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Turkish Journal of Women's Health and Neonatology

Editorial / Editörden

Çok Değerli Okuyucularımız,

Türk Kadın Sağlığı ve Neonatoloji Dergisi (Turkish Journal of Women's Health and Neonatology) 2022 yılı dördüncü sayısıyla huzurlarınızdayız. Bu sayımızda üç özgün araştırma ve bir derlemeyi zevkle okuyacağınızı ümit ediyoruz.

Obezite, yetişkinlerin ve çocukların yaygın görülen ciddi bir kronik hastalığıdır. Sadece kozmetik bir problem değildir. Kalp hastalığı, diyabet, yüksek tansiyon gibi diğer hastalıkların ve sağlık sorunlarının riskini artıran tıbbi bir sorundur. Bir yazıda obezitenin kadın sağlığı ve yaşamı üzerindeki etkileri tartışılmıştır.

Dünya Sağlık Örgütü (DSÖ), 10-19 yaş arasını adölesan dönem olarak kabul etmektedir. Adölesan gebelik riskli gebelik olarak kabul edilmektedir. Bir yazımızda sezaryen ile sonuçlanan adölesan gebeliklerin obstetrik ve perinatal sonuçları irdelenmiştir.

Bir sonraki sayımızda yeni ve ilginç makalelerle buluşmak üzere…

Saygılarımla,
Prof. Dr. Yaprak Üstün
Başeditör

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Orijinal Makale

Postmenopozal osteoporozlu kadınlarda inflamatuar biyobelirteçlerin ve kemik mineral yoğunluğu ile ilişkisinin incelenmesi

Investigation of inflammatory biomarkers and their relationship with bone mineral density in postmenopausal women with osteoporosis

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Öz

Amaç: Postmenopozal osteoporozu olan ve olmayan hastalar arasında inflamatuar biyobelirteç değerlerinin ve kemik mineral yoğunluğu (KMY) ile ilişkisinin incelenmesidir.

Gereç ve Yöntem: Retrospektif gözlemsel çalışmamıza Sağlık Bilimleri Üniversitesi Etlik Zübeyde Hanım Kadın Hastalıkları Eğitim Araştırma Hastanesi'ne Mayıs 2021 ve Ocak 2022 tarihleri arasında rutin kontrol için başvuran ve KMY istenen 93 hasta dahil edildi. 'Dual Enerji X ray Absorbsiyometri (DEXA) ile yapılan KMY sonuçlarından ortalama lumbal KMY T-skoru değerine göre; T-skoru <-2.5 osteoporoz olarak tanımlandı. Çalışma popülasyonu osteoporozu olan ve olmayan postmenopozal kadınlar olarak iki gruba ayrıldı. İki grubun demografik ve klinik özellikleri, biyokimyasal parametreleri, nötrofil/lenfosit oranı (NLR) ve platelet/lenfosit oranı (PLR) ve sistemik immün inflamasyon indeksi (SII) değerleri karşılaştırıldı. Sistemik inflamatuar yanıt ile KMY arasında korelasyon incelendi.

Bulgular: Çalışmaya toplam 93 postmenopozal kadın dahil edildi. Osteoporoz olan (n:49) hastalarda ortalama T- skoru -3,05, osteoporoz olmayan (n:44) grupta ise 3,64 olup istatistiksel olarak anlamlı fark izlendi ($p<0,05$). Osteoporoz olan ve olmayan hastalar arasında NLR, PLR ve SII değerleri açısından istatiksel olarak anlamlı fark izlenmedi ($p>0,05$). T-skoru ile NLR, PLR ve SII değerleri arasında korelasyon izlenmedi ($p>0,05$).

Sonuç: Çalışmamızda, postmenopozal osteoporozlu kadınlarda inflamatuar biyobelirteçler ve kemik mineral yoğunluğu arasında ilişki izlenmemiştir. Çok merkezli ve daha çok hasta sayılı çalışmalara ihtiyaç olmakla beraber, literatürdeki çalışmalar hemogram parametrelerinden elde edilen inflamatuar biyobelirteçlerin postmenopozal osteoporozun taranması ve önlenmesinde önemli bir rol oynayabileceğini göstermektedir.

Anahtar Kelimeler: Postmenopozal osteoporoz; nötrofil/lenfosit oranı; trombosit/lenfosit oranı; sistemik immün inflamasyon indeksi; kemik mineral yoğunluğu

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Abstract

Objective: The aim of this study is to examine the relationship between inflammatory biomarker values and bone mineral density (BMD) in patients with and without postmenopausal osteoporosis.

Material and Methods: This retrospective observational study includes 93 patients who applied to Health Sciences University Etlik Zübeyde Hanım Gynecology Training and Research Hospital for routine control and required to have BMD between May 2021 and January 2022. According to the mean lumbar BMD T-score value from the BMD results performed with Dual Energy X-Ray Absorbsiometry (DEXA); T-score <-2.5 was defined as osteoporosis. The study population was divided into two groups as postmenopausal women with and without osteoporosis. Demographic and clinical characteristics, biochemical parameters, neutrophil/lymphocyte ratio (NLR) and platelet/lymphocyte ratio (PLR) and systemic immune inflammation index (SII) values of the two groups were compared. Correlation between systemic inflammatory response and BMD was examined.

