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Hipokrat Tıp Dergisi 2023 Nisan

Değerli araştırmacılar ve bilim insanları,

Değerli araştırmacılar ve bilim insanları

Dergimizin yayın ve indeks çeşitliliği artarken gönderdikleri çalışmaları, atıfları ile destek olan siz değerli araştırmacılara bir kez daha canı gönülden teşekkürlerimi ifade etmek istiyorum.
Gelecek sayımızda görüşmek üzere bilim dünyasının tüm araştırmacılarına başarılarının devamını temenni ediyor, keyifli okumalar diliyorum.
Selam ve saygılarımla.

Prof. Dr. Nureddin CENGİZ
Baş Editör

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Dergi yılda üç sayı olarak Nisan, Ağustos ve Aralık aylarında yayınlanmaktadır. Derginin resmi yayın dili Türkçe ve İngilizcedir. İngilizce yazım tercih sebebidir. Dergi ile ilgili her türlü işlem https://dergipark.org.tr/tr/pub/hmj adresinden yapılabilir. Geçmiş sayılarda yayınlanan çalışmalara bu adresten ulaşılabilir.

Bilimsel Politikalar ve Etik Sorumluluğu: Yazıların bilimsel sorumluluğu yazarlara aittir. Tüm yazarların çalışmaya aktif olarak katılmış olması gereklidir. Gönderilen yazıların dergide yayınlanabilmesi için daha önce başka bir bilimsel yayın organında yayınlanmamış olması gerekir. Gönderilen yazı daha önce herhangi bir toplantıda sunulmuş ise; toplantı adı, tarihi ve düzenlendiği şehir belirtilmelidir. Klinik araştırmaların protokolü ilgili kurumun etik komitesi tarafından onaylanmış olmalıdır. İnsanlar üzerinde yapılan tüm çalışmalarda, "Yöntem ve Gereçler" bölümünde çalışmanın ilgili komite tarafından onaylandığı veya çalışmanın Helsinki İlkeler Deklerasyonuna (www.wma.net/e/policy/b3.htm) uyularak gerçekleştirildiğine dair bir cümle yer almalıdır. (Etik kurul tarih ve protokol numarası) Çalışmaya dahil edilen tüm insanların bilgilendirilmiş onam formunu imzaladığı metin içinde belirtilmelidir.

Çalışmada "Hayvan" öğesi kullanılmış ise yazarlar, makalenin Gereç ve Yöntemler bölümünde Guide for the Care and Use of Laboratory Animals (www.nap.edu/catalog/5140.html) prensipleri doğrultusunda çalışmalarında hayvanhaklarını koruduklarını ve kurumlarının etik kurullarından onay aldıklarını belirtmek zorundadır.

Değerlendirme Süreci:
Dergiye gönderilen yazıların değerlendirilmesi üç aşamada yapılmaktadır. Birinci aşamada makaleler dergi standartları açısından incelenir, yazım kurallarına uymayan makaleler reddedilir. Makale yazım kurallarına göre düzenlendikten sonra aynı isimle yeniden dergiye yüklenebilir. İkinci aşamada makaleyi editör kurulu tarafından içerik ve yöntem açısından değerlendirmeye alınır. İlk iki aşamayı tamamlayan makaleler üçüncü aşamaya geçerek incelenmesi için hakemlere gönderilir.

Tüm yazılarda editöryel değerlendirme ve düzeltmeye başvurulur; gerektiğinde, yazarlardan bazı soruları yanıtlaması ve eksikleri tamamlaması istenebilir. Değer-

lendirme sonucu kabul, minör revizyon, major revizyon, yeniden yazılması gerekli ya da ret kararı çıkabilir. Dergide yayınlanmasına karar verilen makale basım sürecine alınır; bu aşamada tüm bilgilerin doğruluğu için ayrıntılı kontrol ve denetimden geçirilir; yayın öncesi şekline getirilerek yazarların kontrolüne ve onayına sunulur.

Yayın Hakkı:

1976 Copyright Act'e göre, yayımlanmak üzere kabul edilen yazıların her türlü yayın hakkı dergiyi yayımlayan kuruma aittir. Yazarlar, http://dergipark.gov.tr/smj internet adresinden ulaşacakları "Yayın Hakları Devir Formu"nu doldurup (mavi kalemle ve ıslak imzalı olacak şekilde tüm yazarlarca imzalanmış), DergiPark sitemi üzerinden göndermelidirler.

- Olgu sunumu/serisi ve derleme dışındaki bilimsel çalışmalarda etik kurul onay belgesi sisteme yüklenmelidir.
- Veri toplama süreci Aralık 2010 tarihinden önce tamamlanmış çalışmalar kabul edilmeyecektir.
- Bilimsel çalışmalar, çalışmadaki yazarların isim ve soy isimleri (çalışmaya dahil olan tüm yazar isimleri yazılmalı) ile çalışma başlığındaki tüm kelimelerin (bağlaçlar hariç) sadece ilk harfleri büyük harf olacak şekilde DergiPark sistemineyüklenmelidir.
- Yazarların aynı sayıda ilkisim oldukları yalnızca bir çalışmaları yayınlanacaktır.
- SCI, SSCI, SCIE, ESCI veya A&HCI'de indekslenen dergilerde yayınlanmış çalışmalarında Hipokrat Tıp Dergisi'nde yayınlanmış herhangi bir çalışmaya atıfta bulunan yazarların çalışmalarına öncelik verilecektir. (Çalışma bilgilerinin ve varsa linkinin Editöre Sunum Sayfası'nda belirtilmesi gerekmektedir ve hmj@bandirma.edu.tr adresine mail atılarak hatırlatma yapılmalıdır).
- Yazım dili İngilizce olan bilimsel çalışmaların veya yazım dili Türkçe olan çalışmaların İngilizce özetlerinin yazımında akademik düzenleme hizmeti veren profesyonel kurum veya kuruluşlardan yardım alındığının belgelenmesi durumunda bu çalışmalara öncelik verilecektir.

Yazının Hazırlanması

- Derleme türündeki bilimsel çalışmalar için yazar sayısı üçü geçmemelidir.
- Olgusunumları için yazar sayısı altıyı geçmemelidir.
- Yazılar çift satır aralıklı ve 10 punto olarak, her sayfanın iki yanında ve alt ve üst kısmında 2.5 cm boşluk bırakılarak yazılmalıdır. Yazı stili Arial olmalıdır.
- Yazılar Microsoft Word formatında olmalıdır. (Tablolar dahilolacak şekilde)
- Kısaltmalar, özette ve ana metinde kelimenin ilk geçtiği yerde parantez içinde verilmeli ve tüm metin boyunca o kısaltma kullanılmalıdır. Küçük harflerle yapılan kısaltmalara getirilen eklerde kelimenin okunuşu esas alınır: cm'yi, kg'dan, mm'den, kr.un. Büyük harflerle yapılan kısaltmalara getirilen eklerde ise kısaltmanın son harfinin okunuşu esas alınır: BDT'ye, TDK'den, THY'de, TRT'den, TL'nin vb. Ancak kısaltması büyük harflerle yapıldığı hâlde bir kelime gibi okunan kısaltmalara getirilen eklerde kısaltmanın okunuşu esas alınır: ASELSAN'da, BOTAŞ'ın, NATO'dan, UNESCO'ya vb.
- Editöre sunum sayfası ayrı bir Word dosyası olarak gönderilmelidir. Editöre sunum sayfasında gönderilen çalışmanın kategorisi, eş zamanlı olarak başka bir dergiye gönderilmemiş olduğu, daha önce başka bir dergide yayınlanmamış olduğu, varsa çalışmayı maddi olarak destekleyen kişi ve kuruluşlar ile varsa bu kuruluşların yazarlarla olan ilişkileri belirtilmelidir.
- Kapak sayfası ayrı bir Word dosyası olarak gönderilmelidir. Kapak sayfasında başlık basit ve anlaşılır şekilde olmalıdır (Türkçe ve İngilizce). Başlık 60 karakterden daha uzun olduğu takdirde İngilizce ve Türkçe kısa başlık da kapak sayfasına eklenmelidir. Tüm yazarların adı, soyadı ve unvanları, ORCID numaraları, çalıştıkları kurumun adı ve şehri bu sayfada yer alma-

lıdır. Bu sayfaya ayrıca "yazışmadan sorumlu" yazarın isim, açık adres, telefon ve e-posta bilgileri eklenmelidir.

İstatistik Bilgi Notu

- Kullanılan istatistiksel yöntem, orijinal veriye erişebilecek bilgili bir okuyucunun rapor edilen sonuçları onaylayabileceği bir ayrıntıda belirtilmelidir. İstatistiksel terimler, kısaltmalar ve semboller tanımlanmalıdır. Kullanılan bilgisayar programı, istatistiksel yönteme dair açıklama verilmelidir. Çalışma deseni ve istatistiksel yönteme dair kaynaklar mümkünse belirtilmelidir.
- Sonuçların sunumunda, özellikle ortalama ve yüzdelik verirken, ondalıklı hanelerin gösteriminde virgülden sonra sonra 2 hane kullanılmalıdır (112,2 yerine; 112,20 veya 112,21 gibi). P, t, Z değerleri istisnadır ve virgülden sonra 3 hane verilmelidir ($p<0,05$ yerine tam değer $p=0,001$). Tam sayı dışındaki gösterimlerde virgülden sonra iki hane, istatistiksel değerlerin (p,t,z,F,Ki-Kare gibi) virgülden sonra üç hane değerlerin sunulması, p değerlerinin sunumunda $p<0,05$ veya $p>0,05$ yerine test istatistiği ile birlikte tam p değerinin (bu değerin binde birden küçük olması durumunda $p<0,001$ biçiminde) gösterilmesi gerekmektedir.

Yazının Bölümleri

- Çalışmanın gönderildiği metin dosyasının içinde sırasıyla, Türkçe başlık, Türkçe özet, Türkçe anahtar kelimeler, İngilizce başlık, İngilizce özet, İngilizce anahtar kelimeler, çalışmanın ana metini, kaynaklar, her sayfaya bir tablo olmak üzere tablolar ve son sayfada şekillerin (varsa) alt yazıları şeklinde olmalıdır. Tablolar kaynaklardan sonra, her sayfaya bir tablo olmak üzere çalışmanın gönderildiği dosya içinde olmalı ancak çalışmaya ait şekil, grafik ve fotoğrafların her biri ayrı bir imaj dosyası (jpeg ya da gif) olarak gönderilmelidir.

Araştırma Makalesi:

Öz (Abstract): Türkçe ve İngilizce özetler çalışmanın başlığı ile birlikte verilmelidir. Özetler Amaç (Objective), Gereç ve Yöntemler (Materials and Methods), Bulgular (Results) ve Sonuç (Conclusion) bölümlerine ayrılmalı ve 250 sözcüğü geçmemelidir.

Anahtar Kelimeler (Keywords): Türkçe özetten sonra Türkçe anahtar kelimeler, İngilizce özetten sonra İngilizce anahtar kelimeler belirtilmelidir.

Giriş (Introduction): Giriş bölümünün son paragrafında çalışmanın amacını bildiren bir cümle yer almalıdır.

Gereç ve Yöntemler (Materials and Methods): Araştırmanın tipi, etik hususlar (etik onamının alındığı kurum, tarih ve no), kullanılan istatistiksel analiz yöntemleri belirtilmelidir.

B**ulgular (Results)**

Tartışma (Discussion)

Kaynaklar (References)

Makalenin son sayfasında etik onamının alındığı kurum, tarih ve no ayrıca belirtilmelidir.

Olgu Sunumu/Serisi:

Öz (Abstract): Türkçe ve İngilizce özetler makelenin başlığı ile birlikte verilmelidir. Özetler tek paragraflık olmalıdır. (100-150 kelime olmalıdır.)

Anahtar Kelimeler (Keywords): Türkçe özetten sonra Türkçe anahtar kelimeler, İngilizce özetten sonra İngilizce anahtar kelimeler belirtilmelidir.

Giriş (Introduction)

Olgu Sunumu (Case Report) Tartışma (Discussion) Kaynaklar (References)

*Olgu sunumlarında, bilgilendirimiş gönüllü olur/onam formunun imzalatıldığına dair bilgiye makalede yer verilmesi gereklidir.

Derleme:

Öz (Abstract): Derleme özetleri kısa ve tek paragraflık olmalıdır (ortalama 100-150 kelime; bölümsüz, Türkçe ve İngilizce) **Anahtar Kelimeler (Keywords):** Türkçe özetten sonra Türkçe anahtar kelimeler, İngilizce özettten sonra İngilizce anahtar kelimeler belirtilmelidir.

Giriş (Introduction) Konu İle İlgili Başlıklar Sonuç

(Conclusion) Kaynaklar (References)

Editöre Mektup:

Mektuplar, kaynaklar hariç 500 kelimeyi geçmemelidir. Türkçe ve İngilizce özete gerek yoktur. Kaynak sayısı 5 ile sınırlandırılmalıdır. Bir mektup en fazla 4 yazar tarafından yazılabilir. Editöre mektuplar hakem değerlendirme sürecine alınmaz, ancak editör tarafından gerekli durumlarda yazarlardan mektuba cevap vermeleri istenebilir.

Anahtar Kelimeler

- En az 3 en fazla 6 adet, Türkçe ve İngilizce yazılmalıdır.
- Kelimeler birbirlerinden noktalı virgül (;) ile ayrılmalıdır.
- İngilizce anahtar kelimeler "Medical Subject Headings (MESH)"e uygun olarak verilmelidir (www.nlm.nih.gov/mesh/MBrowser.html).
- Türkçe anahtar kelimeler Türkiye Bilim Terimleri'ne uygun olarak verilmelidir (www.bilimterimleri.com).

Kaynaklar

- Yazarlar yalnızca doğrudan yararlandıkları kaynakları yazılarında gösterebilirler.
- Kaynaklar yazıda geliş sırasına göre yazılmalı ve metinde cümle sonunda noktalama işaretlerinden hemen sonra "Üst Simge" olarak belirtilmelidir.
- Çalışmada bulunan yazar sayısı 6 veya daha az ise tüm yazarlar belirtilmeli, 7 veya daha fazla ise ilk 6 isim yazılıp "et al" eklenmelidir.
- Kaynak yazımı için kullanılan format Index Medicus'ta belirtilen şekilde olmalıdır (www.icmje.org).
- Kaynak listesinde yalnızca yayınlanmış ya da yayınlanması kabul edilmiş veya DOI numarası almış çalışmalar yer almalıdır.
- Kaynak sayısının araştırmalarda 50 ve derlemelerde 100, olgu sunumlarında da 20 ile sınırlandırılmasına özen gösterilmelidir.
- Kaynakların dizilme şekli ve noktalamalar aşağıdaki örneklere uygun olmalıdır (Noktalamaişaretlerine lütfen dikkat ediniz): Vancouver kaynak sitiline göre kaynaklar yazılmalıdır.

Makale için; Yazar(lar)ın soyad(lar)ı ve isim(ler)inin başharf(ler)i, makale ismi, dergi ismi, yıl, cilt, sayı, sayfa no'su belirtilmelidir.

Örnek: Baser A, Eliaçık S, Baykam MM, Tan FU. Clinical Manifestations of Overactive Bladder With Migraine as a Comorbidity: A Prospective Cross-Sectional Study. Int Neurourol J. 2020;24(4):375-381. https://doi.org/10.5213/inj.2040186.093.

Kitap için; Yazar(lar)ın soyad(lar)ı ve isim(ler)inin başharf(ler)i, bölüm başlığı, editörün(lerin) ismi, kitap ismi, kaçıncı baskı olduğu, şehir, yayınevi, yıl ve sayfalar belirtilmelidir.

