unsur olduğu ve günümüzde online bilgiye erişim eğiliminin yüksek olduğu düşünüldüğünde, elde edilen sonuçlar bu hususstaki eksikliği ortaya koymaktadır. Hastaların, mevcut web sitelerinin, kendilerine faydalı olabilecek yeterlilik ve güvenilirlikten uzak olduğu gerçeğini bilmeleri sağlanmalıdır. Sağlık ile ilgili resmi kurumların ve online bilgi sunan diğer kaynakların, bu veriler çerçevesinde gerekli düzenlemeleri yaparak OP konusunda güvenilir ve kullanılabilir web siteleri oluşturulmasına ihtiyaç vardır.

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The Comparison of Osteoporosis Knowledge and Awareness Levels of Patients with Hypothyroidism and Hyperthyroidism

Hipotiroidi ve Hipertirodisi Olan Hastaların Osteoporoz Bilgi ve Farkındalık Düzeylerinin Karşılaştırılması

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Abstract

Objective: Osteoporosis can be followed secondary to hypothyroidism and hyperthyroidism. In this study, we evaluated the awareness and knowledge of osteoporosis in patients with hypothyroidism and hyperthyroidism.
Materials and Methods: A total of 148 patients and 148 volunteers, 80 of whom were diagnosed with hypothyroidism and 68 with hyperthyroidism, were included in the study. Demographic information and socioeconomic status of all patients and volunteers were recorded. Participants were evaluated using the osteoporosis knowledge test and osteoporosis awareness scale. For the osteoporosis knowledge questionnaire, correct answers of 13 and above were considered sufficient and answers below 13 were considered insufficient. First, the patient and volunteer groups were compared, and then the patient group was divided into two groups as hypothyroidism and hyperthyroidism. Questionnaires measuring osteoporosis awareness and osteoporosis knowledge levels of hypothyroid and hyperthyroid patients were compared.
Results: There was no difference between the patient and control groups in terms of age, gender, education level, and income level ($p>0.05$). Both the patient and control groups had osteoporosis awareness, but there was no significant difference between the groups ($p>0.05$). The awareness of osteoporosis was high in the hypothyroid-hyperthyroid patient and control groups. When the osteoporosis knowledge levels of the patient and control groups were compared, a statistically significant difference was found in favor of the control group ($p<0.05$). No statistically significant difference was found regarding the osteoporosis awareness levels of hyperthyroid and hypothyroid patients ($p>0.05$). The osteoporosis knowledge level was low in patients with hypothyroidism and hyperthyroidism.
Conclusion: Osteoporosis awareness was high in the hypothyroid and hyperthyroid patient and control groups. Considering the osteoporosis knowledge levels of the patient and control groups, although the knowledge level was insufficient in both groups, the decrease in the patient group was significant.
Keywords: Hypothyroidism, hyperthyroidism, osteoporosis awareness, level of knowledge

Öz

Amaç: Osteoporoz, hipotiroidi ve hipertiroidiye ikincil olarak izlenebilmektedir. Biz bu çalışmada hipotiroidi ve hipertiroidisi olan hastalarda osteoporoz farkındalık ve bilgi düzeyini değerlendirmeyi amaçladık.
Gereç ve Yöntem: Çalışmaya 80 hipotiroidi ve 68 hipertiroidi tanılı toplam 148 hasta ve 148 gönüllü dahil edildi. Tüm hastaların ve gönüllülerin demografik bilgileri ve sosyoekonomik durumu kaydedildi. Katılımcılar osteoporoz bilgi testi ve osteoporoz farkındalık skalası ile değerlendirildi. Osteoporoz bilgi anket skorları için 13 ve üzeri doğru cevaplar yeterli, 13 altı yetersiz olarak kabul edildi. İlk olarak hasta ve gönüllü grubu karşılaştırıldı ve sonra hasta grubu kendi içinde hipotirodi ve hipertiroidi olarak iki gruba ayrıldı. Hipotirodi ve hipertiroidi hastalarının osteoporoz farkındalıklarını ve osteoporoz bilgi düzeylerini ölçen anketleri karşılaştırıldı.
Bulgular: Hasta ve kontrol grupları arasında yaş, cinsiyet, eğitim düzeyi ve gelir düzeyi açısından fark yoktu ($p>0,05$). Hem hasta hem de kontrol grubu osteoporoz farkındalığına sahipti ancak gruplar arasında anlamlı fark yoktu ($p>0,05$). Hipotiroid-hipertiroid hasta grubu ve kontrol grubunda osteoporoz farkındalığı yüksekti. Hasta grubu ile kontrol grubunun osteoporoz bilgi düzeyleri karşılaştırıldığında, kontrol grubu lehine istatistiksel olarak anlamlı fark bulundu ($p<0,05$). Hipertiroidi ve hipotiroidi hastalarının osteoporoz farkındalık düzeyleri açısından istatistiksel olarak anlamlı fark bulunmadı ($p>0,05$). Hipotiroidi ve hipertiroidisi olan hastalarda osteoporoz bilgi düzeyi düşüktü.

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Sonuç: Hipotiroidi ve hipertiroidi hasta grubu ve kontrol grubunda osteoporoz farkındalığı yüksekti. Hasta ve kontrol gruplarının osteoporoz bilgi düzeylerine bakıldığında her iki grupta da bilgi düzeyi yetersiz olmasına rağmen hasta grubundaki azalma anlamlıydı.
Anahtar kelimeler: Hipotiroidi, hipertiroidi, osteoporoz farkındalık, bilgi düzeyi

Introduction

The thyroid gland is the largest organ in the human body that is specialized for endocrine functions. Hormones secreted from the thyroid gland are necessary for growth and development, as well as for the optimal functioning of most tissues and organs (1). Metabolic changes due to thyroid hormones affect bone turnover (2,3).

Secondary osteoporosis (OP) defines the presence of OP due to causes other than the underlying postmenopausal condition or aging. It occurs not only in postmenopausal women but also in men and premenopausal women (4). Thyroid dysfunction is also one of the main causes of secondary OP. Thyroid hormones stimulate bone formation and increase the bone remodeling process. Thyroid dysfunctions are clinically divided into three as hypothyroidism, euthyroidism, and hyperthyroidism (2,5). Exogenous or endogenous suppression of thyroid stimulating hormone secreted from the pituitary causes bone loss and thus OP (2,3). Overt hyperthyroidism and hypothyroidism are important thyroid dysfunctions that have been associated with OP in both men and women. Hyperthyroidism accelerates bone turnover, shortens the normal bone turnover cycle, and reduces bone mineral density, thus causing OP and increased fracture risk (6). It has been reported that bone mineral densities of hyperthyroid patients are between 7-12% lower than euthyroid healthy controls (6,7). In hyperthyroidism, both vertebral and non-vertebral bone mineral density decreases. Although it did not reach normal values after approximately 2 years of hyperthyroidism treatment, a significant increase in bone mineral density was also observed (8). Information on the effect of hypothyroidism on adult bone is conflicting. The basic view is that the most important factor that increases the risk of OP in hypothyroidism is that long-term and high-level use of thyroid hormone replacement therapy reduces bone density with its cumulative effect and increases the risk of fracture (9,10).

Raising awareness of OP in patients with thyroid dysfunction is a very important public health problem. These patients need to have OP knowledge and awareness levels at the expected level in terms of OP prevention and treatment management of OP. There are studies on multiple sclerosis, chronic obstructive pulmonary disease, postmenopausal, and risk group patients living in rural areas, but there is no study examining OP awareness and knowledge levels of hyperthyroid and hypothyroid patients (11-14). In this way, it can be aimed to create informational brochures and raise awareness with media tools. For this purpose, we aimed to investigate OP knowledge and awareness levels in patients diagnosed with thyroid dysfunction in this study. Thus, it will be possible to obtain information about OP knowledge and awareness of patients with hypothyroidism and hyperthyroidism, which are the causes of secondary OP.

Materials and Methods

Our study is a cross-sectional survey study. The study protocol was approved by the Acıbadem Mehmet Ali Aydınlar University Ethics Committee (date: 02.09.2022). The registration number for the study is 2022-14/09. The study was conducted following the principles of the Declaration of Helsinki.

