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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.

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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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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 reqiuirements 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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3) Editöre Mektuplar:
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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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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.
The scientific board guiding the selection of the papers to be published in the journal is consisted of the elected experts of the journal and from national and international authorities.
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This page should include the Turkish and English titles of the manuscript, affiliation of author(s), key words and running titles.
The English title should take place in the title page. Likely, Turkish title should be mentioned for articles in foreign language. Turkish and English key words and running titles should also be included in the title page.
The names and full postal addresses of authors and the corresponding author should be indicated separately. Especially as e-mail addresses will be used for communication, e-mail address of the corresponding author should be stated. In addition, telephone and fax numbers must be notified.
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In the second page, Turkish and English summaries of the manuscript (maximum 200 words for each), and the key words should take place.
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Türk Osteoporoz Dergisi
TURKISH JOURNAL OF OSTEOPOROSIS

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Türk Osteoporoz Dergisi
TURKISH JOURNAL OF OSTEOPOROSIS

Editorial / Editörden

Sevgili Meslektaşlarımız,

Öncelikle akademik çalışmaların meyvesi olan araştırma makalesi ve olgu sunumları şeklinde çalışmalarını yayınlanmak üzere Emerging Sources Citation Index (ESCI) tarafından indekslenen dergimize düzenli olarak ilettiklerinden değerli meslektaşlarımıza çok teşekkür ederiz. Dergimizin 2023 yılının son sayısında da bu akademik çalışmaları yayınlamaktan büyük mutluluk duyuyoruz.

Dünya Osteoporoz Kongresi (WCO-IOF-ESCEO) 11-14 Nisan 2024 tarihlerinde Londra'da yapılacaktır. International Osteoporosis Foundation (IOF) ve European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) Bilimsel Komiteleri tarafından kas-iskelet sistemi sağlığı konusunda en iyilerini bir araya getirmeye yönelik heyecan verici bir bilimsel programın hazırlandığı belirtilmiştir.

Uluslararası katılımlı 8. Ulusal Osteoporoz Kongresi 21-24 Kasım 2024 tarihlerinde Antalya'da yapılacaktır, ajandanıza kaydetmenizi rica ediyoruz.

Siz değerli meslektaşlarımıza yeni yılda mutluluğun ve başarının yaşamınızdan eksik olmamasını dileyerek, sevgi ve saygılarımı sunarım.

Editör
Prof. Dr. Yeşim Kirazlı

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The Impact of the COVID-19 Pandemic on Osteoporosis Patients

COVİD-19 Pandemisinin Osteoporoz Hastaları Üzerine Etkisi

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Abstract

Objective: Osteoporosis is the most common metabolic bone disease associated with significant mortality and morbidity. The coronavirus disease-2019 (COVID-19) pandemic, which has affected the entire world, has necessitated curfews, quarantine measures, and alterations in hospital health services. Our study aimed to investigate the impact of the pandemic period on our osteoporosis patients.

Materials and Methods: Ninety-two previously diagnosed osteoporosis postmenopausal female patients who presented to the outpatient clinic between July 20, 2020, and October 20, 2020, were enrolled in the study. Besides the patients' demographic characteristics, the duration of osteoporosis, the osteoporosis medications they used, and whether they interrupted the treatment during the pandemic period, and if they did, the reason was questioned. In addition, fracture history, fall frequency and exercise status were recorded before and during the pandemic.

Results: The patients' mean age was 61±8 years. 10.9% had been exercising before the pandemic, and of these, 87.5% either reduced their exercise frequency or quit exercising during the pandemic. 20.7% of the patients before the pandemic and 17.4% during the pandemic period had a history of falling (p>0.05). When the continuation of osteoporosis treatment was analyzed, 7 (7.6%) patients were found to have interrupted their treatments during the pandemic. Of these, one of them had interrupted treatment due to the inability to obtain the medication, one of them had interrupted treatment due to not having the necessary investigations performed, and five patients had interrupted treatment because they could not leave their homes due to restrictions. It was observed that the interruption of drug treatment was not associated with those living in urban or countryside, or the level of osteoporosis knowledge (p>0.05).

Conclusion: Our study demonstrated that the COVID-19 pandemic adversely affected osteoporosis patients' medication adherence and exercise levels. Therefore, we recommend taking preventive measures of addition existing ones in similar situations.

Keywords: COVID-19, osteoporosis, osteoporosis treatment

Öz

Amaç: Osteoporoz metabolik kemik hastalıklarının en sık görülen şekli olup, ciddi mortalite ve morbiditeye sebep olabilmektedir. Tüm dünyayı etkisi altına alan koronavirüs hastalığı-2019 (COVİD-19) pandemisi sokağa çıkma yasağı, karantina uygulamaları ve hastanelerdeki sağlık hizmetlerinde değişiklikleri beraberinde getirmiştir. Çalışmamızda pandemi döneminin osteoporoz hastalarımız üzerine olan etkisini araştırmayı amaçladık.

Gereç ve Yöntem: 20 Temmuz-20 Ekim 2020 tarihleri arasında polikliniğe başvuran daha önceden osteoporoz tanısı almış 92 postmenapozal kadın hasta çalışmaya alındı. Hastaların demografik özelliklerinin yanı sıra; osteoporoz süreleri, kullandıkları osteoporoz ilaçlar ve pandemi dönemi tedaviyi aksatma durumları ve nedenleri sorgulandı. Bunun yanı sıra pandemi öncesi ve pandemi döneminde kırık öyküleri, düşme sıklıkları ve egzersiz durumları değerlendirildi.

Bulgular: Çalışmaya alınan 92 osteoporoz hastasının yaş ortalaması 61±8 idi. Pandemi öncesi hastaların %10,9'u egzersiz yapmaktaydı ve bunların %87,5'i pandemi döneminde egzersizi bıraktığını ya da azalttığını ifade etti. Pandemi öncesi hastaların %20,7'si, pandemi döneminde ise %17,4'ünün düşme öyküsü mevcuttu (p>0,05). Hastaların osteoporoz tedavisini aksatma durumu incelendiğinde; birinin ilacı temin edemediği için, birinin gerekli tetkikleri yaptıramadığı için, beşinin kısıtlamalar nedeniyle evden çıkamadığı için tedavisini aksattığı saptandı. Tedaviyi aksatma durumunun yaşadığı yer ya da bilgi düzeyi ile ilişkisinin olmadığı görüldü (p>0,05).

Sonuç: Çalışmamız COVİD-19 pandemi döneminin osteoporoz hastalarının gerek ilaç devamlılıklarını, gerekse egzersiz düzeylerini olumsuz etkilediğini gösterdi. Olası benzer durumlarda alınan tedbirlere ilave ek önlemlerin alınmasının faydalı olacağını düşünmekteyiz.

Anahtar kelimeler: COVİD-19, osteoporoz, osteoporoz tedavisi

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Introduction

Osteoporosis (OP) is a metabolic bone disease characterized by impairment of bone microarchitecture, decreased bone strength and bone mineral density (BMD), and elevated fracture risk (1). The consequences of the disease consist of mortality, physical disability, pain, increased fracture risk, elevated treatment costs, and impairment in the quality of life (2). Today, OP has become the seventh most prevalent disease worldwide and thus constitutes a global public health problem (3).

Coronavirus disease-2019 (COVID-19) infection due to severe acute respiratory syndrome coronavirus 2, a new coronavirus that emerged in China in late 2019, was attributed a pandemic status by the World Health Organization on March 11, 2020 (4,5). As of July 19, 2020, COVID-19 had infected 14,348,475 individuals worldwide and had caused 603,167 deaths (6). In our country, before the WHO declared a pandemic, the Ministry of Health established a Scientific Committee consisting of expert scientists on January 10, 2020. Following the first case detected in our country on March 11, 2020, the draft of the public policy's main items to be implemented was started to be prepared. Curfews and quarantine practices were enacted in the context of the prepared precautionary policies (7). Besides the imposed quarantine and travel limitations during the COVID-19 pandemic, slowing down routine hospital services has led to worries that limitations might have been encountered in treating chronic disorders (8). For example, patients with OP require long-term therapy and periodic follow-ups. Our study aimed to determine how the COVID-19 pandemic period impacted patients diagnosed with osteoporosis.

Materials and Methods

The study was conducted among postmenopausal OP patients who presented to our outpatient clinic between July 20, 2020, and October 20, 2020. During the study period, a total of 437 OP patients visited our clinic. Patients who were newly diagnosed, male patients, premenopausal women, those the immobility due to other diseases, those who did not understand or answer the questions, and those who refused to participate in the study were excluded. The age, height, weight, education level, place of residence (urban or countryside), chronic diseases, history of COVID-19, and the duration of the OP diagnosis were questioned for the 92 female patients who met the inclusion criteria. Changes in weight during the COVID-19 pandemic were recorded. The T-scores of the total lumbar vertebrae and femur were recorded from the dual-energy X-ray absorptiometry measurements.

The patients included in the study were asked about their exercising status before the pandemic. Exercises such as brisk walking, dancing, climbing stairs, and cycling for at least 30 minutes were considered as exercise. The exercise frequency was recorded as more than 3 times a week, 1-3 times a week, once a week, and less than once a week. Changes in exercise levels during the pandemic were evaluated with the options: a) I continued the same, b) I reduced the amount of exercise, c) I stopped exercising. The occurrence and frequency of falls before and during the COVID-19 pandemic were assessed. The presence of fractures due to minimal trauma (e.g., falling from a standing height or a lower height) or unidentified trauma was questioned for both the pre-pandemic and pandemic periods.

The medications they had been using for treating OP were recorded. Patients were asked whether they continued their treatment regularly during the pandemic. If they reported not being able to continue regularly, the reasons were investigated (a. I couldn't access the medication, b. I couldn't have tests done, c. I couldn't leave home due to restrictions, d. I neglected OP treatment due to other illnesses, e. other).

The patients enrolled in the study were subjected to the Osteoporosis Knowledge test (OKT). OKT is a test to assess OP awareness on various topics associated with calcium intake for OP prevention, as well as exercise and activity levels. The test was developed by Kim et al. (9) in 1991, and Kılıç and Erci (10) demonstrated the validity and reliability of the test's Turkish version in 2004.

The number of OP patients in a similar period of 2019 (pre-pandemic) was retrieved from the outpatient clinic records to analyze whether the number of OP patients presenting to the outpatient clinic has changed during the pandemic.

This study was approved by Aydın Adnan Menderes University Non-invasive Clinical Research Ethics Committee (decision no: 4, date: 06.08.2020). All participants were informed about their conditions and signed an informed consent form.

Statistical Analysis

The conformity of the quantitative data to the normal distribution was analyzed with the Shapiro-Wilk test. For the quantitative variables providing the assumption of normality, t-test was used in independent groups in the intergroup comparisons and descriptive statistics were shown as mean ± standard deviation. In the absence of normality assumption, the Mann-Whitney U test was used and descriptive statistics were given as median (25-75 percentile).The McNemar test was used to evaluate the similarity of qualitative data measured before and after, while chi-square test was used for other qualitative comparisons. Descriptive statistics were given as frequency (%). The results were considered statistically significant when $p<0.05$.

Results

Among the total of 92 female OP patients enrolled in the study, the mean age was 61±8 years. Table 1 presents the patients' demographic characteristics. Forty-three patients lived in the urban center (46.7%), whereas 49 lived in the countryside (53.3%). Twelve (12.9%) patients were diagnosed with COVID-19 during the pandemic. The median duration of OP diagnosis was 5 (3.25-10) years. According to BMD measurement, the median value of the patients' lumbar T score was 2.7 (2.5-3.5), and the femoral T median value was 1.9 (0.8-3.8) (Table 1).

Only ten of 92 patients (10.9%) had been exercising before the pandemic. Among these, four (4.3%) had been exercising less than once a week, 2 (2.16%) once a week and four (4.3%) 1-3 times a week (Table 2). Among the patients who were exercising, 37.5% (3.3% of the total) quit exercising during the pandemic, 50% (4.3% of the total) tapered their exercise frequency, and only 12.5% (1.1% of the total) maintained the same pattern (Table 2).

There was a fall history in 19 patients (20.7%) before this pandemic. The fall frequency was determined as less than once a week in 17 patients (18.5%), whereas it was more than once a week in 2 patient (2.2%). On the other hand, 16 (17.4%) of the patients had a history of falls during the pandemic period. While the fall frequency was less than once a week in 14 (15.2%), 2 (2.2%) had a rate of more than once a week (Table 2). There was no statistically significant difference between the falls during the quarantine period and those occurring in normal times (p>0.05). A history of fracture was present in 16 (17.4%) patients before the pandemic, whereas in three (3.3%) patients in the pandemic period. A weight gain was observed in 27 patients (29.3%) during the pandemic period, and this gain was 1-5 kg in 20 patients (21.7%), whereas 5-10 kg in 8 patients (8.7%).

When the patients' OP treatments were analyzed, it was seen that 8 (8.7%) patients had received medical treatment in the past and were currently being followed up, 14 (15.2%) patients received vitamin D, 12 (13.1%) were administered oral bisphosphonate, 36 (39.1%) patients had parenteral bisphosphonate and 22 (23.9%) patients received denosumab treatment. Seven (7.6%) patients were found to have interrupted their drug treatment during the pandemic period. Of those interrupting their drug treatment, one patient (1.1%) stated that it was because of not being able to obtain the medication, one (1.1%) stated that it was because of not having the necessary examinations done, and five patients (5.4%) stated that it was because they could not leave the house due to restrictions (Table 2). There was no significant difference between those living in urban centers and those living in the countryside regarding drug access (p>0.05). The mean value of the OKT score was computed as 14.02±4.52 and no correlation was identified between the interruption of drug treatment and OKT (p>0.05).

The number of OP patients presenting to the outpatient clinic during the study period was 437, whereas this figure was 484 in the similar period of the previous year. Thus, it was observed that the number of OP patients presenting to the outpatient clinic declined by 9.7% during the pandemic.

Table 1. The patients demographic characteristics and osteoporosis features

	Mean ± SD	**25-75 percentil**
Age (year)	61±8	-
Weight (kg)	67.26±12.12	-
Height (cm)	157.14±5.99	-
BMI	27.19±4.39	-
Osteoporosis knowledge level	14.02±4.52	-
Osteoporosis duration	-	5 (3.25-10)
DXA (T-score)		
Lomber	-	2.7 (2.5-3.5)
Femur	-	1.9 (0.8-3.8)
	n (%)	
Educational status		
Illiterate	18 (19.6)	-
Secondary education	58 (63.1)	-
High school	10 (10.9)	-
Under/postgraduate	6 (6.4)	-
Living place		
Urban center	43 (46.7)	-
Countryside	49 (53.3)	-
Co-morbidity		
Absense	25 (27.2)	-
Hypertension	17 (18.5)	-
Rheumatic disease	9 (9.8)	-
Malignancy	6 (6.5)	-
Diabetes mellitus	-	-

BMI: Body mass index, DXA: Dual X-ray absorptiometry, SD: Standard deviation

Table 2. Exercise, falling and treatment conditions of patients

	n (%)
Exercise in before pandemic	10 (10.9)
Less than 1 per week	4 (4.3)
Once a week	2 (2.2)
1-3 per week	4 (4.3)
Falling in before pandemic	19 (20.7)
<1 time per week	17 (18.5)
≥1 time per week	2 (2.2)
Falling in pandemic	16 (17.4)
<1 time per week	14 (15.2)
≥1 time per week	2 (2.2)
Treatment of osteoporosis	
In untreated follow-up	8 (8.7)
Vitamin D	14 (15.2)
Oral bisphosphonate	12 (13.1)
Prenteral bisphosphonate	36 (39.1)
Denosumab	22 (23.9)
Disrupting treatment	7 (7.6)
Inability to obtain medicine	1 (1.1)
Failure to do inspections	1 (1.1)
Due to restrictions	5 (5.4)

Discussion

Measures such as curfews and physical isolation imposed throughout the COVID-19 pandemic led people to stay indoors and live in confined spaces. Various studies have shown that individuals' exercise levels declined due to such restrictions (11,12). The significance of exercising for treating OP has been clearly emphasized (13). However, exercise routines may differ among different societies. Only 10.9% of the patients with OP enrolled in our study had been regularly exercising before the pandemic. Daşkapan and Atalay (14), in their study conducted on 208 women in our country, reported that 69.7% of the participants did not exercise. According to the National Disease Burden Report of Turkey, the physical inactivity rates in women aged 15-29, 30-44, 45-59, and 60-69 years were determined as 70.0%, 68.7%, 80.0%, and 40.0%, respectively (15). Our OP patients' pre-pandemic exercise data were found to be lower compared to these studies. This situation indicated that our OP patients need to be informed more about exercise, and maybe programs are needed to be prepared in this direction. Half of our exercising patients discontinued exercising during the pandemic, 37.5% tapered their exercise frequency, and only 10% continued with similar exercise regimens. When we consider our entire patient population, 12.5% of our patients were affected by the pandemic regarding exercise.

Our study did not reveal any significant difference between before and after the pandemic regarding our patients' fall frequency. On the other hand, Kiyoshi-Teo et al. (16) indicated that the fall risk increased during the pandemic. Considering the adverse influence of sedentary life on falls, it might be thought that constraints in the pandemic period would have raised the fall risk. However, on the other hand, restrictions imposed on outdoor activities have also been shown to reduce individuals' trauma exposure (17). Therefore, the decrease in trauma exposure during the pandemic might explain why our OP patients' fall frequency remained unchanged and new fractures occurred in only three patients during this period. However, considering that our study data covered the first ten months of the pandemic, we suggest that these rates might have changed in the later pandemic periods, as the restrictions lasted longer, and that studies covering these periods are also warranted.

Dinçer and Kolcu's (12) study revealed that nutritional behaviors were negatively affected, as well as physical activity declined during the pandemic period. Rapid weight gain is among the problems that may be encountered concerning these (18). In 29.3% of our OP patients, weight gain was observed during this phase of the pandemic period. Among these patients, weight gain was between 1-5 kg in 21.7% and 5-10 kg in 8.7%.

Several measures introduced in response to the COVID-19 pandemic also altered how healthcare institutions delivered services (19). For example, our study determined that the number of OP patients presenting to the outpatient clinic during the pandemic declined by 9.7% compared to the previous year's corresponding period. In addition, McCloskey et al. (20) reported that the usage rates of the Frax website to assess OP patients' fracture risk decreased by 23.1% and 58.3% in March and April 2020, respectively, compared to the respective periods in 2019 (20). These results indicate that hospital admissions of OP patients globally declined. Most (63%) of our studied patients' OP treatments consisted of intravenous bisphosphonates or subcutaneous denosumab, whereas the remaining received oral treatments. Even though most of our patients were receiving IV/SC treatments, which were slightly more dependent on hospitalization, only 7.6% were observed to have interrupted their treatments during this period (21). Of these, one patient stated having delayed treatment due to the inability to obtain medication, one patient due to the inability to undergo tests, and five patients because they could not leave home due to restrictions. Delayed or missed access to OP treatments like intravenous or subcutaneous antiresorptives, often hospital-administered, was expected; however, this effect was minimal in our OP patients. The study by Peeters et al. (22) revealed that 45.4% and 6.3% of patients interrupted receiving their intravenous bisphosphonates and denosumab treatments, respectively. The lower interruption rate in OP treatment of our patients compared to other studies might have been related to the health measures introduced with the pandemic in our country. Among these measures, prolonging the medical report durations to reduce patient visits to health institutions and obtaining reported medications from pharmacies without needing a prescription might have been the strategies that positively influenced the results. We also think that studies involving data on subsequent pandemic processes are needed.

Until the COVID-19 pandemic, none of the guidelines contained recommendations on managing such a crisis from the perspective of providing OP treatment. However, since the onset of the pandemic, several opinions have been published (23-26). In addition, long-term protection against fractures after treatment with zoledronic acid and other oral bisphosphonates has been documented in several studies (27-30). Therefore, based on the above, even delaying a scheduled infusion for a few months is not expected to be harmful. On the other hand, if this period will last longer than 6-9 months, switching from infusion to oral bisphosphonates has been recommended (23). When denosumab administrations were delayed for seven months following the last dose, the drug's inhibitory effects on bone resorption were observed to disappear rapidly (31).

Meanwhile, in patients discontinuing treatment, rapid bone loss, increased vertebral fracture risk, and hypercalcemia might be noted by the end of one year (32). A review of current guidelines suggests that denosumab treatment postponement should not exceed one month from the scheduled injection date (31,32). A rebound bone loss and an increased fracture risk are anticipated when delayed. Therefore, patients receiving denosumab and their family members should be educated about such situations, and if such treatment is not possible, conversion to oral bisphosphonates should be recommended (23).

Conclusion

Our study revealed that OP patients were mildly affected by the COVID-19 pandemic. Therefore, we suggest that measures such as telemedicine services, video training, and maintaining a particular clinic active for treating such patients might be helpful in addition to preventive measures undertaken in probable similar situations.

Ethics

Ethics Committee Approval: This study was approved by Aydın Adnan Menderes University Non-invasive Clinical Research Ethics Committee (decision no: 4, date: 06.08.2020).
Informed Consent: All participants were informed about their conditions and signed an informed consent form.
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Geriatrik Egzersiz Programı Hakkındaki Türkçe Videolar Uygun mu ve YouTube Güvenilir ve Kaliteli Bilgiler Sağlıyor mu?