Örnek:

- Yabancı dilde yayımlanan kitaplar için;
- Vissers RJ, Abu-Laban RB. Acute and Chronic Pancreatitis. In: Tintinalli JE, Kelen GD, Stapczynski JS (eds.), Emergency Medicine: A comprehensive Study Guide. 6 st ed. New York: McGraw-Hill Co; 2005. p.573-577.
- Türkçe kitaplar için; Gökçe Ö. Peptik ülser. Dilek ON, editör. Mide ve Duedonum.
- 1. Baskı. Ankara: Anıt Matbaası; 2001. s:265- 276.
- On-line yayınlar için format; DOI tek kabul edilebilir on-line referanstır.

Şekil, Resim, Tablo ve Grafikler

- Şekil, resim, tablo ve grafiklerin metin içinde geçtiği yerler ilgili cümlenin sonunda belirtilmelidir.
- Şekil, resim, tablo ve grafiklerin açıklamaları ana metnin sonuna eklenmelidir.
- Tablolar her sayfaya bir tablo olmak üzere yazının gönderildiği dosya içinde olmalı ancak yazıya ait şekil, grafik ve fotoğrafların her biri ayrı bir imaj dosyası (jpeg ya da gif) olarak gönderilmelidir.
- Kullanılan kısaltmalar şekil, resim, tablo ve grafiklerin altındaki açıklamada belirtilmelidir.

tten sonra İngilizce anahtar kelimeler belirtilmelidir.

Giriş (Introduction) Konu İle İlgili Başlıklar Sonuç

(Conclusion) Kaynaklar (References)

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Kaynaklar

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- Kaynak listesinde yalnızca yayınlanmış ya da yayınlanması kabul edilmiş veya DOI numarası almış çalışmalar yer almalıdır.
- Kaynak sayısının araştırmalarda 50 ve derlemelerde 100, olgu sunumlarında da 20 ile sınırlandırılmasına özen gösterilmelidir.
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Örnek: Baser A, Eliaçık S, Baykam MM, Tan FU. Clinical Manifestations of Overactive Bladder With Migraine as a Comorbidity: A Prospective Cross-Sectional Study. Int Neurourol J. 2020;24(4):375-381. https://doi.org/10.5213/inj.2040186.093.

Kitap için; Yazar(lar)ın soyad(lar)ı ve isim(ler)inin başharf(ler)i, bölüm başlığı, editörün(lerin) ismi, kitap ismi, kaçıncı baskı olduğu, şehir, yayınevi, yıl ve sayfalar belirtilmelidir.

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- Yabancı dilde yayımlanan kitaplar için;
- Vissers RJ, Abu-Laban RB. Acute and Chronic Pancreatitis. In: Tintinalli JE, Kelen GD, Stapczynski JS (eds.), Emergency Medicine: A comprehensive Study Guide. 6 st ed. New York: McGraw-Hill Co; 2005. p.573-577.
- Türkçe kitaplar için; Gökçe Ö. Peptik ülser. Dilek ON, editör. Mide ve Duedonum.
- 1. Baskı. Ankara: Anıt Matbaası; 2001. s:265- 276.
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- Title Page

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RESEARCH ARTICLE / ARAŞTIRMA MAKALESI

The Effect of The Covid-19 Pandemic On Suicide Attempts of Individuals Aged 65 And Over

Covid-19 Pandemisinin 65 Yaş ve Üzeri Yaşlı Bireylerin İntihar Girişimleri Üzerine Etkisi

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Abstract

Introduction The aim of this study is to examine whether the Covid-19 pandemic affects the suicide attempts of elderly individuals aged 65 and over and to offer solutions for the prevention of these suicide attempts.

Materials and Methods The medical records of elderly patients aged 65 years and over who applied to the Emergency Department between March 01, 2016, and March 31, 2022, were retrospectively analyzed. "Pre-pandemic period" suicide attempts and "Pandemic period" suicide attempts were handled separately. Age, gender, length of hospital stays, type of suicide attempt, psychological status, post-examination status, whether he lived alone or with his family, whether there was a recurrent suicide attempt and whether there was a history of psychiatric illness were recorded in the case study forms. SPSS (version 26.0) package program was used for statistical analysis. Demographic data were expressed as numbers and percentages.

Results In this study, the records of 71 patients over the age of 65 were reviewed retrospectively. It was determined that the total number of patients who attempted suicide during the pandemic period showed a statistically significant increase compared to the pre-pandemic period ($p<0.00001$), and there was a 3.56-fold increase in suicide attempts over 65 years of age.

Conclusion Comorbidities with old age negatively affect the quality of life and lead people to despair. Isolation measures taken in old age, when the need for social support increases, pushes the elderly to loneliness even more, and this situation emerges as increasing suicide attempts.

Keywords Elder, Geriatric patient, Pre-pandemic period, Pandemic period, Suicide attempts, Covid-19, ,

Özet

Amaç Bu çalışmanın amacı, Covid-19 pandemisinin 65 yaş ve üstü yaşlı bireylerin intihar girişimlerini etkileyip etkilemediğini incelemek ve bu intihar girişimlerinin önlenmesine yönelik çözüm önerileri sunmaktır.

Gereç ve Yöntemle Acil Servise 01 Mart 2016-31 Mart 2022 tarihleri arasında başvuran 65 yaş ve üzeri yaşlı hastaların tıbbi kayıtları retrospektif olarak incelendi. "Pandemi öncesi dönem" intihar girişimleri ve "Pandemi dönemi" intihar girişimleri ayrı ayrı ele alındı. Yaş, cinsiyet, hastanede kalış süresi, intihar girişiminin türü, hastanın psikolojik durumu, muayene sonrası durumu, yalnız mı yoksa ailesiyle mi yaşadığı, tekrarlayan intihar girişimi olup olmadığı ve psikiyatrik hastalık öyküsü olup olmadığı olgu rapor formlarına kaydedildi. İstatistiksel analiz için SPSS (versiyon 26.0) paket programı kullanıldı. Demografik veriler sayı ve yüzde olarak ifade edildi.

Bulgular Bu çalışmada 65 yaş üzeri 71 hastaya ait kayıtlar geriye dönük olarak incelendi. Pandemi döneminde intihar girişiminde bulunan toplam hasta sayısının pandemi öncesine göre istatistiksel olarak anlamlı düzeyde artış gösterdiği ($p<0,00001$), 65 yaş ve üzeri intihar girişimlerinde 3,56 kat artış olduğu belirlendi.

Sonuç Yaşlılık ile birlikte görülen hastalıklar yaşam kalitesini olumsuz etkilemekte ve insanları umutsuzluğa sürüklemektedir. Sosyal desteğe ihtiyacın arttığı yaşlılıkta alınan izolasyon önlemleri, yaşlıyı daha da yalnızlığa itmekte ve bu durum artan intihar girişimleri olarak karşımıza çıkmaktadır.

Anahtar Kelimeler Yaşlı,Geriatrik hasta, Pandemi öncesi dönem, Pandemi dönemi, ,İntihar girişimleri, Covid-19,

INTRODUCTION

Suicide is a situation that people resort to as a last resort when they cannot solve their problems, and they see death as a way out. Suicide attempts are defined as self-harming behavior in which the person intends to kill himself but does not result in death (1). The fact that suicide is a preventable cause of death makes suicide attempts a serious public health problem. Recently, the prevalence of suicide attempts among adults in the USA has increased from 0.3 to 0.6 (2). Suicide rates are also increasing in our country. According to TUIK data, the number of suicides increased from 3.246 to 3.406 in 2015-2019 (3). Suicide attempts are 30 times more common than suicides in all age groups (4). While the ratio of suicide attempts to suicides in young people is 1/100-200, this rate rises to 1/4 in the elderly (5). Especially in developing countries where the elderly population continues to increase rapidly, these rates are gaining even more importance. The population over the age of 65 is increasing in our country. While the population over the age of 65, which is considered as the elderly population, was 6.5 million (8.3%) in 2016, it became approximately 8.5 million (9.7) in 2021 (6). On the other hand, suicide rates increased from 373 in 2016 to 385 in 2019 (3).

Many risk factors have been identified in predicting suicide. Especially in the elderly, physical dependence due to degenerative diseases, severe pain and social isolation are among these risk factors (2). The two most important parameters defined as the strongest indicator of completed suicide are suicide attempts and advanced age (7,8). In other words, if the necessary precautions are not taken, the next step of an individual aged 65 and over who has attempted suicide will be completed suicide. Especially with the changing living conditions recently, people have become increasingly individualized. This individualization resulted in the isolation of the elderly. Loneliness brought with it fear of the future and hopelessness. Feeling of helplessness and fear play an important role in suicide attempts (9).

Our aim in this study is to examine the effects of the Covid-19 pandemic on the suicide attempts of elderly individuals aged 65 and over who come or are brought to our hospital's emergency department, and to offer solutions for the prevention of these suicide attempts.

MATERIAL and METHODS

Study design and data collecting

Our research is a cross-sectional descriptive study. Patients aged 65 and over who applied to Bakircay University Cigli Training and Research Hospital Emergency Department between 01 March 2016 and 31 March 2022, Izmir, Turkey, due to a suicide attempt were included in the study. The medical records of the patients were reviewed retrospectively through the hospital information operating system. Age, sex, length of hospital stays, type of suicide attempt (drug intake, chemical intake, traumatic, etc.), psychological status (normal, depressive period, psychotic attack), post-examination status (emergency department discharge, service admission, intensive care unit admission), whether he lived alone or with his family, whether there was a recurrent suicide attempt, and whether he had a history of psychiatric illness were recorded in the case study forms.

Suicide attempts before March 11, 2020, when the Covid-19 pandemic was declared by the World Health Organization (WHO), were accepted as "Pre-pandemic period suicide attempts", and suicide attempts on March 11, 2020, were accepted as "Pandemic period suicide attempts". Patients under 65 years of age, non-suicid patients, and patients with missing data were excluded from the study.

Ethical statement

Ethics committee approval dated 11.05.2022 and decision number 595 was obtained from Bakırçay University non-interventional clinical studies ethics committee. Written and verbal consent was obtained from all participants participating in the study.

Table 1. Number of patients applied Pre-pandemic period and the Pandemic period.

		>65 years old Suicidal attempt	Total >18 years old Suicidal attempt	Frequencies (%)		p Value
Pre-pandemic period	2016-2017	6	602	0.99	1.02	<0.00001* 0.201**
	2017-2018	6	607	0.98		
	2018-2019	4	793	0.50		
	2019-2020	12	732	1.63		
Pandemic period	2020-2021	24	541	4.43	3.65	
	2021-2022	19	637	2.98		

** p value is derived from chi square test and it shows result of statistical analysis between frequencies pre-pandemic period and pandemic period.*
***p value is derived from chi square test and it shows the result of statistical analysis between first year of the pandemic period and second year.*

Statistical analysis

SPSS 26.0 (IBM Corporation, Armonk, New York, USA) program was used in the analysis of the variables. Demographic data were expressed as numbers and percentages. Chi-square test was used to compare group frequencies, and Fisher's exact chi-square test was used when the values obtained were below 5. Student-t test was used to compare group means; Mann-Witney U test was used when the variables in the groups were below 30. A p value of <0.05 was considered statistically significant.

RESULTS

In this study, 71 patients who met the inclusion criteria specified in the method section were examined. In the 4-years period before the pandemic, a total of 2734 patients were admitted to the emergency department due to suicide attempts, of which 28 (1.02%) were patients aged 65 and over. On the other hand, during the two-years pandemic period, a total of 1178 patients applied due to suicide attempts, 43 of them (3.65%) were 65 years and older.

When the annual average number of patients admitted due to suicide in the pre-pandemic period and the pandemic period were compared; it was determined that the total number of patients with suicide attempts during the pandemic period increased statistically (p<0.00001), and there was a 3.56-fold increase in suicide attempts aged 65 and over (OR=3.56; 95%, CI=2.2-5.76).

In our study, when the status of the patients after the examinations made after the application was examined; it was determined that the rate of discharge from the emergency department increased during the pandemic period, and the number of intensive care unit admissions decreased (p=0.001).

When the duration of hospitalization of patients who attempted suicide in the pre-pandemic period and during the pandemic period were compared; it was calculated as 3.5±3 days in the pre-pandemic period and 1.9±1.76 days in the pandemic period, and it was determined that the duration of hospital stay was statistically significantly reduced during the pandemic period (p=0.0001).

In the presented study, no statistically significant difference was found in the number of patients aged 65 and over who applied between the first and second years of the pandemic period (p=0.201) (Table 1). There was no statistically significant difference in terms of mean age and gender distribution in the pre-pandemic and pandemic period patient admissions (p=0.129 and p=0.476). When the suicide attempt method and the psychiatric examination findings

Table 2. *Sociodemographic data of the patients who applied Pre-pandemic period and the Pandemic period.*

		Before the pandemic period	Pandemic period	p-Values
Age, (mean±sd)		71.43±9	74.57±7.93	*0.129
Hospitalization period, (mean±sd)		3.5±3	1.19±1.76	**0.0001
Gender, n (%)	Male	15 (53.7%)	18 (42.8%)	***0.476
	Female	13 (46.3%)	24 (57.2%)	
Suicidal attempt method, n (%)	Drug	24 (85.7%)	28 (66.7%)	0.08
	Chemical	4 (14.3%)	10 (23.8%)	
	Trauma	0 (0%)	4 (9.5%)	
Behavior, n (%)	Normal	9 (32.1%)	16 (38.1%)	0.759
	Depressive	16 (57.4%)	23 (54.8%)	
	Psychotic	3 (10.5%)	3 (7.1%)	
Hospitalization, n (%)	Discharged	2 (7.1%)	19 (45.2%)	0.001
	Service	16 (57.2%)	19 (45.2%)	
	ICU	10 (35.7%)	4 (9.6%)	
Sociality, n (%)	Alone	5 (17.9%)	6 (14.3%)	0.745
	Living with family	23 (82.1%)	36 (85.7%)	
Repeated suicidal attempt, n (%)	Yes	3 (10.7%)	0 (0%)	0.06
	No	25 (89.3%)	42 (100%)	
Psychiatric History, n (%)	None	13 (46.4%)	30 (71.4%)	0.075
	Depression	11 (39.3%)	7 (16.7%)	
	Psychosis	3(10.7%)	2 (4.7%)	
	Addiction	0 (0%)	2(4.7%)	
	Bipolar	1 (3.6%)	1 (2.4%)	

** p value is derived from student's t test.*
***p value is derived from Mann-Whitney U test.*
****p value is derived from chi-square test.*
Other p values are derived from Fisher Exact test.

after the suicide attempt were compared, no statistically significant difference was found (p=0.08, p=0.759). However, socio-demographic characteristics of patients who attempted suicide, such as living alone or with their families, having a history of recurrent suicide attempts, and having a history of psychiatric illness did not make a statistically significant difference between the pre-pandemic and pandemic periods (P=0.745, p=0.06, p=0.075) (Table 2).

DISCUSSION

AIn this study, 71 patients who met the inclusion criteria specified in the method section were examined. In the 4-year period before the pandemic, there was a significant increase in the total number of patients admitted to the emergency department due to suicide attempts, and in patients aged 65 and over, in the pandemic period, the length of stay in the hospital has decreased significantly, it is seen that there is a significant increase in the rates of discharge from the emergency department during the pandemic period, and the number of intensive care unit admissions decreased. Despite the significant increase in the number of patients, the decrease in hospitalization rates and hospital stays, in addition, increased discharge rates, we believe that it occurred in order to minimize the risk of contamination brought by the pandemic.