Study Design and Data Collection

The study was designed as a prospective cross-sectional study and was carried out at Acıbadem Hospital Physical Therapy and Rehabilitation Clinic between September 2021 and June 2022. Patients between the ages of 18-50 who were diagnosed with hyperthyroidism and hypothyroidism and agreed to participate in the study were included in the study. Exclusion criteria of the study; to have other secondary OP-causing disease (rheumatoid arthritis, ankylosing spondylitis, hyperparathyroidism, etc.), to have a previous malignancy history or to have an active malignancy, to have an active chronic infection, to be diagnosed with OP. A total of 155 patients were evaluated in the preliminary evaluation. Four of the patients refused to participate in the study and 3 patients were not included in the study because they met the exclusion criteria. As a result, 80 hypothyroid and 68 hyperthyroid patients were included in the study. The control group consisted of healthy volunteers of the same age and gender. Socio-demographic characteristics such as age, height, weight, body mass index (BMI) (kg/m^2), marital status, education level, occupation, and place of residence were recorded. The study was initiated after the approval of the ethics committee. Verbal and written consent was obtained from the patients and the control group. Our work was carried out in two stages. In the first stage, two groups were taken as patient and control. Patient and control group demographic data, OP awareness level, and OP knowledge level questionnaires were evaluated. In the second stage, the patient group was divided into hypothyroidism and hyperthyroidism, and OP awareness and OP knowledge levels were evaluated.

Osteoporosis Knowledge Test (OKT)

The OKT was first performed in 1991 by Kim et al. (15) as a multiple-choice questionnaire containing 24 questions aimed at measuring the level of knowledge about OP. The questionnaire includes questions about exercise and activity level, and the diet applied to prevent OP. Turkish validity and reliability study was conducted by Kılıç and Erci (16). The OKT was revised in 2011 and the number of questions increased to 32 (17). The Turkish validity and reliability of the revised form were performed by Atalay et al. (18). Items 1 to 11 question the risk factors for OP and the answers are given by ticking one of the options "It is highly likely to have OP", "It is unlikely to have OP", "It has nothing to do with the development of OP", and "I do not know". The

answers "It has nothing to do with the development of OP" and "I do not know" are evaluated as wrong and given 0 points. The answers "There is a high probability of OP" or "There is a low probability of OP" are considered correct and 1 point is given. Other questions contain 4 optional answers and 1 point is given when the correct answer is marked. There are two subgroups of Revised OCT: The nutrition subgroup includes 26 questions (1-11 and 18-32), Exercise subgroup includes 20 questions (1-17 and 30-32). Fourteen questions of these two subgroups are common (1-11 and 30-32). This situation is taken into account in the total score and the total score is between 0-32. An increase in the total score obtained from the scale means that the individual's knowledge of OP is at a good level (15). If the total score was below 15, it was considered as insufficient, and if it was above 15, it was considered as sufficient knowledge level.

Osteoporosis Awareness Scale (OAS)

The OAS developed by Choi et al. (19) in 2008 consists of 31 items and five sub-dimensions in English. The Turkish validity and reliability study of the scale was carried out by Ocak Aktürk et al. (20). Responses to the OAS items are rated on a 4-point Likert-type scale from 1 to 4 [(4= I know very well, 3= I know, 2= I know a little, 1= I do not know) none]. The minimum and maximum possible scores from the OAS are 31 and 124, respectively. The higher the average score obtained from the scale, the higher the OP awareness level. There are no reverse-scored items and cut-off points in the scale. The Cronbach's alpha (α) reliability coefficient of the scale is 0.948.

Statistical Analysis

Statistical analysis of the data was done with the Windows SPSS (20.0) program. Data are given as mean ± standard deviation and percentage. The conformity of the data to the normal distribution was analyzed. Chi-square was used for categorical data, the t-test was used for those with normal distribution for group comparisons, and the Pearson test was used for those who did not. Statistical significance was accepted as $p<0.05$. The minimum sample size was calculated as individuals (8 individuals in each group) using the G-Power (ver. 3.1) software (95% confidence interval, 80% power, and 0.72 effect size).

Results

The mean age of patients with hypothyroidism (48 female, 32 male) was 41.89±1.0 years, patients with hyperthyroidism (38 female, 30 male) were 42.75±1.2 years, and the control group (76 female, 72 male) was 39.83±1.73 years. There was no difference between the patient and control groups in terms of age, gender, education level, and income level ($p>0.05$). There was no statistically significant difference between hypothyroid and hyperthyroid patients when age, gender, education level, and income level were compared ($p>0.05$). Demographic data of the patients are shown in Table 1.

The OP risk factors of hypothyroid, hyperthyroid patients and the control group are presented in Table 2. A total of 52.9% of patients with hyperthyroidism had a family history of OP and it was found to be statistically significantly higher when compared to patients with hypothyroidism (28.75%) ($p<0.05$). No statistically significant difference was found between the patient group and the control group in terms of fracture history, family history, consumption of milk/dairy products, coffee, cigarette and alcohol consumption, menopause status, and BMI ($p>0.05$). Both the patient and control groups had OP awareness, but there was no significant difference between the groups (Table 3) ($p>0.05$). The awareness of OP was high in the hypothyroid-hyperthyroid patient group and control group. When the OP knowledge levels of the patient group and the control group were compared, a statistically significant difference was found in favor of the control group ($p<0.05$). In the evaluation of the questionnaire measuring the OP knowledge level, the mean score of the questionnaire in the patient group was 9.26±6.98; 14.25±8.38 in the control group. No statistically significant difference was found regarding the OP awareness levels of hyperthyroid and hypothyroid patients (Table 4) ($p>0.05$). OP knowledge level was low in patients with hypothyroidism and hyperthyroidism. The mean OP knowledge questionnaire scores were 9.39±6.52 in the hypothyroid group and 11.20±8.20 in the hyperthyroid group. No significant difference was found between them ($p>0.05$). In both groups, they heard about OP most frequently from the doctor. 53.7% of hypothyroid patients and 45.5% of hyperthyroid patients heard about OP from the doctor; 21.2% of hypothyroid patients and 22.1% of hyperthyroid patients heard about OP from radio and television.

Discussion

OP is a chronic disease that progresses silently without showing symptoms and results in fracture, requires long-term follow-up, and has become a public health problem by becoming more and more common nowadays. Prevention from OP and the development of a healthy life can be achieved by reaching the groups at risk and gaining preventive health behaviors from OP. Having knowledge about the disease and taking preventive measures by being aware of the risk factors will reduce the incidence of the disease (21). However, studies have shown that OP information is lacking in society, and most of the information is obtained from written and visual media such as television, newspapers, and the internet. It was stated that the contents of this news were insufficient to raise awareness in society and that sufficient information was not given about protection measures and little-known risk factors (22).

In the present study, we found that although the awareness of OP was higher in hyperthyroid and hypothyroid patients compared to the control group, the level of OP knowledge was lower. We found OP awareness at 87.1% in all patients, 86.2% in hypothyroid patients, and 89.7% in hyperthyroid patients. In the literature, there are studies evaluating OP knowledge levels and OP awareness in various parts of society and various patient populations. In different studies conducted in different groups in

Table 1. The sociodemographic data of patients

	Patients with hypothyroidism (n=80) Mean ± SD	Patients with hyperthyroidism (n=68) Mean ± SD	p	Control group (n=148) Mean ± SD	p (all patients-control group)
Age (years)	41.89±1.0	42.75±1.2	0.238	39.83±2.4	0.136
Gender n (%)					
Female	48 (60%)	38 (55.8%)	0.357	76 (51.3%)	0.126
Male	32 (40%)	30 (44.1%)		72 (48.6%)	
Marital status (%)					
Married	45 (56.2%)	36 (52.9%)	0.435	68 (45.9%)	0.344
Single	35 (43.7%)	32 (47.1%)		80 (54.1%)	
Occupation (%)					
Housewife	12 (5%)	11 (16.2%)	0.412	24 (16.2%)	0.541
Office worker	35 (43.7%)	28 (41.2%)		64 (43.2%)	
Retired	22 (27.5%)	14 (20.5%)		35 (23.7%)	
Manuel labor	11 (13.8%)	15 (22.1%)		25 (16.9%)	
Educational status (%)					
Primary school	15 (18.7%)	13 (19.2%)	0.378	27 (18.3%)	0.156
Middle school	18 (22.5%)	17 (25%)		34 (22.9%)	
High school	23 (28.8%)	19 (27.9%)		43 (29.1%)	
University	24 (30%)	19 (27.9%)		44 (29.7%)	
Place of residence (%)					
Urban area	15 (18.75%)	14 (20.5%)	0.243	31 (20.9%)	0.332
Rural area	65 (81.25%)	54 (79.5%)		117 (79.1%)	

SD: Standard deviation, n: Patient number. Group comparisons of baseline characteristics were perfomed with independent samles t-test or x^2 test. P<0.05 is statistically significant

the literature, it is striking that the levels of OP awareness vary in a wide range (23-25). In a multicenter study conducted in Turkey, which included 540 women and 36 men with OP, Kutsal et al. (23) found OP awareness to be 54%. In another study involving 768 Turkish women living in rural areas, OP awareness was found to be 60.8% (24). In another study by Özişler et al. (25) in which 250 cases aged 65 and over were included, the awareness of OP was found to be 88%. It is thought that the wide range in rates is due to population differences and the way awareness is examined. A study examining OP knowledge and awareness levels in patients with thyroid dysfunction, which is one of the causes of secondary OP, has not been found in the literature.