Are Turkish Videos About Geriatric Exercise Program Appropriate and Does YouTube Provide Reliable and Quality Information?

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Öz

Amaç: Bu çalışmanın amacı YouTube'da yer alan ileri yaş egzersiz programı hakkındaki Türkçe videoların güvenirliliğini ve kalitesini araştırmaktır.
Gereç ve Yöntem: 22 Ağustos 2022 tarihinde Türkiye'deki popüler arama motoru olan YouTube kullanılarak bir internet taraması yapılarak ileri yaş için önerilen egzersizler değerlendirildi. Kırk tane YouTube videosu iki denetçi (fiziyatrist) tarafından puanlandırıldı. Çalışmaya dahil edilen videolar, Tüketici Sağlığı Bilgileri için Kalite Kriterleri (*Quality Criteria for Consumer Health Information*-DISCERN) aracı ve Global Kalite Değerlendirme skalası (*Global Quality and Services*-GQS) kıyaslamaları kullanılarak değerlendirildi. Ayrıca video süresi, beğenmesi, beğenmemesi, yorum sayısı, videonun internetteki süresi, video power indeksi, görüntüleme oranı ve beğenme oranları değerlendirildi.
Bulgular: Her iki gözlemcinin değerlendirilmesine göre videolar orta-kötü kalitede olduğu saptandı. Birinci gözlemcinin DISCERN skoru ortalaması 41,3±17,5 iken ikinci gözlemcinin DISCERN skoru ortalaması 44,2±17,1 olarak bulunmuştur ve yapılan analize göre sınıflar arası korelasyon katsayısı değeri 0,898 olarak bulunmuş olup çok iyi uyum olduğu görülmüştür. İki gözlemci arasında DISCERN skoru kategorisi açısından yüksek düzeyde uyum olduğu görülmüştür (κ=0,683, p<0,001). Yine her iki gözlemciye göre videoların GQS ortalaması orta-kötü sonuç olarak saptandı ve her ikisi arasında pozitif yönde korelasyon saptandı.
Sonuç: YouTube üzerinde ileri yaş egzersiz programları hakkında yer alan videoların içeriği genel olarak yetersiz veya kalitesiz olduğu saptandı. Uluslararası kılavuzları baz alan daha yüksek kalitede ve bilgi seviyesinde videolar hazırlanması, hasta uyumu ve egzersiz programlarına yönelik kamu farkındalığının artırılmasına katkı sağlayabilecek videolara ihtiyaç olduğu saptandı.
Anahtar kelimeler: İleri yaş, ev egzersiz programı, YouTube, güvenilirlik, kalite, video

Abstract

Objective: The aim of this study was to investigate the safety and quality of Turkish videos about the provincial age exercise program on YouTube.
Materials and Methods: On August 22, 2022, an internet search was made using YouTube, the popular search engine in Turkey, and the exercises recommended for the ages were evaluated. Forty YouTube videos were rated by two supervisors (physiatrists). The videos included in the study were evaluated using the Quality Criteria for Consumer Health Information (DISCERN) tool and Global Quality and Services (GQS) benchmarks. In addition, video duration, likes, dislikes, number of comments, duration of the video on the internet, video power index, viewing rate and liking rates were evaluated.
Results: According to the evaluation of both observers, the videos were found to be of medium to poor quality. While the average DISCERN score of the first observer was 41.3±17.5, the average of the DISCERN score of the second observer was 44.2±17.1, and according to the analysis, the intraclass correlation coefficient value was found to be 0.898 and it was seen that there was a very good agreement. There was a high level of agreement between the two observers in terms of the DISCERN score category (κ=0.683, p<0.001). Again, according to both observers, GQS average of the videos was determined as moderate-poor results and positive correlation was found between both.
Conclusion: It was determined that the content of the videos on YouTube about the age exercise programs was generally inadequate or of poor quality. It has been determined that there is a need for videos that can contribute to the preparation of higher quality and informational videos based on international guidelines, and to increase public awareness about patient compliance and exercise programs.
Keywords: Advanced age, home workouts, YouTube, reliability, quality, video

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Giriş

İnternet, hem sağlık personellin hem de hastalar tarafından giderek daha fazla kullanılan bir bilgi kaynağı olmaya başladı. Türkiye İstatistik Kurumu tarafından yayınlanan istatistiklere göre internet kullanım oranı 2021 yılında 16-74 yaş grubundaki bireylerde %82,6 olarak tespit edildi. Ayrıca istatistiklere göre 16-74 yaş grubundaki tüm bireylerin %80,5'inin, 2021 yılı ilk üç ayını kapsayan dönemde interneti düzenli olarak (hemen her gün veya haftada en az bir defa) kullandığı saptandı. İnternet kullanıcılarının interneti genellikle sosyal medyada profil oluşturmak, video paylaşmak ve web sitelerinde alışveriş yapmak için kullandıkları tespit edildi (1).

Demirel ve ark. (2) göre internet; bilgiye ulaşmanın kolay, ucuz ve hızlı bir yolu olduğu için tercih edilmektedir. İnternet kullanıcılarının çoğu, sağlıkla ilgili kararlarını internete dayalı olarak veriyorlar (2).

Geriatri, 65 yaş ve üstü bireylerin dahili hastalıkları, sosyal ve fonksiyonel yaşamları, yaşam kaliteleri, koruyucu sağlık hizmetleri ve yaşlılarda sık görülen hastalıklarla ilgilenen bir bilim dalıdır. Altmış beş yaş ve üstündeki bireyler geriatrik hasta grubuna dahil edilir.

Osteoporoz ve sarkopeni geriatrik hastalarda sık görülen hastalıklardan olup kas ve kemik erimesine bağlı meydana gelmektedir. Kas güçsüzlüğüne bağlı denge koordinasyon ve yürüyüş bozukluğu ile kolay düşmeler meydana gelebilir. Uygun egzersizler yapıldığında kas kitlesinde ve kemik kalitesinde artış gerçekleşir (3). Geriatrik hastalar egzersiz ihtiyaçları için bir fiziyatrist veya geriatri uzmanından kendileri için uygun egzersiz programları alabilirler. Ancak hastaların çoğu doktora gitmeden internet aracılığıyla önerilen egzersizleri yapmaktadır. Bu nedenle webdeki bilgilerin kalitesi, güvenilirliği ve doğruluğu kritik öneme sahiptir. Hem klinisyenlerin hem de hastaların sağlıkla ilgili bilgiler konusunda kaliteli web siteleri seçmelerine yardımcı olmak için internet sitelerinin çeşitli özelliklerini değerlendirebilen doğrulama araçları geliştirilmiştir. Tüketici Sağlığı Bilgileri için Kalite Kriterleri (*Quality Criteria for Consumer Health Information*-DISCERN) (4), Global Kalite Değerlendirme skalası (*Global Quality and Services*-GQS) (5), Amerikan Tabipler Birliği Dergisi (*Journal of American Medical Association*-JAMA) (6) ve İnternette Sağlık Davranış Kuralları (*Health on the Net Code of Conduct*) (7) kullanılan sitelerden bazılarıdır.

Geriatrik hasta sayısının artması, doktora ulaşabilirliliğin zor olması ve ileri yaş egzersiz ihtiyacından dolayı internetteki videoların kullanımı giderek artmaktadır. Bu çalışmadaki amacımız ileri yaş için önerilen egzersiz videolarının DISCERN ve GQS ölçeklerini kullanarak ilgili bilginin kalitesini değerlendirmektir.

Gereç ve Yöntem

22 Ağustos 2022 tarihinde Türkiye'deki popüler arama motoru olan YouTube kullanılarak bir internet taraması yapıldı. Anahtar kelime olarak "ileri yaş egzersizleri, ileri yaş ev egzersizleri, geriatri içi egzersizler, 65 yaş üstü için egzersizler" terimleri kullanıldı. Bunlar hastalar tarafında en sık kullanılan ifadelerdir.

Her bir anahtar kelime ve arama motoru için ilk 560 tane YouTube videosu değerlendirildi. Yinelenenler ve alakasız videolar hariç tutulduktan sonra kalanlar iki denetçi (fiziyatrist) tarafından puanlandırıldı. Ayrıca yüklenen videolar üç gruba ayrılarak fiziyatristlerin yüklediği videolar 1. gruba, fizyoterapistlerin yüklediği videolar 2. gruba ve diğer kişilerin (spor eğitmeni, pilates eğitmenleri, diğer sağlık çalışanları ve yüklenin belli olmayan videolar) yüklediği videolar 3. gruba alındı. Çalışmaya dahil edilen videolar, DISCERN aracı ve GQS kıyaslamaları kullanılarak değerlendirildi. Ayrıca video süresi, beğenmesi, beğenmemesi, yorum sayısı, videonun internetteki süresi, video power indeksi (VPI), görüntüleme oranı ve beğenme oranları kaydedildi.

DISCERN Ölçeği

DISCERN ölçeği Charnock (4) tarafından geliştirilmiş olup sağlık alanı için 1998 yılında kullanılmaya başlanmıştır. Gökdoğan ve ark. (8) tarafından Türkçeye çevrisi yapılmıştır. DISCERN, 16 sorudan oluşup 1'den 5'e kadar derecelendirilir. 1 derece videonun kötü, 5 derece çok iyi olduğunu gösterir. Ayrıca üç bölümden oluşup ilk 8 soru güvenirliliği, 9 ile 15 arasındaki sorular tedavi için kaliteli bilgiyi ve son soru genel bilgiyi değerlendirir. Bu araca göre toplam ortalama puanlar dikkate alınarak web siteleri 5 gruba ayrılır: 16-26 arası çok kötü, 27-38 arası zayıf, 39-50 arası orta, 51-62 arası puan iyi ve 63'ten yüksek puan mükemmel puan olarak değerlendirilir.

GQS: GQS 5 puandan meydana gelmiştir. Bir puan; videonun kalitesiz, bilgi akışın zayıf, çoğu bilginin eksik ve hastalar için yararsız olduğunu, 2 puan; videonun bazı bilgiler vermekle birlikte hastalar için kaliteli bilgiler içermediğini ve 3 puan ise orta kalitede olup hastalar için bazı önemli bilgiler içerdiğini gösteriyor. Dört puan videonun kaliteli olduğunu ve hastalar için faydalı bilgiler içerdiğini ve 5 puan ise videonun mükemmel olduğunu ve hastalar için çok faydalı bilgiler içerdiğini gösteriyor.

Video görüntüleme oranı: Videonun görüntüleme sayısının internet üzerindeki süreye bölünmesiyle elde edilir.

Video beğenme oranı: Videoyu beğenen kişi sayısının beğenen ve beğenmeyenlerin toplamına bölünmesiyle elde edilir.

VPI: Videoyu beğenen kişi sayısının görüntüleme sayısına çarpmasıyla elde edilen sonucu 100'e bölünmesiyle elde edilir.

İstatistiksel Analiz

Analizler SPSS (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL) 22 paket programında değerlendirilmiştir. Çalışmada tanımlayıcı veriler kategorik verilerde n, % değerleri, sürekli verilerde ise ortalama ± standart sapma ve medyan çeyrekler açıklığı (25-75 persantil değerleri) değerleri ile gösterilmiştir. Gruplar arası kategorik değişkenlerin karşılaştırılmasında ki-kare analizi (Pearson ki-kare) uygulanmıştır. Sürekli değişkenlerin normal dağılıma uygunluğu Kolmogorov-Smirnov testi ile değerlendirilmiştir. İkiden fazla değişkenlerin karşılaştırılmasında One-Way ANOVA analizi yapılmıştır. Sürekli değişkenlerin birbiriyle ilişkisinin incelenmesinde Pearson testinden yararlanılmıştır. İki puanlayıcı arasındaki uyuşma derecesini belirlemek için sınıflar arası korelasyon katsayısı (ICC) hesaplanmıştır (Model: İki Yönlü Karışık; Tip: Tutarlılık). Puanlayıcıların puanları için puanlayıcılar

arası anlaşmayı ölçmek için Cohen'in kappa katsayısı (κ) da hesaplanmıştır. Analizlerde istatistiksel anlamlılık düzeyi p<0,05 olarak kabul edilmiştir.

Bulgular

Çalışmaya dahil edilen 40 videonun 5'i (%12,5) fiziyatrist, 10'u (%25) fizyoterapist ve 25'i (%62,5) diğerleri tarafından yüklenmiştir. Ortalama video süresi 14,0±11,1 dk, izleyen sayısı ortalaması 9409,9±14648,0, beğenme sayısı ortalaması 139,4±204,4 olup yorum sayısı ortalaması 9,2±17,4 şeklindedir. Videoların yükleme zamanı ortalaması 809,4±295,9 gün olarak bulunmuştur. Görüntüleme oranı 11,2±17,8 iken VPI ise 161894,4±847997,9 olarak tespit edilmiştir. Birinci gözlemcinin DISCERN skoru ortalaması 41,3±17,5 olup 10'u (%25) çok kötü, 5'i (%12,5) kötü, 15'i (%37,5) orta, 5'i (%12,5) iyi ve 5'i (%12,5) çok iyi olarak değerlendirilmiştir. Yine birinci gözlemcinin GQS skoru incelendiğinde 8'i (%20) çok kötü, 5'i (%12,5) kötü, 17'si (%42,5) orta, 8'i (%20) iyi ve 2'si (%5) çok iyi olarak değerlendirilmiştir. İkinci gözlemcinin DISCERN skoru ortalaması 44,2±17,1 olup 8'i (%20) çok kötü, 9'u (%22,5) kötü, 10'u (%25) orta, 7'si (%17,5) iyi ve 6'sı (%15) çok iyi olarak değerlendirilmiştir. Yine ikinci gözlemcinin GQS skoru incelendiğinde 4'ü (%10) çok kötü, 13'ü (%32,5) kötü, 11'i (%27,5) orta, 8'i (%20) iyi ve 4'ü (%10) çok iyi olarak değerlendirilmiştir (Tablo 1).

Birinci gözlemcinin DISCERN skoru ile birinci gözlemcinin GQS skoru ve VPI'sı arasında pozitif yönde anlamlı bir korelasyon görülmüştür. İkinci gözlemcinin DISCERN skoru ile ikinci gözlemcinin GQS skoru arasında pozitif yönde anlamlı bir korelasyon görülmüştür (Tablo 2).

Birinci gözlemcinin DISCERN skoru ortalaması 41,3±17,5 iken ikinci gözlemcinin DISCERN skoru ortalaması 44,2±17,1 olarak bulunmuştur ve yapılan analize göre ICC değeri 0,898 bulunmuş olup her iki gözlemci arasında çok iyi uyum olduğu görülmüştür.

İki gözlemci arasında DISCERN skoru kategorisi açısından yüksek düzeyde uyum olduğu görülmüştür (κ=0,683, p<0,001) (Tablo 3).

İki gözlemci arasında GQS skoru kategorisi açısından orta düzeyde uyum olduğu görülmüştür (κ=0,550, p<0,001) (Tablo 4).

Videoyu yükleyenler arasında video kalitesi açısından anlamlı farklılık görülmemiştir (p>0,05) (Tablo 5).

Tartışma

Birçok kişi hastalıkların teşhisinde, tedavisinde veya önlemesi hakkındaki konularda bilgi sahibi olabilmek için sosyal medya platformlarına başvururlar. YouTube kolay ulaşılabilirliği ve içerik çeşitliliği nedeniyle güçlü bir bilgi kaynağı olmasına rağmen yayınlanan videoların kalitesi ve bilgi düzeyi ile ilgi hala soru işaretleri taşımaktadır. Yayınlanan videoların çoğunluğunun içeriği bilimsel verilerden ziyade kişisel deneyimlere dayanmaktadır (9). Biz de geriatrik hastaların evde yapabileceği ve geriatrik hastalar için yayınlan bu YouTube videolarının DISCERN ve GQS'ye göre kalitesini değerlendirmek istedik.

Çalışmamızdan elde ettiğimiz veriler, YouTube kullanıcılarının geriatrik ev egzersizi programı ile ilgili videoları sıklıkla yüklediklerini, izleyicilerin bu videoları izleme, beğeni ve yorum yapma özelliği sayesinde diğer kullanıcılarla sık sık iletişim halinde olduğunu göstermiştir. Çalışmamızda DISCERN 50 ve üstü puan alan videolar iyi, 50 altı puan alanlar ise orta-kötü olarak değerlendirilmiştir. Her iki gözlemciye göre yüklenen videoların çoğunluğun kalitesi DISCERN'e göre orta-kötü kalitede saptandı (birinci gözlemci %75, ikinci gözlemci %67,5). Çalışmamıza göre birinci gözlemcinin DISCERN skoru ortalaması 41,3±17,5 iken ikinci gözlemcinin DISCERN skoru ortalaması 44,2±17,1 olarak bulunmuştur. Bu analize göre ICC değeri 0,898 olarak bulunmuş olup her iki gözlemci arasında çok iyi uyum olduğu gösterilmiştir. Ayrıca iki gözlemci arasında DISCERN skoru kategorisi açısından yüksek düzeyde uyum olduğu saptanmıştır (κ=0,683, p<0,001). Bu da yaşlı kişiler için YouTube üzerinde yayınlanan egzersiz programların yetersiz olduğunu ve daha kaliteli videolara ihtiyaç olduğunu göstermektedir. Araştırmamızda incelenen videoların egzersiz programları hakkında yeterli bilgi vermediği, egzersizin nasıl yapılacağı, egzersiz öncesi ve sonrası ısınma ve soğuma periyotları anlatılmadığından ve egzersizin faydalarından bahsedilmediğinden dolayı düşük içerikli videoların sayısında artışa neden olduğu düşünülmektedir.

Çalışmamızda videoların kalitesi GQS'ye göre incelediğinde videoların kalitesinin orta-kötü kalitede olduğu saptandı. Yine her iki gözlemcinin GQS skoru kategorisi açısından orta düzeyde uyumlu olduğu görülmüştür (κ=0,550, p<0,001). Ayrıca gözlemcilerin DISCERN skoru ile GQS açısında kıyaslandığında her iki gözlemcinin DISCERN skoru ile GQS skoru arasında pozitif yönde anlamlı bir korelasyon olduğu görülmüştür.

Çalışmaya dahil edilen videoların çoğunluğu spor ve pilates eğitmeni ile spor solanları tarafından yüklendiği saptanmıştır. Ayrıca çalışmamızın bulgularına göre videoyu yükleyenler arasında video kalitesi açısından istatistiksel olarak anlamlı bir fark olmamakla birlikte fiziyatristlerin yükledikleri videoların zengin içerikli video sayısı fakir içerikli video sayısından daha fazlaydı. Böylece fiziyatristlerin daha fazla zengin içerikli video ürettikleri sonucuna varılmaktaydı.

YouTube'daki sağlık hizmetiyle ilgili videolar hakkındaki bilgiler genellikle yanlış olup hastaların bu yanıltıcı bilgilere ulaşması oldukça olasıdır. Bu, kamuoyunu ve hastalığın birincil algısını ve yönetimini etkileyebileceği için tehlikeli olabilir (10). Ayrıca internet üzerinden egzersiz programları hakkında bilgi edinmeye çalışan kişiler yorumlardan yanlış bilgi edinebilir ve uygunsuz egzersiz tedavileri yaparak kendisi için daha kötü sonuçlar elde edebilir. Çalışmamızda da videoların egzersiz öncesi ve sonrası ısınma ve soğutma periyotlarına çok fazla yer vermediği tespit edildi. Bu da egzersiz sırasında önemli yaralanmalara neden olabilir.

YouTube'da tıbbi bilgi videolarının kalitesini araştıran çok sayıda çalışma bulunmaktadır. Bu çalışmalarda YouTube'daki sağlık hizmetiyle ilgili videoların kalitesinin düşük olduğu tespit edilmiştir (11-16). Çalışmamızda da benzer şekilde sonuçlar elde edilmiştir.

2014 yılında Brooks ve ark. (17) YouTube'da hastalar için bilgilendirici bir kaynak olan lomber diskektomi videolarını

Tablo 1. Çalışmaya dahil edilen videoların tüm özellikleri

		Ort ± SS	Ortanca (IQR)
Yükleyen, n (%)	Fiziyatrist	5	12,5
	Fizyoterapist	10	25,0
	Diğer	25	62,5
Video süresi (dk)		14,0±11,1	11,0 (5,5-20,0)
İzleyen sayısı		9409,9±14648,0	1623,5 (516,0-10179,0)
Beğenme sayısı		139,4±204,4	41,5 (16,0-220,5)
Yorum sayısı		9,2±17,4	2,0 (0,0-11,0)
Yükleme zamanı (gün)		809,4±295,9	850,0 (835,0-860,0)
Görüntüleme oranı		11,2±17,8	1,9 (0,6-14,4)
Video power indeksi		161894,4±847997,9	609,5 (56,0-18673,5)
DISCERN skoru		41,3±17,5	42,5 (26,5-51,5)
DISCERN kategori n (%)	Çok kötü	10	25,0
	Kötü	5	12,5
	Orta	15	37,5
	İyi	5	12,5
	Çok iyi	5	12,5
GQS skoru n (%)	Çok kötü	8	20,0
	Kötü	5	12,5
	Orta	17	42,5
	İyi	8	20,0
	Çok iyi	2	5,0
DISCERN skoru 2		44,2±17,1	40,0 (34,0-57,0)
DISCERN kategori 2 n (%)	Çok kötü	8	20,0
	Kötü	9	22,5
	Orta	10	25,0
	İyi	7	17,5
	Çok iyi	6	15,0
GQS skoru 2 n (%)	Çok kötü	4	10,0
	Kötü	13	32,5
	Orta	11	27,5
	İyi	8	20,0
	Çok iyi	4	10,0

Ort ± SS: Ortalama ± standart sapma, IQR: Çeyrekler açıklığı, DISCERN: Tüketici Sağlığı Bilgileri için Kalite Kriterleri, GQS: Global Kalite Değerlendirme skalası

incelemiş ve düşük kalitede olduğunu saptamışlar. Yine yakın zamanda Celik ve ark. (14) YouTube'da rotator manşet yaralanmasıyla ilgili videoları incelemişler ve bunların kalitesiz olduğunu bulmuşlar. Dinçel ve ark. (18) osteoporoz ile ilgili YouTube videolarını incelemiş ve düşük kalitede olduğunu tespit etmişlerdi. Demirsoy Kurt ve ark. (19) beyaz nokta lezyonlarıyla ilgili YouTube videolarının bilgi güvenilirliği ve kalitesinin değerlendirilmesini incelediği bir çalışmada video kalitelerinin yeterli düzeyde olmadığını saptamışlardır. Çalışmamızda literatür ile uyumlu olup ileri yaş için önerilen videoların orta düzeyde bir kalitede olduğu saptandı.