While some studies on the Covid-19 pandemic indicate that anxiety levels, depression, substance use, and suicidal thoughts increase during the pandemic period, they do not provide any definitive data on the increase in completed suicides or suicide attempts (10,11). On the other hand, in the survey study of Pirkis covering 9 countries, it was reported that the suicide rates decreased compared to the pre-pandemic period, but there were increases in the suicide rates in Austria, Puerto Rico and Japan after the first 6 months of the pandemic period (12). In another study by

Mitchell, it was stated that there was no significant change in the rates in the first 4 months of the pandemic, but there was a peak in suicide attempts in the following period (13). The Indian study by Suchandra reported that the pandemic potentially contributed to the increase in mental illness and suicide rates, and suggested strategies for the COVID-19 pandemic to reduce the risk of suicide (14). In addition to the social-psychiatric effect of Covid-19, suicidal thoughts have been found to increase due to the biological effect of the brain in people who have had Covid-19 disease (15). It is not easy to clarify the distinction between these two etiologies. As a result; All patients with psychiatric effects after Covid-19 disease are considered as psychiatric sequelae of Covid-19 (16). In a meta-analysis study conducted by Farooq in 2021 regarding the effect of Cwovid-19 on suicidal ideation, it was reported that suicidal ideation increased in all age groups (17). In our study, it was determined that the total number of patients who came with a suicide attempt during the pandemic period increased statistically significantly, and there was a significant increase in suicide attempts over the age of 65. Our study is seen that the data of our study are compatible with the meta-analysis.

In this study, no statistically significant difference was found in terms of mean age and gender distribution in-patient admissions in the pre-pandemic and pandemic period. Although our working age group reflects a specific age group over the age of 65, there are different stressors brought by the Covid-19 pandemic in younger groups. Despite the future anxiety in the elderly population for care purposes, it pushes people to similar results with a different primary cause, such as the future anxiety caused by economic reasons in young people. In our study, it is seen that the rates of suicide attempts that increased during the pandemic period did not change between the first and second years of the pandemic period. The anxiety created by the unknowns about the disease in the early stages of the pandemic, then the detection of old age as a bad prognosis indicator for Covid-19, the number of diseases and deaths announced day by day, the high mortality of the elderly and the rapid spread of other negative information discovered in today's technology, caused the elderly population to be negatively affected psychologically. Even though social media has provided a very serious transmission speed in the communication network, the fact that it has shown elderly patients as the target and victim of Covid-19 can also be shown as a negative effect. In a study conducted among adolescent individuals, it was shown that social media has an increasing effect on suicide attempts (18). In the survey conducted with 18 thousand people in China, the stress and anxiety levels of adolescent individuals who used active social media during and before the Covid-19 period were evaluated. As a result of this study, it was concluded that stress, fear and tendency to violence increase during the pandemic period (19). The increasing fear of death was added to the anxiety and stress brought on by the unknown of the disease, and the isolation measures taken to prevent transmission made the elderly population even more lonely. The active young population, on the other hand, seems to have ignored the psychological trauma caused by this isolation in the face of the anxiety of contagion and preferred the isolation of the elderly to the risk of contamination. As a result of these, we believe that there has been a 3.56-fold increase in suicide attempts of elderly individuals who have become even more lonely during the pandemic period and cannot meet even their minimum needs. Parallel to this increase, according to the data obtained from this study and similar studies (17); it can be concluded that there may be a similar increase in completed suicide rates, and that the high rates found may be a striking indicator of the rapid loss of our population from an avoidable cause.

In the present study, no statistically significant difference was found when the method of suicide attempt and psychiatric examination findings after suicide attempt were compared. No increase in suicide attempts was detected due to the pandemic in people with a history of psychiatric illness before the pandemic. In the literature, similar re-

sults have been obtained in a small number of studies conducted in pre-Covid-19 pandemics, and it has been shown that suicide attempts caused by pandemics do not increase the risk of death (12). It is predicted that the Covid-19 pandemic will cause an increase in mental health problems (20), and we believe that these mental effects will not cause a change in suicide rates if appropriate diagnostic and treatment approaches are used.

In this study, patients who attempted suicide were living alone or with their families, having a history of recurrent suicide attempts, it was observed that sociodemographic characteristics such as having a history of psychiatric illness did not make a significant difference between the pre-pandemic period and pandemic period. It has been reported that family relationships, staying in life and friendship ties are important in preventing both depression and suicide attempts in the elderly (21). In Calati's study, it was shown that loneliness is positively associated with suicidal ideation (22). In our study, however, the fact that individuals live alone or with their families does not seem to significantly affect the suicide attempt rates. We can say that suicide attempt rates are affected by social relations independent of the pandemic, but the pandemic is not statistically significant in this regard.

The Covid-19 pandemic we are experiencing has created fear all over the world. The fact that advanced age is a risk factor in itself for Covid-19 and the mortality is higher in the elderly has drawn the attention of the public to the elderly population during the pandemic period (17). The news made for protection and information purposes has created psychological pressure on the elderly people and made them feel even more vulnerable and helpless. In addition, isolation measures taken to prevent infection have reduced social relations. It has been shown that policies for Covid-19 management increase psychosocial risks and this creates a risk of suicide attempt that can persist both during and after the pandemic (23). As a result of all these factors, the rate of suicide attempts has increased in the elderly who have no expectation for life. In solving the problem of elderly people's suicide attempts; family members, the community and health professionals need to work together (10). Family members and society should be able to provide the necessary social support, and people should be able to easily access both mental and physical health support. In fact, primary health care services should monitor elderly patients more closely with routine mental health checks. For the elderly who do not have anyone to take care of them, spaces should be created that can provide appropriate shelter and care services and social relations can be established.

CONCLUSION

With the increase in life expectancy, the elderly population is also increasing. However, the comorbidities brought about by old age negatively affect the quality of life and most of the elderly have difficulty in continuing their lives without support. Both old age and additional diseases make old age difficult and lead people to despair. Isolation measures taken for a reason such as a pandemic in the old age, when the need for social support increases, pushes the elderly to despair even more, and this situation emerges as increasing suicide attempts.

Suicide attempts can be considered as one of the most important indicators of completed suicides and evidence of an increase in completed suicides. We believe that providing the necessary support to the elderly population, to increase the social areas for the elderly, to increase the routine biological and psychological health screenings, to improve the economic conditions of the elderly, to increase the use of supportive national media and social media organs, will play an important role in preventing suicide attempts and maintaining a healthy life for the elderly population. Family members and society should be able to provide the necessary social support, and people should be able to easily access both mental and physical health support. Primary health care services should monitor elderly patients more closely with routine mental health checks and contact a higher-level health center when ne-

cessary. For the elderly who have no one to look after, spaces should be created to provide appropriate shelter and care services, and to establish social relations. It would be beneficial to plan more targeted improvements to prevent suicide attempts in the elderly, who are one of the specific groups most affected by the negative effects of the Covid-19 pandemic all over the world.

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RESEARCH ARTICLE / ARAŞTIRMA MAKALESI

Evaluation of Insulin Resistance of Individuals with MAFLD

MAFLD'lı Bireylerin İnsülin Rezistansı'nın Değerlendirilmesi

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Abstract

Introduction MAFLD is a new diagnosis that has been brought to the terminology in the last 2 years, and it is thought that the main mechanism underlying its development is Insulin Resistance (IR). In our study, it is planned to research the role of IR level in the etiology of patients with MAFLD.

Materials and Methods 265 individuals with MAFLD are included in the study by examining their sub-parameters of case diagnosis. While 85 patients have T2DM, 180 patients are found to be PreDiabetic. IR is calculated with HOMA-IR. The value of 2.5 and above is considered as high, and below 2.5 is considered as normal. The ratios of HOMA-IR levels and their relationship between waist circumference and BMI were examined.

Results The value of HOMA-IR was found high in 60.6% of prediabetic MAFLDs, while it was normal in 39.4% of them. Age ((p=0.001; p<0.01) and waist circumference (p=0.028; p<0.05) in the T2DM group were found to be higher than the PreDiabetic group. Very weak positive correlation was found between HOMA-IR and BMI (r=0.223; p=0.003; p<0.01) and waist circumference (r=0.205; p=0.006; p<0.01) in the prediabetic group. In the T2DM group, there was a very weak positive correlation between BMI and HOMA-IR (r=0.254; p=0.019; p<0.05).

Conclusion : In our study, IR was not detected in 39.4% of patients with MAFLD. This result leads us to think that insulin sensitizing agents may not be effective in this patient group in patients with normal IR levels. We think that these agents will not be effective in patients with normal IR levels. Our study should be supported with experimental and histological MAFLD studies.

Keywords MAFLD, Prediabetes, Insulin Resistance

Özet

Amaç MAFLD son 2 yılda terminolojiye kazandırılmış yeni bir tanı olup, gelişiminde altta yatan ana mekanizmanın İnsülin Rezistansı(IR) olduğu düşünülmektedir. Çalışmamızla MAFLD'lı hastaların IR düzeyinin etyolojideki rolünü incelemeyi planladık.

Gereç ve Yöntemle Method: Çalışmaya 265 MAFLD'lı vaka tanı alt parametreleri incelenerek dahil edildi. 85 hastada T2DM varken, 180 hasta Prediyabetik'ti. HOMA-IR ile IR hesaplandı. 2.5 ve üzeri yüksek, 2.5 altı normal olarak değerlendirildi. HOMA-IR düzeyi oranları ve bel çevresi ve BMI ile ilişkisi incelendi.

Bulgular Prediyabetik MAFLD'ların %60.6'sında HOMA-IR yüksek iken, %39.4'ünde normaldir. T2DM grubunun yaş((p=0,001; p<0,01) ve bel çevresi(p=0,028; p<0,05) prediyabetik gruptan yüksek tespit edildi. Prediyabetik grupta HOMA-IR ile BMI arasında(r=0,223; p=0,003; p<0,01), bel çevresi arasında(r=0,205; p=0,006; p<0,01) çok zayıf pozitif ilişki tespit edilmiştir. T2DM grubunda ise BMI ile HOMA-IR arasında çok zayıf düzeyde pozitif ilişki tespit edilmiştir(r=0,254; p=0,019; p<0,05).

Sonuç Çalışmamızda MAFLD'lı hastaların %39.4'ünde IR saptanmamıştır. Bu sonuç bize IR düzeyi normal hastalarda insülin duyarlaştırıcı ajanların bu hasta grubunda işe yaramayabileceğini düşündürmektedir. IR seviyesi normal hastalarda bu ajanların işe yaramayacağını düşünmekteyiz. Çalışmamızın deneysel ve histolojik düzeyde MAFLD çalışmaları ile desteklenmesi gerekmektedir.

Anahtar Kelimeler MAFLD, İnsülin Rezistansı, Prediyabet

INTRODUCTION

Metabolic Syndrome (MetS) and its main sub-components which is Insulin Resistance (IR), and the presence of HepatoSteatosis with obesity have been defined as Metabolic Disfunction-Associated Fatty Liver Disease (MAFLD)(1,2) recently. Even though it has similar aspects with Non-Alcoholic Fatty Liver Disease (NAFLD), the diagnosis of MAFLD does not exclude viral hepatitis and alcohol consumption above a certain level. Evidence of metabolic disorder (presence of Type 2 Diabetes Mellitus (T2DM), obesity or metabolic disorder) must be present for the diagnosis of MAFLD at the same time. However, these criteria are not required for NAFLD. It is required for diagnosis to show fat in the liver in Ultrasonographic (USG) imaging or histologically show 5% or more fat in hepatocytes. As a new terminology, MAFLD is more inclusive and its diagnosis depends on more precise criteria in comparison with NAFLD (3).

It is still a common idea nowadays that IR is the most important mechanism underlying metabolic effects and lipoidosis in the liver. The fact that HepatoSteatosis is seen more common in T2DM and rare in Type 1 Diabetes Mellitus (T1DM) also encourages this thesis. Moreover, glucotoxicity and lipotoxicity are among the other important factors that contribute to the development of lipidosis in the liver(4).

In this study, we have the purpose to analyze the frequency of IR and its relationship with the components that comprises MAFLD in cases diagnosed with MAFLD.

MATERIAL and METHODS

A study group of 265 cases aging 18 years and over who applied to 3 different internal diseases policlinic between the dates June and September 2022 and complied with the MAFLD criteria were constituted. The data were evaluated retrospectively. T1DM, pregnant women and patients with gestational diabetes mellitus were excluded from the study. Cases were included in the study if the HbA1c value was between 5.7-6.4% in the aspect of PreDiabetes. The livers evaluated in all cases were interpreted by radiology specialists with Voluson Simens G60 S brand USG device, and were included in the study in case grade 1 or higher HepatoSteatosis were seen. In order to make standardization among the cases, any level of alcohol consumption and the presence of viral hepatitis were excluded from the study. PreDiabetic patients using any antidiabetic agents were not included in the study. Waist circumference, height and weight values of all cases were measured and Body Mass Index (BMI) values were calculated. Individuals who have BMI values of 30 kg/m2 and above were considered as obese. Blood pressure values were measured manually with an Omron brand mercury sphygmomanometer. HbA1c level, Fasting Plasma Glucose (FPG) levels and lipid parameters were evaluated in all cases.

A homeostasis model evaluation HOMA-IR (fasting insulin(microU/L)xFPG(nmol/L)/22.5) was used to evaluate IR (5). HOMA-IR level of 2.5 and above was evaluated as IR.

Ethics committee approval was granted (desicion no:2022/514/234/1).

Statistical Method

For statistical analysis and calculations, IBM SPSS Statistics 26 (IBM-SPSS, Turkey) licensed program was used. Descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum, maximum) were used in the evaluation of the data. The quantitative data's conformity to normal distribution was tested with Kolmogorov-Smirnov, Shapiro-Wilk test, Skewness-Kurtosis test and graphical evaluations. Independent Samples t-Test was used for the comparison of normally distributed quantitative data between two groups, and the Mann Whitney U test was used for two-group comparisons of data that were not normally distributed. Pearson Chi-Square test was used for the comparison of qualitative data. In order to evaluate the relationships between variables, Spearman's Correlation Analysis was used. Significance level was determined at least $p<0.05$.

Table 1: Distribution of Demographic Characteristics

		n	%
Age (years)	Median(Min-Max); Mean±Sd	49(18-74)	48,4±10,7
Gender	Male	66	24,9
	Female	199	75,1
BMI(kg/m^2)	Median(Min-Max); Mean±Sd	31(19-53)	31,9±5,71
	Obese(-)	111	41,9
	Obese(+)	154	58,1
Waist circumference (cm)	Median(Min-Max); Mean±Sd	104(75-141)	105±11,3
T2DM	PreDiabetes	180	67,9
	T2DM	85	32,1
HbA1c(%)	Median(Min-Max); Mean±Sd	5,9(5,1-15,3)	6,5±1,4
FPG(mg/dL)	Median(Min-Max); Mean±Sd	96(64-327)	111,9±48,5
HOMA-IR	Median(Min-Max); Mean±Sd	3(0,4-32,6)	3,9±3,5
	Normal	98	37
	High	167	63

FPG: Fasting Plasma Glucose
BMI: Body Mass Index

RESULTS

The study was conducted with a total of 265 cases, with the participants of which 24.9% (n=66) were male and 75.1% (n=199) were female. The ages of the participants ranged from 18 to 74, with a mean of 48.4±10.7 years old.

BMI measurements vary between the values of 19 and 53 kg/m2, with a mean value of 31.9±5.7 kg/m2. While 58.1% (n=154) of the participants are obese, 41.9% (n=111) of them do not have the obesity. Waist circumference measurements vary between the values of 75 and 141 cm, with a mean value of 105±11.3 cm. While 67.9% (n=180) of the cases participating in the study were PreDiabetes, 32.1% (n=85) of them were T2DM patients.

HbA1c measurements vary between the values of 5.1% and 15.3%, with a mean value of 6.5±1.4%. FPG measurements vary between the values of 64 mg/dL and 327 mg/dL, with a mean value of 111.9±48.5 mg/dL. Homa-IR measurements ranged from the values 0.4 to 32.6, with a mean value of 3.9±3.5; Homa-IR level was found to be normal in 37% (n=98) of the cases, while Homa-IR level was evaluated as high in 63% (n=167) of the cases.

It was determined that there was a statistically significant difference between the ages of the cases in regard to the groups (p=0.001; p<0.01); The ages of the group with T2DM is higher than the group with prediabetes.

A statistically significant difference was found between the gender distribution of the cases in regard to the groups (p=0.001; p<0.01); The rate of incidence of T2DM is higher in women than in men.