The four important steps to prevent OP are: Nutrition rich in calcium and vitamin D, increasing physical activity, not smoking and alcohol use, early diagnosis, and treatment stages are very important (21). To know and apply these stages, increasing the knowledge of OP and increasing the belief in health against OP gains importance in protection against the disease. To achieve success in the prevention of OP, the effect of cognitive processes should be increased, and preventive practices should gain meaning for people and provide permanent behavioral change (22). It is emphasized that raising awareness and knowledge about OP in individuals with diseases that predispose them to secondary OP is an important step in the prevention of OP. It is seen that studies on knowledge and awareness levels about OP are mostly carried out on health workers and individuals with OP risk factors (11-14). The aim here is to aim to increase the awareness of health professionals about OP, enlighten society, and try to take preventive measures to prevent OP in patients with risk factors. However, it is very important to inform patients with risk factors in terms of OP, as well as healthcare professionals. In our study, we found low OP knowledge levels in hyperthyroid and hypothyroid patients. With the OP knowledge test we used in this study, it is aimed to measure the knowledge level of people by questioning the nutrition and exercise knowledge that will prevent or reduce the development of OP. Despite their awareness, the low level of OP knowledge shows us that sufficient information will not be given to the patient during the short polyclinic examination. For this purpose, we think that meetings and brochures to be organized for the education of risky individuals may be important. There is a need to raise awareness about OP in every period of life. Raising awareness, especially in patients with secondary OP, will contribute more to the preservation of bone health and the prevention of disease development.

Table 2. Osteoporosis risk factors of hypothyroid, hyperthyroid patients and control group

	Patients with hypothyroidism (n=80) Mean ± SD	Patients with hyperthyroidism (n=68) Mean ± SD	p	Control group (n=148) Mean ± SD	p (all patients-control group)
Milk/dairy product consumption					
0/day	4 (5%)	2 (2.9%)	0.467	5 (3.4%)	0.552
1-3 portion/day	68 (85%)	51 (75%)		121 (81.8%)	
More than 3 portion	8 (10%)	15 (22.1%)		22 (14.8%)	
Coffee consumption					
0 cups/day	37 (46.25%)	31 (45.6%)	0.120	68 (45.9%)	0.235
1-3 cups/day	40 (50%)	36 (52.9%)		76 (51.3%)	
More than 4 cups/day	3 (3.75%)	1 (1.5%)		4 (2.8%)	
Alcohol consumption					
0 times/week	63 (78.75%)	51 (75%)	0.455	116 (78.4%)	0.356
1-3 times/week	13 (16.25%)	10 (14.7%)		21 (14.2%)	
More than 4 times/week	4 (5%)	7 (10.3%)		11 (7.4%)	
Physical activity					
None	16 (20%)	14 (20.6%)	0.345	32 (21.6%)	0.236
Rarely (less than once a week)	18 (22.5%)	16 (23.5%)		33 (22.3%)	
Minor (1 or 2 per week)	28 (35%)	27 (39.7%)		55 (37.2%)	
Regular (3 days a week)	12 (15%)	8 (11.8%)		19 (12.8%)	
Every day of the week	6 (7.5%)	3 (4.4%)		9 (6.1%)	
History of osteoporosis in the family (%)					
Yes	23 (28.75%)	36 (52.9%)	0.002	61 (41.2%)	0.438
No	57 (71.25%)	32 (47.1%)		87 (57.8%)	
Menopause (%)					
Yes	10 (20.8%)	9 (23.7%)	0.118	16 (21.1%)	0.239
No	38 (79.1%)	29 (76.3%)		60 (78.9%)	
BMI (kg/m^2)	25.762±3.316	24.126±3.402	0.398	26.112±4.234	0.145
Disease duration (month)	50.35±68.71	48.32±47.56	0.345	-	-
History of fracture (%)					
Yes	9 (11.25%)	6 (8.8%)	0.479	16 (10.8%)	0.347
No	71 (88.75%)	62 (91.2%)		132 (89.2%)	

SD: Standard deviation, n: Patient number, BMI: Body mass index. Group comparisons of baseline characteristics were perfomed with independent samles t-test or x^2 test. P<0.05 is statistically significant

Table 3. Patient and control group osteoporosis knowledge questionnaire score

	Patient (n=148) Mean ± SD	Control (n=148) Mean ± SD	p
Osteoporosis knowledge test			
Insufficient (15<)	113 (76.3%)	81 (54.7%)	0.004
Sufficient (15 and above)	35 (23.6%)	67 (45.2%)	
Osteoporosis knowledge level			
Mean ± SD	9.26±6.98	14.25±8.38	0.001
Osteoporosis awareness scale			
Mean ± SD	112.45±8.54	116.76±9.78	0.736
Osteoporosis awareness (%)			
Yes	129 (87.1%)	131 (88.5%)	0.826
No	19 (12.8%)	17 (11.4%)	

SD: Standard deviation, n: Patient number. Chi-square was used for categorical data, the t-test was used for those with normal distribution for group comparisons and the Pearson test was used for those who did not. P<0.05 is statistically significant

When the information sources about OP were questioned, 53.7% of hypothyroid patients and 45.5% of hyperthyroid patients were asked by a doctor; It was reported that 21.2% of hypothyroid patients and 22.1% of hyperthyroid patients learned about OP from radio and television. Our patients with hyperthyroidism and hypothyroidism have a high awareness of OP because they are under regular doctor follow-up. Contrary to literature data (22), the fact that they mostly hear about OP from doctors supports this data.

Study Limitations

Our study has some limitations. Being a cross-sectional study, planned with a relatively small number of patients, it is not appropriate to interpret the OP knowledge and awareness level for the general population. Better results can be achieved with multicenter studies with more participants. In previous studies (26-28), the correct answers given by individuals to the questioning of the definition of OP and risk factors were evaluated with questionnaire forms mostly structured by researchers, and the

Table 4. Comparison of patients with hypothyroidism and hyperthyroidism			
	Hypothyroidism (n=80) Mean ± SD	**Hyperthyroidism (n=68) Mean ± SD**	**p**
Osteoporosis knowledge test			
Insufficient (15<)	62 (77.5%)	51 (75%)	0.812
Sufficient (15 and above)	18 (22.5%)	17 (25%)	
Osteoporosis knowledge level			
Mean ± SD	9.39±6.52	11.20±8.20	0.298
Osteoporosis awareness scale			
Mean ± SD	110.89±9.86	114.78±7.98	0.756
Osteoporosis awareness			
Yes	69 (86.2%)	61 (89.7%)	0.103
No	11 (13.8%)	7 (10.3%)	
From whom did you hear about osteoporosis?			
Doctor	43 (53.7%)	31 (45.5%)	0.447
Radio tv	17 (21.2%)	15 (22.1%)	
Friend	4 (0.05%)	3 (0.04%)	
Internet	2 (0.02%)	2 (0.02%)	
Other healthcare personnel	2 (0.02%)	0 (0%)	
Other	1 (0.01%)	0 (0%)	

SD: Standard deviation, n: Patient number. Chi-square was used for categorical data, the t-test was used for those with normal distribution for group comparisons, and the Pearson test was used for those who did not. P<0.05 is statistically significant

relationship between socio-demographic characteristics and OP knowledge and awareness level was investigated. Unlike previous studies, we evaluated the level of OP knowledge and awareness with scales such as OCT and OAS, which have international validity and are valid and reliable in our country.

Conclusion

OP awareness was high in the hypothyroid and hyperthyroid patient group and control group. Considering the OP knowledge levels of the patient and control groups, although the knowledge level was insufficient in both groups, the decrease in the patient group was significant. OP knowledge level was low in patients with hypothyroidism and hyperthyroidism. No significant difference was found between them. Providing training to those with hypothyroidism and hyperthyroidism to increase their knowledge of OP is important in terms of preventing OP and reducing the risk of fracture.

Ethics

Ethics Committee Approval: The study protocol was approved by the Acıbadem Mehmet Ali Aydınlar University Ethics Committee (decision no: 2022-14/09, date: 02.09.2022).

Informed Consent: Verbal and written consent was obtained from the patients and the control group.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: S.K., Concept: S.K., I.F.K., Design: S.K., I.F.K., Data Collection or Processing: S.K., I.F.K., Analysis or Interpretation: S.K., I.F.K., Literature Search: S.K., I.F.K., Writing: S.K.