Yüklenen videolara yapılan yorumlar genellikle beğenilmeye ve tavsiye edilmeye yönelik yorumlardı. Ancak bu yorumları yapanların videoyu yükleyenin yakın çevresi olup olmadığı bilinmediğinden yorumlara göre hareket etmek doğru olmaz. Ayrıca videoyu izleyen, beğenen, yorum yapan ve tavsiye eden kişilerin yaşları, tıbbi bilgi düzeyleri ve eğitim düzeyleri hakkında da bilgi sahibi olunmadığından videoyu beğeni ve görüntüleme sayısına göre kaliteli bulmak doğru olmayabilir. Bundan dolayı bir videonun kaliteli olup olmadığını değerlendirmek için DISCERN, GQS veya JAMA gibi doğrulama araçları kullanılmalıdır.

Tüm dünyayı etkisi altına alan koronavirüs hastalığı-2019 pandemisi döneminde insanlar evde daha çok vakit geçirdi. Bu da internet kullanımının artmasına neden oldu. Özelikle çoklu sistemik hastalıkları olan ve dışarıya çıkamayan geriatrik hastalar

Tablo 2. Çeşitli parametrelerin korelasyonu

		DISCERN skoru	DISCERN kategori	GQS skoru	Video power indeksi	DISCERN 2	DISCERN kategori 2
DISCERN kategori	r	**0,965**	-	-	-	-	-
	p	**0,000**	-	-	-	-	-
GQS skoru	r	**0,938**	**0,968**	-	-	-	-
	p	**0,000**	**0,000**	-	-	-	-
Video power indeksi	r	**0,437**	**0,446**	**0,438**	-	-	-
	p	**0,005**	**0,004**	**0,005**	-	-	-
DISCERN 2	r	**0,808**	**0,813**	**0,790**	0,268	-	-
	p	**0,000**	**0,000**	**0,000**	0,094	-	-
DISCERN kategori 2	r	**0,799**	**0,803**	**0,761**	0,267	**0,980**	-
	p	**0,000**	**0,000**	**0,000**	0,096	**0,000**	-
GQS skoru 2	r	**0,703**	**0,725**	**0,722**	0,188	**0,930**	**0,896**
	p	**0,000**	**0,000**	**0,000**	0,245	**0,000**	**0,000**

DISCERN: Tüketici Sağlığı Bilgileri için Kalite Kriterleri, GQS: Global Kalite Değerlendirme skalası

Tablo 3. Gözlemciler arasında DISCERN skoru uyumu

		Birinci gözlemci				
		Çok kötü	**Kötü**	**Orta**	**İyi**	**Çok iyi**
İkinci gözlemci	Çok kötü	8	0	0	0	0
	Kötü	0	5	4	0	0
	Orta	0	0	9	1	0
	İyi	2	0	2	3	0
	Çok iyi	0	0	0	1	5

DISCERN: Tüketici Sağlığı Bilgileri için Kalite Kriterleri

Tablo 4. Gözlemciler arasında GQS skoru uyumu

		Birinci gözlemci				
		Çok kötü	**Kötü**	**Orta**	**İyi**	**Çok iyi**
İkinci gözlemci	Çok kötü	4	0	0	0	0
	Kötü	2	5	6	0	0
	Orta	1	0	9	1	0
	İyi	0	0	2	6	0
	Çok iyi	1	0	0	1	2

GQS: Global Kalite Değerlendirme skalası

egzersiz ihtiyaçlarını internet üzerindeki videolarla gidermeye çalıştılar. İnternet üzerindeki videoların bu kadar kötü-orta kalitede olması insanları yanlış yönlendirmeye veya egzersizlerin yanlış yapılmasına sebep olabilir. Bu durum da hekimlerin interneti daha aktif kullanması ve hastalıklarla ilgi bilgileri daha çok paylaşması gerekliliğini doğurmaktadır. Hem dünyada hem de ülkemizde insanların sağlık personeline güveninin daha fazla olması nedeniyle onların yüklediği videolar daha çok tercih edilebilir.

Tablo 5. Video kalitelerinin yükleyene göre karşılaştırılması

		Fiziyatrist	Fizyoterapist	Diğer	p-değeri
		Sayı (%)	Sayı (%)	Sayı (%)	
Birinci gözlemci DISCERN skoru		50,0±24,6	41,6±16,8	39,5±16,4	0,480*
Birinci gözlemci DISCERN kategori	Çok kötü	1 (20,0)	2 (20,0)	7 (28,0)	0,588**
	Kötü	1 (20,0)	2 (20,0)	2 (8,0)	
	Orta	1 (20,0)	3 (30,0)	11 (44,0)	
	İyi	0 (0,0)	2 (20,0)	3 (12,0)	
	Çok iyi	2 (40,0)	1 (10,0)	2 (8,0)	
Birinci gözlemci GQS skoru	Çok kötü	0 (0,0)	1 (10,0)	7 (28,0)	0,148**
	Kötü	2 (40,0)	2 (20,0)	1 (4,0)	
	Orta	1 (20,0)	4 (40,0)	12 (48,0)	
	İyi	1 (20,0)	3 (30,0)	4 (16,0)	
	Çok iyi	1 (20,0)	0 (0,0)	1 (4,0)	
İkinci gözlemci DISCERN skoru		50,8±25,0	47,3±15,8	41,6±16,0	0,452*
İkinci gözlemci DISCERN kategori	Çok kötü	1 (20,0)	1 (10,0)	6 (24,0)	0,423**
	Kötü	1 (20,0)	3 (30,0)	5 (20,0)	
	Orta	1 (20,0)	1 (10,0)	8 (32,0)	
	İyi	0 (0,0)	4 (40,0)	3 (12,0)	
	Çok iyi	2 (40,0)	1 (10,0)	3 (12,0)	
İkinci gözlemci GQS skoru	Çok kötü	0 (0,0)	0 (0,0)	4 (16,0)	0,481**
	Kötü	3 (60,0)	2 (20,0)	8 (32,0)	
	Orta	0 (0,0)	5 (50,0)	6 (24,0)	
	İyi	1 (20,0)	2 (20,0)	5 (20,0)	
	Çok iyi	1 (20,0)	1 (10,0)	2 (8,0)	

*One-Way ANOVA analizi, **Ki-kare analizi yapılmıştır,
DISCERN: Tüketici Sağlığı Bilgileri için Kalite Kriterleri, GQS: Global Kalite Değerlendirme skalası

Sonuç

Sonuç olarak çalışmamız, Türkçe videolarda ileri yaş egzersizleri ile ilgili bilgi sayısının ve video kalitesinin düşük olduğunu ve bu durumun risk altındaki kişilere yetersiz bilgi kaynağı sunduğu sonucuna varılmıştır. Daha kaliteli ve güvenli videolar paylaşması için hekimlere ihtiyaç olduğunu göstermiştir.

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The Relationship Between Anthropometric and Ultrasonographic Muscle and Subcutaneous Fat Thickness Measurements and Osteoporosis in Male Patients

Erkek Hastalarda Antropometrik ve Ultrasonografik Kas ve Deri Altı Yağ Kalınlığı Ölçümleri ile Osteoporoz Arasındaki İlişki

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Abstract

Objective: In this study, the relationship between osteoporosis severity and fat and muscle mass and strength in osteoporotic men was compared with anthropometric and ultrasonographic measurements.

Materials and Methods: Forty-three osteoporotic men who applied to the physical medicine and rehabilitation outpatient clinic were evaluated as follows: osteoporosis severity by dual energy X-ray absorbtiometry T-scores and bone mineral densities (BMD), muscle strength by Jamar Hand Dynanometer, muscle mass by anthropometric mid arm muscle circumference (MAMC) and ultrasonographic mid-upper arm muscle thickness, subcutaneous fat thickness by triceps skinfold thickness caliper and ultrasonographic triceps subcutaneous fat thickness. The smoking use of the patients was noted and their physical activity levels were evaluated with the international physical activity questionnaire.

Results: A statistically significant correlation was found with MAMC and femur neck T-score, femur total T-score, femur total BMD, mid-upper arm muscle thickness and triceps skinfold thickness caliper ($p<0.05$, $r=0.391$, $r=0.358$, $r=0.319$, $r=0.352$, $r=0.440$, respectively). A statistically significant correlation was found with mid-upper arm muscle thickness and femur neck T-score, femur neck BMD, femur total T-score and hand grip strength ($p<0.05$, $r=0.500$, $r=0.315$, $r=0.396$, $r=0.407$, respectively). Triceps skinfold measurement was significantly correlated with ultrasonographic triceps subcutaneous fat thickness, MAMC and hand grip strength ($p<0.01$, $r=0.502$, $r=0.440$, $r=0.413$, $r=0.352$, $r=-0.440$, respectively).

Conclusion: MAMC and ultrasonographic mid-upper arm muscle thickness measurements are associated with the severity of osteoporosis. Simple and rapid ultrasonographic and anthropometric measurements can provide information about osteoporosis and sarcopenia in men.

Keywords: Osteoporosis, male, ultrasonography, anthropometric, muscle thickness

Öz

Amaç: Bu çalışmada 50 yaş üzeri osteoporotik erkeklerde osteoporoz şiddeti ile yağ ve kas kütlesi ve kuvveti arasındaki ilişki antropometrik ve ultrasonografik ölçümlerle karşılaştırıldı.

Gereç ve Yöntem: Fiziksel tıp ve rehabilitasyon polikliniğine başvuran 43 osteoporotik erkekte, dual enerji X-ışını absorbtiyometri T-skorları ve kemik mineral yoğunlukları (KMY) ile osteoporoz şiddeti, Jamar Hand Dynanometer ile el kavrama kuvveti, antropometrik orta kol kas çevresi (MAMC) ve ultrasonografik orta-üst kol kas kalınlığı ölçümü ile kas kütlesi, triseps skinfold kalınlığı kaliper ve ultrasonografik triseps deri altı yağ kalınlığı ölçümü ile deri altı yağ kalınlığı değerlendirildi. Hastaların sigara kullanımı not edildi ve uluslararası fiziksel aktivite anketi ile fiziksel aktivite düzeyleri değerlendirildi.

Bulgular: MAMC ile femur boyun T-skoru, femur total T-skoru, femur total KMY, ultrasonografik orta-üst kol kas kalınlığı ve triseps skinfold kalınlığı ile istatistiksel olarak anlamlı korelasyon saptandı ($p<0,05$, $r=0,391$, $r=0,358$, $r=0,319$, $r=0,352$, $r=0,440$, sırasıyla). Ultrasonografik orta-üst kol kas kalınlığı ile femur boyun T-skoru, femur boyun KMY, femur total T-skoru ve el kavrama kuvveti ile istatistiksel olarak anlamlı korelasyon saptandı ($p<0,05$, $r=0,500$, $r=0,315$, $r=0,396$, $r=0,407$, sırasıyla). Triseps skinfold ölçümü triseps subkütan yağ kalınlığı ile, MAMC ile ve el kavrama kuvveti ile anlamlı korele saptandı ($p<0,01$, $r=0,502$, $r=0,440$, $r=0,413$, $r=0,352$, $r=-0,440$, sırasıyla).

Sonuç: MAMC ve ultrasonografik orta-üst kol kas kalınlığı ölçümü osteoporoz şiddeti ile ilişkilidir. Basit ve hızlı ultrasonografik ve antropometrik ölçümler erkeklerde osteoporoz ve sarkopeni ile ilgili bilgi verebilir.

Anahtar kelimeler: Osteoporoz, erkek, ultrasonografi, antropometri, kas kalınlığı

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Introduction

Osteoporosis is described as a 'silent disease' because although it does not cause obvious symptoms when uncomplicated, it can cause a serious disease burden due to fragility fractures (1). In the FRACTURK study, it is estimated that there were 1,045,000 individuals with osteoporosis in 2010, and the figures will increase by 64% to reach 870,000 men and 1,841,000 women in 2035 (2).

Several studies have been published on the links between bone, muscle, and adipose tissue, and to better reveal the common mechanisms in the etiopathogenesis of osteoporosis and sarcopenia (3,4). Previous studies have shown that bone mass is more closely related to muscle mass in men than in women (5-7). This situation is explained by gender specific sex hormone differences. Differences in bone and muscle properties in men are controlled by testosterone and IGF-1 levels, and an increase in these hormones causes an elevation in muscle mass and strength, while an elevation in estrogen levels in women causes an increase in bone mass more than muscle (5).

Muscle plays a critical role in regulating bone mass. Relationships between body composition, bone mineral density (BMD) and osteoporosis have been reported in clinical studies (8,9). In the studies of Gjesdal et al. (8), it is demonstrated that lean muscle mass is more strongly associated with BMD of the femoral neck in middle-aged and older men and women compared to fat mass, while fat mass is a much stronger indicator of BMD among women.

Muscle-bone relationship is reported to be best observed in the non-weight-bearing and non-dominant upper limbs, which are not subjected to higher than normal mechanical loads. In their study, Klein et al. (10) reported that the age-related decrease in muscle cross sectional area (CSA) was more pronounced in the arm than in the forearm and the decrease in muscle size and strength with age contributes significantly to the decrease in bone cortical area.

Among studies investigating the relationship between muscle characteristics and osteoporosis, there is little information about the relationship between upper extremity anthropometry and osteoporosis. An emerging anthropometric measurement in recent years, mid-arm muscle circumference (MAMC) has been shown to be a marker of muscle mass, with a significantly inverse relationship between MAMC and mortality in older men (11). MAMC is an practical and convenient bedside anthropometric measurement and recently be reported as a marker for osteoporosis in male population (12).

In addition to clinical and anthropometric measurements, real time ultrasonography (USG) is a proposed method that is accurate in determining size, location and texture of soft tissue structures and is easily accessible, low-cost and suitable for daily practice. There are studies reported that muscle ultrasonographic evaluation may be a reliable tool in estimating muscle mass (13,14). However, no study evaluating anthropometric measurements and ultrasonographic measurements together and investigating their relationship with osteoporosis in adult men is found within our knowledge.

In this study, the relationship between osteoporosis and muscle strength, ultrasonographic measurement of upper arm muscle thickness and MAMC were investigated in osteoporotic adult men.

Materials and Methods

A cross-sectional study conducted to investigate the relationship between mid upper arm muscle thickness and subcutaneous fat thicknesses measured ultrasonographically, anthropometric measurements and femoral neck and total bone mineral densities in adult osteoporotic men. Forty-three osteoporotic men who applied to the physical medicine and rehabilitation outpatient clinic between February and December 2021 were included.

Men with a T-score of -2.5 and below in dual energy X-ray absorbtiometry according to the World Health Organization criteria and diagnosed with osteoporosis were included in the study (15).

Patients diagnosed with secondary osteoporosis and patients with malignancy, thyroid/parathyroid disease, diabetes mellitus, cardiovascular disease, and patients using antiepileptics, antiandrogenic medications or steroids were excluded.

Ethics committee approval for the study was obtained from İstanbul Medeniyet University Göztepe Training and Research Hospital Clinical Research Ethics Committee (decision no: 2020/0089, date: 19.02.2020). The study was conducted in accordance with the Declaration of Helsinki according to the STROBE checklist and all participants gave written consent before the study.

Demographic Data

Age, smoking status and daily activity levels of the patients were recorded as demographic parameters. The activity of the participants during a day was evaluated with international physical activity questionnaire (IPAQ) short form (16). Physical activity scores noted as MET minutes a week and dividen into 3 categories as low/moderate/high activity levels.

Anthropometric Measurements

Anthropometric measurements were made using a tape measure and skinfold caliper by the same researcher.

Body mass index was calculated as body weight in kilogram and the square of the height in meters (kg/m^2).

Triceps skinfold (TS) thickness: The measurement was made with a skinfold thickness caliper. During the measurement, the subject was standing with his arms hanging freely to the sides without straining and the person taking the measurement is behind the subject. The measurement was taken over the triceps muscle at the back of the upper arm and in the middle of the upper arm (middle between the acromion and the olecranon points). The skin lifted between the fingers was be perpendicular to the ground.

Mid upper arm circumference (MUAC): The arm is bent 90º from the elbow, the midpoint between the acromial protrusion on the shoulder and the olecranon protrusion on the elbow is marked, and the circumference is measured with a non-flexible measuring tape to estimate muscle mass.
MAMC (cm): MAMC was calculated as: MUAC (cm) - 0.3142 x TS thickness (mm) (17).

Hand Grip Strength

Hand grip strength was measured using Jamar Hand Dynamometer (manufactured by Patterson Medical) following published procedures (32). Measurements were made while the individual was in an upright sitting position (without arm support on the sitting surface), the arm was kept in a free position, the knee angle was 90 degrees, the elbow angle was 90 degrees, and the wrist was kept without deviation and the dynamometer was held in an upright position. The measurement was performed for both hands 3 times with an interval of 10 seconds and the average of the 3 measurements was taken. The highest force (in kg) was taken for the dependent variable.

Ultrasound Measurements

A B-mode ultrasound device (Toshiba Aplio SSA-770A™) with a 7.5 MHz linear transducer was used. The ultrasound examination of all subjects was performed by the same experienced musculoskeletal sonographer. In order to eliminate changes in muscle thickness and muscle echo intensity, attention was paid to apply minimum and equal pressure to the probe during ultrasound scans. By applying water-based gel to the probe, surface tension formation was prevented by preventing air from remaining between the probe and the skin. The transducer was held perpendicular to the skin, and the depth was adjusted to visualize the humerus.
The patients were positioned in an upright position standing with the elbows 90° flexed. A mark was made on the skin at the midpoint between the tip of the acromion and the olecranon process. Thickness of the mid upper arm muscle was measured from the subcutaneous adipose tissue to humerus and thickness of triceps subcutaneous fat thickness was measured from dermis to muscle (Figure 1).
This examination was performed 3 times, and the average of 3 measurements was noted.

Statistical Analysis

Before the study, power analysis was performed using the G power program to determine the number of samples. When the correlation analysis coefficient was taken as 0.3, the effect size was calculated as 0.55. When alpha 0.05 and 1-beta 0.99 were accepted, the number of samples to be included in the study was found to be 39. All data were evaluated using the IBM SPSS Statistics (Statistical Package for Social Sciences, version 22.0, IBM, USA) program. Shapiro-Wilk test was used to determine whether the quantitative variables were suitable for normal distribution. Descriptive statistics of quantitative variables were given as mean ± standard deviation and as frequency for categorical variables. Spearman and Pearson correlation analysis was applied to determine whether there was a relationship between quantitative variables. Cohen's classification was used for the effect size of the relationship is the correlation coefficient (18). For all tests, the statistical significance level was accepted as 0.05 or 0.01.

Figure 1. Ultrasonographic assessment of mid upper arm muscle thickness

Results

Demographic and clinical data of the participants are given in Table 1.
Correlation analysis between anthropometric, ultrasonographic measurements and BMD, T-score measurements are given in Table 2.
When the correlation of ultrasonographic mid upper arm muscle thickness measurement and osteoporosis parameters was examined; Large statistically significant relationship between muscle thickness and femur neck T-score ($p<0.01$, $r=0.500$), moderate statistically significant relationship between muscle thickness and femoral neck BMD ($p<0.05$, $r=0.315$) and moderate statistically significant relationship between muscle thickness and femur total T-score ($p<0.01$, $r=0.396$) was found.
No statistically significant relationship was found between smoking status and femoral neck and femoral total BMD ($r=-0.130$, $p=0.406$; $r=-0.209$, $p=0.179$, respectively). But statistically significant medium relationship was found between smoking status and MAMC ($r=-0.346$, $p=0.023$).
No statistically significant relationship was found between IPAQ score and femoral neck and femoral total BMD ($r=0.194$, $p=0.213$; $r=0.286$, $p=0.063$, respectively). No statistically significant medium relationship was found between IPAQ score and MAMC ($r=-0.182$, $p=0.244$).