There could not be seen a statistically significant difference between BMI measurements and obesity prevalence rates of the cases in regard to the groups (p>0.05).

It was observed that there was a statistically significant difference between the waist circumference measurements of the cases in regard to the groups (p=0.028; p<0.05); Waist circumference measurements of the group with T2DM are higher than the group with Prediabetes.

Homa-IR measurements and Homa-IR level ratios of the cases did not show a statistically significant difference in regard to the groups (p>0.05).

For PreDiabetes Group;

It was found that there was a positive and statistically significant very weak correlation between the BMI measurements of the cases and the HOMA-IR measurements (r=0.223; p=0.003; p<0.01).

A positive and statistically significant very weak correlation was found between the waist circumference measurements of the cases and the HOMA-IR measurements (r=0.205; p=0.006; p<0.01).

Table 2: Evaluations according to the Existence of Diabetes

		PreDiabetes (n=180)	T2DM (n=85)	p
Age(years)	Median(Min-Max)	46,5(18-74)	53(32-74)	[a]0,001**
	Mean±Sd	45,8±10,79	54±8,4	
Gender; n (%)	Male	32(17,8)	34(40)	[b]0,001**
	Female	148(82,2)	51(60)	
BMI(kg/m^2)	Median(Min-Max)	31(19-53)	31(21-49)	[a]0,641
	Mean±Sd	32,1±5,7	31,7±5,7	
Obesity; n (%)	No	74(41,1)	37(43,5)	[b]0,710
	Yes	106 (58,9)	48(56,5)	
Waist circumference (cm)	Median(Min-Max)	103(75-136)	106(75-141)	[a]0,028*
	Mean±Sd	103,9±11,1	107,2±11,7	
HbA1c(%)	Median(Min-Max)	5,8(5,1-6,4)	7,2(5,6-15,3)	[a]0,001**
	Mean±Sd	5,8±0,2	7,8±1,9	
FPG(mg/dL)	Median(Min-Max)	91(64-137)	134(69-327)	[a]0,001**
	Mean±Sd	92,3±11,3	153,6±67,4	
HOMA-IR	Median(Min-Max)	2,9(0,4-32,6)	3,2(0,4-21)	[c]0,499
	Mean±Sd	3,8±3,6	4±3,3	
HOMA-IR level; n (%)	Normal	71(39,4)	27(31,8)	[b]0,227
	High	109(60,6)	58(68,2)	

aIndependent Samples t Test *bPearson Chi-Square Test*
cMann Whitney U Test ***p<0,01* **p<0,05*

For the T2DM Group;

It was found that there was a positive and statistically significant very weak correlation between the BMI measurements of the cases and the HOMA-IR measurements (r=0.254; p=0.019; p<0.05).

No statistically significant correlation was determined between the waist circumference measurements of the cases and the HOMA-IR measurements (p>0.05).

DISCUSSION

There are some studies in the literature that shows the relationship between NAFLD-HOMA-IR(6,7). The existence of IR is also one of the diagnostic criteria for MAFLD. In the absence of T2DM or obesity, it can be diagnosticated directly if at least one of the other minor criteria (prediabetes, being overweight, hypertension, hypertriglyceridemia, low HDL level, waist circumference that is 102 cm and above in men and 88 cm and above in women) exists with IR(8).

In this study, the cases were separated as T2DM and PreDiabetes. Because of the fact that almost all of the cases with T2DM use Metformin, some of the T2DM cases also use Pioglitazone as well. Both of the agents augment insulin sensitivity in liver and muscle tissues and facilitate the use of glucose of the tissues, and regulate plasma glucose levels (9,10). Pioglitazone has shown improvements significantly IR and related diseases which is one of the NAFLD indices in T2DM even at low dose levels, and it regulates this effect independent from the control of glucose (11). It has been found that there is a decrease in steatosis and inflammation in hepatocytes after the use of Pioglitazone in NAFLD in animal experiments (12). Whilst Metformin has positive effects on IR and weight loss (13); though there are controlled studies on HepatoSteatosis in MAFLD, these studies have not reached out to the conclusion or the final stage yet (14). As mentioned before, the fact that the existence of IR is the main issue on HepatoSteatosis and other metabolic effects is still kept up-to-date (4). PreDiabetics using Metformin currently were not included in the study, while PreDiabetic MAFLDs were included in the study. However, Pioglitazone is not within the cover of payback and cannot be used currently in PreDiabetics and/or MAFLD/NAFLD patients in our country. The reason why the Metformin users were excluded from the study is to ensure that IR could be evaluated accurately and wit-

Table 3: The Relationship between BMI and Waist Circumference Measurements and HOMA-IR Measurements

		PreDiabetes (n=180)	T2DM (n=85)
BMI & HOMA-IR	r	0,223	0,254
	p	0,003**	0,019*
Waist circumference & HOMA-IR	r	0,205	0,130
	p	0,006**	0,237

r: Spearman's Correlation Coefficient **p<0,01 *p<0,05

hout intervention. Since there will be changes in FPG and Fasting Insulin values in the use of Metformin, HOMA-IR measurement changes as well. Prediabetic MAFLDs were evaluated additionally, because IR measurements of MAFLDs with T2DM cannot reflect the baseline IR value at this point. In this group of 180 people, 60.6% (n=109) of them were determined with HOMA-IR value of 2.5 and above, while 39.4% (n=79) of them had a HOMA-IR measurement below 2.5 and this was considered as normal. One of the trend topics of the recent period which is the approach to MAFLD and its treatment is not very clear. There has not given a clear answer to the question yet, whether Pioglitazone has an effect on lipoidosis and inflammation in hepatocytes in the approximately 40% population with normal HOMA-IR values, or it is only clinically and histologically beneficial to Pioglitazone in MAFLDs with high IR values. Pharmacological treatment decision in MAFLD cases may create reservations for the physicians when the side effects that limit the use of Pioglitazone were considered. Even though MAFLD is a new subject which has been in our practice for 2 years, studies evaluating the effects of Pioglitazone in cases with NAFLD do not show such a distinction, and there is not enough data on this subject.

The idea that IR is being the main mechanism of lipoidosis in hepatocytes does not comprise all the cases. Looking at MAFLD as the new terminology instead of an updated version of NAFLD, it is considered that it would be more accurate to research it as a diagnostic area with unexplained questions underlying it. There may also be divergences for the treatments of MAFLDs without IR. However, it is evaluated that this hypothesis should be tested with different data of clinical patients, different studies in which hepatocytes were interpreted histologically, and new animal experiments.

Another finding is that while a weak positive correlation was statistically seen between HOMA-IR level and BMI, it was found a weak positive correlation between waist circumference and HOMA-IR level in PreDiabetics as well. Regardless of male or female, the median of waist circumference was 104 cm in the study, while the median of BMI was 31 kg/m2. Even though, it can not be assessed about the MAFLD prevalence at the moment, we should keep in mind that Turkey has the most obese society in Europe, and it is estimated that 50% of the Turkish population will be obese by the year 2030 (15). It was shown in the results of TURDEP-2 that the T2DM prevalence in our country was 13.7%, and the prevalences of Isolated-IFG, Impaired Glucose Tolerance (IGT) and Combined Prediabetes were 14.7%, 7.9% and 8.2% respectively (16). It is seen that the prevalence stated in TURDEP-2 has increased in the past 12 years. The hypertension prevalence in our country is 30.3%(17). It is evaluated that the increase in prevalences of T2DM, PreDiabetes, Obesity, Hypertension would augment the frequency of MAFLD. On the other hand, it has been understood now that the detection of HepatoSteatosis on USG is not considered insignificant as previously determined. All the other components should be investigated as well, when any of the components of MAFLD was detected. 3 out of every 4 patients were women in the study. It is considered that women should especially be

more alert and careful about MAFLD.

Limitations of the Study

This is a retrospective study. Because of the pandemic conditions, Postprandial Plasma Glucose was not measured in patients who applied to the policlinic. Moreover, the hs-CRP level of the cases could not be evaluated due to laboratory conditions. The patients that were added to the MAFLD group were excluded from these criteria.

CONCLUSION

It is seen in the results of the study that approximately 1 out of every 3 patients diagnosed with MAFLD does not have IR. This result suggests that insulin sensitizing agents recommended to use in the treatment of MAFLD may not be useful in this group. It is evaluated that it could be more appropriate to consider each patient with MAFLD individually rather than the standard treatment approach

The study has never been presented anywhere before.
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RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

Can The Monocyte-To-Lymphocyte Ratio Be Another Predictor Of Prostate Cancer?

Monosit-Lenfosit Oranı, Prostat Kanserinin Başka Bir Göstergesi Olabilir Mi?

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Abstract

Introduction This study aimed to evaluate whether monocyte-lymphocyte-ratio (MLR) had a potential role as a biomarker of prostate cancer (PCa).

Materials and Methods For patients who underwent a prostate biopsy between January 1, 2017, and December 31, 2021, age, hemogram parameters, free-total PSA values, and pathology results were recorded. Patients with a pathology result of PCa and those with a Gleason score of 3+4 and above were defined as having clinically significant PCa (csPCa), while other PCa cases were defined as having clinically non-significant PCa (non-csPCa).

Results The pathology result was reported as PCa in 164 of the 510 patients included in the study and non-PCa in 346. The monocyte count was found to be higher in the PCa group than in the non-PCa group (0.61±0.33 and 0.53±0.19, respectively; p=0.002). MLR was also significantly higher in the PCa group (0.35±0.29 and 0.26±0.13, respectively; p<0.001). Of 164 patients whose pathology was reported as PCa, 69 (39%) had csPCa and 95 (61%) had non-csPCa. When these PCa subgroups were analyzed, age at diagnosis, free PSA, and total PSA were found to be statistically significantly higher in the csPCa group, while the f/tPSA value was statistically significantly lower in this group. There was no statistically significant difference between the csPCa and non-csPCa groups in terms of the lymphocyte and monocyte counts, and MLR.

Conclusion In patients undergoing a biopsy, an MLR value above 0.3 can predict the pathology result being reported as PCa at a sensitivity of 27.4% and specificity of 85.3%.

Keywords monocyte-to-lymphocyte ratio, monocyte, prostate cancer, prostate biopsy

Özet

Amaç PSA'nın nispeten düşük duyarlılığı ve özgüllüğü nedeniyle tanı verimliliğini artırmak için ucuz, invaziv olmayan ve özellikle klinik önemli prostat kanserini tanıyabilen belirteçlere ihtiyaç vardır. MLR'nin prostat kanserinin bir biyobelirteci olarak potansiyel rolü olup olmadığının değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntemle 1 Ocak 2017 ile 31 Aralık 2021 tarihleri arasında prostat biyopsisi alınan hastaların yaşı, işlem öncesinde lenfosit, monosit sayısı gibi hemogram parametreleri, free-total PSA değerleri, patoloji sonuçları kayıt altına alındı. Patoloji sonucu prostat kanseri (PCa) gelenlerin, Gleason Skoru 3+4 ve üzeri olan hastalar klinik anlamlı prostat kanseri (csPCa) olarak tanımlanırken, diğer PCa'li hastalar klinik anlamlı olmayan prostat kanseri (non-csPCa) olarak tanımlandı.

Bulgular Çalışmaya dahil edilen 510 hastanın 164'ünün patolojisi PCa, 346'sının sonucu non-PCa olarak raporlandı. Monosit sayıları PCa'li grupta non-PCa gruptan daha yüksek bulundu. (sırasıyla; 0,61±0,33 ve 0,53±0,19, p=0.002) MLR de PCa grubunda daha yüksek bulundu. (sırasıyla; 0.35±0.29 ve 0.26±0.13, p<0.001) Tanı anındaki yaş, total PSA, monosit sayısı, MLR, PCa grubunda istatistiksel anlamlı olarak daha yüksek bulunurken, free/total PSA oranı (f/tPSA) bu grupta istatistiksel anlamlı daha düşük izlendi. Patolojisi PCa olarak raporlanan 164 hastalardan 69'unda (39%) csPCa bulunurken, 95'inde (61%) non-csPCa mevcuttu. Bu sub-grupların analizi yapıldığında tanı anındaki yaş, free PSA, total PSA csPCa grubunda istatistiksel anlamlı olarak daha yüksek bulunurken bu grupta f/tPSA değeri istatistiksel olarak anlamlı daha düşük bulundu. Lenfosit, monosit, MLR değerleri açısından csPCa ve non-csPCa grupları arasında istatistiksel olarak anlamlı bir fark bulunamadı.

Sonuç Biyopsi yapılan hastalarda 0.3'ün üzerindeki MLR değeri olması halinde patolojinin PCa olarak sonuçlanması %27,4 duyarlılık ve %85,3 özgüllük ile öngörülebilir.

Anahtar Kelimeler monosit-lenfosit oranı, monosit, prostat kanseri, prostat biyopsisi

INTRODUCTION

Due to the relatively low sensitivity and specificity of PSA, it is often used together with its derivatives, such as free PSA, PSA density, and PSA velocity to increase diagnostic efficiency.(1) However, due to the low specificity of these parameters, many unnecessary biopsies are still performed. In some centers, the urinary prostate cancer antigen 3 test has proven helpful in detecting PCa, and the United States Food and Drug Administration has approved it for repeat biopsies.(2) Another tool used to reduce unnecessary prostate biopsies is multi-parametric magnetic resonance imaging (mpMRI). When a suspicious lesion is detected, a targeted biopsy can be performed with mpMRI. However, the performance of this diagnostic tool may be affected by the characteristics of the patient population, quality of MRI scans, and experience of the radiologist.(3) In addition, the high cost of such additional approaches is the greatest obstacle to their widespread use in clinical practice.(4) It is known that low IPSS score and positive rectal examination (stiffness) increase the probability of being diagnosed with cancer in patients with PSA levels in the gray zone.(5) But there is still a need for markers that can be measured with a low cost in a non-invasive manner, especially to identify clinically significant PCa (csPCa).