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Case Report / Olgu Sunumu

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Oral Mucosal Ulcer Associated with Improper Usage of Bisphosphonate: A Case Report

Yanlış Bifosfonat Kullanımına Bağlı Oral Mukozal Ülser: Olgu Sunumu

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Abstract

Bisphosphonates are widely used agents for osteoporosis. Although bisphosphonates are generally well-tolerated drugs, especially oral forms may have gastrointestinal system side effects. Oral bisphosphonate-induced oral mucosal injury, oral ulcers, vesicles, and gingivitis are rarely reported in the literature. Lesions related to improper usage of bisphosphonates are atypical and need to be differentiated from other mucosal erosions. In this report, a case of painful, hemorragic oral ulcer in the soft palate in a patient with osteoporosis is discussed in light of the relevant literature.
Keywords: Biphosphonate, alendronate, mucosal ulcer, improper usage

Öz

Bifosfonatlar osteoporoz tedavisinde yaygın olarak kullanılan ajanlardır. Bifosfonatlar genellikle iyi tolere edilen ilaçlar olmakla birlikte özellikle oral formları gastrointestinal sistem yan etkilerine neden olabilir. Oral bifosfonat kaynaklı oral mukozal lezyonlar, oral ülserler, veziküller ve diş eti iltihabı nadiren literatürde bildirilmiştir. Bifosfonatların yanlış kullanımına bağlı lezyonlar atipiktir ve diğer mukozal erozyonlardan ayırt edilmesi gerekir. Bu yazıda osteoporotik bir hastada yumuşak damakta ağrılı hemorajik oral ülser olgusu ilgili literatür ışığında tartışılmıştır.
Anahtar kelimeler: Bifosfonat, alendronat, mukozal ülser, yanlış kullanım

Introduction

Bisphosphonates are pyrophosphate analogue drugs act as an inhibitors of osteoclasts apoptosis by binding hydroxyapatite cristals in bone (1). They are widely used agent for treatment postmenauposal osteoporosis,men osteoporosis and steroid related osteoporosis. Their clinical profile of bone-specific efficacy, rapid response, protection from both spine and hip fractures in patients with osteoporosis, and excellent tolerability is all that can be expected of an anti-remodeling drug (1). Although bisphosphonates are generally well tolerated drugs, especially oral forms may cause gastrointestinal system side effects like mucosal irritation and ulceration in esophageal and gastric mucosa and necrosis in bone structures such as maxilofacial bone and jaw (2). Bisphosphonate-related osteonecrosis of jaw (BRONJ) is the most commonly known oral side effect associated with bisphosphonates (3).

Oral bisphosphonate induced oral mucosal injury, oral ulcers, vesicles and gingivitis are rarely reported cases seen in elderly patient with physical and mental comorbidities. The regressed lesions by withdrawal or proper taking of oral bisphosphonates describes that oral mucosal lesions associated with inappropriate usage of bisphosphanates such as chewing and allowing to melt in the mouth (4,5).

Lesions related to improper usage of bisphosphonates are atypical and need to be differentiated from other mucosal erosions. In this report, a case of painful, hemorragic oral ulcer in a patient with osteoporosis is discussed in the light of the relevant literature.

Case Report

Seventy-year-male patient with osteoporosis under the treatment with weekly alendronate for nine months admitted to physical

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medicine and rehabilitation outpatient clinic with a complaint of oral ulcer on his soft palate. Oral ulcer was 1 cm in size, and had a hemorrhagic red appearance and not presented with pain, cough, bleeding and dysphagia or other symptoms (Figure 1).

He had a history of hypertension, familial mediterranean fever, coronary artery bypass graft and osteoporosis. Medications included acetilsalicylic acid, clopidogrel, colchicine, metoprolol,alendronate, vitamin D and calcium.

Patient referred to otorhinolaryngology clinic, diagnosed with gastroesophageal reflux and proton-pump inhibitor treatment was started. Follow-up evaluation showed enlargement of the lesion and an increase in the number of leukoplakia lesions with accompanying bleeding and severe pain complaints and incisional biopsy was taken. The biopsy result was reported as ulcer, inflamation with lymphocytes and plasma cells, compatible with dysplasia. Then he referred to skin and venereal disease clinic for further investigations had differential diagnosis squamous cell carcinoma, leukoplasia, paraneoplastic pemphigus. The second biopsy was reported that erosion, ulcer without dysplasia.

When patient was asked to describe the use of medications especially alendronate, it was noticed that he used the drug by chewing. Thereupon, the current alendronate treatment was stopped immediately, and in the follow-up, the patient's lesions were completely healed within two weeks. The lesions never had recur during follow-up of the patient.

Informed consent was obtained from the patient regarding this report.

Figure 1. Ulcer with well-defined borders on the soft palate

Discussion

Biphoshonates are mostly preferred drugs for the treatment of osteoporosis (1). Alendronate is widely used biphosphanates and has oral and iv forms. The side effects of weekly used oral alendronate on gastrointestinal system especially gastric mucosal ulcers, osteonecrosis (2). Oral ulcers with alendronate usage is underreported and rarely seen. Although the pathophsiology of cytotoxic effect on epithelium of oral alendronate is unclear, improper use of the drug, sucking, chewing and keeping the pill in the mouth until it dissolves, results in inflammation, erosion and ulcerations by a prolonged mucosal exposure (6). In this case report, the patient took the medication by chewing and made prolonged exposure of oral mucosa for alendronate and then swallowed it. After the cessation of the drug, the lesions are dissappeared and healed.

In literature review, the onset of oral ulcers occurs an average of 2 weeks-13 months after initiation of bisphosphonate therapy (7). In this case, the patient has complaints after 6 months from his first dose of oral alendronate and the lesions become evident on the day of taking the drug and subside at the end of the week. The lesions are most commonly identified in hard palate and tongue however the soft palate, larynx and buccal mucosa may also be affected. The soft palate lesion seen in this report is a very rare location not reported previously in the literature.

In this case report, it is emphasized that the physicians should be precisely sure that the patient had understand correctly the usage form and procedure of oral bisphosphonates and even should examine patients oral, buccal mucosa and gingiva during their follow-up. Weekly oral bipshophanates should be taken by swallowing with minimum one glass water in an upright position and staying upright for at least 45 minutes to prevent reflux, oesophageal irritation and ulceration. For patients having mental problems, cognitive impairments, difficulties for swallowing, other forms of biphosphanates should be considered as an alternative treatment.

Ethics

Informed Consent: Written informed consent was obtained from the patient prior to the drafting of the manuscript.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Ş.N.B., B.D.K., A.İ., Concept: Ş.N.B., B.D.K., A.İ., Design: Ş.N.B., B.D.K., A.İ., Data Collection or Processing: Ş.N.B., B.D.K., A.İ., Analysis or Interpretation: Ş.N.B., B.D.K., A.İ., Literature Search: Ş.N.B., B.D.K., A.İ., Writing: Ş.N.B., B.D.K., A.İ.

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

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Patient Presenting with Hemoptysis: A Case of Hughes-Stovin Syndrome

Hemoptizi ile Başvuran Hasta, Hughes-Stovin Sendromlu Bir Olgu

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Abstract

Hughes-Stovin syndrome (HSS) is a very rare autoimmune clinical disorder that has been described as the presence of thrombophlebitis and multiple aneurysms in pulmonary and/or bronchial arteries. The pathogenesis is still unknown, but this syndrome is often thought of as a manifestation of Behçet disease. Herein, we describe a 59-year-old male patient who was admitted to massive hemoptysis. HSS was diagnosed on the basis of imaging pulmonary artery aneurysms and a history of lower extremity thrombosis. It differs in terms of the occurrence of this rare syndrome in an elderly patient. In this syndrome, which has a high mortality, the results are satisfactory when the treatment is started with a rapid diagnosis.
Keywords: Hughes-Stovin syndrome, deep vein thrombosis, hemoptysis, pulmonary artery aneurysm

Öz

Hughes-Stovin sendromu (HSS), pulmoner ve/veya bronşiyal arterlerde tromboflebit ve çoklu anevrizma varlığı olarak tanımlanan, çok nadir görülen bir otoimmün klinik bozukluktur. Patogenezi hala bilinmemektedir, ancak bu sendrom sıklıkla Behçet hastalığının bir varyantı olarak düşünülmektedir. Burada masif hemoptizi nedeniyle başvuran 59 yaşında bir erkek hastayı sunduk. HSS, görüntülemede pulmoner arter anevrizmaları görülmesi ve alt ekstremite tromboz öyküsü temelinde konuldu. İleri yaş bir olguda bu nadir sendromun görülmesi açısından farklılık göstermektedir. Yüksek mortalitesi olan bu sendromda tedavisi hemen başlandığında sonuçlar yüz güldürücü olmaktadır.
Anahtar kelimeler: Hughes-Stovin sendromu, derin ven trombozu, hemoptizi, pulmoner arter anevrizması

Introduction

Hughes-Stovin syndrome (HSS) is a very rare autoimmune clinical disorder which has been described as the presence of thrombophlebitis and multiple aneurysms in pulmonary and/or bronchial arteries, first described in 1959 by two British physicians (1).