Table 1. Characteristics of the participants (n=43)	
Age (years), mean ± SD	64.06±7.38
BMI (kg/m^2), mean ± SD	26.72±4.25
Femur neck T-score, mean ± SD	-1.59±0.77
Femur neck BMD, mean ± SD	0.90±0.16
Femur total T-score, mean ± SD	-2.17±0.47
Femur total BMD, mean ± SD	0.80±0.11
Hand grip strength (n), mean ± SD	46.74±11.99
Mid upper arm circumference (cm), mean ± SD	31.00±4.47
Mid arm muscle circumference (cm), mean ± SD	30.56±4.41
Triceps skinfold thickness caliper (mm), mean ± SD	13.95±3.66
Triceps subcutaneous fat thickness USG (mm), mean ± SD	8.73±3.03
Mid upper arm muscle thickness USG (mm), mean ± SD	30.06±6.85
IPAQ score (MET), mean ± SD	248.37±271.27
IPAQ category, n (%)	
Minimally active	10 (23.3)
Inactive	33 (76.7)
Smoking status, n (%)	
Yes	15 (34.9)
No	28 (65.1)

SD: Standard deviation, USG: Ultrasonography, BMD: Bone mineral density, IPAQ: International physical activity questionnaire, BMI: Body mass index

Correlation analysis between anthropometric, ultrasonographic measurements and hand grip strength are given in Table 3.

Intraclass correlation coefficients (ICC) were calculated to evaluate intra-rater reliability of muscle and fat thickness measurements by ultrasound.

The ICC value was 0.997 [95% confidence interval (CI) 0.992 to 0.999] for mid upper arm muscle thickness USG, and 0.992 (95% CI 0.980 to 0.997) for triceps subcutaneous fat thickness USG.

Discussion

In this study, the relationship between osteoporosis severity and muscle mass and strength in osteoporotic men was compared with anthropometric and ultrasonographic measurements.

Osteoporosis is considered a primarily female disease, therefore male osteoporosis is underestimated, underdiagnosed and undertreated. However, studies have reported a significant risk of fragility fracture of 13% in a 50-year-old man and 25% in an 80-year-old man (19,20).

A relationship between BMD and muscle mass and muscle strength in elderly people has been reported in the literature (21). There is an increasing number of publications showing that this muscle-bone relationship is more prominent in men.

Table 2. Correlation analysis between anthropometric, ultrasonographic measurements and bone mineral density, T-score measurements (n=43)					
		Femur neck T-score	**Femur neck BMD**	**Femur total T-score**	**Femur total BMD**
MUAC	rho	0.398**	0.241	0.367*	0.330*
	p	0.008	0.120	0.015	0.031
MAMC	rho	0.391**	0.233	0.358*	0.319*
	p	0.009	0.132	0.018	0.037
USG fat	rho	-0.195	-0.184†	-0.226	-0.234
	p	0.210	0.238	0.145	0.131
USG mus	rho	0.500**	0.315†*	0.396**	0.170
	p	0.001	0.039	0.009	0.275
TST caliper	rho	0.168	0.124	0.084	0.066
	p	0.281	0.427	0.594	0.673

*p<0.05, **p<0.01, †Pearson correlation test
MUAC: Mid upper arm circumference, MAMC: Mid arm muscle circumference, USG: Ultrasonography, TST: Triceps skinfold thickness, BMD: Bone mineral density

In a study conducted on a group of male osteoporotic patients over the age of 65 with a very high sample size, sarcopenia was reported to be a predictor of risk of fracture independent of BMD (6). Also in another study conducted in a cohort of 4000 Chinese men and women aged 65 and over, sarcopenia was found to be significantly associated with all fractures in men, but not in women (7).

In this study, ultrasonographic measurement of mid-upper arm muscle thickness was found to be significantly correlated with femoral neck T-score, femoral neck BMD and femur total T-score. MAMC measurement was also found to be significantly correlated with femur total T-score and BMD and femur neck T-score. Significant correlation was revealed between the two measurements (MAMC and ultrasonographic measurement of mid-upper arm muscle thickness). MAMC has been previously reported as a muscle mass marker in evaluation of sarcopenia (22). Cano et al. (11) reported MAMC as an indicator of mortality in elderly men. Kuo et al. (23) reported in their study on 731 community-dwelling adults aged 65 and older that the relationship between sarcopenia and osteoporosis was more pronounced in males. Chao et al. (12) recently reported that MAMC may be an indicator of osteoporosis in men, but not in women, in their study of a large population of 10,000 people. Similar to Chao et al. (12), in this study, MAMC was associated with osteoporosis in men. While MAMC can be used to estimate muscle mass and screening osteoporosis in clinical practice, it can also be estimated more precisely with a cost-free and bedside ultrasonographic mid upper arm muscle thickness measurement.

Baek et al. (24) compared ultrasonographic measurements of certain muscle groups according to gender in the estimation of appendicular skeletal muscle mass in sarcopenia screening, and

Table 3. Correlation analysis between anthropometric, ultrasonographic measurements and hand grip strength (n=43)

		Hand grip strength	MAMC	TST caliper	USG fat	USG mus
Hand grip strength	rho	1	-0.022	-0.413**	-0.292	0.407**
	p	-	0.890	0.006	0.058	0.007
MAMC	rho	-	1	0.440**	0.160	0.352*
	p	-	-	0.003	0.306	0.021
TST caliper	rho	-	-	1	0.502**	0.028
	p	-	-	-	0.001	0.858
USG fat	rho	-	-	-	1	-0.225
	p	-	-	-	-	0.147
USG mus	rho	-	-	-	-	1
	p	-	-	-	-	-

*p<0.05, **p<0.01
MAMC: Mid arm muscle circumference, USG: Ultrasonography, TST: Triceps skinfold thickness

showed the relationship of biceps, triceps and rectus femoris muscles with sarcopenia in men. These results show that muscle USG is a method that can be easily used in sarcopenia screening and measurements of various muscles can be used in sarcopenia screening. Klein et al. (10) reported a greater reduction in age-related muscle CSA in the arm than in the forearm. Since MUAC is measured in the calculation of MAMC, the measurement of the same region provides standardization, due to proposition of Klein et al. (10), and the convenience of measuring the same area for the clinician, mid upper arm muscle measurement was used in this study.

While no correlation was found between TS thickness and osteoporosis, TS thickness was positively correlated with ultrasonographic triceps subcutaneous fat thickness and MAMC, and negatively correlated with hand grip strength. The MAMC as muscle mass indicator and hand grip strength as indicator of muscle strength are included in the sarcopenia diagnostic criteria. Although the severity of osteoporosis cannot be estimated by measuring subcutaneous fat thickness with a skinfold caliper or USG, it seems to be useful in sarcopenia screening.

In this study, no relationship was found between smoking status, physical activity level and the severity of osteoporosis. However, a relationship was found between smoking status and MAMC. It is known that smoking and sedentary life are important risk factors for osteoporosis (25). Chao et al. (12) also found correlation between smoking and MAMC tertiles in their study and included them in the modeling, and they found a relationship between the included model and osteoporosis. In the Framingham Heart Study, Visser et al. (26) reported that smoking and reduced physical activity were associated with lower BMD in elderly men and women. In this study, participants did not show a homogeneous distribution in terms of physical activity levels. With the small sample size of the study, the fact that 80% of them are physically inactive may be the reason for this result.

This is the first study to investigate the relationship between anthropometric and ultrasonographic muscle and fat thickness measurements and osteoporosis in men to our best knowledge.

Study Limitations

However, the study has some limitations. The small sample size of the study is the primary limitation. Since the study sample was not homogeneously distributed in terms of physical activity level, no relationship was found between physical activity, MAMC and osteoporosis severity. This relationship may be demonstrated in a more homogeneous group.

Conclusion

In conclusion, MAMC, an anthropometric measurement, and ultrasonographic mid upper arm muscle thickness measurement were found to be associated with the severity of osteoporosis. Secondly, it can be suggested that the measurement of TS thickness can be used in screening for sarcopenia. Simple and rapid ultrasonographic measurements can provide information about osteoporosis and sarcopenia in men.

Ethics

Ethics Committee Approval: Ethics committee approval for the study was obtained from İstanbul Medeniyet University Göztepe Training and Research Hospital Clinical Research Ethics Committee (decision no: 2020/0089, date: 19.02.2020).

Informed Consent: All participants gave written consent before the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: B.D.K., E.M., A.İ., Design: B.D.K., E.M., A.İ., Data Collection or Processing: B.D.K., E.M., A.İ., Analysis or Interpretation: B.D.K., E.M., A.İ., Literature Search: B.D.K., E.M., A.İ., Writing: B.D.K., E.M.

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Evaluation of Vitamin D Levels in Patients Treated in Physical Medicine and Rehabilitation Service

Fiziksel Tıp ve Rehabilitasyon Servisinde Tedavi Alan Hastalarda D Vitamin Düzeylerinin Değerlendirilmesi

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Abstract

Objective: The background of our study is to detect the frequency of vitamin D deficiency in hospitalized patients who had been administered physical medicine and rehabilitation (PMR) programs and the distribution of vitamin D deficiency according to patient groups.
Materials and Methods: A total of 1210 patients (805 females and 405 males) who received a PMR program in the inpatient clinics of a secondary state hospital between 01.01.2017 and 01.08.2022 were retrospectively included in the study. Age, gender, hospitalization diagnosis, serum 25-hydroxyvitamin D [25(OH)D] values were recorded.
Results: The median age of the participants was 64 (54-72). The median 25(OH)D value was 13.16 (8.73-19.36). When the participants were categorized into groups considering the diagnoses for which they were applied the physical therapy program, and 25(OH)D values were compared, a meaningful difference was determined between the diagnosis groups (p=0.020). The lowest median value was found in the group with internal derangement of the knee, muscle, and tendon injury group, followed by the neurologic rehabilitation group. The highest median 25(OH)D level was determined in the orthopedic rehabilitation group. Vitamin D deficiency or insufficiency was found in 93,9% of the patients. The neurologic rehabilitation group had the highest severe deficiency ratio (38.1%).
Conclusion: Vitamin D deficiency is often seen in patients hospitalized in PMR services. Therefore, we think measuring vitamin D levels during hospitalization and providing replacement and maintenance treatments if deficiency is detected may improve rehabilitation outcomes.
Keywords: Vitamin D, deficiency, rehabilitation, inpatient

Öz

Amaç: Çalışmamızın amacı fiziksel tıp ve rehabilitasyon (FTR) servislerinde yatarak tedavi alan hastalarda D vitamini eksikliği oranını ve hasta gruplarına göre dağılımını belirlemektir.
Gereç ve Yöntem: Çalışmaya ikinci basamak bir devlet hastanesinin FTR servislerinde 01.01.2017-01.08.2022 tarihlerinde yatarak tedavi alan 805'i kadın ve 405'i erkek olmak üzere toplam 1210 hasta retrospektif olarak dahil edildi. Tüm hastaların yaş, cinsiyet, hastaneye yatış tanısı, hastaneye yatış tarihindeki 25-hidroksivitamin D [25(OH)D] değerleri kaydedildi.
Bulgular: Çalışmaya alınan hastaların yaş ortalaması 64'tü (54-72). Ortalama 25(OH)D düzeyi 13,16'ydı (8,73-19,36). Hastalar fizik tedavi programı aldıkları tanılara göre gruplara ayrıldığında ve 25(OH)D düzeyleri değerlendirildiğinde, tanı grupları arasında bulunan farklılık anlamlıydı (p=0,020). En düşük ortanca değeri dizin iç bozukluğu, kas ve tendon yaralanması olan grupta bulunurken; bunu nörolojik rehabilitasyon grubu izledi. En yüksek ortanca değeri ise ortopedik rehabilitasyon grubunda olan hastalarda bulundu. Hastaların %93,9'unda D vitamini eksiklik veya yetersizliği saptandı. En yüksek ciddi eksiklik oranı ise nörolojik rehabilitasyon grubundaydı (%38,1).
Sonuç: FTR servislerinde yatan hastalar D vitamini eksikliği açısından risk altında olan bir popülasyondan oluşmaktadır. Bu nedenle hastalarımızın servislere kabul aşamasında D vitamini değerinin rutin ölçüm yapılıp, replasman ve idame tedavilerinin yapılmasının optimal rehabilitasyon sonuçlarına ulaşabilmek açısından faydalı olabileceğini düşünmekteyiz.
Anahtar kelimeler: D vitamini, eksiklik, rehabilitasyon, yatan hasta

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Introduction

Vitamin D was first discovered in 1913 (1). Vitamin D, in the structure of a steroid hormone, is effective in bone metabolism and increases the absorption of calcium, phosphorus, and magnesium (2). Although its primary activity site is bone metabolism, vitamin D receptors are determined in many systems in the body (3). Vitamin D deficiency was found a factor in the etiopathogenesis of many diseases, including autoimmune diseases, depression, type 2 diabetes, heart diseases, cancer, sarcopenia, osteoporosis, and infections in some studies (4,5). Approximately 60% of adults worldwide have vitamin D deficiency (6). A serum 25-hydroxyvitamin D [25(OH)D] level below 20 ng/mL (50 nmol/liter) is defined as vitamin D deficiency, and a serum 25(OH)D level of 21-29 ng/mL (525-725 nmol/liter) is determined as vitamin D insufficiency (7). A serum 25(OH)D value below 10 ng/mL is thought to increase the risk of osteomalacia (8). Above the age of 70 years, decreased sun exposure and synthesis in the skin have a negative effect on vitamin D levels.

Vitamin D deficiency is often seen in children, adolescents, and the elderly people (9). Female gender, age, dressing style, living in a nursing house, hospitalization, and obesity are accepted as risk factors for low vitamin D levels (2,10). Some studies has shown that patients participating in inpatient rehabilitation programs have many risk factors for low vitamin D values, including senility, multiple co-morbid diseases, and decreased mobilization (11). Patients receiving inpatient treatment in physical medicine and rehabilitation (PMR) services are mostly treated for neurological rehabilitation, such as hemiplegia and paraplegia, orthopedic rehabilitation, degenerative joint diseases, and spine-related pain, such as cervical and lumbar disc lesions (12). Various studies found that low vitamin D levels were often in neurologic rehabilitation patients, and improvement in various neuromotor areas is observed with vitamin D replacement (13,14). Some studies showed that low vitamin D values lead to increased pain and analgesic consumption (15). Studies evaluating vitamin D supplementation on pain scores in participants with low vitamin D levels have showed conflicting results (16). It was found that adequate serum 25(OH)D values decreased risk of falls and fractures in the older people (3). The measurement of serum 25(OH)D levels and supplementation, if necessary, in patients receiving physical therapy programs in inpatient clinics may contribute to neuromotor development and decrease pain scores, the risk of fracture, and falls. For this reason, we aimed to assess vitamin D deficiency in rehabilitation patients and determine the groups at risk for low vitamin D levels.

Materials and Methods

Patients who received inpatient treatment in the PMR services of a secondary state hospital between 01.01.2017 and 01.08.2022 were retrospectively included in the study. Age, gender, diagnosis of hospitalization, 25(OH)D, calcium, phosphorus, and parathormone values during hospitalization were recorded. Ethical approval was obtained from the Ankara City Hospital Clinical Research Ethics Committee before study (decision no: E2-22-2357, date: 07.09.2022).

Statistical Analysis

All analyses were performed with SPSS 25.0 (IBM®, USA). The data of our study are presented with frequencies and percentages. Kolmogorov-Smirnov test was used for normality analysis. Numerical variables that did not show normal distribution were presented as the median and interquartile range (IQR: 25-75th percentile). The chi-square test was applied to compare categorical data between groups, and the likelihood ratio was used. For the comparison of numerical variables between more than two groups, the Kruskal-Wallis test was used because of non-parametric distribution. Spearman correlation analysis was used to assess the variables associated with serum 25(OH)D values. $P<0.05$ was accepted for statistical significance.

Results

Data from 1210 patients, 805 women, and 405 men were analyzed for the study. The median age of the participants was 64 (IQR: 25th-75th: 54-72). Patients with stroke, paraplegia, tetraplegia, multiple sclerosis, and Parkinson's disease were included in the neurological rehabilitation group. In contrast, the orthopedic rehabilitation group included patients receiving post-fracture and arthroplasty rehabilitation. Degenerative arthropathies and rheumatic diseases were grouped, and patients receiving treatment for cervical, thoracic, and lumbar disc lesions were grouped under the intervertebral disc lesions group. When the patients were evaluated according to the diagnostic groups, the group with the highest number of patients was the intervertebral disc lesions group. The distribution of the patients according to the diagnostic groups is shown in Table 1. No meaningful difference was determined between genders in terms of vitamin D levels (p=0.392). No correlation was determined between age and serum 25(OH)D values (p=0.064). The median level of 25(OH)D and the biochemical values of the participants are shown in Table 2.

Table 1. The distribution of the patients according to diagnostic groups

Diagnostic group	(n/%)
Degenerative and rheumatic diseases	137 (11.3)
Intervertebral disc lesions	438 (36.2)
Internal derangement of the knee, muscle, and ligament injuries	38 (3.1)
Lymphedema	19 (1.6)
Neurological rehabilitation	388 (32.1)
Shoulder pathologies	133 (11.0)
Orthopedic rehabilitation	38 (3.1)
Peripheric neuropathy or peripheric nerve lesions	19 (1.6)

A meaningful difference was determined between the groups when the patients were compared regarding 25(OH)D levels according to the diagnostic groups they received physical therapy program (p=0.020). The lowest median value was found in the group with internal derangement of the knee, muscle, and tendon injury, followed by the neurologic rehabilitation group. The highest median value was found in patients receiving orthopedic rehabilitation (Table 3).

Only 6% of patients (73/1210) had normal 25(OH)D values. No patient was found to have a toxic level (>150 ng/mL) of 25(OH) D. The distribution of patients according to serum 25(OH)D values is summarized in Table 4.

According to 25(OH)D deficiency classification of the patients according to the diagnostic group, severe deficiency was determined often in the neurological rehabilitation patients (38.1%), and the highest rate of normal levels was found in patients with lymphedema and peripheral neuropathic/ peripheral nerve lesions. There was only a significant difference in severe deficiency between neurological rehabilitation and patients in the disc lesions group (p=0.028). The categorization of 25(OH)D values according to the diagnostic group of the patients is shown in Table 5.

Table 2. 25-hydroxyvitamin D and other biochemical values of the participants

25-hydroxyvitamin D (ng/mL)	13.16 (8.73-19.36)
Calcium (mg/dL)	9.3 (9.0-9.6)
Phosphorus (mg/dL)	3.8 (3.4-4.3)
Alkaline phosphatase (IU/mL)	80.0 (67.0-94.0)
Parathormone (pg/mL)	49.1 (33.4-66.2)

Table 3. Serum 25-hydroxyvitamin D levels of the patients in terms of diagnostic groups

Diagnostic group	25-hydroxyvitamin D (ng/mL)*	p-value
Degenerative and rheumatic diseases	13.83 (8.27-20.53)	0.020
Intervertebral disc lesions	14.09 (9.65-20.70)	
Internal derangement of the knee, muscle, and ligament injuries	11.45 (8.50-17.34)	
Lymphedema	13.69 (9.58-16.24)	
Neurological rehabilitation	12.16 (7.82-17.84)	
Shoulder pathologies	12.99 (8.86-21.40)	
Orthopedic rehabilitation	15.57 (9.91-19.37)	
Peripheric neuropathy or peripheric nerve lesions	11.7 (7.60-25.03)	

*Median (interquartile range; 25-75th percentile)

Table 4. Distribution of the patients according to 25-hydroxyvitamin D level

Severe deficiency	<10 (ng/mL)	385 (31.8%)
Deficiency	≥10-20 (ng/mL)	535 (44.2%)
Insufficiency	≥20-30 (ng/mL)	217 (17.9%)
Normal	≥30 (ng/mL)	73 (6.0%)

Discussion

Vitamin D deficiency is seen worldwide. The role of 25(OH)D in the improvement of balance, gait speed, and functional capacity and in the decrease of falls and fractures were shown in many studies (11,17). In a meta-analysis study conducted in 2019, prevalence 25(OH)D deficiency in Turkey was found to be 63% (18). Our study found vitamin D deficiency in 76% and deficiency or insufficiency in 93.9% of patients hospitalized in PMR services. Vitamin D deficiency is often seen in patients hospitalized in PMR services. It was found vitamin D deficiency was more often in women; 25(OH)D deficiency were associated with age, and obesity in a study (10). We found no difference in vitamin D levels according to age and gender. This discrepancy may be related to the age distribution of the patients who participated in the studies. In a review conducted in 2021, it was reported that the frequency of low 25(OH)D levels was more often in elderly, obese, hospitalized patients, and nursing house inhabitants (19).

Table 5. The category of 25-hydroxyvitamin D deficiency of the patients regarding the diagnostic group

Diagnostic group	Severe deficiency (<10 ng/mL)	Deficiency (≥10-20 ng/mL)	Insufficiency (≥20-30 ng/mL)	Normal level (≥30 ng/mL)
Degenerative and rheumatic diseases (n=137)	43 (31.4)	57 (41.6)	30 (21.9)	7 (5.1)
Intervertebral disc lesions (n=438)	116 (26.5)	207 (47.3)	84 (19.2)	31 (7.1)
Internal derangement of the knee and muscle and ligament injuries (n=38)	13 (34.2)	17 (44.7)	5 (13.2)	3 (7.9)
Lymphedema (n=19)	5 (26.3)	12 (63.2)	-	2 (10.5)
Neurological rehabilitation (n=388)	148 (38.1)	164 (42.3)	60 (15.5)	16 (4.1)
Shoulder pathologies (n=133)	42 (31.6)	52 (39.1)	28 (21.1)	11 (8.3)
Orthopedic rehabilitation (n=38)	9 (23.7)	21 (55.3)	7 (18.4)	1 (2.6)
Peripheric neuropathy or peripheric nerve lesions (n=19)	9 (47.4)	5 (26.3)	3 (15.8)	2 (10.5)

Similarly, we also found a high frequency of 25(OH)D deficiency in the inpatient participants consisting of predominantly elderly patients.