PCa is the most common urological malignancy in men and is the second leading cause of cancer-related death after lung cancer.(6) Tumor-associated inflammation and microenvironment are known to be key factors for neoplasia, proliferation, and metastasis.(7, 8) It has also been reported that systemic inflammatory responses play a role in the initiation and progression of PCa.(9) Inflammation has been considered to increase the risk of PCa, similar to some other types of cancer.(8) Oxidative substances released by inflammatory cells cause cell and gene damage, as well as cellular changes and genetic mutations that may lead to PCa.(10)

Considering that appropriate biomarkers were needed for the detection of csPCa before a needle biopsy, some authors investigated the number of serum monocytes in patients with PCa and found it to be significantly increased in those with a high GS.(11) Another study showed that in addition to PSA and f/tPSA, the diagnostic value of MLR

Assessed for eligibility	**Patients who underwent prostate biopsy: 1611**
Exclusion*	**Patients without pathological examination results: 105** **Patients without PSA values: 252** **Patients without hemogram results before procedure: 862** **Patients with anemia: 113** **Patients with acute or chronic prostatitis, prostatic intraepithelial neoplasia according to the pathology result : 238** **Patients taking antibiotics, non-steroidal anti-inflammatory drugs, or 5-alpha reductase inhibitors: 102** **Patients with malignancy other than prostate cancer: 3**
Grouping	**Prostate cancer group (Pca): 164** **non-Prostate cancer group (non-Pca): 346**
Cancer grouping	**Clinically significant prostate cancer group (csPca): 69** **Clinically non-significant prostate cancer group (non-csPca): 95**

Figure 1. *Flowchart for patient selection*

Table 1. *Clinical characteristics and blood parameters of the PCa and non-PCa groups*

		PCa Group	Non-PCa Group	P value
Cases (n)		164	346	
Age of diagnosis (years)		67 ± 7 (62-79)	63 ± 7 (59-73)	<0.001*
Free PSA (ng/mL)		3.78 ± 7.08 (0.88-19.68)	1.73 ± 2.00 (0.90-3.68)	0.121
Total PSA (ng/mL)		34.19 ± 109.59 (6.47-100)	8.54 ± 7.79 (4.78-21.27)	<0.001*
f/tPSA		0.17 ± 0.10 (0.10-0.37)	0.22 ± 0.09 (0.15-0.38)	<0.001*
Hgb (g/dL)		14.73 ± 1.13 (13.90-16.40)	14.84 ± 1.01 (14.00-16.5)	0.144
Hct (%)		43.91 ± 3.27 (41.90-48.60)	44.06 ± 3.59 (41.80-49.30)	0.287
MCV (fL)		88.78 ± 5.13 (85.60-96.80)	88.19 ± 4.68 (85.60-95.10)	0.331
WBC (n, x10^3/mL)		8.12 ± 2.29 (6.60-12.68)	8.32 ± 3.52 (6.29-12.90)	0.807
Lym (n, x10^3/mL)		2.08 ± 0.81 (1.50-3.70)	2.22 ± 1.04 (1.64-3.40)	0.077
Mono (n, x10^3/mL)		0.61 ± 0.33 (0.44-0.92)	0.53 ± 0.19 (0.40-0.90)	0.002*
MLR		0.35 ± 0.29 (0.20-0.80)	0.26 ± 0.13 (0.20-0.50)	<0.001*
Hypertension	Absent	107 (65.2)	238 (68.8)	0.424
	Present	57 (34.8)	108 (31.2)	
Cardiovascular disease	Absent	128 (78.0)	275 (79.5)	0.711
	Present	36 (22.0)	71 (20.5)	
Hyperlipidemia	Absent	137 (83.5)	296 (85.5)	0.553
	Present	27 (16.5)	50 (14.5)	
Diabetes	Absent	150[a] (91.5)	288[b] (83.2)	0.013*
	Present	14[a] (8.5)	58[b] (16.8)	

*Data in the table are given as mean value ± standard deviation (interquartile range) for values and number (percentage) for comorbidities. Abbreviations and explanations: PCa, prostate cancer; PSA, prostate-specific antigen; f/tPSA, ratio of free/total serum prostate-specific antigen; Hgb, hemoglobin; Hct, hematocrit; MCV, mean corpuscular volume; WBC, white blood cell; Lym, lymphocyte; Mono, monocyte; MLR, monocyte-to-lymphocyte ratio. *Statistically significant at p<0.05*

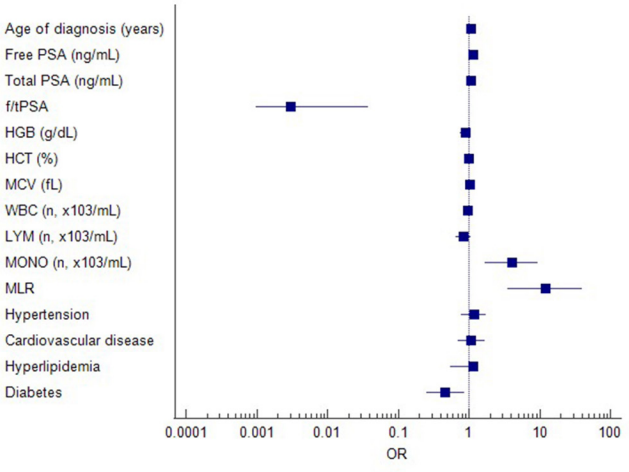

Figure 2. *Forest plot graphic of risk factors on PCa*

Table 2. *Clinical characteristics and blood parameter of the PCa subgroups*

		csPCa Group	Non-csPCa Group	P value
Cases (n)		69	95	
Age of diagnosis (years))		68 ± 7 (63-74)	66 ± 7 (61-70)	0.044*
Free PSA (ng/mL)		6.50 ± 10.20 (1.00-6.15)	1.86 ± 2.01 (0.83-2.13)	0.005*
Total PSA (ng/mL)		65.73 ± 164.01 (7.69-42.29)	11.28 ± 10.27 (6.24-11.88)	<0.001*
f/tPSA		0.16 ± 0.11 (0.09-0.20)	0.18 ± 0.09 (0.11-0.22)	0.049*
Hgb (g/dL)		14.55 ± 0.92 (13.80-15.10)	14.86 ± 1.25 (14.00-15.40)	0.092
Hct (%)		43.57 ± 2.72 (42.10-45.30)	44.15 ± 3.62 (41.3-45.80)	0.511
MCV (fL)		88.45 ± 5.19 (85.30-91.70)	89.01 ± 5.09 (85.80-91.50)	0.458
WBC (n, x10^3/mL)		8.21 ± 2.19 (6.59-9.30)	8.06 ± 2.37 (6.60-9.02)	0.520
Lym (n, x10^3/mL)		2.11 ± 0.91 (1.50-2.49)	2.07 ± 0.74 (1.50-2.50)	0.882
Mono (n, x10^3/mL)		0.63 ± 0.41 (0.45-0.70)	0.60 ± 0.25 (0.43-0.70)	0.745
MLR		0.34 ± 0.26 (0.20-0.40)	0.36 ± 0.31 (0.20-0.40)	0.854
Hypertension	Absent	45 (65.2)	62 (65.3)	1.000
	Present	24 (34.8)	33 (34.7)	
Cardiovascular disease	Absent	58 (84.1)	70 (73.7)	0.129
	Present	11 (15.9)	25 (26.3)	
Hyperlipidemia	Absent	60 (87.0)	77 (81.1)	0.395
	Present	9 (13)	18 (18.9)	
Diabetes	Absent	64 (92.8)	86 (90.5)	0.779
	Present	5 (7.2)	9 (9.5)	

Data in the table are given as mean value ± standard deviation (interquartile range) for values and number (percentage) for comorbidities. Abbreviations and explanations: PCa, prostate cancer; csPCa, clinically significant prostate cancer; non-csPCa, clinically non-significant PCa; PSA, prostate-specific antigen; f/tPSA, ratio of free/total serum prostate-specific antigen; Hgb, hemoglobin; Hct, hematocrit; MCV, mean corpuscular volume; WBC, white blood cell; Lym, lymphocyte; Mono, monocyte; MLR, monocyte-to-lymphocyte ratio. *Statistically significant at p<0.05.

was also higher than that of neutrophil-lymphocyte ratio (NLR) and platelet-lymphocyte ratio (PLR), and concluded that MLR could be a good helpful indicator for the diagnosis of PCa.(12)

In a previous study, it was suggested that the total number of white blood cells (WBC), their fractions, C-reactive protein (CRP) level, or their ratio over each other could be good candidates as biomarkers to predict aggressive cancer as indicators of systemic inflammation and immune responses.(11) Monocytes, a fraction of WBC, can suppress lymphocyte activation and increase tumor progression.(13) A high monocyte count can promote tumorigenesis and angiogenesis by suppressing local immunity and stimulating tumor neovasculogenesis.(14) The monocyte-lymphocyte ratio (MLR), which is calculated by dividing the absolute monocyte count by the absolute lymphocyte count, is a frequently used and easily accessible hematological and inflammatory parameter for this purpose. It has been reported that MLR predicts a poor prognosis in primary pulmonary lymphoepithelioma-like carcinoma.(15) In addition, it has been suggested that a high MLR value, a simple biomarker of the host immu-

Table 3. *Results of the univariate and multivariate analyses for the effect of MLR on PCa detection*

	Univariate analysis			Multivariate analysis		
	OR	95% CI	P value	OR	95% CI	P value
Age of diagnosis (years)	1.088	1.056-1.121	<0.001*	1.088	1.052-1.125	<0.001*
Free PSA (ng/mL)	1.148	1.061-1.242	0.001*			
Total PSA (ng/mL)	1.060	1.037-1.083	<0.001*			
f/tPSA	0.003	0.000-0.038	<0.001*	0.001	0.000-0.019	<0.001*
Hgb (g/dL)	0.901	0.751-1.080	0.261			
Hct (%)	0.987	0.937-1.041	0.640			
MCV (fL)	1.026	0.987-1.066	0.200			
WBC (n, x10^3/mL)	0.979	0.920-1.042	0.504			
Lym (n, x10^3/mL)	0.833	0.652-1.064	0.143			
Mono (n, x10^3/mL)	4.019	1.696-9.525	0.002*			
MLR	12.047	3.571-40.640	<0.001*	7.076	1.879-26.645	0.004*
Hypertension	1.174	0.792-1.740	0.425			
Cardiovascular disease	1.089	0.693-1.713	0.711			
Hyperlipidemia	1.167	0.553-1.167	0.553			
Diabetes	0.463	0.250-0.858	0.014*			

Abbreviations and explanations: PCa, prostate cancer; SD, standard deviation; OR, odds ratio; CI, confidence interval; PSA, prostate-specific antigen; f/tPSA, ratio of free/total serum prostate-specific antigen; Hgb, hemoglobin; Hct, hematocrit; MCV, mean corpuscular volume; WBC, white blood cell; Lym, lymphocyte; Mono, monocyte; MLR, monocyte-to-lymphocyte ratio. *Statistically significant at p<0.05.

ne system, is associated with a poor prognosis in various cancers.(16)

There are few studies in the literature that draw attention to the role of MLR in the prediction of PCa.(4, 11, 12) In this retrospective study, we evaluated whether MLR had a potential role as a biomarker of PCa activity based on clinicopathological data.

MATERIAL and METHODS

Patients who underwent a transrectal prostate biopsy at our urology clinic between January 01, 2017, and December 31, 2021, were included in the study. The pathology results of the prostate biopsies performed in the clinic, patients' history, and results of routine examinations performed before the biopsy procedure were obtained from the Hospital Information Management System (HIMS). Patients with urinary tract infections, active or previous malignancies, or anemia, those that used antibiotics or non-steroidal anti-inflammatory drugs before the biopsy, and those with pathology results being reported as prostatic intraepithelial neoplasia, and acute or chronic prostatitis were not included in the study.

For all the patients included in the study, age, hemogram parameters [hemoglobin (Hgb), lymphocyte and monocyte counts], free PSA-total PSA, biopsy pathologies, and presence of comorbidities (hypertension, diabetes, cardiovascular disease, and hyperlipidemia) were recorded. The Gleason score (GS) of the patients with PCa according to the pathology results was determined by the pathologists of our hospital based on the 2005 International Society of Urological Pathology Consensus Conference. Patients with a GS of 3+4 and above were defined as having csPCa while other PCa cases were defined as having clinically non-significant PCa (non-csPCa).

Statistical analysis:

The data were examined with the Shapiro-Wilk test to determine whether they represented a normal distribution. The results were presented as mean ± standard deviation, interquartile range (IQR) median (minimum-maximum), or frequency and percentages. Normally distributed data were compared with the independent-samples t-test or the Mann Whitney U test for non-normally distributed data. Categorical variables were compared between groups using Pearson's chi-square test and Fisher's exact test. The logistic regression analysis was performed, and the crude odds ratios (ORs) along with their 95% confidence intervals (CIs) were reported. The multivariate binary logistic regression analysis was also undertaken, and the adjusted ORs and 95% CIs were obtained. $p<0.05$ was considered as the statistical significance level. Statistical analyses were performed using IBM SPSS ver. 23.0 (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.).

RESULTS

When the data of the 1,611 patients who underwent a transrectal prostate biopsy were examined, 510 patients were found to be eligible for the study. The flowchart of the study is shown in Figure 1.

The pathology result was reported as PCa in 164 of the 510 patients included in the study and non-PCa in the remaining 346. The monocyte count was significantly higher in the PCa group than in the non-PCa group (0.61±0.33 and 0.53±0.19, respectively; $p=0.002$). MLR was also found to be significantly higher in the PCa group than in the non-PCa group (0.35±0.29 and 0.26±0.13, respectively; $p<0.001$). In the PCa group, age at diagnosis, total PSA, were statistically significantly higher and f/tPSA was statistically significantly lower compared to the non-PCa group. There was no statistically significant difference between the PCa and non-PCa groups in terms of Hgb, hematocrit (Hct), mean corpuscular volume (MCV), WBC, and lymphocyte values. The percentage of patients with diabetes was significantly higher in the non-PCa group, but there was no other statistically significant difference in relation to the remaining comorbidities. The clinical characteristics and blood parameters of the PCa and non-PCa groups are shown in Table 1.

Of the 164 patients whose pathology result was reported as PCa, 69 (39%) had csPCa and 95 (61%) had non-csPCa. When these subgroups were analyzed, age at diagnosis, free PSA, and total PSA were found to be statistically significantly higher in the csPCa group, while the f/tPSA value was statistically significantly lower in this group. The subgroup analysis of the patients with PCa revealed no statistically significant difference between the csPCa and non-csPCa groups in terms of the Hgb, Hct, MCV, WBC, lymphocyte, monocyte, and MLR values. Table 2 shows the clinical characteristics and blood parameter of the PCa subgroups (csPCa and non-csPCa). The statistically significant difference observed in the monocyte count and MLR, which were higher in the PCa group compared to the non-PCa group, was not detected in the PCa subgroup analysis.

The receiver-operating characteristic (ROC)-derived area under the curve (AUC) analysis was performed to evaluate the predictive accuracy, and Youden's index was used to determine the optimal cut-off values. The ROC-derived AUC analysis was performed to evaluate the predictive accuracy of the investigated parameters, and Youden's index was used to determine their optimal cut-off values. In the ROC analysis, it was observed that an MLR value of 0.3 provided the maximum Youden index. Therefore, the cut-off value for MLR was set as 0.3. For the likelihood of f/tPSA to predict PCa, the AUC value was determined as 0.665 (95% CI: 0.620-0.709), and at a cut-off value of ≤0.15, it had 55.1% sensitivity and 74.8% specificity. For MLR, the AUC value was calculated as 0.593 (95% confidence interval [CI] 0.549-0.636) for the likelihood of this parameter to predict PCa in all men. When the cut-off value of MLR was taken as >0.3, it had a sensitivity of 27.4% and specificity of 85.3%. Lastly, the AUC value of the combination of age, f/tPSA, and MLR in this prediction was determined to be 0.727 (95% CI:0.684-0.768, sensitivity:

63.0%, specificity: 73.9%).

The logistic regression analysis showed a positive correlation between PCa and age, free PSA, total PSA, monocyte count, and MLR. A negative correlation was found between the presence of diabetes and f/tPSA. The remaining hemogram parameters examined in the study (Hgb, Hct, MCV, WBC, and lymphocyte) were not predictors of PCa (Figure 2). According to the multivariate logistic regression analysis, MLR was a significant predictor of PCa, when used together with f/tPSA and age ($p<0.001$). Table 3 presents the results of the univariate and multivariate analyses of the effects of the investigated parameters on PCa detection.

DISCUSSION

The reason for the increased monocyte fraction in PCa cases with a high GS has not yet been clearly defined. In vitro studies of PCa have reported that monocyte-induced cancer cell invasion mediates chemokine ligand 2 (monocyte chemotactic protein-1) and nuclear factor-κB activity and that tumor stroma-derived factors skew monocyte to dendritic cell differentiation toward a suppressive phenotype.(17) One study showed that tumor-associated macrophages (TAMs), which are putatively derived from serum monocytes, could interact with tumor cells to promote cancer progression by producing a variety of cytokines and chemokines.(18) Another study reported that the infiltration of TAMs in prostate biopsy specimens predicted disease progression in PCa after hormonal therapy.(19) The formation of TAMs in the tumor microenvironment can be accelerated by a high number of monocytes. Conversely, a wide variety of cytokines and chemokines produced by cancer cells can affect the serum monocyte count.(11)

Currently, leukocyte subpopulation tests are frequently used to detect inflammation.(20) Although varying physiological conditions may result in changes in the absolute value of each test, this has little effect on MLR, NLR, and PLR.(21) Based on this idea, a previous study showed that among WBC fraction ratios, NLR was a potential marker to predict PCa.(22) NLR has been widely investigated in other urological malignancies such as bladder cancer or testicular cancer.(23, 24) A decrease in NLR with BCG treatment was found to be an indicative of the decreased likelihood of recurrence and progression for non-muscle invasive bladder cancer.(24) In a study investigating the role of NLR, PLR, and MLR in predicting PCa, MLR was shown to be the best indicator among the three values.(12) In our study, consistent with the literature, in addition to the monocyte fraction, we found MLR to be statistically higher in the patients with PCa compared to those without cancer. We determined that in the prediction of PCa among patients with high PSA values, rather than using f/tPSA (AUC:0.665) alone, the combination of f/tPSA with age and MLR increased the likelihood of this prediction (AUC:0.727).