The etiology and pathogenesis is still unknown, although vascult is thought to be the underlying mechanism, various infectious agents are thought to be the cause for HSS (2). Although HSS is considered a variant of Behçet's disease (BD), it is thought to be a different entity. Patients with HSS usually present with symptoms such as cough, shortness of breath, fever, chest pain and hemoptysis (3,4). It is assumed to be a result of angiodysplasia and vasculitis, as in BD.

The disease affects predominantly young males between the second and fourth decades of life (5). We considered this case worth presenting in terms of his older age and a previous history of deep vein thrombosis (DVT).

Case Report

Herein, we described a 59-year-old male patient was admitted to the emergency department because of hemoptysis following 1 week of intermittent non-productive cough and sudden onset of dyspnea. He reported no chest pain. Hemoptysis was massive (about 300 mL) on admission. His medical history revealed that he was a ex-smoker (20 packs/year) and had oral aphthous ulcers occurring 3-4 times a year. There was no medical history of fever, weight loss, sweating, genital ulcer, uveitis and skin

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lesions or tuberculosis. He gave a history of DVT in left leg in 2019. At that time, a chest tomography was taken and he was called to the controls for further research, but he did not come. He has been receiving warfarin 5 mg/day ever since.

On physical examination, his blood pressure was 140/85 mmHg, body temperature was 37 °C, respiratory rate 22/minute. Musculoskeletal examination revealed normal range of motion and no arthritis was found. There was an increase in diameter in the left leg. He had no rash lesion on extremities. Respiratory sounds were decreased in the bilateral lower zones of the lung. Laboratory investigations showed; sedimentation first hour 25 mm/h, C-reactive protein of 1.6 mg/dL, hemoglobin 13.3 gm/dL, white blood cell count of 9,400/µL. Platelet count was 192,000/µL. Renal and liver function tests were within normal limits. Normal D-dimer levels (n<243) was found.

The chest computed tomography (CCT) scan was taken due to abnormality on lung X-ray. CCT revealed an aneurysmal enlargement in the right lower lobe pulmonary artery with thrombus inside. It was reported that the right lower lobe ground glass opacity probably representing a pulmonary hemorrhage (Figure 1a, b). When the patient's previous examinations were examined, a CCT was seen in 2019. Partially thrombosed saccular aneurysmatic enlargements were observed in the subsegment branches of the right lung lower lobe pulmonary artery, and clinical laboratory correlation in terms of the differential diagnosis of pulmonary artery aneurysm was reported as appropriate in terms of Behçet and other vasculitic involvement (Figure 2).

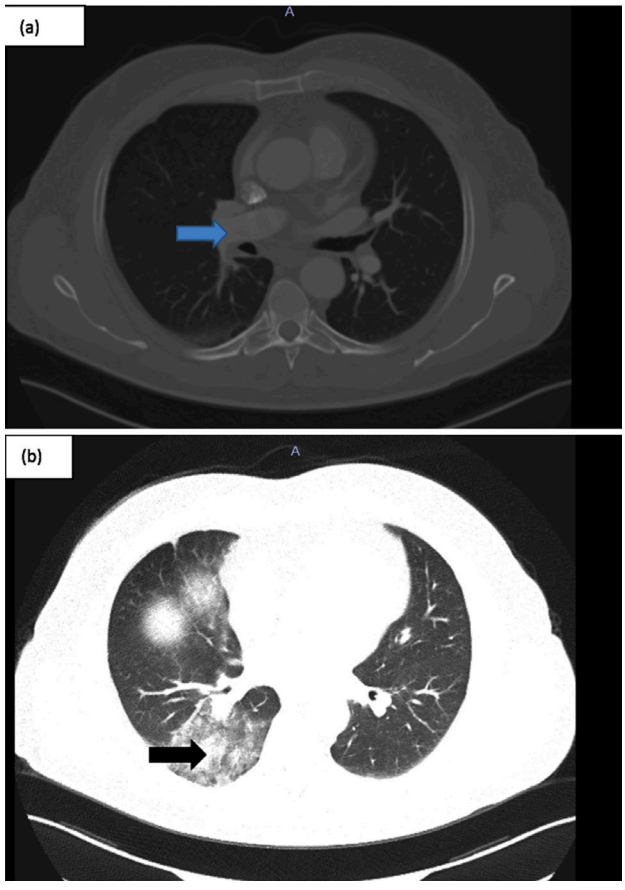

Figure 1. (a) Thoracic computed tomography (CT) showing an aneurysmal enlargement in the right lower lobe pulmonary artery with thrombus inside (blue arrow) (b) ground glass opacity representing a pulmonary hemorrhage (black arrow)

Finally, a diagnosis of HSS was made on the basis of pulmonary artery aneurysms and thromboses. Warfarin was discontinued due to bleeding. The patient started with pulse methylprednisolone therapy (1000 mg/day) intravenous bolus infusion and then cyclophosphamide 750 mg monthly as intravenous pulses. He was treated with intravenous therapy followed by oral steroid with subsequent taper (1 mg/kg) and 6 cyclophosphamide pulses of 1 gram each per 6 months with incomplete regression of aneurysms and thromboses.

Written informed consent was obtained for publication of the case report and accompanying images.

Discussion

HSS is very rare but associated with significant morbidity and mortality. The aetiology of this condition is unclear and has been defined in different ways in the literature. Some of those; "incomplete BD" and "a rare case of BD" (6,7).

Although the exact etiology and pathogenesis of HSS are unknown, it has been suggested that vasculitis may be an underlying mechanism. In this respect, it should be considered in terms of differential diagnosis with BD, which is also known as "Silk Road" disease and is common in our country. Although it seems to have similar aspects to BD in terms of pulmonary involvement and DVT, it differs in the absence of systemic involvement and the absence of orogenital ulcers (8).

While thromboembolism is seen in 25% of patients with HSS, massive hemoptysis secondary to pulmonary artery aneurysm rupture is also severely mortal. It progresses with different clinical findings from thrombophlebitis to aneurysm. Major vascular involvements of the syndrome are as follows: arterial (7%), venous (25%) or both (68%) in the studies (9,10).

Diagnosis is usually based on the clinical and radiological presentation of venous thrombosis with concomitant pulmonary

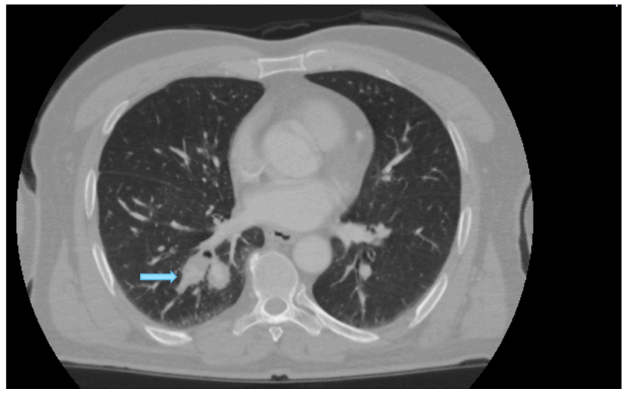

Figure 2. The blue arrow points to partially thrombosed saccular aneurysmatic enlargements were observed in the subsegment branches of the right lung lower lobe pulmonary artery

artery aneurysm in a patient. CT scan or magnetic resonance angiography is the diagnostic method of choice to detect pulmonary artery aneurysms or other visceral artery aneurysms (9,11).

In medical treatment, steroids and cytotoxic agents are used. In particular, the combination of glucocorticoids and cyclophosphamide was used as the most commonly preferred therapeutic agents in this context. Rapid recognition of this syndrome is important, especially since the presence of pulmonary artery aneurysm has a poor prognosis. If appropriate treatment is initiated promptly and early in the course of the disease, remission can be achieved quickly (12,13). In some cases, surgery may be required, except in emergencies, surgery is considered after the disease has stabilized (14).

Our case did not have any new complaints in the follow-up after completing his treatment with 6 cyclophosphamide pulses. In this case, we wanted to present the presence of aneurysm in the chest tomography taken at the time of admission with DVT and the presence of HSS at a older age.

Ethics

Informed Consent: Written informed consent was obtained for publication of the case report and accompanying images.

Peer-review: Internally peer-reviewed.

Authorship Contributions

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

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

Financial Disclosure: The authors declared that this study has received no financial support.