The frequency of low vitamin D levels was determined in 95.2% of patients with paraplegia in the study by Özgirgin et al. (20). Although serum 25(OH)D values were meaningful lower in the patients with paraplegia, this difference was not clinically significant. Also, ambulation status was reported as an important factor affecting serum 25(OH)D values. The frequency of low vitamin D levels was determined in 83% of patients admitted to subacute rehabilitation clinics (21). Similar to these studies, we found frequency of low vitamin D levels in 95.9% of participants in the neurologic rehabilitation group, including patients with spinal cord injuries.

A research that examined the serum 25(OH)D values of hospitalized rehabilitation patients found that, frequency of 25(OH)D deficiency were more than the average of normal population in parallel with our data. Vitamin D levels of non-ambulatory patients were found to be lower than those of ambulatory patients, and it was recommended that attention should be paid to 25(OH)D values in people hospitalized in rehabilitation clinics (22). In a study conducted in our country, it was shown that 25(OH)D usement provided a meaningful improvement in balance and functional capacity in patients with hemiplegia (14). The optimal replacement dose may be planned with the determine of 25(OH)D values at the beginning of rehabilitation program. In a study conducted in a rehabilitation center serving elderly patients, 25(OH)D values were determined normal only 4% of the patients similar to our study (3).

Mobilization scores and serum 25(OH)D values were correlated with each other in a study conducted in an inpatient rehabilitation center. The study also reported that patients with low vitamin D values had prolonged durations of hospitalization. (23). The diagnosis of determine of low 25(OH)D values and supplementation can shorten the duration of hospitalization and thereby reduce the complications associated with prolonged hospitalization, and also may reduce healthcare costs.

When evaluated according to the diagnostic groups, the lowest median vitamin D value was found in patients with internal knee disorders, muscle and tendon injuries, and then in the neurologic rehabilitation group. Especially in knee pathologies, impaired ambulation and thus decreased sun exposure may be associated with this finding. In neurological rehabilitation patients, decreased sun exposure due to ambulation difficulties and decreased 25(OH)D production in the skin due to the older age group can cause for low 25(OH)D values. The fact that the highest median serum 25(OH)D value was found in patients receiving orthopedic rehabilitation may be caused from the supplement of 25(OH)D supplements in these patients after a fracture.

Study Limitations

Our study has some limitations. Lack of information about the function and mobilization status of the patients and the use of vitamin D supplements are limitations of our study. On the other hand, analyzing a high number of patients at risk for low 25(OH) D values and detecting a high frequency of low vitamin D levels among this population may be considered valuable aspects of our study.

Conclusion

Vitamin D deficiency is often seen in patients hospitalized in PMR services. We believe that the diagnosis and appropriate treatment of vitamin D deficiency may improve rehabilitation skills by improving muscle strength, balance and gait. So, we suggest that routine measurement of serum 25(OH)D levels at the begining time of rehabilitation may be beneficial.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Ankara City Hospital Clinical Research Ethics Committee before study (decision no: E2-22-2357, date: 07.09.2022).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: E.Ş.B., Design: E.Ş.B., G.D.K., F.B., Data Collection or Processing: E.Ş.B., F.B., Analysis or Interpretation: E.Ş.B., G.D.K., Literature Search: E.Ş.B., Writing: E.Ş.B.

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Knowledge of Osteoporosis in Patients with Type 2 Diabetes in Mongolia: Web-based Cross-sectional Study During COVID-19 Pandemic

Moğolistan'da Tip 2 Diyabetli Hastalarda Osteoporoz Bilgisi: COVİD-19 Pandemisi Sırasında Web Tabanlı Kesitsel Çalışma

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Abstract

Objective: This study aimed to assess osteoporosis knowledge among individuals diagnosed with type 2 diabetes mellitus (T2DM) receiving care in Ulaanbaatar hospitals.

Materials and Methods: Conducted as a cross-sectional survey, the study included 644 participants, both male and female, aged between 20 and 65, all diagnosed with T2DM. Participants completed an online questionnaire evaluating their understanding of international osteoporosis within a 20-30-minute timeframe, amid the coronavirus disease-2019 pandemic in 2021. Knowledge levels were categorized using an Osteoporosis Knowledge Assessment Tool (OKAT), defining a good score as ≥20, a moderate score as 14-19, and a poor score as ≤1-13. Multivariate logistic regression analyses were employed to discern predictors of OKAT scores.

Results: Among the participants, 90.2% were married, 3.6% were unmarried, and 6.2% were divorced. Osteoporosis knowledge varied, with 1.08% demonstrating good knowledge, 25.62% having intermediate knowledge, and 73.3% possessing poor knowledge. Participants were stratified by T2DM duration, revealing that 47.5% had been diagnosed for 0-5 years, 26.86% for 6-10 years, and 25.62% for more than 11 years. Smoking was reported by 25% of participants, with 78.5% of males and 69.4% of females exhibiting poor osteoporosis knowledge. Among smokers, 0.6% had good knowledge, 24.2% had moderate knowledge, and 75.2% had poor knowledge. After adjusting for gender, odds ratios (OR) indicated that lower education was significantly linked to osteoporosis knowledge in T2DM (OR, 1.50; p=0.002). Additionally, OR for ophthalmic diseases and rheumatoid arthritis demonstrated a significant impact on osteoporosis knowledge in T2DM (OR, 1.01; p=0.001; OR, 1.20; p=0.001).

Conclusion: Patients aged 20-65 diagnosed with T2DM displayed insufficient knowledge about osteoporosis. The findings underscore the necessity for enhancing awareness and understanding of osteoporosis, particularly among individuals with diabetes.

Keywords: Osteoporosis, diabetes, knowledge

Öz

Amaç: Bu çalışmanın amacı, Ulan Batur hastanelerinde tedavi gören tip 2 diabetes mellitus (T2DM) tanılı bireyler arasında osteoporoz bilgisini değerlendirmektir.

Gereç ve Yöntem: Kesitsel bir anket olarak yürütülen çalışmaya, yaşları 20 ile 65 arasında değişen ve tümü T2DM tanısı almış kadın ve erkek 644 katılımcı dahil edilmiştir. Katılımcılar, 2021'deki koronavirüs hastalığı-2019 (COVİD-19) pandemisinin ortasında, 20-30 dakikalık bir zaman dilimi içinde uluslararası osteoporoz anlayışlarını değerlendiren çevrimiçi bir anket doldurmuştur. Bilgi düzeyleri, Osteoporoz Bilgi Değerlendirme Anketi (OKAT) kullanılarak kategorize edilmiş ve iyi puan ≥20, orta puan 14-19 ve kötü puan ≤1-13 olarak tanımlanmıştır. OKAT puanlarının prediktörlerini ayırt etmek için çok değişkenli lojistik regresyon analizleri kullanılmıştır.

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Bulgular: Katılımcıların %90,2'si evli, %3,6'sı bekar ve %6,2'si boşanmıştı. Osteoporoz bilgisi çeşitlilik göstermekte olup %1,08'i iyi, %25,62'si orta ve %73,3'ü zayıf bilgi düzeyine sahipti. Katılımcılar T2DM süresine göre sınıflandırıldı ve %47,5'inin 0-5 yıldır, %26,86'sının 6-10 yıldır ve %25,62'sinin 11 yıldan uzun süredir tanı almış olduğu ortaya çıkarıldı. Katılımcıların %25'i sigara içtiğini bildirmiş, erkeklerin %78,5'i ve kadınların %69,4'ü osteoporoz hakkında yetersiz bilgiye sahip olduğunu belirtmiştir. Sigara içenlerin %0,6'sı iyi derecede, %24,2'si orta derecede ve %75,2'si kötü derecede bilgi sahibiydi. Cinsiyete göre ayarlama yapıldıktan sonra, odds oranları (OR) düşük eğitimin T2DM'de osteoporoz bilgisi ile anlamlı derecede bağlantılı olduğunu göstermiştir (OR, 1,50; p=0,002). Ayrıca, göz hastalıkları ve romatoid artrit için OR, T2DM'de osteoporoz bilgisi üzerinde anlamlı bir etki göstermiştir (OR, 1,01; p=0,001; OR, 1,20; p=0,001).
Sonuç: T2DM tanısı almış 20-65 yaş arası hastalar osteoporoz hakkında yetersiz bilgiye sahipti. Bulgular, özellikle diyabetli bireyler arasında osteoporoz konusunda farkındalığın ve anlayışın artırılması gerekliliğinin altını çizmektedir.
Anahtar kelimeler: Osteoporoz, diyabet, bilgi

Introduction

According to the World Health Organization, the number of people diagnosed with diabetes increased from 108 million in 1980 to 422 million in 2014 (1). Also, according to the International Diabetes Association, the prevalence of diabetes in the age group of 20-80 years in 2019 was 9.3% (463 million people) and will increase to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. The prevalence was higher in urban areas (10.8%) than in rural areas (7.2%), and higher in high-income countries (10.4%) and lower-income countries (4.0%). One in two people with diabetes (50.1%) is unaware that they have diabetes. In 2019, the prevalence of hypoglycemia decreased to 7.5% (374 million) and is expected to reach 8.0% (454 million) by 2030 and 8.6% (548 million) by 2045 (2).

Other serious complication of diabetes is osteoporosis (OP), decreased bone mineral density (BMD), and loss of bone integrity (3-5). Diabetic-induced osteopathy is associated with type 1 and type 2 diabetes and is usually associated with decreased BMD (6,7). A recent meta-analysis found that people with type 1 diabetes have a relative risk (RR) of developing a fracture of the middle bone marrow compared with non-diabetics, and people with type 2 diabetes have a RR of developing a bone marrow fracture compared to people without diabetes 1.34 (7). In addition to the Rotterdam study, inadequate self-monitoring of blood glucose was associated with a 47-62% increased risk of fractures, and adequate self-monitoring of glucose was associated with an increased risk of fractures [risk level: 0.91 (0.67-1.23)] (8). The clinical mechanism that leads to OP in diabetes is still controversial. Diabetes mellitus type 1 is a disorder in which autoimmune pancreatic beta cell damage results in acute insulin deficiency and adversely affects bone fractures and bone health (9-12). In patients with type 2 diabetes, reduced bone blood flow leads to OP, and fragility (9,13).

Awareness-raising studies on OP in patients with cancer, thalassemia, and HIV have shown that their knowledge of OP is insufficient (14-16). Previous epidemiological studies regarding insufficient to assess the level of knowledge about OP in patients with type 2 diabetes in Malaysia and Vietnam (17,18). In recent years, the prevalence of non-communicable diseases (NCDs) has been increasing among Mongolians due to lifestyle changes. The second national NCD survey in 2009 found that diabetes was 6.5% and fasting glucose was 9.5% (19). In addition, according to a survey conducted among the population aged 15-69, 17.4% have fasting blood glucose changes and 8.3% have diabetes. In the western region, the prevalence of diabetes is 4.2%, which is higher than the national average and in Ulaanbaatar city and other regions, 7.9% of men with diabetes are newly diagnosed. 28.3% of diabetic cases are treated with medication, 17.9% with insulin therapy, and 12.6% with conventional treatment.

According to the above studies, 60,000 to 80,000 people in Mongolia are likely to have diabetes, but according to official statistics, as of 2009, about 7,000 people have been diagnosed with diabetes by laboratory tests and are being treated by endocrinologist. In Mongolia, diabetes accounts for 42.9 percent of endocrine diseases and is 111.4 per 10,000 population, which has increased from (82.9) to (28.5) in 2018. In terms of gender, men are 104.6 per 10,000 population and women are 117.7 per 10,000 population. In terms of age group, the highest incidence is 22,360 (62.9%) or 378.5 per 10,000 population aged 45-65 years. In terms of location, it is the highest in the Central Region at 114.5 per 10,000 population. Among the images in the Central Region, Darkhan-Uul is 163.2, Tuv 141.2, Umnugovi 115.8, and Selenge 104.9 (20,21). Therefore, there is a need to improve the program for early detection of diabetes and prevention of other comorbidities. In Mongolian countries, despite the prevalence and clinical studies of NCDs, no research has been conducted to determine the knowledge of people diagnosed with diabetes with OP, which is the basis for this study. Thus, to determine the knowledge of OP in people diagnosed with diabetes in the central and suburban hospitals of Ulaanbaatar.

Materials and Methods

Study Design and Setting

Cross-sectional data were collected using an online survey questionnaire from January to April 2022 in Ulaanbaatar, Mongolia, due to coronavirus disease-2019 (COVID-19) pandemic restrictions.

Study Participants and Tools

A total of 644 type 2 diabetes mellitus (T2DM) patients aged 20-65 were randomly selected from two district units including the Chingeltei Health Unit controlled by an endocrinologist, and the Songinokhairkhan Health Unit located in Ulaanbaatar, Mongolia.

The sample size of the study was computed using a single proportion population formula as follows: $n=(Z2\alpha/2*P(1-P)/d2)$, where n is the sample size, p is an estimation of 53.3% prevalence of OP knowledge problems among study participants, d is a margin of error at 0.05, and Z is the value of standard normal distribution at the 95% confidence level, equal to 1.96. Thus, the sample size is 644 participants in total.

This study adopted a standardized questionnaire of Osteoporosis Knowledge Assessment Tool (22) and Osteoporosis Health Beliefs (23) which consisted of 32 questions.

All participants provided written informed consent before participating in the study. The study protocol was approved by the Ethics Committee of the Mongolian National University of Medical Sciences (MNUMS) – (No.: 2022/3-01-2022/D-04).

Measure of OP Knowledge

Knowledge of OP-related issues was assessed by 32 questions. Each correct response was assigned 1 point, and an incorrect response was assigned 0 points. According to Bloom's cut-off points (24), we categorized the scores of each question into three levels of knowledge:

Good knowledge: a score of 80-100% (above 20 points)
Moderate knowledge: a score of 50-79% (14-19 points)
Poor knowledge: a score <49% (0-13 points)

Statistical Analysis

This study employed descriptive methods to measure the level of OP-related knowledge according to the sociodemographic characteristics of the participants. The t-test for continuous variables and the chi-squared test for categorical variables were used to determine differences between the subject's gender and level of knowledge OP. The following logistic regression model was fitted to estimate putative determinants of participants' level of knowledge on OP:

KNOW= $\beta\_0+ \beta\_i \bar{}x\_i+e\_i$, where KNOW stands for the level of knowledge on OP, β_i is the intercept, β_i is the effect of determinants of OP knowledge, and e_i is the error term. All statistical analyses were performed with SPSS version 25.0 (SPSS Inc., Chicago, IL, USA).

Results

Table 1 shows a summary of the study participants according to sociodemographic characteristics. A total of 644 participants were recruited for the study, and all completed the questionnaire. Of the participants 90.2% were married, 3.6% were unmarried, and 6.2% were divorced. Approximately 22.4% of the participants lived in a suburban district, and 76.6% lived in a downtown district. Cardiovascular disease (CVD) and diabetic leg wound were significantly associated with gender. Also, smoking, alcohol, and salt food consumption were significantly associated with gender.

Table 2 shows the relationship between OP knowledge levels and other variables in patients with T2DM. The knowledge score of OP was statistically associated with gender and education, but the differences were not significant for age, and lifestyle factors in patients with T2DM.

Table 3 presents the relationship between OP knowledge scores and diabetes-related variables. The prevalence of gestational diabetes was significantly associated with OP knowledge level. Furthermore, ophthalmic diseases and rheumatoid arthritis were significantly associated with OP knowledge levels, but the diabetic duration and treatment of diabetes were not significant with OP knowledge levels in patients with T2DM.

Table 4 displays univariable and multivariable logistic regression results for factors associated with the level of knowledge regarding T2DM patients. After accounting for gender differences, there was a noteworthy correlation between lower educational levels and a heightened likelihood of possessing knowledge about OP in individuals with type 2 diabetes [odds ratio (OR), 1.50; p=0.002; 95% confidence interval (CI) (0.55-0.75)]. Additionally, the ORs for ophthalmic diseases and rheumatoid arthritis demonstrated a substantial impact on OP knowledge in individuals with type 2 diabetes [OR, 1.01; p=0.001; 95% CI (0.85-1.28), and OR, 1.20; p=0.001; 95% CI (0.93-1.02), respectively].

Discussion

The present study examined the level of OP knowledge among Mongolian patients with T2DM. To our best knowledge, this is the first study to examine this knowledge in Mongolian with T2DM patients in the context of a cross-sectional online survey. We found that the number and proportion of overweight with a body mass index (BMI) of 25.0 or higher was 297 (80.4%) for females and 207 (75.3%) for males. In this regard, Jayedi et al. (25) examine the association between anthropometric and obesity indices and the risk of type 2 diabetes in a systematic review and dose-response meta-analysis of cohort studies. They enrolled 216 cohort studies investigating the causal relationship between systemic obesity or central obesity and body fat mass and risk of type 2 diabetes in a general adult population of 26 million, including 2.3 million patients with type 2 diabetes (25). As a result, the risk ratios were 1.72 (95% CI 1.65 to 1.81; based on 182 studies) for a 5-unit increase in BMI, 1.61 (1.52 to 1.70; based on 78 studies) for a 10 cm larger waist circumference, 1.63 (1.50 to 1.78; based on 34 studies) for a 0.1-unit increase in waist-to-hip ratio, 1.73 (1.51 to 1.98; based on 25 studies) for a 0.1-unit increase in waist-to-height ratio, 1.42 (1.27 to 1.58; based on 9 studies) for a 1-unit increase in visceral adiposity index, 2.05 (1.41 to 2.98; based on 6 studies) for a 10% higher percentage body fat, 1.09 (1.05 to 1.13; based on 5 studies) for a 0.005-unit increase in body shape index, 2.55 (1.59 to 4.10; based on 4 studies) for a 10% higher body adiposity index, and 1.11 (0.98 to 1.27; based on 14 studies) for a 10 cm larger hip circumference (25). The relationship between BMI and the risk of type 2 diabetes exhibited a strong positive linear association (25). The number of smokers was 34 (9.2%) for females and 113 (41.0%) for males, and there was a significant difference

Table 1. Characteristics of participants

Variables	Total (n=644)	Gender		p-value
		Female (n=369)	Male (n=275)	
Age (years)				
<44	103	59 (16.0)	44 (16.0)	0.994
45-54	187	106 (28.5)	81 (29.5)	
55-64	231	134 (36.3)	97 (35.3)	
>65	123	70 (19.0)	53 (19.3)	
BMI (kg/m²)				
Normal (18.5-24.9)	140	72 (51.4)	68 (48.6)	0.003
Overweight (25.0-29.9)	255	142 (55.7)	113 (44.3)	
Grade 1 obesity (30.0-34.9)	169	93 (55)	76 (45)	
Grade 2 obesity (35.0-39.9)	63	49 (77.8)	14 (22.2)	
Grade 3 obesity (40<)	17	13 (76.5)	4 (23.5)	
Education				
Primary	140	77 (20.9)	63 (22.7)	0.358
Secondary	199	124 (33.6)	75 (27.3)	
College	111	59 (16.0)	52 (18.9)	
University	194	109 (29.5)	85 (30.9)	
Marital status				
Married	581	327 (88.6)	254 (92.4)	0.016
Not married	23	13 (3.5)	10 (3.6)	
Divorced, widowed	40	29 (7.8)	11 (4.0)	
Where do you live				
Suburban district	144	71 (19.2)	73 (26.5)	0.028
Downtown district	500	298 (80.8)	202 (73.5)	
Comorbidity				
Hypertension	221	120 (32.5)	101 (36.9)	0.252
Kidney disease	219	140 (37.9)	79 (28.7)	0.015
Cardiovascular disease	203	132 (35.8)	71 (25.8)	0.007
Ophthalmic disease	182	98 (26.6)	84 (30.5)	0.266
Diabetic leg wound	171	83 (22.5)	88 (32.0)	0.011
Rheumatoid arthritis	129	83 (22.5)	46 (16.7)	0.071
Chronic hepatitis	118	70 (19.0)	48 (17.5)	0.623
Drug use				
Anti-diabetic drugs	337	206 (55.8)	131 (47.6)	0.111
Insulin injection	253	133 (36.0)	120 (43.6)	
Combined treatment	54	30 (8.1)	24 (8.7)	
Lifestyle				
Smoking				
Yes	147	34 (0.7)	113 (0.7)	0.0001
No	497	335 (0.7)	162 (0.7)	
Alcohol				
Yes	129	33 (0.7)	96 (0.7)	0.0001
No	515	336 (0.7)	179 (0.7)	
Exercise				
I do it regularly	370	211 (0.7)	159 (0.7)	0.87
Not regularly	274	158 (0.7)	116 (0.7)	
Consumption of salt				
Salty food				
Eat	549	306 (0.7)	243 (0.7)	0.054
Do not eat	95	63 (0.7)	32 (0.7)	
Salty tea				
Drink	351	199 (0.7)	152 (0.7)	0.735
I don't drink	293	170 (0.7)	123 (0.7)	

P values were obtained by Student's t-test or chi-square test. BMI: Body mass index