It has been shown that the monocyte ratio in peripheral blood is correlated with GS, and the monocyte ratio is significantly increased in patients with PCa with a high GS, but the underlying mechanism has not yet been clearly revealed.(11) In another recent large series, it was suggested that the lymphocyte-to-monocyte ratio might play an independent predictive role in the detection of csPCa.(4) In the current study, of the patients whose pathology result was reported as PCa, those with a GS of 3+4 and above were accepted as having csPCa, and unlike the literature no statistically significant difference was found between the csPCa group and the non-csPCa group in terms of the monocyte fraction and MLR.

MLR can be expected to become one of the candidate biomarkers for PCa when used together with age and f/tPSA. However, further research and validation are still needed to determine whether the serum monocyte fraction is one of the useful biomarkers of PCa and elucidate the association of serum monocytes with the progression of PCa. In addition, future studies should investigate whether it is associated with the stages and prognosis of PCa.

There are some limitations to our study. Due to the retrospective design, hemogram parameters, which were of great importance for this study, could not be accessed in almost half of the patients who underwent a biopsy. Furthermore,

due to our hospital being a reference hospital, the examinations of many patients had been undertaken in another center from which they were referred, but they were not recorded in HIMS. In addition, PSA density, which is a frequently used PSA derivative in the literature, could not be calculated because the prostatic volumes of the patients were not recorded in the form used during the biopsy procedure. Another limitation of our study is that it evaluated data from a single center. In the literature, it is known that there is a statistically significant mismatch between the prostate needle biopsy and radical prostatectomy materials in relation to GS and tumor volume, but this agreement increases as GS and tumor volume increase.(25) Further studies evaluating patients who have undergone radical prostatectomy can contribute to the literature by better presenting the difference between the patients with csPCa and non-csPCa.

CONCLUSION

We determined that the serum monocyte fraction and MLR were significantly increased in patients with PCa compared to patients with benign prostate pathologies. However, the monocyte fraction and MLR were not adequate in the differentiation between the csPCa and non-csPCa subgroups. In patients undergoing a biopsy, an MLR value above 0.3 can predict the pathology result being reported as PCa at a sensitivity of 27.4% and specificity of 85.3%.

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Effects of Postoperative Three-Balls Respiratory Exercise on Respiratory Function Tests in Smoking Patients Who Underwent Extremity Surgery Under Generel Anesthesia

Sigara Içen Hastalarda Ameliyat Sonrası Üç Top Solunum Egzersiz Uygulamasının Solunum Fonksiyon Testleri Üzerine Etkisi

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Abstract

Introduction	Incentive spirometry is used to reduce pulmonary complications after surgical interventions under general anesthesia. In this study, we aimed to investigate the effect of postoperative incentive spirometry on pulmonary function tests in patients who smoke and undergo extremity surgery under general anesthesia.
Materials and Methods	Eighty patients with ASA I-II physiological score, aged 18-61 years, who underwent extremity operation in a 3rd level hospital were included in the study. After the patients were divided into two groups as 40 patients in each group, smokers of 10-20 cigarettes per day for at least 5 years and non-smokers and the groups were once more randomized according to whether they would use incentive spirometry (three balls of breathing exercise) or not. Group K (n=20):Non-smoker and not using incentivespirometry, Group T (n=20): Non-smoker and using incentivespirometry, Group S (n=20): Smoker of 10-20 cigarettes per day for at least 5 years andnot using incentive spirometry, Group ST (n=20): Smokers of 10-20 cigarettes per day for at least 5 years and using incentive spirometry.
Results	The demographic data similar between the groups. When the groups were compared in terms of preoperative and postoperative FVC and FEV1 values, the postoperative FVC values in Group K and Group S were found to be significantly lower than the preoperative values (p=0.001, p=0.002, respectively). Postoperative PEF values were significantly lower than preoperative values (p=0.024, p=0.024, p=0.001, respectively). When compared within groups, postoperative VC values in Group K and Group S were found to be significantly lower than preoperative values (p=0.037, p=0.012, respectively). When the groups were compared statistically in terms of preoperative and postoperative FEV1/FVC values, no significant difference was found (p>0.05).
Conclusion	It was found that postoperative worsening of respiratory function test values in smokers who received general anesthesia has improved with the use of incentive spirometry. For this reason, it is assumed that the use of incentivespirometry in the postoperative period in extremity operations performed under general anesthesia will be helpful in preventing postoperative respiratory complications.
Keywords	General anesthesia, cigarette, incentivespirometry, respiratory function test, Genel anestezi, sigara, solunum fonksiyon testleri, insentifspirometri., insentifspirometri

Özet

Amaç	Anestezi altında cerrahi girişimler sonrasında ortaya çıkan pulmoner komplikasyonları azaltmak için insentif spirometri kullanılmaktadır. Bu çalışmada, sigara içen ve genel anestezi altında ekstremite cerrahisi uygulanan hastalarda post operatif insentif spirometri uygulamasının solunum fonksiyon testleri üzerine etkisini araştırmayı amaçladık.
Gereç ve Yöntemle	3. Basamak bir hastanede extremite operasyonu uygulanan, 18-61 yaş arası, ASA I-II fizyolojik skoru olan80 hasta çalışmaya dahil edildi. Hastalar her grupta 40 hasta olarak en az 5 yıl/günde 10-20 adet sigara içen ve sigara içmeyen olarak 2 gruba ayrıldıktan sonra her grup insentifspirometri (üç top solunum eksersizi) kullanıp kullanmayacağına göre randomize edildi. Grup K (n=20): Sigara içmeyen ve insentifspirometri kullanmayan, Grup T (n=20): Sigara içmeyen ve insentifspirometri kullanan, Grup S (n=20): En az 5 yıl/günde 10-20 adet sigara içen ve insentif spirometri kullanmayan, Grup ST (n=20): En az 5 yıl/günde 10-20 adet sigara içen ve insentifspirometri kullanan.
Bulgular	Çalışmaya katılan hastaların demografik verileri gruplar arasında benzerdi. Preoperatif ve postoperatif FVC ve FEV1 değerleri bakımından gruplar karşılaştırıldıklarında Grup K ve Grup S'deki postoperatif FVC değerleri preoperatif değerlere göre anlamlı derecede düşük bulundu (sırasıyla p=0,001, p=0,002).Gruplar içi karşılaştırmalarda Grup K, Grup S ve Grup ST'dekipostoperatif PEF değerleri preoperatif değerlere göre anlamlı derecede düşük bulundu (sırasıyla p=0,024, p=0,024, p=0,001). Gruplar içi karşılaştırıldıklarında Grup K ve Grup S'deki postoperatif VC değerleri preoperatif değerlerine göre anlamlı derecede düşük bulundu (sırasıyla p=0,037, p=0,012). Gruplar kendi içlerinde preoperatif ve postoperatif FEV1/FVC değerleri bakımından istatistiksel olarak karşılaştırıldıklarında anlamlı bir fark bulunmadı (p>0,05).
Sonuç	Genelanestezi alan sigara içen hastalarda postoperatifkötüleşen solunum fonsiyon testi değerlerininsentifspirometre kullanımı ile düzeldiği saptandı. Bu nedenle genel anestezi altında uygulananekstremite operasyonlarında postoperatif dönemde insentifspirometri kullanımının, postoperatif solunum komplikasyonlarını önlemede faydalı olacağı düşünülmektedir.
Anahtar Kelimeler	Genel anestezi, sigara, solunum fonksiyon testleri, insentifspirometri

INTRODUCTION

Negative effects of anesthetic agents on the lungs may be described as decrease in functional residual capacity, upward displacement of the diaphragm, change in ventilation/perfusion balance due to inhibition of hypoxic pulmonary vasoconstriction response, and deterioration in mucociliary clearance (1). The effect of anesthesia on lung volumes is related to the change in tonic and phasic activity of respiratory muscles during spontaneous breathing. (2). After anesthesia, mucociliary activity decreases for 4-6 days postoperatively, which increases the risk of postoperative pulmonary complications (3).

The smoking negatively affects the periods of anesthesia. Thus,pre-operative smoking cessation is mandatory to reduce the risk of postoperative complications (4).

The time required for respiratory functions to return to normal after smoking cessation varies between 12 hours and 8 weeks (5).Patients also should be actively supported in order to increase postoperative functional residual capacity and lung tidal volume and to remove tracheobronchial secretions(6). Incentive spirometry is a mechanical device used to prevent or reduce post-operative pulmonary complications. Incentive spirometry provides collateral ventilation in the alveoli and strengthens the inspiratory muscles (7). In this study, we aimed to investigate the effect of postoperative incentive spirometry on pulmonary function tests in smokers who underwent extremity surgery under general anesthesia.

MATERIAL and METHODS

Eighty cases with voluntary informed consent aged between 18-61, with the American Society of Anesthesiology (ASA) I-II physiological score who are planned to undergo lower and upper extremity operations under general anesthesia were included in the study. Cases with a history of pneumonia and tuberculosis and who were inable to communicate for pulmonary function test (PFT) were excluded from the study. The patients were taught to use a spirometer (Spiro Analyzer ST-90, FukudoSangyo). Preoperative forcedvital capacity (FVC), forced expiratory volume (FEV1), peak flow rate (PEF), vital capacity (VC), FEV1 /FVC % basal values were measured with a spirometer and recorded.

A total of 80, 40 smokers and 40 non-smokers, were included in the study. Afterwards, each group were randomized into two sub-groups by drawing lots as those who will use incentive spirometry (three ball respiratory exercises) and those who will not. Thus, a total of 4 groups were formed;

Group K (n=20): Non-smoker and not using incentive spirometry

Group T (n=20): Non-smoker and using incentive spirometry

Group S (n=20): Smoker of 10-20 cigarettes per day for at least 5 years and not using incentive spirometry

Group ST (n=20): Smokers of 10-20 cigarettes per day for at least 5 years and using incentive spirometry

In order to ensure a uniform practice while using incentive spirometry throghout the study period.

In the postoperative period, the incentive spirometry technique was used at the 6th hour after the operation and between 08:00 and 19:00 the next day, with 5 minutes of inspiration and expiration every hour. No respiratory exercise was performed in other cases. The pulmonary function test was repeated in all patients 48 hours after the operation. FVC, FEV1, peak inspiratory flow rate (PE(I)FR), VC, FEV1 /FVC % values were recorded again.

Informed Consent and Ethics Committee Decision

All patients included in the study were informed and a written consent form was obtained. Ethics committee approval was obtained from Trakya University Faculty of Medicine Dean's ScientificResearch Evaluation Commission (TÜBADK) 2011/93 with the decision number 09/06 dated 20/04/2011.The studywas conducted in accordance with the Declaration of Helsinki.

Statistical analysis

Statistical evaluation was done with SPSS 19.0 (Licence No: 10240642) statistical package program at Trakya University Faculty of Medicine, Department of Biostatistics. After checking the conformity of the measurable data with

Tab1e 1. *Demographic characteristics of the groups.*

	Group K	Group T	Group S	Group ST	p
Sex(n)	13/7	16/4	9/11	11/9	0,131*
(M/F) (%)	65/35	80/20	45/55	55/45	
Age (mean±SD)	42,65±8,29	35,4±9,52	45,45±12,32	36,3±7,91	0,698**
Weight (mean±SD)	73,70±12,14	73,45±13,23	78,25±11,15	73,00±13,56	0,519**
Height(mean±SD)	170,25±7,30	172,55±7,86	166,75±10,20	171,30±6,74	0,141**

** post-hoc Tukey test; ** KolmogorovSmirnov*

Table 2. *Forced vital capacity values of the groups.*

FVC (lt)	Group K	Group T	Group S	Group ST	p*
Preoperative(mean±SD)	3,62±0,90	3,72±0,96	3,95±2,35	3,54±0,76	0,672
Postoperative(mean±SD)	3,12±0,75	3,76±0,77	2,65±0,87	3,5±0,84	0,001
p**	0,001	0,313	0,002	0,940	

FVC:Forced vital capasity.
** Mann Whitney U test, ** Kruskal Wallis*

normal distribution with a single sample Kolmogorov Smirnov test, analysis of variance and post-hoc Tukey test were used for comparisons between groups for those with normal distribution, and Kruskal-Wallis analysis of variance and Mann Whitney U test for those with non-normal distribution. Wilcoxon two-sample paried test was used for intragroup comparisons, and Pearson $\chi 2$ test was used for qualitative data. Median (Min-Max) values and arithmetic mean±standard deviation were given as descriptive statistics. The limit of significance was chosen as $p<0.05$ for all statistics. After Kruskal Wallis analysis of variance, Bonferroni correction was made for pairwise comparisons and the limit of significance was chosen as $p<0.008$.

RESULTS

I80 cases were included in the study and afterwards, each group were randomized into two sub-groups by drawing lots as those who will use incentive spirometry and those who will not. Thus, a total of 4 groups were formed (Figure 1).

Comparison of patients in terms of gender, age, weight and height distribution revealed no significant difference between the groups (Table1)

While there was no statistically significant difference between the groups in terms of preoperative FVC level (p=0.672), there was a significant difference between Group S and Group ST and Group S and Group T in terms of postoperative FVC level (p=0.003; p=0.001, respectively). When the groups were compared in terms of preoperative and postoperative FVC values, the postoperative FVC values in Group K and Group S were found to be significantly lower than the preoperative values (p=0.001, p=0.002, respectively) (Table 2).

Figure 1.*Grouping of patients included into the study according the status of intensive spirometry use.*

While there was no statistically significant difference between the groups in terms of preoperative FEV1 values

Table 3. *Forced expiratory volume1 values of the groups.*

FEV1(lt)	Group K	Group T	Group S	Group ST	p*
Preoperative(mean±SD)	3,14±0,67	3,47±0,74	2,87±0,83	3,23±0,67	0,062
Postoperative(mean±SD)	2,76±0,69	3,57±0,59	2,38±0,88	3,17±0,64	0,001
p**	0,001	0,096	0,001	0,332	

**FEV1: Forced expiratory volume 1*
** Mann Whitney U test, ** Kruskal-Wallis*

Table 4. *Peak flow velocity values of the groups.*

PEF (lt/sec)	Group K	Group T	Group S	Group ST	p*
Preoperative(mean±SD)	7,07±1,92	6,34±1,89	6,12±2,35	7,94±1,61	0,014
Postoperative(mean±SD)	6,2±1,65	6,34±1,90	5,25±2,27	6,79±1,00	0,005
p**	0,024	0,794	0,024	0,001	

PEF:Peak expiratuar flow.
** p<0,05; Mann Whitney U test, **p<0,05; Kruskal-Wallis*

Table 5. *Vital capacity values of the groups.*

VC (lt)	Group K	Group T	Group S	Group ST	p*
Preoperative(mean±SD)	3,75±0,95	4,08±0,96	3,07±1,07	3,92±0,68	0,010
Postoperative(mean±SD)	3,39±0,66	4,03±0,96	2,75±0,77	3,81±0,58	0,001
p**	0,037	0,324	0,012	0,070	

VC:Vital capacity.
* Mann Whitney U test, ** Kruskal-Wallis

(p=0.062), there was a significant difference between the groups in terms of postoperative FEV1 values (p=0.001). Between Group ST and Group T, between Group S and Group T and between Group S and Group ST the difference was significant (p=0.001, p=0.001, p=0.001, respectively). Intragroup comparison of preoperative and postoperative FEV1 values reevaled that postoperative FEV1 values in Group K and Groups S were found to be significantly lower than the preoperative values (p=0.001, p=0.001, respectively) (Table 3).