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Case Report / Olgu Sunumu

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An Osteoporotic Vertebral Fracture Case After Lumbar Sympathetic Ganglion Block

Lomber Sempatik Ganglion Bloğu Sonrası Gelişen Osteoporotik Vertebra Kırığı Olgusu

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Abstract

We report the case of a patient with lymphedema who experienced an osteoporotic vertebral fracture following lumbar sympathetic ganglion block (LSGB). A 66-year-old woman with intractable lymphedema of the right leg went through surgery for cervix cancer. Because she was resistant to conventional treatments, we planned to commence LSGB treatment. Thus, she received two sessions of LSGB administered with a steroid and local anesthetic mixture. After the second session, the patient underwent severe lumbar pain. After thorough anamnesis and physical examination, we decided to use magnetic resonance imaging to rule out the possibility of metastasis. Contrast-enhanced magnetic resonance imaging, which was assessed by an expert spine radiologist, revealed an osteoporotic fracture of the L4 vertebra. The patient's severe pain considerably diminished in the third month after beginning antiosteoporotic and analgesic medications, orthosis, and exercises. We speculate that the use of steroids in LSGB may lead to osteoporotic vertebral fracture.
Keywords: Low back pain, lymphedema, osteoporotic fracture, sympathetic ganglion, steroids

Öz

Lomber sempatik ganglion bloğu (LSGB) sonrası osteoporotik vertebra kırığı yaşayan lenfödemli bir hastayı sunuyoruz. Altmış altı yaşında, kadın, serviks kanseri nedeniyle ameliyat olduktan sonra sağ bacağında inatçı lenfödem gelişip konvansiyonel tedavilere dirençli olduğu için LSGB tedavisine başlamayı planladık. Bu nedenle hastaya steroid ve lokal anestezik karışımı ile iki seans LSGB tedavisi yapıldı. İkinci seanstan sonra hastada şiddetli bel ağrısı şikayeti gelişti. Kapsamlı bir anamnez ve fizik muayene yaptıktan sonra, metastaz olasılığını ekarte etmek için kontrastlı manyetik rezonans görüntüleme kullanmaya karar verdik. Uzman bir nöro-radyolog tarafından değerlendirilen kontrastlı manyetik rezonans görüntüleme ile L4 vertebrada osteoporotik fraktür tespit edildi. Anti-osteoporotik ve analjezik ilaçlar, ortez ve egzersizlere başlandıktan sonraki üçüncü ayda hastanın şiddetli ağrıları belirgin olarak azaldı. Bu olgudan yola çıkarak, LSGB'de steroid kullanımının osteoporotik vertebra kırığına yol açabileceğini düşünmekteyiz.
Anahtar kelimeler: Bel ağrısı, lenfödem, osteoporotik kırık, sempatik ganglion, steroidler

Introduction

Lumbar sympathetic ganglion block (LSGB) has been commonly used in the diagnosis and management of sympathetically mediated, ischemic, and neuropathic pain in the lower limbs, including complex regional pain syndrome, circulatory insufficiency, and post-herpetic neuralgia (1,2). LSGB is also performed in clinical practice for various chronic conditions such as lymphedema (3). Local anesthetics and steroids are usually combined and injected around the sympathetic ganglia at the L2 or L3 level.

Osteoporosis (OP) is a serious complication associated with glucocorticoid therapy. Systemic glucocorticoids have adverse effects on the skeleton through different mechanisms. Glucocorticoids inhibit bone formation by suppressing osteoblast differentiation and accelerating bone loss by inducing osteoclast expression. They also indirectly impair bones through a reduction in intestinal calcium absorption, increase in urinary calcium loss and other extraskeletal effects (4).

Glucocorticoids are mostly used in interventional procedures such as epidural steroid injections (ESIs), facet joint injections, and sympathetic ganglion blocks. We conducted a review of the

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literature and, to the best of our knowledge, there have not been any reports on the association between LSGB and osteoporotic vertebral fracture. Here, we present a case of lymphedema in the right leg with osteoporotic vertebral fracture due to LSGB.

Case Report

Verbal and written informed consent was obtained from the patient.

A 66-year-old woman is suffering from lymphedema of the right leg after she went through surgery for cervix cancer. She had OP and hypertension as comorbidities. She had been given all kinds of conventional treatment, such as complex decongestive therapy, pneumatic compression pump, etc., and yet she still had intractable lymphedema in her right leg. Thus, we decided to perform three sessions of LSGB on the right side, one week apart. The blockade was carried out by an experienced interventional pain specialist under sterile conditions with the C-arm fluoroscopy guidance. After the patient is placed in a prone position, the C-arm is rotated obliquely until the tip of the transverse process of L3 overlies the antero-lateral margin of the L3 vertebral body. The skin entry area was infiltrated with 2% prilocaine and a 12-cm, 22-gauge Quincke spinal needle was advanced to the anterolateral margin of the L3 vertebral body under intermittent fluoroscopic imaging. 1 mL of contrast medium (iohexol 300 mg/mL) was delivered to affirm the appropriate spread pattern and the absence of intravascular uptake prior to injection of a mixture of 6 mg betamethasone and 9 cc of 0.5% bupivacaine (Figure 1). The effectiveness of the injection was tested by measuring a temperature difference of at least 1 °C between the limbs. The patient attended the outpatient clinic with severe lumbar pain three days after the 2nd session. When a detailed anamnesis was taken from the patient, there was no history of trauma or fall. There was tenderness in her lumbar spinous processes during the examination and the numeric rating scale (NRS) score was 10 in the pain assessment. Owing to her prior diagnosis of OP, we immediately had a contrast-enhanced lumbar magnetic resonance imaging and measured bone mineral density (BMD) levels. An expert radiologist confirmed the existence of a minimal (grade 1) osteoporotic fracture in the L4 vertebra (Figure 2) and ruled out any metastasis regarding her cancer. There were no changes in her BMD values compared to prior BMD. We commenced denosumab 60 mg subcutaneous injection semi-annually, cholecalciferol 20,000 IU (0.5 mg vitamin D3) twice a week, tramadol 50 mg three times per day, lumbo-sacral orthosis, and a home-based exercise program. The NRS score of the patient declined by 4 points, from 10 to 6, after a week. Thus, the use of orthosis was discontinued, and the tramadol dose was reduced to twice a day. Her 3rd week and 3rd month NRS scores were 4 and 3, respectively.

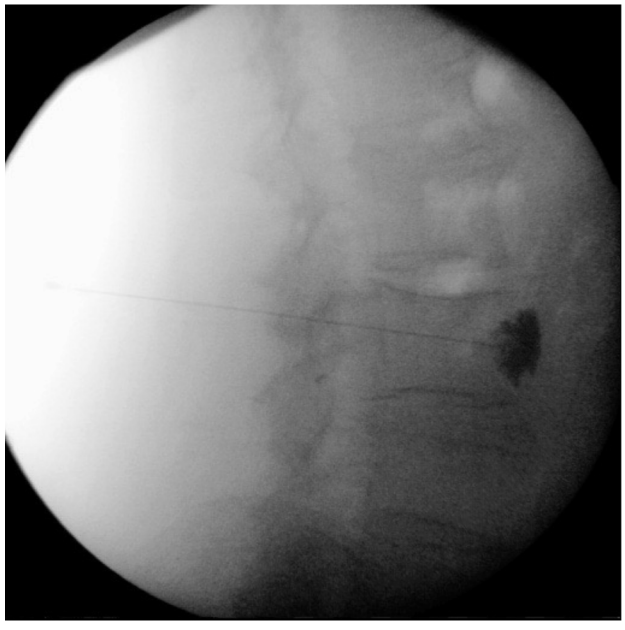

Figure 1. Lateral fluoroscopic image of the lumbar sympathetic ganglion block with contrast medium at the L3 vertebral body

Discussion

In our patient with right leg lymphedema who was resistant to various conventional treatments, we detected the development of an osteoporotic vertebral fracture following a second LSGB session that was performed with local anesthetic and steroid mixture. We started antiosteoporotic agent, opioid analgesia, lumbo-sacral orthosis, and a home-based exercise program. After all these treatments, a 70% reduction in pain was achieved in the 3rd month control.