Table 2. Relationship between osteoporosis knowledge levels and other variables

Variables	n	Osteoporosis knowledge level			p-value
		Good (>20 scores)	Moderate (14-19 score)	Poor (0-13 score)	
Sex					
Male	275	2 (0.7)	57 (20.7)	216 (78.5)	**0.032**
Female	369	59 (1.4)	108 (29.3)	256 (69.4)	
Age group					
<44	103	1 (1.0)	28 (27.2)	74 (71.8)	0.845
45-54	187	3 (1.6)	51 (27.3)	133 (71.1)	
55-64	231	1 (0.4)	58 (25.1)	172 (74.5)	
>65	123	2 (1.6)	28 (22.8)	93 (75.6)	
Education level					
Primary	339	1 (0.7)	22 (15.7)	117 (83.6)	**0.002**
Secondary	111	4 (2.0)	56 (28.1)	139 (69.8)	
College	194	1 (0.9)	25 (22.5)	85 (76.6)	
University	194	1 (0.5)	62 (32.0)	131 (67.5)	
Marital status					
Married	581	6 (1.0)	146 (25.1)	429 (73.8)	0.708
Single	23	0	8 (34.7)	15 (65.2)	
Divorced, widowed	40	1 (2.5)	11 (27.5)	28 (70.0)	
Lifestyle factors					
Smoking					
Yes	161	1 (0.6)	39 (24.2)	121 (75.2)	0.509
No	403	5 (1.2)	113 (28.0)	285 (70.7)	
Alcohol					
Yes	118	1 (0.8)	35 (29.7)	82 (69.5)	0.725
No	456	5 (1.1)	119 (26.1)	332 (72.8)	
Regular exercise					
Yes	350	4 (1.1)	91 (26.0)	255 (72.9)	0.909
No	254	2 (0.8)	66 (26.0)	186 (73.2)	

P values were obtained by Student's t-test or chi-square test

between males and females. Many studies have shown that smoking makes them more susceptible to diabetes. As per a previous investigation, among the 25 studies selected (26-50), all except one (48) identified a connection between active smoking and a heightened risk of diabetes, though not all reached statistical significance. Out of these, three studies presented unadjusted RRs, and the combined crude RR estimate from these studies stood at 1.89 (95% CI, 1.58-2.27) (38,47,48). Across all 25 studies, adjusted risks were reported in terms of RRs, hazard ratios (26-50), incidence density ratios, or ORs, and the fully adjusted RRs derived from these ranged from 0.82 to 3.74. Active smokers demonstrated an elevated risk of developing type 2 diabetes compared to nonsmokers, with a combined RR of 1.44 (95% CI, 1.31-1.58) (51). In addition, the more cigarettes they smoke, the more likely they are to develop diabetes, and people who quit smoking are at lower risk. It is thought that smoking is associated with two actions that make people more likely to develop diabetes: "stimulating the sympathetic nerves to raise blood sugar" and "interfering with the action of insulin in the body". Smoking cessation reduces the risk of developing diabetes compared to smokers, but it has been reported that weight gain associated with smoking cessation increases blood sugar. However, smoking cessation improves overall health far more than the problem of increased blood sugar due to weight gain. It has also been shown that the risk of myocardial infarction and stroke is halved even if weight gain is achieved after quitting weight for CVDs whose risk is likely to increase due to weight gain. For these reasons, it is important to quit smoking as soon as possible.

There was a significant difference between males and females, with 33 females (8.9%) and 96 males (34.9%) drinking alcohol. Ingesting the right amount of alcohol with proper drinking

Table 3. Relationship between osteoporosis knowledge levels and diabetes-related variables

Variables	n	Osteoporosis knowledge level			p-value
		Good (>20 score)	Moderate (14-19 score)	Poor (0-13 score)	
Diabetic duration					
0-5 years	306	3 (1.0)	79 (25.8)	224 (73.2)	0.848
6-10 years	173	3 (1.7)	46 (26.6)	124 (71.7)	
11 years	165	1 (0.6)	40 (24.2)	124 (75.2)	
BMI					
Normal	140	2 (1.4)	29 (20.7)	109 (77.9)	0.742
Overweight	255	1 (0.4)	66 (25.9)	188 (73.7)	
Obese					
Obese class 1	169	3 (1.8)	44 (26.0)	122 (72.2)	
Obese class 2	63	1 (1.6)	20 (31.7)	42 (66.7)	
Obese class 3	17	0	6 (35.3)	11 (64.7)	
Hypertension					
Yes	221	2 (0.9)	57 (25.8)	162 (73.3)	0.948
No	422	5 (1.2)	108 (25.6)	309 (73.2)	
Gestational diabetes					
Yes	24	2 (8.3)	5 (20.8)	17 (70.9)	0.002
No	620	5	160	455	
Treatment of diabetes					
Anti-diabetic drugs	337	0	76 (22.5)	261 (77.5)	0.462
Insulin injection	253	1 (0.4)	47 (0.4)	205 (81)	
Combined treatment	54	0	14 (26)	40 (74)	
Comorbidity					
Ophthalmic disease					
Yes	182	4 (2.2)	61 (33.5)	117	0.003
No	462	3	104	355	
Diabetic leg wound					
Yes	171	0	35 (20.4)	136 (79.6)	0.795
No	473	1 (0.2)	102 (21.6)	370 (78.2)	
Rheumatoid arthritis					
Yes	129	4 (3.1)	46 (35.7)	79 (61.2)	0.0001
No	515	3 (0.6)	119 (23.1)	393(76.3)	

P values were obtained by Student's t-test or chi-square test. BMI: Body mass index

reduces the development of diabetes. Specifically, it is said that about 20 to 25 g of alcohol per day suppresses the occurrence of diabetes. However, if you drink more than that, it is thought that it may raise the blood sugar level due to the effect on the fat accumulated in the liver and the effect of suppressing insulin secretion from the pancreas. In addition, excessive calories caused by drinking too much and eating too much are the biggest and most important causes of raising blood sugar levels. Continued excessive alcohol intake can eventually lead to alcoholic cirrhosis and alcoholic pancreatitis. Alcoholic cirrhosis causes hyperglycemia, and the liver does not release the necessary glucose, which can cause life-threatening hypoglycemia. Alcoholic pancreatitis can also lead to hyperglycemia and hypoglycemia by destroying both cells that lower and raise blood sugar levels. Blood sugar levels become unstable in both conditions, especially in those who are using insulin preparations or insulin secretory drugs for treatment.

There was also a significant difference between males and females in CVD and chronic kidney disease. Alcohol intake and smoking may be involved. However, this survey did not ask about the quantity of alcohol intake or smoking.

Table 4. Unadjusted and gender-adjusted odds ratios of osteoporosis knowledge of good to moderate and poor for diabetic mellitus and other covariates

			Unadjusted		Sex-adjusted		
Variables	**Unit/category**	**OR**	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**
Age							
<44	Reference group						
45-54		0.97	0.57-1.65	0.895	0.96	0.56-1.65	0.888
55-64		1.14	0.68-1.92	0.617	1.14	0.68-1.94	0.606
>65		1.22	0.67-2.20	0.521	1.22	0.67-2.20	0.523
Sex	Female/male	0.70	0.43-1.89	0.010	-	-	-
Education							
Primary	Reference group						
Secondary		1.00	0.48-0.75	0.002	1.50	0.50-0.75	0.002
College		0.50	0.27-0.78	0.004	0.46	0.27-0.81	0.006
University		0.64	0.34-1.20	0.167	0.63	0.34-1.20	0.157
Comorbidity							
Hypertension	Yes/No	1.00	0.69-1.43	0.983	1.02	0.70-1.47	0.924
Ophthalmic disease	Yes/No	1.50	0.37-0.79	0.001	1.01	0.85-1.28	0.001
Rheumatoid arthritis	Yes/No	0.51	0.34-0.75	0.001	1.02	0.93-1.02	0.001

OR: Odds ratio, CI: Confidence interval

According to their knowledge of OP, 1.08% had good knowledge, 25.62% had intermediate knowledge, and 73.3% had poor knowledge (Table 2). The lack of knowledge of OP indicates that the subjects of this study will suffer from OP in the future. There was a significant difference in knowledge of OP due to the difference in education level (Table 3). Especially when the education category is low, the knowledge of OP is low. OP prevention education in Junior High school is needed to reduce the prevalence of OP in the future. In this survey, the educational background of the parents was more significantly associated with the knowledge of OP than the educational background of the subjects themselves (Table 4). This may be related to lifestyle as well as education. The need for home education was also suggested.

This study reveals how much knowledge about OP is in patients with type 2 diabetes. However, it is necessary to mention the limitations of research. The questionnaire was conducted on the Web under COVID-19. Therefore, it is indistinguishable whether the answer is based on the knowledge of the person or whether they are searching and answering by themselves. Since BMD has not been measured, the relationship between the knowledge of OP and the actual BMD is unclear. These are future issues.

Conclusion

Patients with T2DM had inadequate knowledge of OP. Therefore, there is a need to improve knowledge and understanding of OP, among diabetic patients. Also, it is believed that there is a need to study the knowledge of people with diabetes about OP in relation to blood glucose control and OP prevention behavior.

Ethics

Ethics Committee Approval: The study protocol was approved by the Ethics Committee of the Mongolian National University of Medical Sciences (MNUMS) - (No.: 2022/3-01-2022/D-04).

Informed Consent: All participants provided written informed consent before participating in the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: M.J., A.D., Design: M.J., A.D., Data Collection or Processing: M.J., A.D., B.B-O., T.J., B.B., Analysis or Interpretation: M.J., B.B-O., B.B., Y.I., Literature Search: M.J., B.B-O., T.J., Y.I., Writing: M.J., Y.I.

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Does Dry Needling Contribute to Conventional Treatment on Nocturnal Calf Cramps? A Randomized Controlled Study

Nokturnal Bacak Kramplarının Tedavisinde Kuru İğnelemenin Etkisi: Randomize Kontrollü Bir Çalışma

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Abstract

Objective: Nocturnal calf cramps (NCC) are painful contractions of the lower limbs at night, most commonly in the calf muscles. Many trials demonstrated that dry needling (DN) effectively treats various musculoskeletal conditions. This study aimed to examine the effectiveness of DN in treating NCC.

Materials and Methods: Forty-two patients were randomized into two groups. The first group received stretching exercises, and the second group received stretching exercises and DN to trigger points in the gastrocnemius muscle. The cramp duration (CD), the number of cramps (NOC), cramp intensity (CI), algometric measurements of pressure pain threshold (PPT), and Pittsburgh sleep quality index (PSQI) values were recorded before, after, and three months after treatment.

Results: There was no difference between the groups regarding the parameters investigated before intervention. Investigated before intervention. Both groups had a significant decrease in NOC, CI, and PSQI scores and an increase in PPT values after treatment and the third month ($p<0.001$). At post-treatment measures, between the groups, there was a significant decrease in CI ($p<0.001$) and PSQI ($p=0.002$), and increase in PPT ($p=0.001$) in the DN group, and no difference in NOC ($p=0.545$) and CD ($p=0.140$). At the 3-month follow-up, between the groups, there was a significant decrease in NOC ($p=0.016$), CI ($p<0.001$), and increase in PPT ($p=0.003$) in the DN group and no difference in PSQI ($p=0.229$) and CD ($p=0.175$).

Conclusion: DN in the treatment of NCC in the short and medium term is an effective method of reducing pain, decreasing the duration and intensity of cramps, and improving sleep quality.

Keywords: Nocturnal calf cramps, dry needling, trigger points, gastrocnemius, sleep quality

Öz

Amaç: Nokturnal bacak krampları (NBK), geceleri alt ekstremitelerde, en sık baldır kaslarında görülen ağrılı kasılmalardır. Literatürde kuru iğneleme (Kİ) tedavisinin çeşitli kas-iskelet sistemi ağrılarında etkinliğini gösteren çalışmalar mevcuttur. Bu çalışma, Kİ'nin NBK tedavisindeki etkinliğini incelemeyi amaçlamıştır.

Gereç ve Yöntem: Kırk iki hasta iki gruba randomize edildi. Birinci gruba germe egzersizleri verilirken, ikinci gruba ise germe egzersizleri ile birlikte gastroknemius kasındaki tetik noktalara Kİ uygulandı. Kramp süresi (KS), kramp sayısı (KSa), kramp şiddeti (KŞ), algometrik ağrı eşiği ölçümleri (AAÖ) ve Pittsburgh uyku kalitesi indeksi (PSQI) değerleri tedaviden önce, sonra ve üç ay sonra kaydedildi.

Bulgular: Çalışma öncesi parametreler açısından gruplar arasında fark yoktu. İki grupta da tedavi sonrasında ve üçüncü ayda KS, KŞ ve PSQI skorlarında anlamlı bir düşüş ve AAÖ değerlerinde artış görüldü ($p<0,001$). Tedavi sonrası ölçümlerde, gruplar arasında, Kİ grubunda KŞ ($p<0,001$) ve PSQI ($p=0,002$) değerlerinde anlamlı düşüş ve AAÖ ($p=0,001$) değerinde artış görülürken, KSa ($p=0,545$) ve KS ($p=0,140$) değerlerinde fark bulunmadı. Üç aylık takipte, gruplar arasında, Kİ grubunda KS ($p=0,016$), KŞ ($p<0,001$) ve AAÖ'de ($p=0,003$) anlamlı bir düşüş görülürken, PSQI ($p=0,229$) ve KS'de ($p=0,175$) fark görülmedi.

Sonuç: Kİ, NBK tedavisinde kısa ve orta vadede ağrıyı, krampların süresini ve şiddetini azaltmada ve uyku kalitesini iyileştirmede etkili bir yöntem olarak karşımıza çıkmaktadır.

Anahtar kelimeler: Nokturnal bacak krampları, kuru iğneleme, tetik nokta, gastroknemius, uyku kalitesi

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Introduction

Nocturnal calf cramps (NCC) are painful contractions of the lower limbs at night, most commonly in the calf muscles. Cramps can last anywhere between a few seconds and several minutes. Although cramps are usually brief, pain and tenderness can last for hours (1). Fifty to sixty percent of adults report experiencing NCC. They are slightly more prevalent among women, and their incidence rises with age (2). The condition has a negative impact on patients' sleep quality in particular, as well as their overall quality of life (3). Although most cases are idiopathic, secondary NCC can occur due to various neurologic, endocrine, metabolic, vascular, drug-induced, and toxic causes. Although treatment of secondary causes, pharmacologic and nonpharmacologic therapies, and minimally invasive procedures such as botulinum toxin and lidocaine injection have been used, a treatment method with a consistent efficacy and safety profile is not yet established (4).

Myofascial trigger points (MTrP) are palpable nodules in muscle tissue that are hyperirritable and hypersensitive (5). MTrPs can cause muscle cramps in young and older adults without any other underlying cause (6). According to the literature, MTrPs, particularly those of the gastrocnemius muscle, are one of the causes of NCC (7). Injection therapy for MTrPs was described by Travell and Simons, who were the first to identify this entity. Injections of the gastrocnemius muscle's MTrPs have been shown to improve pain and sleep quality (1).

Based on the scientific principles of western medicine, dry needling (DN) therapy, which uses acupuncture needles to treat MTrPs, is simple to learn, cost-effective, minimally invasive, and low-risk treatment. Even though DN for treating musculoskeletal pain has been empirically developed, studies have shown no difference between DN and the injection of pharmacological agents in treating MTrPs (8). Randomized controlled trials and meta-analyses have demonstrated that DN effectively treats various musculoskeletal conditions (9-12).

Regarding all of this information, this study aimed to examine the effectiveness of DN in the treatment of NCC.

Materials and Methods

In this prospective, randomized, single-blinded, and controlled study, patients aged between 20-50 who described experiencing NCC at least once a week were included after Biruni University's Clinical Research Ethics Committee approval with the decision number 2015-KAEK-42-20-11 (date: 27.07.2020). The study took place between December 2019 and April 2020. All participants were informed about the study and signed an informed consent form. Eligible participants were required to have experienced cramps for at least six months, have no history of physical activity before cramps, and have MTrP in the gastrocnemius muscle. Gastrocnemius muscle MTrPs were diagnosed as criteria described by Travell and Simons, witch as follows; hypersensitive nodules within a taut band in the gastrocnemius muscle, typical reflected pain pattern, and twitch response with snapping palpation of the trigger point. The MTrP assessment was conducted by a researcher (F.B.) with at least five years of experience in this field. Patients with electrolyte or hormonal imbalance due to any known disease, congenital musculoskeletal disease, inability to communicate, or cognitive dysfunction due to any psychiatric or central nervous system disease were excluded from the study. Patients with a primary diagnosis of insomnia, bleeding diathesis or cancer, recent vertebral compression fracture, a history of sleeping pills, anticoagulants or sedative medication use for one month or longer, history of invasive therapy for MTrPs or to gastrocnemius muscle in past six months and patients who refused to give consent were also excluded.

The demographic data of the patients participating in the study were recorded, and the patients were randomized into two groups by drawing a random assignment from sealed envelopes. Flowchart of the study is presented in Figure 1. The first group received stretching exercises, and the second group received stretching exercises and DN to MTrPs in the gastrocnemius muscle. The cramp duration (CD), the number of cramps (NOC) experienced during one week, cramp intensity (CI) according to visual analog scale values, algometric measurements of pressure pain threshold (PPT), and Pittsburg sleep quality index (PSQI) values were recorded before, after and three months after treatment by a blinded researcher.

To evaluate patients' PPT levels, algometric measurements were performed before, after, and three months after treatment. The evaluation was repeated thrice from the most sensitive point on the taut bands determined by palpation. The mean of three applications was taken, and the assessment was completed.

The sleep quality of the patients was evaluated with the PSQI before, after, and three months after treatment. This scale, which assesses sleep quality and sleep disturbances in the past month, consists of seven components. Each component is evaluated between 0 and 3 points. The maximum score is 21; anything above 5 on the full scale indicates poor sleep quality (13).

Patients in both groups were given a standardized stretching exercise program for the gastrocnemius muscle. The exercises were described to the patients by a physiotherapist with 10 years of experience in the field. The patients are told to start by standing straight up with their backs to a wall that is at least an arm's length away. Then they are instructed to advance on one leg and place their hands on the wall. The patients are instructed to straighten their knees while keeping their heels flat on the floor after placing their hands on the wall. In order to feel a stretch down the back of their calves, the patients then leaned their bodies toward the wall (14). Patients were asked to perform the exercise at least twice daily, 3 stretches per leg, with each stretch lasting at least 60 seconds (15). Patients were given an exercise sheet explaining the exercise and including visuals. Patients were informed that the exercise should be performed for three weeks.

DN was performed by a researcher (F.B.) with at least five years of experience in the field. The patient was placed in the prone

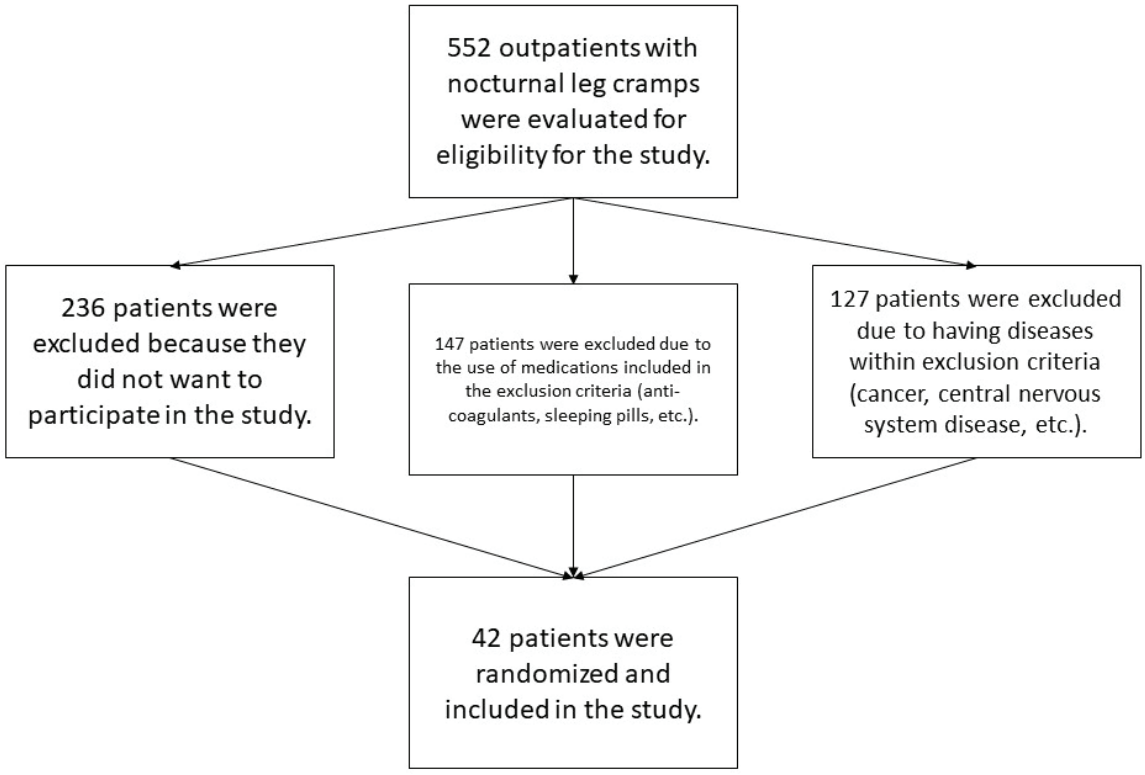

Figure 1. Flowchart of the study

position to apply DN to the medial head of the gastrocnemius muscle, and the patient's knee was slightly flexed. Pincer palpation technique was used. Needling was performed with the penetration angle of the needle slightly medialized, and care was taken to avoid needle penetration to the midline (Figure 2a). For needling of the lateral head of the gastrocnemius muscle, the patient was placed in a prone position, and the knee was slightly flexed. Care was taken to avoid needle penetration to the midline. Needling was performed with the penetration angle of the needle slightly lateralized (Figure 2b) (16). 0.30x50 mm acupuncture needles were used. The treatment was applied for six sessions, two sessions per week (17). There were no major adverse events after the procedures except minor side effects such as bleeding, tenderness and pain during needling.