There was a significant difference between groups in terms of preoperative PEF values (p=0,014), this difference was between Group S and Group ST(p=0,004). There was a significant difference between groups in terms of post-operative PEF values (p=0,005), this difference was between Group S and Group ST(p=0,001). Intragroup comparison of preoperative and postoperative PEF values has revealed that post-operative PEF values of Group K, Group S and Group ST were significantly lower relative top re-operative values, (respectively, p=0,024, p=0,024, p=0,001) (Table4).

There was a significant difference between groups in terms of preoperative VC values (p=0,010), this difference was between Group S and Group ST and Group S and Group T (respectively, p=0,002; p=0,002).

There was a significant difference between groups in terms of post-operative VC values(p=0,001), this difference was between Group S and Group ST and Group S and Group

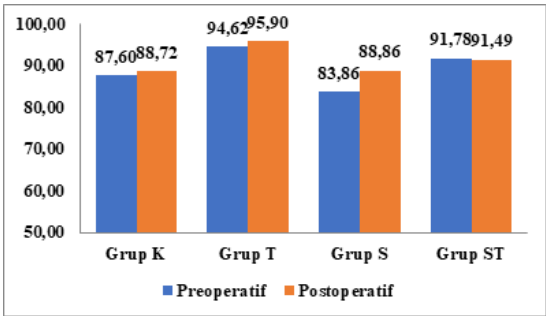

Figure 2. *The figure shows the distribution of the tiffeneau ratio (FEV1/FVC) values between groups.*

T (respectively, p=0,001; p=0,001). Intragroup comparison of preoperative and postoperative VC values has revealed that postoperative VC values in Group K and S were significantly lower relative to preoperative values (respectively, p=0,037, p=0,012)(Table5).

There was no statistically significant difference between the groups and in intra-group comparisons in terms of preoperative and postoperative FEV1/FVC levels. (p>0,05; Figure2).

DISCUSSION

Since the physiological impact of abdominal, cardiac, or thoracic surgery on respiratory function varies widely, most of the complications occur after thoracic and upper abdominal surgery(8). Therefore, we conducted our study in extremity operations in order to eliminate the effects of surgical site and technique on spirometry.As the daily number of cigarettes smoked and the duration of smoking increase, the percentage of decrease in flow velocity tests are higher than the percentage of decrease in volume tests (9).In a study by Rizzo et al.,pulmonary complications developed in 36.4% of patients who underwent thoracic surgery. They reported that 60% of the cases that developed complications were in the smoking group. (10).There are many studies reporting that smoking impairs lung functions in the elderly (11). In fact, the negative effects of smoking on PFT occur even at younger ages. Moreover, the decrease in PFT with age begins earlier in smokers than in nonsmokers and also develops more rapidly (12).

Amara et al., in a study conducted on men aged 55-86, found the mean FEV1 values of non-smokers to be higher than those of smokers (13).It has been reported that spirometric tests used to obtain information about the respiratory tract are significantly affected by age, height, weight differences and smoking (14).In the study of Aparici et al.,they enrolled smokers in a smoking cessation program and showed that their pulmonary function tests were improved after one year (15). Sheril et al. have followed up smokers and non-smokers for 14 years and have reported that FEV1 and VC values decreased in line with respiratory symtoms in bıth groups but FEV1/FVC ratio have deteriorated more in smokers compared ton on-smokers (16). In our study, VC values were found to be lower in smokers in PFTs performed in the preoperative period. When preoperative values were compared with postoperative values, FVC, FEV1, PEF and VC values were found to be lower in the postoperative period.There are studies showing that pulmonary physiotherapy is effective in preventing postoperative pulmonary complications (17) Several studies have shown that incentive spirometry is beneficial in preventing pulmonary complications after abdominal surgery (18). In the study conducted by Fagevik et al. (19), 368 patients who underwent upper abdominal surgery were evaluated.The postoperativepulmonary complication rate was 6% in the respiratory- exersize group and 27% in the control group. Zileli et al. (20) investigated the effects of respiratory and incentivespirometry exercises on respiratory functions in 45 patients diagnosed with DMDand have reported that there was a significant improvement in the VC, FVC and FEV1/FVC % parameters in the patients who had training compared to the control group.

In most of the studies comparing different treatment modalities (incentivespirometry, intermittent positive pressure ventilation, continuous positive pressure airway, etc.) used for postoperative pulmonary physiotherapy, superiority of one modality to could not be proven (21,22).

In our study, it was found that the negative effect of general anesthesia on PFT was decreased in patients using incentivespirometry in the postoperative period, and similar results were obtained with on FVC, FEV1 and VC values in the preoperative period. Postoperative PEF values were found to be lower than preoperative values in patients who smoked and used incentivespirometry. This may indicate the negative effect of smoking on major airways.

Although different from our study, in a meta-analysis that may contribute to the same goal with our study, the effect of the exercise training modality used in pulmonary rehabilitation to improve skeletal muscle mass, function and exercise capacity in COPD was reviewed. Moderate evidence supports that exercise training has significant and

beneficial effects on peripheral skeletal muscle strength and exercise capacity in stable COPD patients (23).

Our study has some limitations. For instance, the patient population was limited since a certain disease group (in the surgery group?) was included into the study. One of the strengths of the study is that it is a prospective study.

CONCLUSION

In conclusion; in smoking patients who will be operated under general anesthesia postoperative PFT values deteriorates severely and who smoke, and use of Incentive spirometry in the postoperative period improves this negative condition. For this reason, the use of incentivespirometry in the postoperative period in extremity operations under general anesthesia will be helpful in preventing postoperative respiratory complications.

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RESEARCH ARTICLE / ARAŞTIRMA MAKALESI

A BIBLIOMETRIC STUDY ON "BRAIN ABSCESS" IN WEB OF SCIENCE DATABASE

WEB OF SCIENCE VERİTABANINDA "BEYİN APSESİ" ÜZERİNE BİR BİBLİOMETRİK ÇALIŞMA

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Abstract

Introduction The aim of this study is to analyze the articles in the ISI Web of Knowledge-Science database with the keyword "brain abscess" in the title and to make a bibliometric analysis.

Materials and Methods As a result of the research made in the WoS database; The years in which the articles were published, the journals in which they were published and the languages of publication, the publisher companies of the journals, the countries where the studies were conducted, the first name authors of the articles and the institutions the authors were affiliated with, the categories of the studies in the WoS database and whether financial support was received in the preparation/publishing of the studies were examined, the number of citations to the articles was single were calculated individually and collectively.

Results The demographic data similar between the groups. When the groups were compared in terms of preoperative and postoperative FVC and FEV1 values, the postoperative FVC values in Group K and Group S were found to be significantly lower than the preoperative values (p=0.001, p=0.002, respectively). Postoperative PEF values were significantly lower than preoperative values (p=0.024, p=0.024, p=0.001, respectively). When compared within groups, postoperative VC values in Group K and Group S were found to be significantly lower than preoperative values (p=0.037, p=0.012, respectively). When the groups were compared statistically in terms of preoperative and postoperative FEV1/FVC values, no significant difference was found (p>0.05).

Conclusion The presented study is the first to demonstrate Turkey's research efficiency in this area. Thanks to the increase in bibliometric research, we suggest that the scientific efficiency values of the published studies will be revealed and that future studies should be reviewed accordingly, and new bibliometric researches should be conducted.

Keywords Brain Abscess, Web of Science, Bibliometric study, Bibliometric analysis.

Özet

Amaç Bu çalışmanın amacı, başlığında "beyin apsesi" anahtar sözcüğü geçen ve ISI Web of Knowledge-Science veritabanında yer alan makaleleri inceleyerek bibliometrik analizini yapmaktır.

Gereç ve Yöntemle WoS veritabanında yapılan araştırma sonucunda; makalelerin yayınlandığı yıllar, yayınlandığı dergiler ve yayın dilleri, dergilerin bağlı bulunduğu yayıncı şirketler, çalışmaların yapıldığı ülkeler, makalelerin ilk isim yazarlara ve yazarların bağlı bulunduğu kurumlar, çalışmaların WoS veritabanındaki kategorileri ile çalışmaların yapılmasında/yayınlanmasında finansal destek alınıp alınmadığı incelendi, makalelere yapılan atıf sayıları tek tek ve toplu olarak hesaplandı.

Bulgular Çalışma kapsamında "Brain Abscess" anahtar sözcüğünü içere 994 makale belirlendi. Bu eserlere toplamda 16330 atıf yapıldığı ve H indeksinin 57 olduğu belirlendi. Makalelerin en sık (n=41, %4,1) 2008 yılında yayınlandığı, en sık (n=29, %3.0) Surgical Neurology dergisinde yayınlandığı, büyük çoğunluğunun (n=892, %89.8) İngilizce dili kullanılarak yazıldığı, yayınlanan ülkeler arasında ilk sırada Amerika'nın (n=239, %24.0) geldiği tespit edildi.

Sonuç Sunulan çalışma Türkiye'nin bu alandaki araştırma verimliliğini gösteren ilk çalışma niteliğindedir. Bibliometrik araştırmaların artması sayesinde, yayınlanan çalışmaların bilimsel verimlilik değerlerinin ortaya konulacağını ve gelecekteki çalışmaların da buna göre gözden geçirilerek yeni bibliometrik araştırmaların yapılması gerektiğini önermekteyiz.

Anahtar Kelimeler Beyin Apsesi, Web of Science, Bibliometrik çalışma, Bibliometrik analiz

INTRODUCTION

Brain abscess is defined as a focal suppurative process that begins as an area of cerebritis localized within the brain parenchyma and that develops into pus surrounded by a well-vascularized capsule (1). Brain abscesses are reported to typically present with progressive headache, a fluctuating level of consciousness, and a progressive focal neurological deficit and/or seizure, and the patients may report focal neurological symptoms of sudden onset (2). It is reported that the infectious process affecting the central nervous system can threaten the life and vital neurological functions of the person; the prognosis of these patients has improved significantly in recent years with the help of methods such as Computed Tomography and Magnetic Resonance Imaging and the new generation antibiotics, but the morbidity and mortality of central nervous system infections are remarkably high despite these improvements (1-4).

Bibliometrics, which was developed to evaluate the literature, is a statistical method used to mathematically analyze publications such as scientific books, research articles, etc., published in a specific field (5,6).

The aim of this study was to access the articles in the ISI Web of Knowledge-Science (WoS) database that have the keyword "brain abscess" in the title, and to analyze the distribution of these articles by year, country, first author, and institution.

MATERIAL and METHODS

Study data

The presented work is a research study in the healthcare field. Indexes that scan the journals that publish studies in the fields of health and science are the Science Citation Index (SCI) and Science Citation Index-Expanded (SCI-E). Therefore, articles published in the SCI and SCI-E indexes were chosen and included in this study.

The WoS database was used to analyze the articles published in journals scanned in the SCI and SCI-E indexes and that had the keyword "Brain Abscess" in the title, in the current study. The articles were found to be published in 1980 and later, and they were retrospectively scanned by using the keyword "Brain abscess", that is listed in MeSH, in the search section of the WoS database.

By using the filtering feature of the WoS database, all articles and then only those published in the SCI and SCI-E indexes that index the journals where studies in the fields of health and science are published were filtered among the publications containing the keyword "Brain Abscess" in the title. Finally, as a result of the research performed in the WoS database; the years in which the articles were published, the journals where they were published and the languages of publication, the publisher companies of the journals, the countries where the studies were conducted, the first authors of the articles and the institutions the authors were affiliated with, the categories of the studies in the WoS database and whether financial support was received in the preparation/publishing of the studies were investigated and the number of citations to the articles was individually and collectively calculated.

Statistical Analysis

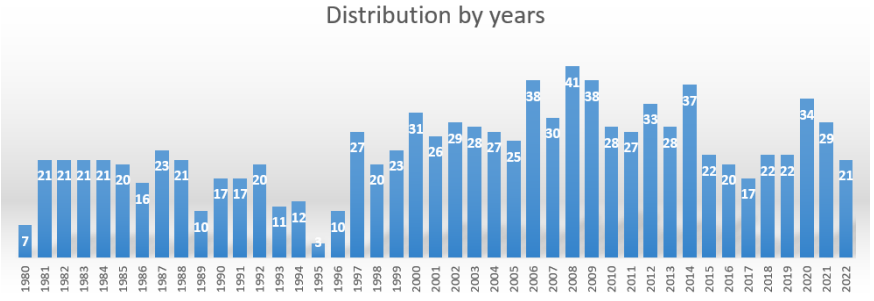
The data obtained in the study were transferred to the computer environment. The descriptive statistics of the data were analyzed with the SPSS (Version 22) software program. The comparison values were calculated at a confidence interval of 95%, and a p value <0.05 was accepted as statistically significant.

Limitations

Since the Social Sciences Citation Index (SSCI) is one of the non-SCI and non-SCI-E indexes where journals in the field of social sciences (politics, law, philosophy, etc.) are scanned, and the Arts and Humanities Citation Index (AHCI) is an index where journals in the field of arts and humanities (architecture, dance, etc.) are scanned, the articles published in these indexes were excluded from the study. In addition, only the title of the article and not all areas was scanned in order to prevent any misleading information. These two filters constitute the limitations of our study.

Table 1. *Annual average and total citation information of the 10 articles with the highest number of citations.*

Cited Article	Average number of citations per year (n)	Total
Discrimination of brain abscess from necrotic or cystic tumors by diffusion-weighted echo planar imaging. (8)	9.7	272
Clinical characteristics and outcome of brain abscess systematic review and meta-analysis. (9)	22.2	222
Brain-abscess - a review of 400 cases. (10)	5.16	222
Nocardial brain-abscess - treatment strategies and factors influencing outcome. (11)	7.13	214
Primary determinants of ischemic stroke/brain abscess risks are independent of severity of pulmonary arteriovenous malformations in hereditary hemorrhagic telangiectasia. (12)	13.25	212
Brain abscess and necrotic or cystic brain tumor: Discrimination with signal intensity on diffusion-weighted MR imaging. (13)	7.96	207
Brain abscess and necrotic brain tumor: Discrimination with proton MR spectroscopy and diffusion-weighted imaging. (14)	9.27	204
Brain-abscess - a study of 45 consecutive cases. (15)	4.79	182
Neuropathological and computerized tomographic findings in experimental brain-abscess. (16)	4.05	174
15-Year review of the mortality of brain-abscess. (17)	3.81	164



Graphic 1. Distribution of articles by years.

RESULTS

When the keyword "Brain abscess" included in MeSH was scanned in all the publications within the WoS database, it was seen to be included in the title of a total of 1963 publications. Of these, 1181 were articles. Of these articles, 994 were identified when only those published in journals indexed within the scope of SCI and SCI-E were filtered, and these were included in the study. All (100%) of the 994 articles included in the scope of the study had been published in the journals within the scope of SCI-E, and 246 (24.7%) were found to be Open Access while 96 (9.6%) had received financial support for publication. Besides, it was found that 994 articles had received 16,330 citations since the day they were published, the mean number of citations to these articles per year was 379.8, the mean number of citations per article was 16.43, and the H index of all the articles was 57. The 10 articles with the highest number of citations in addition to the mean annual number of citations and the total number of citations for these articles are shown in the table (7-16) (Table 1).

No filtering for years was applied to the articles included in this study and all published articles were reviewed. We found that the articles had been included in WoS since 1980 and different numbers of articles had been published every year until 2022; however, the most articles were published in 2008 (n=41, 4.1%), 2006 (n=38, 3.8%), and 2009 (n=38, 3.8%) while the smallest number of articles were published in 1995 (n=3, 0.3%). The years in which the articles were published and the number of articles per year are given in the graph (Graphic 1).