OP is a skeletal illness defined by a reduction in BMD, which causes bone fragility and increases the risk of fracture (5). Secondary OP is frequently the cause of glucocorticoid-induced

Figure 2. Osteoporotic compression fracture of the L4 vertebrae under T2 weighted sagittal MRI
MRI: Magnetic resonance imaging

OP (6). Oral and intravenous glucocorticoids have significant negative effects on bone and raise fracture risk promptly within the first three months of treatment (7). While systemic exposure via interventional procedures such as ESIs is much lower than from oral or intravenous administration, evidence of hyperglycemia and inhibition of the hypothalamic-pituitary-adrenal axis following ESIs proposes that some systemic absorption does take place (8). Even though there were some studies regarding ESIs and OP (9), to our knowledge, there was no study that looked into the systemic effects of glucocorticoid after LSGB. We assumed that since ESI and LSGB have similar GK doses and mechanisms, they may cause OP due to the systemic effects of GK. The association between ESIs and OP fracture risk has been investigated in a few retrospective studies (10-12). Among these investigations, only one study reported a higher incidence of OP fractures following ESIs (12). In accordance with this retrospective cohort study, the risk of vertebral fracture escalated by 29% after being exposed to ESI. In addition, the risk of fracture was shown to be dose-dependent, with each subsequent injection increasing the risk by a ratio of 1.21 (95% confidence interval =1.08-1.30) (12). Our patient's complaints developed in the second session of treatment. This may demonstrate that as the procedure is performed more frequently, the likelihood of complications also increases. These findings are consistent with the aforementioned study by Mandel et al. (12) The majority of research on the impact of ESIs on the skeletal system has been on changes in BMD. There is a link between ESI exposure and low BMD that has been found in several studies (13,14). However, we found no changes in BMD levels; this might be due to the short interval between evaluation periods. Given our patient's cancer and OP comorbidities, even only two sympathetic blocks with a total of 12 mg betamethasone may have facilitated this situation and induced the development of fracture.

Even if not administered systemically, the use of glucocorticoids, along with significant risk factors such as cancer and OP, may play an important role in the development of osteoporotic fracture. For this reason, when performing sympathetic blocks, using local anesthetic alone-not steroids-can be a better choice in patients with these risk factors. In conclusion, more research is required to assess the effectiveness and safety of adding steroids to sympathetic block applications.

Ethics

Informed Consent: Verbal and written informed consent was obtained from the patient.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: S.Ş., R.I., Ş.A., Concept: S.Ş., O.H.G., Design: R.I., S.Ş., Data Collection or Processing: R.I., Ş.A., Analysis or Interpretation: O.H.G., S.Ş., Literature Search: R.I., S.Ş., Writing: R.I., S.Ş.

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Preference of Quality of Life Questionnaires and Risk Assessment Calculators in Osteoporosis: A Brief Report

Osteoporozda Yaşam Kalitesi Anketleri ve Risk Değerlendirme Ölçeklerinin Kullanımında Sağlık Çalışanlarının Tercihleri: Kısa Rapor

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Abstract

Objective: The purpose of this study was to identify the most preferred measurement tools for assessing fracture risk and quality of life (QoL) in patients with osteoporosis (OP).

Materials and Methods: The QoL questionnaires and risk assessment calculators in OP were investigated based on a questionnaire conducted by the Turkish Osteoporosis Society during WCO-IOF-ESCEO 2023 in Barcelona. One hundred congress participants were included in the study. Basically the participants were questioned which risk assessment calculator they preferred to assess fracture risk and which OP QoL questionnaire they used to evaluate patients' QoL.

Results: Twenty-one participants reported that they did not evaluate QoL. Those who completed the QoL assessment were found to prefer the OP QoL questionnaire the most (32.6%). We found that participants most preferred Fracture Risk Assessment Tool (FRAX) (81.0%) to assess fracture risk at the OP.

Conclusion: FRAX was found to be significantly preferable in the assessment of fracture risk, despite the fact that healthcare professionals did not have a substantial consistency in QoL questionnaires.

Keywords: Osteoporosis, quality of life, osteoporotic fractures

Öz

Amaç: Osteoporozu (OP) olan hastalarda kırık riskini ve yaşam kalitesini (QoL) değerlendirmek için en çok tercih edilen ölçme-değerlendirme araçlarını belirlemektir.

Gereç ve Yöntem: Barselona'da düzenlenen WCO-IOF-ESCEO 2023 Kongresi sırasında 100 sağlık profesyoneli katılımcıya OP'li hastalarda tercih ettikleri QoL anketleri ve kırık riskini hesaplama araçları Türkiye Osteoporoz Derneği tarafından hazırlanan bir anket ile soruldu. Temel olarak katılımcılara kırık riskini değerlendirmek için hangi risk hesaplama aracını kullandıkları ile hastaların QoL'yi değerlendirip değerlendirmedikleri ve hangi anketi tercih ettikleri soruldu.

Bulgular: Yirmi bir katılımcı QoL'yi değerlendirmediklerini bildirdi. QoL değerlendirmesini tamamlayanların en çok OP QoL anketini (%32,6) tercih ettikleri görüldü. Katılımcıların OP'de kırık riskini değerlendirmek için en çok Kırık Riski Değerlendirme Aracı'nı (*Fracture Risk Assessment Tool*-FRAX) (%81,0) tercih ettikleri gözlendi.

Sonuç: Sağlık profesyonellerinin yaşam kalitesini değerlendirmede kullanılan anketlerde önemli bir tutarlılığa sahip olmamasına rağmen, FRAX'ın kırık riskini değerlendirmede önemli ölçüde tercih edildiği görüldü.

Anahtar kelimeler: Osteoporoz, yaşam kalitesi, osteoporotik kırıklar

Introduction

Evaluation of fracture risk in osteoporosis (OP) and also evaluation of patients' quality of life (QoL) will be a guide for clinicians in daily practical applications. Hip, spine, or wrist fracture pain, along with physical, emotional, and psychological incapacity, may reduce QoL. An important marker of the clinical course of patients with OP and fractures is evaluation of health-related QoL (HRQoL) (1).

To better identify patients at high risk of fracture, several web-based tools for fracture prediction which allow the inclusion of clinical risk factors, with or without bone mineral density (BMD),

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have been developed (2). The prevention of such injuries is a key public health objective due to the increased socioeconomic burden of OP-related fractures globally. The aim of this survey study was to determine the most frequently preferred scales for assessing fracture risk in OP and measuring QoL.

Materials and Methods

The QoL questionnaires and risk assessment calculators in OP were investigated by a questionnaire conducted by the Turkish Osteoporosis Society during WCO 2023 in Barcelona.

Hundred congress members voluntarily participated in the research. Eighty four of the participants (83.2%) were physicians. The rest were other health professionals. Most of the attendees were between the ages of 36-45 (27%). The others were between 46-55 (26%) and 56-65 (24%). Participations were from Italy (11.4%), Spain (10.2%), Romania 9.1% and other countries.

Basicly 2 questions were asked:

A- Which one of the risk assessment calculator do you prefer?

1. Garvan Institute Bone Fracture Risk Calculator,
2. The Fracture Risk Assessment Tool (FRAX) algorithm,
3. QFracture®,
4. Osteoporosis Risk SCORE (Simple Calculated Osteoporosis Risk Estimation),
5. American Bone Health 10-Year Fracture Risk Calculator Version 2.1,
6. Other: please write in capital letters .....
7. I do not use a risk assessment calculator.

B- Which one of the osteoporosis QoL questionnaires do you prefer?

1. The Women's Health Questionnaire,
2. Osteoporosis Quality of Life Questionnaire,
3. Osteoporosis Assessment Questionnaire,
4. Osteoporosis Functional Disability Questionnaire,
5. Quality of Life Questionnaire of the European Foundation for Osteoporosis- Qualeffo-41,
6. Osteoporosis-Targeted Quality of Life Questionnaire,
7. Japanese Osteoporosis Quality of Life Questionnaire,
8. The 16-item Assessment of Health-Related Quality of Life in Osteoporosis,
9. The Quality of Life Questionnaire in Osteoporosis (QUALIOSTTM),
10. I do not evaluate the Quality of Life in osteoporosis patients...

Results

When the results were examined, it was noteworthy that 24.4% of the participants did not apply QoL assessment. It was determined that those who made a QoL assessment preferred the OP QoL questionnaire the most (32.6%). The Women's Health Questionnaire preference was 18.6% and others were used at lesser rates (Figure 1).

It was found that the participants preferred FRAX the most (81.0%) in order to assess the fracture risk at the OP. OP risk score preference was 6% and 4% of the participants stated that they did not use any risk assesment calculator (Figure 2).

Discussion

Due to its link to age-related fractures, notably those of the hip, vertebrae, distal forearm, and humerus, osteoporosis is a significant public health problem. It is well known that; OP is an overlooked issue that there is no evidence of disease until a fracture occurs. Osteoporotic fractures have a significant impact on patients' QoL, which may lead to severe complications including disability.

A meta-analysis was performed to systematically review HRQoL in women with three different bone states (normal bone density, OP, OP with fractures).