Statistical Analysis

Mean, standard deviation, median, minimum, maximum value frequency, and percentage were used for descriptive statistics. The distribution of variables was checked with the Kolmogorov-Smirnov test. Independent samples t-test and Mann-Whitney U test were used to compare quantitative data. The Wilcoxon test was used for the repeated measurement analysis. The chi-square test was used for the correlation analysis. SPSS 27.0 (IBM Corp., Armonk, NY) was used for statistical analyses.

Results

In both groups, there was no significant difference between the patient's age, gender, body mass index, and occupational data.

Figure 2. Application of dry needling therapy to the gastrocnemius muscle; **a**) medial head, **b**) lateral head

Demographic data of the patients are given in Table 1.

There was no difference between the groups regarding CD before treatment (p=0.939). In the exercise therapy group, a statistically significant decrease was found in CDs after treatment compared to pretreatment (p<0.001) and at three-month follow-up (p<0.001). In the DN group, a statistically significant decrease in CD was found after treatment compared to the pretreatment period (p<0.001) at the three-month follow-up (p<0.001). No significant difference was found between the two groups in post-treatment measurements (p=0.140) and at the three-month follow-up (p=0.175) (Figure 3).

Before treatment, there was no statistically significant difference between the groups in the NOC (p=0.680). In the exercise therapy group, there was a statistically significant decrease in the

Table 1. Demographic data of the patients

		Exercise			Exercise + dry needling			
		Mean ± SD /n-%		Median	Mean ± SD /n-%		Median	p-value
Age		37.0	±8.2	36.0	37.6	±8.1	39.0	0.822[t]
Gender	Male	13	61.9%		15	71.4%		0.513[x²]
	Female	8	38.1%		6	28.6%		
BMI		23.4	±1.1	23.7	23.7	±0.8	24.0	0.330[m]
Occupation	Housewife	5	23.8%		4	19.0%		0.707 [x²]
	Student	7	33.3%		11	52.4%		0.212[x²]
	Officer	8	38.1%		6	28.6%		0.513[x²]
	Retired	1	4.8%		0	0.0%		1.000[x²]

[t]Independent samples t-test, [m]Mann-Whitney U test, [x²]Chi-square (Fisher test)
SD: Standard deviation, BMI: Body mass index

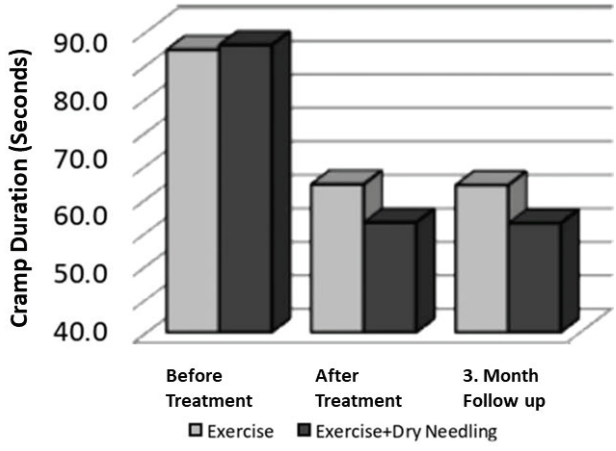

Figure 3. Change in cramp duration between groups after treatment and at the three-month follow-up

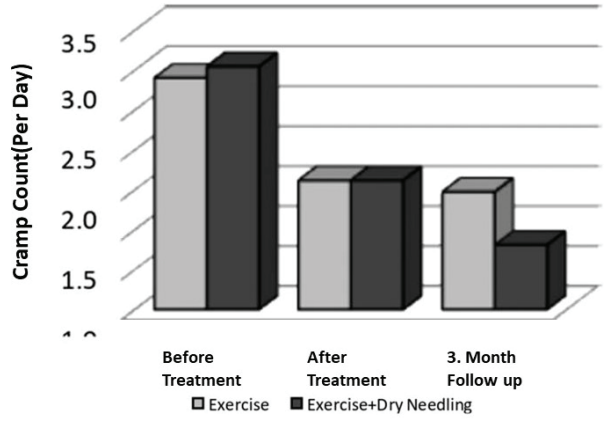

Figure 4. Change in number of cramps between groups after treatment and at the three-month follow-up

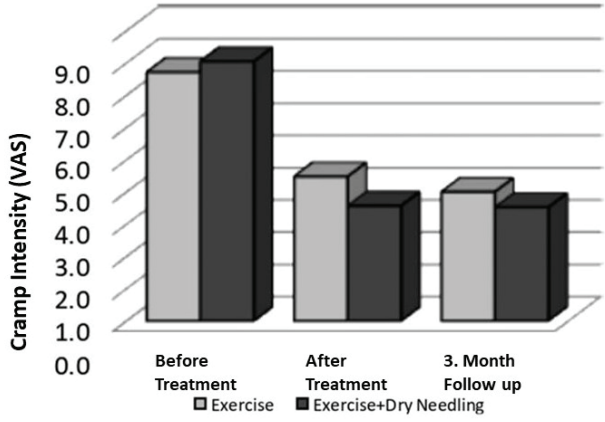

Figure 5. Change in cramp intensity between groups after treatment and at the three-month follow-up
VAS: Visual analogue scale

NOC after treatment (p<0.001) and at the three-month follow-up (p<0.001). In the DN group, a statistically significant decrease was found in the NOC after treatment (p<0.001) and at three-month follow-up (p<0.001). A comparison between groups revealed no significant difference between post-treatment measurements (p=0.545). At the three-month follow-up, there was a statistically significant decrease in the NOC in the DN group (p=0.016) (Figure 4).

There was no significant difference in CI between the groups before treatment (p=0.07). In the exercise group, a statistically significant decrease in CI was found after treatment compared to pretreatment (p<0.001) and at three-month follow-up (p<0.001). In the DN group, a statistically significant decrease in CI was found after treatment compared to the pretreatment period (p<0.001) and at the three-month follow-up (p<0.001). In the comparison between groups, there was a significant decrease in CI in the DN group after treatment (p<0.001) and at the three-month follow-up (p<0.001) (Figure 5).

PPT values prior to treatment did not significantly differ between the groups (p=1.00). In the exercise group, a statistically significant increase was found in PPT values after treatment compared to pretreatment (p<0.001) and at three-month follow-up (p<0.001). In the DN group, a statistically significant increase was found in PPT values after treatment compared to before treatment (p<0.001) and at the three-month follow-up (p<0.001). In comparison between groups, there was a significant increase in PPT values in the DN group after treatment (p=0.001) and at the three-month follow-up (p=0.003) (Figure 6).

Prior to treatment, there was no statistically significant difference between the groups in the PSQI scores (p=0.07). In the exercise therapy group, there was a significant decrease in the PSQI scores after treatment compared to pretreatment (p<0.001) and at the three-month follow-up (p<0.001). In the DN group, there was a significant decrease in the PSQI scores after treatment compared to pretreatment (p<0.001) and at the three-month follow-up (p<0.001). In the comparison between groups, there was a significant decrease in the PSQI scores in the group receiving DN treatment (p=0.002). At the three-month follow-up, there was no significant difference between groups (p=0.229). The decrease in PSQI scores after treatment and at the three-month follow-up was significantly greater than exercise alone (p=0.003) (Figure 7).

Discussion

NCC is a common, distressing problem that occurs at night, particularly in the elderly, and have a significant deleterious effect on sleep and quality of life (4). Numerous therapies have been used despite their subpar performance and the prevalence of side effects, such as the usage of magnesium and quinine. The Food and Drug Administration has strongly cautioned against using quinine to treat NCC owing to the possibility of adverse effects (18). Despite the promise of muscle stretching and exercise as first-line therapy for NCC, poor compliance with this approach is a persistent problem, especially in treating older patients afflicted with the syndrome (19). DN is a practical, inexpensive, and medication-free treatment for NCC. Even though the relationship between MTrP and NCC has been demonstrated in the literature, there are limited studies concerning the use of DN as a treatment for NCC (17). This study aimed to investigate the efficacy of DN in the treatment of NCC. The results of this study showed that DN added to exercise therapy was superior to exercise therapy alone in terms of the NOC, CI, raising PPT, and sleep quality.

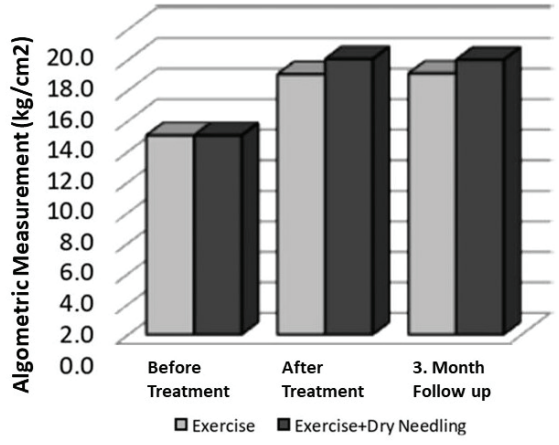

Figure 6. Change in algometric measurements (PPT) between groups after treatment and at the three-month follow-up
PPT: Pain pressure threshold

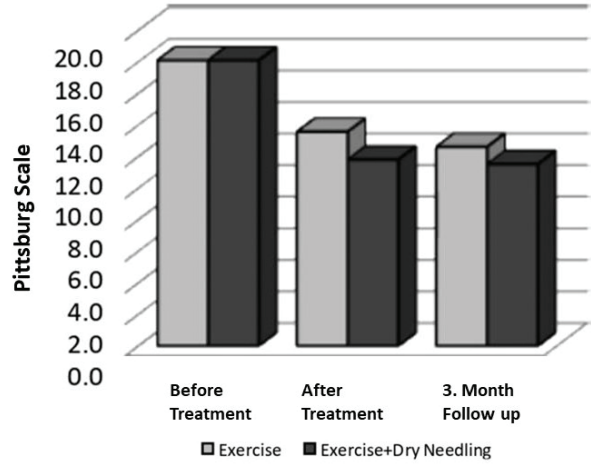

Figure 7. Change in the Pittsburg scale between groups after treatment and at the three-month follow-up

There are various views in the literature regarding the therapeutic effects of DN. According to an article by Abbaszadeh-Amirdehi et al. (20), DN reduces the irritability of the motor terminal plate and the sympathetic nervous system's hyperactivity in active MTrPs. An article that Dommerholt (21) published ascribed the mechanical, neurophysiologic, and chemical actions of DN to its therapeutic benefits. Similar to this article, Ziaeifar et al. (22) reported that DN treatment had a better impact on pain threshold levels than the MTrP compression approach. According to Ziaeifar et al. (22), the application of DN generated this result via increasing blood flow and oxygen levels in the area of MTrP as well as higher chemical and mechanical change. Tesch et al. (23) reported that the pressure pain threshold is closely related to electrical activity levels in the MTrP. Animal experiments have shown that DN treatment inhibits spontaneous electrical activity in MTrPs. Similar to the above, the decrease in algogenic and pro-inflammatory compounds (neuropeptides, catecholamines, and pro-inflammatory cytokines) in active MTrPs after twitch responses during DN can contribute to alleviating pain and raising PPT. It has been demonstrated that the inactivation of active MTrPs by DN also involves supraspinal pain control mechanisms in both antinociception and pain alleviation, independent of peripheral processes. Therefore, the therapeutic effects of DN on active MTrPs may include both peripheral and central processes (23).

Various views have been put forward in the literature about the origin of muscle cramps. Although some researchers report that the source of cramps are motor nerve discharges that occur spontaneously, hyperactivity of the motor unit brought on by disinhibition at the level of the spine, and aberrant excitability of the terminal branches of the motor axons (24,25); a study by Roeleveld et al. (26), which investigated the temporal and spatial surface electromyography characteristics of cramps, indicated that cramps originate at levels close to the muscle fibers or from the muscle fiber itself. Ge et al. (6) investigated the connection between latent MTrPs and nociceptive stimulation that causes muscle cramps. They concluded that the relationship between

MTrPs and muscle cramps might be caused by increased nociceptive sensitivity in MTrPs; the researchers advised that MTrPs should be considered when treating muscle cramps (6). According to the research findings by Prateepavanich et al. (7), injection therapy to MTrPs of the gastrocnemius muscle was beneficial in reducing the symptoms of NCC. Furthermore, parallel to this study's findings, Kim et al. (1) reported that in patients with NCC, MTrP injection into the gastrocnemius muscle relieves pain and minimizes the degree of sleeplessness.

The phrase "sleep quality" includes factors such as total sleep time, sleep onset delay, fragmentation level, total waking time, sleep efficiency, and sporadical sleep-disrupting events such as spontaneous arousals or apnea. The highly regarded PSQI is an indicator of overall sleep quality, relying on respondents' backdated evaluations (past month) of several sleep measures, including sleep latency, length, habitual sleep quality, sleep disruption, use of prescription sleeping medications, and daytime dysfunction (27). Generally, painful conditions and sleep disruption may interact, and nocturnal pain episodes, in particular, have been shown to alter the sleep cycle, bring on stages of arousal, and even bring on awakenings (1). Lautenbacher et al. (28) found that improved pain alleviation may encourage more restorative sleep, which in turn helps to reduce long-term pain, in their study on the link between sleep deprivation and pain perception. Hawke et al. (3) reported that NCC is significantly linked to worse sleep quality and lower physical components of health-related quality of life. They also stated that the harmful influence of NCC on sleep quality might be a significant factor in explaining how they affect health-related quality of life (3). DN's advantage over exercise alone in terms of sleep quality and algometric measures may be explained by its superiority in treating MTrPs compared to exercise therapy alone, thereby improving sleep quality.

Study Limitations

The study has several limitations. First, the study investigated and treated only MTrPs in the gastrocnemius muscle. More accurate and universal results could be obtained with more extensive and comprehensive studies, including MTrPs in other lower extremity muscles. Again, although the efficacy of DN has been observed, better results might be achieved with more extensive populations. Long-term follow-up of the effectiveness should be investigated. Studies with larger populations are needed, including other drug treatments such as gabapentin and other injection methods such as botulinum toxin therapy.

Conclusion

In conclusion, this study's results suggest that using DN in the treatment of NCC in the short and medium term is an effective method of reducing pain, decreasing the duration and intensity of cramps, and improving sleep quality.

Ethics

Ethics Committee Approval: Ethical approval to report this case was obtained from Biruni University Clinical Research Ethics Committee (decision number: 2015-KAEK-42-20-11, date: 27.07.2020).

Informed Consent: Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: M.H.T., F.B., Concept: F.B., Design: M.H.T., Data Collection or Processing: M.B., Analysis or Interpretation: Y.Ç., Literature Search: F.B., Writing: M.H.T.

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

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Prevalence of Osteoporosis and Osteoporotic Vertebral Fractures in Turkish Patients with Ankylosing Spondylitis: A Retrospective Cross-sectional Study

Türk Ankilozan Spondilit Hastalarında Osteoporoz ve Osteoporotik Vertebral Fraktür Prevalansı: Retrospektif Kesitsel Çalışma

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Abstract

Objective: Ankylosing spondylitis (AS) is a chronic inflammatory disease mainly affecting the vertebral column that is the prototype of the spondyloarthritides and is characterized by bone marrow edema, osteitis, erosions, enthesopathy, new bone formations and sclerosis. A decrease in bone mineral density (BMD), in addition to later restrictions in movement and muscle weakness, predisposes the patient to osteoporotic fractures. In this retrospective study, we aimed to assess the prevalence of osteoporosis (OP) and osteoporotic vertebral fractures.
Materials and Methods: This study was conducted in Ege University Faculty of Medicine, Departments of Physical Medicine and Rehabilitation and Rheumatology on patients who were diagnosed with AS and who had in the previous year received a BMD examination. Demographic and disease information, Bath Ankylosing Spondylitis Disease Activity index scores and if present, findings of vertebral radiographs and vitamin D levels were recorded from patient files. These parameters were used to compare patients with or without OP.
Results: One hundred consecutive patients that were seen in our outpatient clinic and who met the inclusion criteria were enrolled in this study. In BMD examinations, 48% of subjects were found to have OP or osteopenia. Sixty radiographs were reached and 16% of subjects were found to have at least one vertebral fracture. We detected a significant difference between these groups regarding age, sex, disease duration and BMD and T-scores at the levels of femur neck and total hip ($p<0.05$). We did not detect a significant correlation between clinical parameters and parameters related to OP ($p>0.05$).
Conclusion: The presence of concomitant OP in patients with AS is significant for increased fracture risk, also recurrent vertebral fractures may exacerbate the spinal deformities caused by the disease itself. It bears importance that clinicians be aware of increased risk of OP to be able to better manage pain and function loss in this patient population.
Keywords: Ankylosing spondylitis, fracture, osteoporosis

Öz

Amaç: Ankilozan spondilit (AS), spondiloartropati ailesinin prototipi olup kemik iliği ödemi, osteit, erozyonlar ile entezopati, yeni kemik oluşumu ve sklerozun bir arada seyrettiği, omurgayı etkileyen bir enflamatuvar hastalıktır. Özellikle erken dönemlerde omurgada kemik mineral yoğunluğu (KMY) azalması, ileri dönemde hareket kısıtlılığı, kas güçsüzlüğü ile birlikte osteoporotik kırıklara zemin hazırlar. Bu retrospektif çalışmada, AS'li hastalarda retrospektif olarak osteoporoz (OP) varlığı ve osteoporotik vertebral kırık prevalansını değerlendirmeyi amaçladık.
Gereç ve Yöntem: Araştırmaya Ege Üniversitesi Tıp Fakültesi, Fiziksel Tıp ve Rehabilitasyon ve Romatoloji Polikliniklerinden AS tanısı ile takipli ve son 1 yıl içerisinde KMY ölçümü yapılmış hastalar dahil edilmiştir. Gönüllülerin demografik ve hastalık özellikleri, KMY, varsa vertebra radyografik incelemeleri, D vitamini, Bath Ankilozan Spondilit Hastalık Aktivite indeksi (BASDAI) skorları ve kullandıkları ilaçlar hasta dosyalarından kayıt edilmiştir. Daha sonra KMY ölçümüne göre OP saptanan ve saptanmayan hastalar, incelenen klinik parametreler açısından karşılaştırılmıştır.
Bulgular: Polikliniklere ardışık olarak başvuran ve dahil edilme kriterlerini karşılayan 100 hasta çalışmaya dahil edilmiştir. Hastaların %48'inde OP ve osteopeni saptanmıştır. Hastaların 60'ının son 1 yıl içerisinde çekilmiş iki yönlü vertebral direkt grafileri mevcut olup, hastaların %16'sında vertebral çökme kırıkları saptanmıştır. OP mevcut olan ve olmayan hastalar arasında yaş, cinsiyet, hastalık süresi ve femur boyun ve total kalça T-skorları açısından anlamlı fark saptanmıştır ($p<0,05$). İncelenen klinik parametreler ile OP ile ilişkili değişkenler arasında anlamlı ilişki izlenmemiştir ($p>0,05$).

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Sonuç: AS hastalarında OP varlığı, kırık riski açısından anlamlı olup, tekrarlayan vertebral kırıklar hastalığa bağlı omurga deformitesini daha da şiddetlendirebilir. Ağrı ve fonksiyon kaybının önlenebilmesi açısından hekimlerin bu hasta grubunda OP riskinin farkında olması önemlidir.
Anahtar kelimeler: Ankilozan spondilit, fraktür, osteoporoz

Introduction

All rheumatological diseases have been associated with lower bone mineral density (BMD) and fragility fractures. It is well known that untreated inflammation as well as immobility, reduced physical activity and some medications used in the treatment of these disease all contribute to higher risk for osteoporosis (OP) (1). Ankylosing spondylitis (AS) is the prototype of a group of diseases called spondyloarthritides (SpA). The difference of AS from other rheumatological conditions is its affinity for new bone formations in addition to erosions and generalized demineralization (2). This increased risk for OP and osteoporotic fractures also poses a risk for vertebral and other fractures to go unnoticed in this patient group who are used to chronic pain.

The relationship between AS and OP has been well established, in fact OP has been reported to be the most common comorbidity in patients with AS (3). Although there has been speculation that AS and low BMD may have a common genetic background, no objective evidence of said relationship has been discovered to date (4). Inversely and interestingly, it has been reported that OP may increase the risk for development of AS in same patients (4). It has been long accepted that immobilization and chronic inflammation predispose patients with AS to OP. Corticosteroid use is less common in AS than other rheumatological diseases and treatment with anti-inflammatory medications has been associated with better bone mineral scores (5). Briot et al. (6) reported increases in lumbar BMD values in patients receiving anti TNF-α therapies.