Regarding the language of the articles, we found that 892 articles (89.8%) were published in English, 32 (3.2%) in French, 26 (2.6%) in German, 16 (1.6%) in Spanish, 15 (1.5%) in Japanese, 3 (0.3%) in Turkish, 3 (0.3%) in Czech,

Table 2. *Journals in which the articles were published the most.*

Journal Name	Number (n)*	Percentage (%)
Surgical Neurology	29	3.0
Journal of Clinical microbiology	26	2.7
Acta Neurochirurgica	22	2.2
Journal of Neurosurgery	22	2.2
Childs Nervous System	21	2.1
British Journal of Neurosurgery	19	1.9
Neurosurgery	19	1.9
Clinical Infectious Diseases	16	1.6
Journal of Clinical Neuroscience	16	1.6
Neurological Surgery	15	1.5
American Journal of Neuroradiology	14	1.4
World Neurosurgery	13	1.3
Infection	12	1.2
Scandinavian Journal of Infectious Diseases	12	1.2
Clinical Neurology and Neurosurgery	11	1.1
Journal of Korean Neurosurgical Society	11	1.1
Neurologia Medico Chirurgica	11	1.1
Neuroradiology	11	1.1
Pediatric Infectious Disease Journal	11	1.1
BMC Infectious Diseases	9	0.9
Journal of Computer Assisted Tomography	9	0.9
Internal Medicine	8	0.8
Journal of Craniofacial Surgery	8	0.8
Medicine	8	0.8
Others	641	64,5
Total	994	100,0

** In the table, the journals in which 8 or more studies were published are given.*

2 (0.2%) in Italian, 2 (0.2%) in Portuguese, 2 (0.2%) in Russian, and 1 (0.1%) in Icelandic.

When the journals where the presented studies had been published were investigated, Surgical Neurology was at the forefront with 29 (%3) articles, followed by the Journal of Clinical Microbiology with 26 (2.7%) articles, Acta Neurochirurgica and the Journal of Neurosurgery with 22 (2.2%) articles each, and Child's Nervous System with 21 (2.1%) articles (Table 2). The publisher companies of the journals where the articles had been published were investigated and revealed that Elsevier ranked first among the publisher companies with 192 (19.3%) articles, followed by Springer Nature with 122 (12.3%), Lippincott Williams & Wilkins with 87 (8.8%), and Taylor & Francis with 42 (4.2%) articles (Table 3).

Evaluation of the countries where the articles had been published showed the United States to rank first with 239 articles (24.0%), followed by Japan with 94 (9.5%) articles, India with 89 (9.0%) articles, and Turkey and France with 52 (5.3%) articles each (Table 4).

A review of the first authors showed Bodilsen J. to be the first author with the most articles on "Brain Abscess" with 14 (1.4%) articles followed by Gupta R.K. and Prasad K.N. with 12 (1.3%) articles each (Table 5). Considering the institutions of the first authors of the articles, Udice French Research Universities ranked first with 24 (2.5%) articles, followed by the University of California System with 20 (2.1%) articles, and the Chang Gung Memorial Hospital with 18 (1.8%) articles (Table 6).

The distribution of the articles by the categories used by WoS was also investigated in this study. We found that some articles were included in more than one category, and accordingly a total of 1498 articles were listed in 18 categories with 328 (21.9%) articles in Clinical Neurology, 279 (18.6%) in Surgery, 140 (9.4%) in Infectious Diseases, and 112 (7.5%) in Medicine, General Internal categories (Table 7).

Financial support had been received during the research and/or publication phase by 96 (9.6%) of the 994 articles evaluated within the scope of the study; this financial support had been provided by 65 supporting institutions for a total of 200 times for the 96 articles. Of these instituti-

Table 3. *The companies that the journals in which the articles are published are affiliated with.*

Company Name	Number (n)*	Percentage (%)
Elsevier	192	19.3
Springer Nature	122	12.3
Lippincott Williams & Wilkins	87	8.8
Taylor & Francis	42	4.2
Wiley	41	4.1
Oxford Univ. Press	33	3.3
Amer Soc. Microbiology	30	3.0
Amer Assoc. Neurological Surgeons	28	2.8
Thieme Medical Publishers	25	2.6
Igaku-Shoin Ltd.	15	1.5
Amer Soc. Neuroradiology	14	1.4
Japan Neurosurgical Soc.	11	1.1
Korean Neurosurgical Soc.	11	1.1
Univ Chicago Press	10	1.0
Sage	9	0.9
Wolters Kluwer Medknow Publications	9	0.9
Japan Soc. Internal Medicine	8	0.8
Karger	8	0.8
Others	299	30,1
Total	994	100,0

** In the table, the companies in which the journal with 8 or more articles were published are given.*

Table 4. *Distribution of studies by countries.*

Company Name	Number (n)*	Percentage (%)
Elsevier	192	19.3
Springer Nature	122	12.3
Lippincott Williams & Wilkins	87	8.8
Taylor & Francis	42	4.2
Wiley	41	4.1
Oxford Univ. Press	33	3.3
Amer Soc. Microbiology	30	3.0
Amer Assoc. Neurological Surgeons	28	2.8
Thieme Medical Publishers	25	2.6
Igaku-Shoin Ltd.	15	1.5
Amer Soc. Neuroradiology	14	1.4
Japan Neurosurgical Soc.	11	1.1
Korean Neurosurgical Soc.	11	1.1
Univ Chicago Press	10	1.0
Sage	9	0.9
Wolters Kluwer Medknow Publications	9	0.9
Japan Soc. Internal Medicine	8	0.8
Karger	8	0.8
Others	299	30,1
Total	994	100,0

** In the table, the companies in which the journal with 8 or more articles were published are given.*

ons, the National Institutes of Health (NIH) USA and the United States Department of Health and Human Services were found to support 32 (16%) articles each, followed by the NIH National Institute of Neurological Disorders and Stroke (NINDS) with support of 20 (10%) articles. The data on the institutions supporting the articles have been provided in the table (Table 8).

DISCUSSION and CONCLUSION

Brain abscess is a serious and life-threatening infectious disease that is seen in 4 to 9 out of every 1000 people worldwide; it can cause serious neurological sequelae, but the mortality rate has been reported to have decreased from 40% to 10% with the help of neurosurgical techniques, modern imaging methods, effective laboratory tests, and treatments developed in recent years (17). It can be said that scientific research and studies on brain abscess play

Table 5. *Distribution of the first name authors of the article.*

Authors	Number (n)*	Percentage (%)
Bodilsen J	14	1.4
Gupta RK	12	1.3
Prasad KN	12	1.3
Enzmann DR	11	1.2
Lu CH	11	1.2
Britt RH	10	1.1
Chang WN	10	1.1
Nielsen H	9	1.0
Husain M	8	0.8
Brouwer MC	7	0.7
Obana WG	7	0.7
Rathore RKS	7	0.7
Van De Beek D	7	0.7
Husain N	6	0.6
Kielian T	6	0.6
Ojha BK	6	0.6
Placone RC	6	0.6
Scheld WM	6	0.6
Others	833	83,8
Total	994	100,0

** In the table, the names of the first authors of 6 or more articles are given.*

Table 6. *Institutions that the first authors were affiliated with.*

Authors' Institutions	Number (n)*	Percentage (%)
Udice French Research Universities	24	2.5
University of California System	20	2.1
Chang Gung Memorial Hospital	18	1.8
Aalborg University	17	1.7
Aalborg University Hospital	17	1.7
Sanjay Gandhi Postgraduate Institute of Medical Sciences	17	1.7
Assistance Publique Hopitaux Paris APHP	16	1.6
US Department of Veterans Affairs	15	1.5
Veterans' Health Administration VHA	15	1.5
King George S Medical University	14	1.4
Stanford University	14	1.4
Post Graduate Institute of Medical Education Research Pgimer Chandigarh	13	1.3
Universite Paris Cite	13	1.3
Chang gung University	10	1.0
Pennsylvania Commonwealth System of Higher Education Pcshe	10	1.0
University of California San francisco	10	1.0
University of Texas System	10	1.0
All India Institute Of Medical Sciences AIIMS New Delhi	9	0.9
Others	723	72.7
Total	994	100.0

** In the table, the institution names of 9 or more authors are given.*

an important role in the diagnosis and treatment of the disorder and undoubtedly contribute significantly to the literature. While evaluating this contribution of scientific research and studies to the literature, the number of citations and the H index can give us important clues in this regard. The H index of the published articles was seen to be 57 in the presented study. Besides, the contribution of each article to the literature can be evaluated separately by investigating the most cited articles on the subject of brain abscess together with the mean annual number of citations from the time of publication. The study conducted by Ebisu et al. in 1996 (7) has received 272 citations, and the study conducted by Brouwer et al. in 2014 (8) has received an annual average of 22.2 citations; thus, they have made a significant contribution to a large number of research work and studies (Table 1).

A total of 994 articles included in WoS are present in the current study and these are all the articles that have been published from the past to the present on the subject of brain abscess. The first one was published in 1980 and

Table 7. *WoS category distribution of articles.*

Category	Number (n)	Percentage (%)
Clinical Neurology	328	21.9
Surgery	279	18.6
Infectious Diseases	140	9.4
Medicine General Internal	112	7.5
Pediatrics	97	6.4
Microbiology	92	6.1
Neurosciences	90	6.0
Radiology Nuclear Medicine Medical Imaging	88	5.9
Immunology	62	4.1
Neuroimaging	33	2.2
Pathology	32	2.1
Otorhinolaryngology	27	1.8
Medicine Research Experimental	24	1.6
Veterinary Sciences	21	1.4
Dentistry Oral Surgery Medicine	17	1.2
Public Environmental Occupational Health	16	1.1
Tropical Medicine	15	1.0
Pharmacology Pharmacy	13	0.9
Cardiac Cardiovascular Systems	12	0.8
Total*	1498	100,0

** Since some studies fall into more than one category, the total number of articles categorized is higher than the total number of articles included in the study.*

Table 8. *Institutions giving financial support to the studies.*

Institutions providing financial support	Number (n)*	Percentage (%)
National Institutes of Health NIH USA	32	16.0
United States Department of Health Human Services	32	16.0
NIH National Institute of Neurological Disorders Stroke NINDS	20	10.0
Indian Council of Medical Research ICMR	7	3.5
National Natural Science Foundation of China NSFC	7	3.5
NIH National Center for Research Resources NCRR	6	3.0
NIH National Cancer Institute NCI	5	2.5
Copenhagen University Hospital Rigs Hospitalet	4	2.0
European Commission	4	2.0
NIH National Institute of Allergy Infectious Diseases NIAID	4	2.0
NIH National Institute of Mental Health NIMH	4	2.0
European Research Council ERC	3	1,5
Grants In Aid for Scientific Research Kakenhi	3	1,5
Japan Society for The Promotion of Science	3	1,5
Ministry Of Education Culture Sports Science and Technology Japan Mext	3	1,5
NIH National Institute of Diabetes Digestive Kidney Diseases NIDDK	3	1,5
Norwegian Epilepsy Society	3	1,5
Wellcome Trust	3	1,5
Others	54	27.0
Total**	200	100,0

** In the table, the countries where 3 or more articles were published are given.*
*** 65 institutions provided financial support for 96 articles 200 times in total, and the numbers and percentages were adjusted accordingly.*

the number of articles included in the WoS database has varied every year. The distribution of the articles by year reveals no statistically significant increase or decrease ($p>0.05$) but there was an increase in the number of articles in 2000 and later compared to the 80s and 90s (Graph 1), indicating that brain abscess as a subject has not lost its popularity in the scientific arena from the past to the present, and is even becoming more popular.

English is commonly used in many countries worldwide and it is also the lingua franca of scientific research (articles, books, international congresses, etc.). We found in this study that articles on brain abscess had been written in many languages, but the majority of the authors preferred the English language (n=892, 89.8%) as expected.

The articles included in the evaluation were most frequently published in the following journals: Surgical Neuro-

logy (n=29, 3.0%), Journal of Clinical Microbiology (n=26, 2.7%), Acta Neurochirurgica (n=22, 2.2%), Journal of Neurosurgery (n=22, 2.2%), and Child's Nervous System (n=21, 2.1%) (Table 2). Elsevier ranked first among the publisher companies of the journals where the articles were published (n=192, 19.3%), and was followed by Springer Nature (n=122, 12.3%), Lippincott Williams & Wilkins (n=87, 8.8%), and Taylor & Francis (n=42, 4.2%) (Table 3). Based on the numbers and rates detected, the specified journals and companies made a significant contribution to the literature on brain abscess. These findings also indicate that these journals at the SCI and SCI-E level and their affiliated companies are respected and preferred in their fields.

According to TÜBİTAK Ulakbim data, the United States is the country with the highest number of publications worldwide between 2010 and 2015 (18). The number of studies conducted and the citations they received should be evaluated in order to observe the scientific development and performance of different countries. This is important in order for the conducted studies to be inspiring for other scientists and direct them towards the relevant research activities (19). The articles in the current study were most often the product of studies conducted in the United States (n=239, 24.0%), followed by Japan (n=94, 9.5%), India (n=89, 9.0%), Turkey (n=52, 5.3%), and France (n=52, 5.3%) (Table 4). Considering the number of articles from Turkey among the articles within the scope of the current study, in addition to the ratio to all articles and Turkey's place in the country ranking, it can be said that studies from Turkey and in particular those concerning "brain abscess" make a significant contribution to the literature.

Many scientists from many parts of the world were found to have conducted scientific studies on this particular subject and to have published their results in the literature, in the current study focusing on articles on brain abscess. The names of the authors with 6 or more articles published are given in table 5 and Bodilsen J. (n=14, 1.4%), Gupta R.K. (n=12, 1.3%), and Prasad K.N. (n=12, 1.3%) can be seen at the forefront while the institutions of the first authors are given in table 6 where Udice French Research Universities (n=24, 2.5%), the University of California System (n=20, 2.1%), and the Chang Gung Memorial Hospital (n=18, %1.8) take the top places. Although not a definite judgment, the authors and institutions mentioned here seem to have contributed more to the enrichment of the literature on "brain abscess" compared to others.

Based on the categorization performed by WoS, the articles were found to be most commonly published in the Clinical Neurology (n=328, 21.9%), Surgery (n=279, 18.6%), Infectious Diseases (n=140, 9.4%), Medicine, General Internal (n=112, 7.5%), and Pediatrics (n=97, 6.4%) categories although there were studies in almost all categories (Table 7). The subject of brain abscess is generally considered to be within the realm of the Neurosurgery and Infectious Diseases specialties but it may also be of interest to many medical branches and require an interdisciplinary approach.

Of the 994 articles reviewed in this study, financial support was found to have been provided only for 9.6% (n=96), and the most common institutions providing financial support were the National Institutes of Health (NIH) USA (n=32, 16%), the United States Department of Health and Human Services (n=32, 16%), and the NIH National Institute of Neurological Disorders and Stroke (NINDS) (n=20, 10%). Only a few scientific studies had been supported when the percentages are considered but supporting scientific research and studies could be expected to be effective in encouraging scientists to conduct further research and studies, thus enriching the literature in terms of both quantity and quality.

Bibliometric research helps to determine the level of the scientific studies published in the literature on the subjects determined by the researchers, and also to assess the distribution of the articles to the publications while revealing the data on how the publications change by journal, year, country, first author, author institution, WoS category, etc. Although bibliometric studies can be performed on many databases, we believe that those conducted using the WoS database, which includes the SCI and SCI-E indexes involving reputable journals, is more valuable than studies on

other databases.

A bibliometric study was conducted on "brain abscess" in the current study, and the number of studies from Turkey in this field, their percentage, and the country rankings were revealed. This study is the first to show the effectiveness of studies from Turkey in this field.

In conclusion, the scientific place of studies conducted on the field of "brain abscess" in the literature has been revealed to some extent, based on the results obtained from the current study. Accordingly, we believe that the scientific effectiveness of the published studies will be revealed thanks to the increase in bibliometric studies, and new bibliometric studies should be conducted by reviewing future studies accordingly.

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The authors report no financial interest.

Conflict of Interest

The authors declare no competing interest.

Ethical Approval

Ethical Approval dated February 15, 2023, with decision no: 884 was received from the İzmir Bakırçay University Non-Invasive Clinical Study Ethics Committee in order to conduct the study.

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