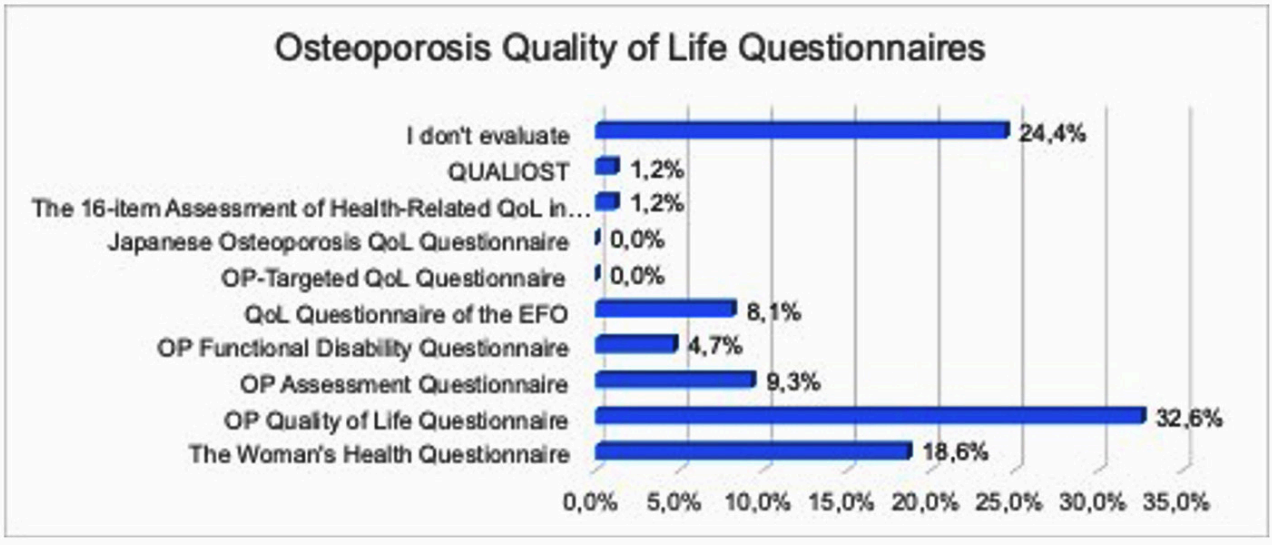

Figure 1. Preference of OP QoL questionnaires
OP: Osteoporosis, QoL: Quality of life

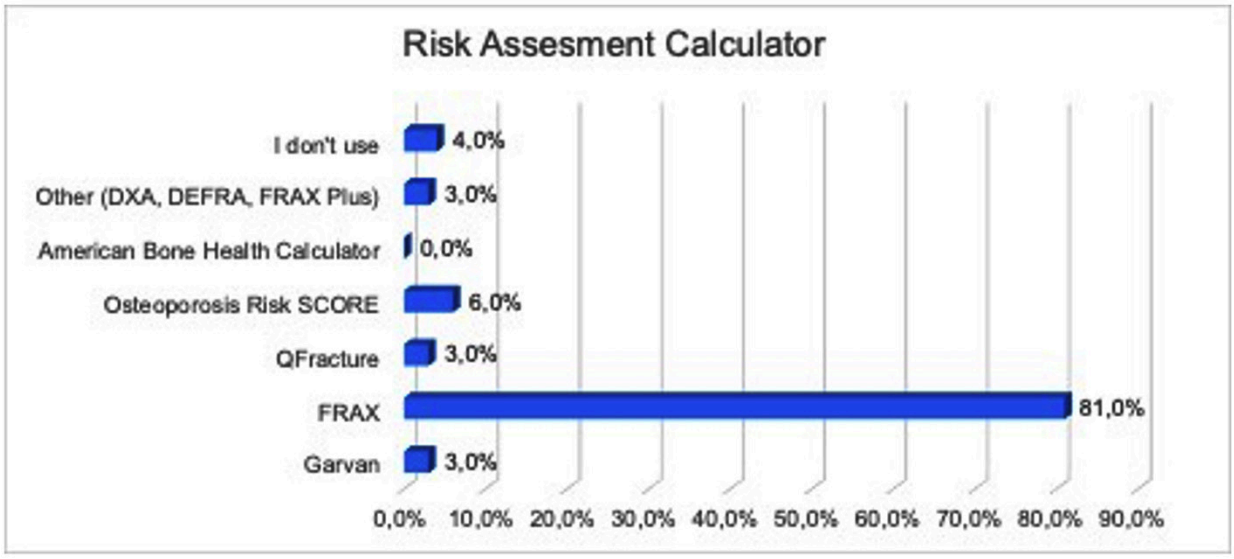

Figure 2. Preference of risk assesment calculator
FRAX: Fracture Risk Assessment Tool, DXA: Dual energy X-ray absorptiometry

Studies were included if they examined the QoL of postmenopausal women with OP or osteoporotic fractures using a validated QoL questionnaire. With regard to 2897 postmenopausal women, 13 papers that met the inclusion criteria were thoroughly reviewed, and 12 of those studies were included in the meta-analysis. In comparison to postmenopausal women with normal BMD, those with OP exhibited worse overall HRQoL and several HRQoL aspects. Postmenopausal women with osteoporotic fractures had poorer overall HRQoL and individual measures of HRQoL, especially physical component summary, when compared to the postmenopausal women with OP. While fragility fracture severity was adversely correlated with HRQoL, BMD was positively correlated with it. Thus, it was determined that postmenopausal OP and fragility fractures may reduce HRQoL in women to variable degrees (3).

Evaluating QoL is crucial to health research and clinical trials investigating OP. It should be taken into account that, the choice of the type of research being conducted and the research question influence the choice of the QoL instrument; each instrument has unique benefits and drawbacks (4). Pastor-Robles et al. (5) reported the risk factors for OP related to QoL by comparing QoL in women over the age of 65 years diagnosed with OP with the general population. Except for pain/discomfort and anxiety/depression, the study group's QoL was comparable to that of the general population. Age, highest educational level reached, inflammatory diseases, physical activity, and insomnia were independent predictors of QoL in women with OP (5).

An assessment of the QoL of patients implies evaluating their health status and relationship with their environment. The results of our research have showed that OP QoL questionnaire is the most preferred scale. The practicality of the application and the fact that the specialists are used to it may be the reason of preference.

A number of web-based tools have been created to assist the identification of people at high fracture risk, with FRAX being the most commonly used globally. These methods enable the integration of clinical risk factors in fracture prediction algorithms, with or without BMD.

Access to dual energy X-ray absorptiometry, OP risk assessment, case identification, and treatment varies around the world, but studies reveal that only a tiny number of men and women at high fracture risk receive therapy (2).

According to the reserach performed by Holloway-Kew et al. (6) their results showet that, the FRAX and Garvan calculators underestimated the incident major osteoporotic and fragility fractures, especially in patients with osteopenia or OP. Both calculators predicted hip fractures more accurately. Detailed statistical analyses suggest that Garvan (with BMD) performed better than Garvan (without BMD) for prediction of fragility fractures (6). The participants of our study preferred FRAX the most in order to assess the fracture risk at the OP.

The accessibility of the fracture risk assessment tool FRAX®, which is now included in more than 100 clinical osteoporosis guidelines worldwide, has significantly improved the targeting of treatment to individuals at high risk of fracture. There is a study going on is to evaluate whether the existing algorithms can be further optimized with respect to current and novel risk factors. In this study, for each previosly known and candidate risk factor, multivariate hazard functions for hip fracture, major osteoporotic fracture and mortality will be examined. After meta-analyses of the cohort-specific beta coefficients for each risk factor, models with a 10-year probability of hip and major osteoporotic fracture, with or without femoral neck bone mineral density, will be created. These combined cohorts and the stated models will serve as the foundation for an enhanced FRAX tool providing improved assessment of fracture risk [PROSPERO (CRD42021227266)] (7).

In a consensus report, it is also stated that, Turkey is performing well in certain areas such as BMD access and uptake of FRAX (8). When used rationally, these scales improve the ability of clinicians to identify high-risk patients and allow us to distinguish fracture risk among patients presenting with similar bone mineral densities. As Cozadd et al. (9) clearly stated, even in the absence of BMD data, fracture risk assessment methods such as the FRAX, Garvan fracture risk calculator, and QFracture examine the impact of numerous clinical parameters on fracture risk. Because of the fast evaluation of high number of patients in outpatient clinics application of such scales seems to be ignored.

Peer-review: Internally and externally peer-reviewed.

Authorship Contributions

Concept: Y.G.K., Design: Y.G.K., Data Collection or Processing: Ü.A., R.T., Ş.T., Analysis or Interpretation: Y.K., Ş.T., M.S., N.E., Literature Search: Y.G.K., Y.K., M.S., N.E., Writing: Y.G.K., Y.K., R.T.

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

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