OP risk factors as well as incidence of fractures vary across countries and age groups. In this context it would be expected that ratios of AS patients with OP could show differences in different populations. In a prospective study from Taiwan, patients with AS were reported to be at a 2.17 times higher risk for OP than healthy subjects (5). On the other end of the spectrum, a study from Germany found OP incidence to be 40.7% among patients with AS (7). As inferred from these data, AS poses a higher risk for OP, the incidence of OP and fragility fractures in Turkish AS patients remain unknown.

Therefore, the aim of our study was to assess the frequency and severity of OP in Turkish patients with AS.

Materials and Methods

Setting and Participants

This retrospective cross-sectional study was conducted in Ege University Faculty of Medicine, Departments of Rheumatology and Physical Medicine and Rehabilitation. Ethics approval was obtained from the Ethics Committee of Ege University Medical Research on 18.05.2022 with the approval number 22-5T/62.

Sample size calculation was carried out using G-Power software (Düsseldorf, Germany) and with an effect size of 0.3 and alpha value of 0.05, the minimum (min) required number of volunteers ws found to be 28. Consecutive 100 patients with AS/axial SpA that visited the rheumatology and physical medicine and rehabilitation outpatient clinics who had in the previous year received a Dual X-ray absorptiometry (DXA) measurement were included in the study. Patients having another disease that may cause OP or patients without DXA examinations in the previous year were excluded.

Study Parameters

Demographic data, and if present, levels of vitamin D, calcium phosphorus, body mass index and Bath Ankylosing Spondylitis Disease Activity index (BASDAI) scores were recorded. Total hip, femoral neck and total lumbar (L1-L4) T-score values were recorded from the DXA results. DXA measurements were obtained with the patient in the supine position. Osteopenia and OP were defined as T-scores below -1 and below or equal to -2.5, respectively. The lateral radiographic images of patients that were taken in the last year were examined for osteoporotic fractures. Patient files were examined and any symptom that may be related to osteoporotic fractures were noted. Patients' medications were also recorded. Disease duration was defined as the time from the first diagnosis.

Statistical Analysis

Statistical analysis was conducted using Statistical Package for the Social Sciences version 20.0 (SPSS, IBM, New York). Descriptive statistics were used for demographic data (frequency, number, percentage, mean and standard deviation). Shapiro-Wilk test was used to evaluate for normalcy of data. Parameters from patients with or without osteopenia, OP and vertebral fractures were compared using chi-square for nominal and ordinal data. Continuous data were compared using independent samples t-test or Kruskal-Wallis analysis, depending on the normalcy of the data. BASDAI was compared using Kruskal-Wallis since it is an ordinal measure. Correlation analyses were used for assessing the association between clinical and laboratory parameters.

Results

One hundred consecutive patients with AS that had received a DXA examination in the previous year were included in the study. Patient demographic and disease characteristics are presented in Table 1. Mean age was found to be 51.1±10.2 years and mean duration of diagnosis was 15.0±8.3 years. Median BASDAI score was 3 (min: 0, maximum: 8). Eighty one subjects used NSAIDs and 14 used anti TNF-α medications.

DXA, vertebral radiographs and vitamin D values are presented in Table 2. Based on the findings from DXA examinations, 12

subjects were osteoporotic and 36 were osteopenic. Vertebral radiographs were present in 60 subjects. Of those, 16 (26.6%) showed at least one vertebral fracture. This percentage translated to 16% of all our subjects. Sixteen subjects were taking oral or intravenous bisphosphonates while 2 were on denosumab. Twenty subjects were found to take only vitamin D and calcium supplementation. Of the 16 subjects with proven vertebral fractures, 13 (81.25%) were on anti-osteoporotic medications.

When patients with and without osteopenia and OP were compared regarding disease and demographic characteristics, it was revealed that patients with OP/penia were significantly older and had longer disease duration than those patients without OP/penia ($p<0.05$). More patients with OP/penia were females ($p<0.05$). No significant difference was detected regarding BASDAI score, vitamin D levels, NSAID or anti TNF-α use ($p>0.05$). Data from patients with and without OP/penia are presented in Table 3.

Correlation analyses did not reveal a significant correlation between the studied parameters, apart from a positive correlation between age and disease duration ($p=0.01$, $r=0.92$) which is to be expected.

Table 1. Demographic and clinical data for all patients (n=100, %)

Sex, male, n	54
Age, years, mean ± SD	51.1±10.2
Disease duration, years, mean ± SD	15±8.3
BASDAI score, median (min-max)	3 (0-8)
NSAID use, n	81
Anti TNF-α use, n	14
OP treatment, n	
Bisphosphonate	16
Denosumab	2
Only calcium and vitamin D	20

SD: Standard deviation, n: Number, BASDAI: Bath Ankylosing Spondylitis Disease Activity index, NSAID: Non-steroidal anti-inflammatory drug, anti TNF-α: Anti tumor necrosis alpha, OP: Osteoporosis, min-max: Minimum-maximum

Table 2. Parameters related to osteoporosis in all subjects (n=100, %)

DXA result, n	
Osteopenia	36
Osteoporosis	12
X-ray present, n	
Fracture present, n	16
Number of fractures, n	
1	10
2	4
3	2
Vitamin D, ng/mL, mean ± SD	19.1±12.5

n: Number, DXA: Dual X-ray absorptiometry, SD: Standard deviation

Discussion

In this retrospective cross-sectional study we have detected that 16% of our subjects had at least one vertebral fragility fracture. Prevalence of osteoporotic fractures in SpA patients varies in the literature. Ralston et al. (8) reported vertebral fractures in up to 18% of patients with AS while a study that examined 157 patients found osteoporotic fractures in 9.5% of patients (9). These numbers may be similar to the literature but are higher than the general population and show us that patients with AS have increased fracture risk, regardless of disease activity status. We have observed that not all patients with DXA results had a radiographic examination in our hospital database. OP is a diffuse disease and inflammation causes diffuse bone mineral loss (10). In patients with SpA, OP involvement in different parts of the skeleton may vary according to disease status and duration. Some characteristics of SpA's themselves also pose challenges to the diagnosis of OP. It has been reported that in early stages of the disease, inflammation causes losses in vertebral BMD, which may in part be explained by bone marrow edema, however in later stages, ligament calcifications vertebral sclerosis may cause false negative results in lumbar DXA examination (5). In our patient population who had a mean disease duration of 15 years, significant differences were detected in the femoral BMD measurements while in most patients, lumbar BMD measurements were in the normal range, in some patients, even in the presence of radiographically diagnosed vertebral fractures. This finding is in agreement with the literature, in that highest risk for osteoporotic fractures have been reported in those patients with low BMD at the femoral neck or distal forearm (11).

AS patients were reported to have a fracture risk almost twice as high as those without AS (11). In this patient group, consequent vertebral fractures further exacerbate the spinal deformity that is the characteristic feature of this disease. Pain resulting from fractures also limit subjects' mobility and poorly affect muscle mass and function. Vitamin D levels were overall below normal values in all subjects. We could not detect the effect of low vitamin d on BMD since both groups had insufficiency. Median BASDAI scores for the study population was found to be 3 (range: 0-8). Chronic untreated inflammatory conditions, through the effects of IL-6, IL-1 and TNF-α exacerbate OP (12). Subjects included in this study were receiving treatment and most were in the chronic stages of the disease. We detected no correlation between disease activity score and BMD values. A low disease activity score may explain the relative lack of correlation between BMD and other disease parameters.

Study Limitations

Because this is a retrospective cross-sectional study, data were obtained from patients who had already had X-rays and DXA taken. That may have caused an imbalance in favor of patients with higher disease activity than the general patient population since patients with more active symptoms may have received

Table 3. Comparison of patients with and without osteoporosis

	Osteoporosis/penia present (n=48)	Osteoporosis/penia not present (n=52)	p-value
Age, years, mean ± SD	53.4±9.5	42.7±10.3	0.03*+
Sex, male, n (%)	23 (47.9)	31 (59.6)	0.04*$
Lumbar spine DXA			
T-score	-0.72±1.6	0.58±1.2	0.13+
BMD	1.090±0.171	1.272±0.279	
Femoral neck			
T-score	-1.31±1.06	-0.79±1.32	0.009**+
BMD	0.810±0.092	0.917±0.152	
Hip total			
T-score	-0.6±0.94	0.2±1.33	0.049*+
BMD	0.842±0.135	0.1002±0.099	
BASDAI, median (min-max)	4 (0-8)	3 (0-7)	0.82#
Vitamin D, ng/mL, mean ± SD	20.3±5.9	16.2±13.7	0.59+
Disease duration, years, mean ± SD	19±8.9	14±6.1	0.03*
Anti TNF-α use, n (%)	5	9	0.68$
NSAID use, n (%)	40	41	0.62$

n: Number, SD: Standard deviation, BMD: Bone mineral density, BASDAI: Bath Ankylosing Spondylitis Disease Activity index, NSAID: Non-steroidal anti-inflammatory drug, anti TNF-α: Anti tumor necrosis alpha, *p<0.05,**p<0.01, +Independent samples T-test, $Chi-square test, #Kruskal-Wallis test

more robust laboratory testing. Also, nearly half of our subjects were females, which is a higher ratio than usually observed in other studies about AS. This may be explained by the relative selectiveness of physicians for ordering OP tests from female patients.

Conclusion

In this retrospective cross-sectional study, we have found the prevalence of OP in an AS population to be higher than previously reported. AS, in addition to causing OP, may also decrease physical exercise capacity and cause muscle weakness, further making patients susceptible to falls. In order to prevent fractures and related complications, all physicians caring for patients with AS be aware of this heightened risk for OP.

Ethics

Ethics Committee Approval: Ethics approval was obtained from the Ethics Committee of Ege University Medical Research on 18.05.2022 with the approval number 22-5T/62.

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.Ç., Y.K., D.K., G.K., Concept: E.Ç., Y.K., D.K., G.K., Design: E.Ç., Y.K., D.K., G.K., Data Collection or Processing: E.Ç., Y.K., D.K., G.K., Analysis or Interpretation: E.Ç., Y.K., D.K., G.K., Literature Search: E.Ç., Y.K., D.K., G.K., Writing: E.Ç., Y.K., D.K., G.K.

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Sleep Quality in Patients with Ankylosing Spondylitis

Ankilozan Spondilitli Hastalarda Uyku Kalitesi

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Abstract

Chronic pain and inflammation, loss of function, immobility and systemic involvement that are all characteristics of ankylosing spondylitis (AS) have been proposed to cause sleep problems. Almost 70-90% of patients with AS are reported to suffer from disturbed sleep. There are many indices that aim to assess quality and duration of sleep in clinical and academic settings. We have carried out a pilot study and enrolled 70 patients with AS and questioned each subject with a single question that assessed their quality of sleep. This question was taken from the 4th item of the Hamilton Anxiety scale and has been previously used in this population. We have asked patients to assess their sleep quality and score it from 0 to 4, 0 denoting no sleep disturbance and 4 denoting very severe sleep disturbance. The question was well understood and answered fast, causing no delay in routine patient care. Almost 90% of our patients reported some level of sleep disturbance. We have found a significant correlation between disease activity measured by Bath Ankylosing Spondylitis Disease Activity index and severity of sleep disturbance ($p<0.05$, $r=0.34$). Assessing quality of sleep in the routine clinical setting does not need to take a very long time and carries valuable information regarding patients' physical and mental wellbeing.
Keywords: Ankylosing spondylitis, pain, sleep quality

Öz

Ankilozan spondilitin (AS) karakteristik özelliklerinden olan kronik ağrı, enflamasyon, fonksiyon kaybı, immobilizasyon ve sistemik tutulumların uyku problemlerine de yol açabileceği öne sürülmüştür. AS hastalarının neredeyse %70-90'ı arasında bir oranda uyku sorunlarının görüldüğü bildirilmiştir. Hem klinik hem de akademik amaçla uyku kalitesini ve uyku süresini ölçmeyi amaçlayan pek çok ölçek mevcuttur. Bizler, 70 AS hastasında bir pilot çalışma yaparak her gönüllüden uyku kalitesini değerlendiren tek bir soruyu yanıtlamasını istedik. Bu soru Hamilton Anksiyete skalasının uykuyu değerlendiren 4. sorusundan alınmış olup bireyden uyku kalitesini 0 ile 4 arasında puanlaması istenir, 0 puan hiç uyku sorunu yok anlamına gelirken, 4 puan çok şiddetli uyku sorunu anlamı taşır. Hastalarımız bu soruyu doğru bir şekilde anlamış ve hızlı bir şekilde yanıtlamışlardır ve rutin klinik hizmetlerinde bir yavaşlama yaşanmamıştır. Hastalarımızın neredeyse %90'ı farklı düzeylerde uyku bozukluğu ile uyumlu yanıt vermiştir. Uyku bozukluğu düzeyi ile Bath Ankilozan Spondilit Hastalık Aktivite indeksi skoru arasında da anlamlı korelasyon saptanmıştır ($p<0,05$, $r=0,34$). Klinik ortamda uyku kalitesini değerlendirmek çok vakit almamaktadır ve hastaların hem fiziksel hem de mental iyilik durumu hakkında bilgi vermesi açısından değerlidir.
Anahtar kelimeler: Ankilozan spondilit, ağrı, uyku kalitesi

Introduction

Ankylosing spondylitis (AS) is a chronic inflammatory disorder of mainly the spine that also affects peripheral joints, entheses and may cause severe disability. Studies and management strategies commonly focus on musculoskeletal involvement of this disorder. Chronic pain and inflammation, loss of function, immobility and systemic involvement have been reported to cause sleep problems (1). Cytokine activity has also been proposed to be a factor in disturbed sleep (2). Nie et al. (1) reported that up to 70% of patients with AS suffer from sleep disturbances. They reported that patients with higher levels of disease activity, pain and functional limitations have worse sleep scores than patients with more moderate disease severity.

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Wadeley et al. (3) assessed subjects sleep quality using Jenkins Sleep Evaluation questionnaire and reported that nearly 20% of volunteers were poor sleepers. Especially nighttime pain caused by untreated inflammation is speculated to contribute to chronic sleep disturbance (4). This trend is objectively shown in studies by the significant correlation of levels of sleep disturbance and disease activity indices (3,5).

Another facet of this problem is that sleep problems further exacerbate disease related symptoms such as pain and decreased mobility, still sleep and related problems stay a secondary outcome of most studies.

Many assessment methods have been developed to better distinguish sleep problems in this patient population. Some are more detailed and are more commonly used in clinical studies while some are easier to perform in routine day-to-day practice.

The Pittsburg Sleep Quality index is a self-reported questionnaire that assesses sleep related symptoms over a one-month period. Patients are grouped as good or poor sleepers according to their scores (6).

Medical outcomes study sleep questionnaire consists of 12 questions that assesses the duration and quality of sleep and has been previously used in different disease groups (7). Another inventory used to measure sleep quality is the Insomnia Severity index is a brief inventory 7 item questionnaire that is scored from 0 to 28 with its results denoting from absence of insomnia to severe insomnia respectively.

Hakkou et al. (2) have used the sleep item of the Hamilton Anxiety scale to assess sleep disturbances in patients with AS and they have reported that 65% of all patients complained of disturbed sleep and that pain and depression significantly correlated with these sleep patterns (8).

These data reflect that sleep problems correlate with anxiety, depression, and quality of life. These subjective areas of research show variance according to country and region and may be affected by more than disease and inflammatory activity.

To assess sleep disturbances in our patients and to lay the groundwork for a larger and detailed study, we have questioned AS patients that came to our departments of physical medicine and rehabilitation and rheumatology departments for a routine outpatient visit over a one months period with the fourth item of the Hamilton Anxiety scale (8). This way we were able to question 70 subjects. The questions were well understood by our patients and this questioning took less than 2 minutes for each patient. After routine physical examination and blood testing, we have asked subjects to rate their sleep quality between 0 and 4, 0 denoting no sleep disturbance or insomnia, and 5 meaning severe sleep disturbance. Twelve percent of subjects responded to the question as having very good sleep, meaning almost 90% suffered from some level of disordered sleep. Subjects' percentages as having mild, moderate, or severe sleep problems were 9.1, 53.8, and 20 respectively. The remaining 5.7% responded as having very severe sleep disturbance. We detected a weak but significant correlation between disease activity level measured using Bath Ankylosing Spondylitis Disease Activity index and sleep item of the Hamilton anxiety scale ($p<0.05$, $r=0.34$). We did not detect a significant difference between sexes regarding sleep quality or disease activity.

Sleep disturbances are proposed to underlie or exacerbate many painful conditions such as fibromyalgia, mood disorders and chronic fatigue syndrome. AS, as a chronic inflammatory condition that when not managed properly causes nighttime pain, morning stiffness, limitation of physical activity and decreased mobilization. Physicians caring for patients with AS need to keep in mind that unrecognized and untreated sleep disorders may explain at least some of the wide symptomatology and challenges of this painful condition. Assessing quality of sleep in the routine clinical setting does not need to take a very long time and carries valuable information regarding patients' physical and mental wellbeing. In light of these findings, we plan in the future to study the effects of disordered sleep assessed by polysomnography on disease activity, laboratory findings and quality of life in patients with AS.

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Authorship Contributions

Concept: E.Ç., D.K., Y.K., Design: E.Ç., D.K., Y.K., Data Collection or Processing: E.Ç., D.K., Y.K., Analysis or Interpretation: E.Ç., D.K., Y.K., Literature Search: E.Ç., D.K., Y.K., Writing: E.Ç., Y.K., D.K.

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Düzeltme: Postmenopozal Osteoporoz Tedavisinde Denosumabın Etkinliği: Bir Yıllık Takip, Tek Merkezli Çalışma

Correction: Efficacy of Denosumab in the Treatment of Postmenopausal Osteoporosis: One-year Follow-up, Single Center Study

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2021 yılı 3. sayıda "Postmenopozal Osteoporoz Tedavisinde Denosumabın Etkinliği: Bir Yıllık Takip, Tek Merkezli Çalışma" adlı çalışmayı özenle okudum ve çalışmada yer alan maddi hataların bilimsel literatürü yanıltmaması ve meta-analizlerde hatalı bilgilerin yer almaması için bu mektubu yazıyorum (1).

Tüm dünyada yaşlanan nüfusun artması ve beraberinde gelişebilecek kırık riskleri nedeniyle önemli bir sağlık sorunu halini alan osteoporozun tedavisinde denosumab onaylanmış ilk monoklonal antikordur (2). Nükleer faktör-kappa-beta ligandının reseptör aktivatörüne bağlanır ve bunu inhibe ederek anti-rezorbtif etki gösterir (3). 2010 yılında Gıda ve İlaç Dairesi (*Food and Drug Administration*) tarafından onaylanan ilaç üzerinde yapılan çalışmalarda denosumabın kemik mineral yoğunluğunu (KMY) artırdığı ve kırık riskini azalttığı gösterilmiştir (4,5).

TRDizin'de denosumabla ilgili araştırma sayısı 27 olup Türkiye'de az sayıda çalışma mevcuttur. Osteoporozda kullanılan denosumab ile ilgili çalışma sayısı daha azdır. Türkiye'de yapılan bu çalışma osteoporozda kullanılan denosumabın etkinliği ile ilgili kıymetli çalışmalardan biridir. Bununla birlikte bu çalışmada gözden kaçan maddi hatalar mevcuttur.

Bu çalışmada denosumabın lomber, kalça total ve kalça boyun bölgesinde KMY oranlarında gr/cm^2 miktarlarında artış olduğu belirtilmektedir ve bu durum hem sayısal hem de grafiksel olarak gösterilmektedir (Tablo 4 ve Şekil 1) (1). KMY artış oranları sırasıyla %17, %26 ve %12 olarak ifade edilmektedir. Literatürde ise bu çalışmada da belirtildiği gibi 10 yıllık Freedom çalışmasında bu oranlar lomber bölgede %21,7, total kalçada %9,2, femur boyunda %9 olarak saptanmıştır (6).

Ancak tablo ve şekilleri incelediğimizde KMY'yi gr/cm^2 olarak sırasıyla lomber, total kalça ve kalça boyun olarak aldığımızda %18,4; %23, %3,6 olarak bulunması gerekirdi. Özellikle femur boyundaki KMY'nin yanıltıcı olarak çok yüksek bulunması hem bu çalışma açısından hem de meta-analizlere konu olması açısından önemlidir.

Türkiye'de denosumab ile alakalı çalışmaların sayısı baz alındığında bu çalışmanın önemi daha da artmaktadır. Özellikle osteoporoz tedavisinde kullanılan denosumab ile ilgili Türkiye'deki çalışma sayısı oldukça azdır. Bu tarz çalışmaların teşvik edilmesi ve daha fazla sayıda yapılması ümidi taşıyarak, çalışmalardaki maddi hatalar üzerinde dikkatli olunması gerekir. Çünkü bu çalışmalar literatüre katkı sağlamaktadır ve bilim geçmişteki bilgileri baz alarak ve üstüne koyarak ilerler. Bu sebeplerden ötürü çalışmalardaki hataların ve düzeltmelerin belirtilmesi çok önemli olup bilimin gelişmesine ve eklenerek ilerlemesine neden olur.

Anahtar kelimeler: Denosumab, osteoporoz, kemik mineral yoğunluğu
Keywords: Denosumab, osteoporosis, bone mineral density
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Kaynaklar

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