Results: A total of 93 postmenopausal women were included in the study. The mean T-score was -3.05 in patients with osteoporosis (n:49) and 3.64 in the non-osteoporosis group (n:44), with a statistically significant difference ($p<0.05$). There was no statistically significant difference between patients with and without osteoporosis in terms of Neutrophil/ Lymphocyte ratio (NLR) and Platelet/Lymphocyte Ratio (PLR) and Systemic immune inflammation index (SII) values ($p>0.05$). No correlation was observed between NLR, PLR and SII values and T score ($p>0.05$).

Conclusion: In our study, no relationship was observed between inflammatory biomarkers and bone mineral density in postmenopausal women with osteoporosis. Although multicenter studies with larger numbers of patients are needed, studies in the literature show that inflammatory biomarkers obtained from hemogram parameters can play an important role in the screening and prevention of postmenopausal osteoporosis.

Keywords: Postmenopausal osteoporosis; neutrophil/lymphocyte ratio; platelet/lymphocyte ratio; systemic immune inflammation index; bone mineral density

1. Giriş

Postmenopozal osteoporoz (PMOP), kemik kütlesinde azalma ve kemiğin mikro-mimarisinde bozulma ile karakterize, kırık riskinde artışa yol açan sistemik metabolik bir kemik hastalığıdır (1,2). Nüfusun hızla artmasıyla birlikte PMOP, son yıllarda postmenopozal kadınlarda yaygınlaşmakta sonrası, ciddi bir sosyal sağlık sorunu haline gelmekte ve sağlık sistemi üzerinde ağır ekonomik yüklere neden olmaktadır (3). PMOP için değiştirilebilir risk faktörlerinin önceden tespiti ve koruyucu önlemlerin alınması POMP yönetiminde en etkili sağlık stratejilerindendir. Geleneksel tanı yaklaşımı, çift enerjili X-ışını absorpsiyometrisi (DEXA) ile kemik mineral yoğunluğu (KMY) değerlendirilmesine dayanır ancak çok sayıda postmenopozal kadın DEXA yaptırmaksızın osteoporoza bağlı semptomlar geliştiğinde sağlık kuruluşlarına başvurmaktadır (2). Gecikmiş tanı karşımıza osteoporozun olumsuz sonuçlarıyla çıkmaktadır. Bu nedenle, postmenopozal kadınlarda PMOP'u erken tanımak için kolay ve etkili biyobelirteçlerin belirlenmesi önemlidir (4).

PMOP vücut immün disfonksiyonu ve sistematik inflamasyon aktivasyonu ile yakından ilişkilidir. Patogenezinde kadınlarda menopoz sonrası endojen östrojen korumasının kaybedilmesi ile birlikte tümör nekroz faktörü-alfa, interlökin (IL) 6, IL-12, IL-17 gibi inflamatuar sitokinlerin artarak birikmesi ve bu inflamatuar sitokinlerin oksidatif stres hasarına aracılık ederek osteoklastları uyarması yer almaktadır. Bu nedenle PMOP'u erken tanımak için sistematik inflamatuar biyobelirteçlerin kullanılabilirliği ön plana taşınmıştır (5-7).

Tam kan sayımlarındaki inflamatuar parametreler genellikle vücuttaki sistemik inflamatuar yanıtın göstergesi olarak kullanılmakta ve son yıllarda, çalışmalar nötrofil/ lenfosit oranı (NLR) ve platelet/lenfosit oranı (PLR)'nin PMOP'yi tanımlamak için biyobelirteçler olarak kullanılabileceğini öne sürmektedir (8). Sistemik immün inflamasyon indeksi (SII), tam kan sayımına dayanan yeni bir inflamatuar indekstir ve solid tümörlerin prognozlarını güçlü bir şekilde predikte etmektedir (9). Bu çalışmadaki amacımız osteoporoz olan ve olmayan hastalar arasında sistemik inflamatuar yanıt farklılığı ve sistemik inflamatuar yanıt KMY arasındaki ilişkinin araştırılmasıdır.

2. Gereç ve Yöntemler

Kesitsel nitelikte retrospektif gözlemsel çalışmamız için Sağlık Bilimleri Üniversitesi Etlik Zübeyde Hanım Kadın Hastalıkları Eğitim Araştırma Hastanesi'ne Mayıs 2021 ve Ocak 2022 tarihleri arasında rutin kontrol için başvuran KMY istenen hastaların verileri hasta kayıt sisteminden retrospektif olarak tarandı. Demografik bilgilerine ulaşılabilen, tam kan sayımı, rutin biyokimya değerleri sistemde olan postmenopozal 93 hasta çalışmaya dahil edildi. Çalışma protokolü Sağlık Bilimleri Üniversitesi Etlik Zübeyde Hanım Kadın Hastalıkları Eğitim ve Araştırma Hastanesi Tıpta Uzmanlık Eğitim Kurulu tarafından

onaylandı (09/29). Hastaların yaş, menopoz yaşı, gravida, parite, vücut kitle indeksi (kg/m²), komorbid hastalık varlığı verileri incelendi. Rutin biyokimya tetkiklerinden total kolesterol, trigliserit, yüksek dansiteli lipoprotein (HDL-kolesterol), düşük dansiteli lipoprotein (LDL-kolesterol), çok düşük yoğunluklu lipoprotein (VLDL), 25-Hidroksi vitamin D, kan üre azotu (BUN) ve kreatinin (Cr) tetkikleri hastanemiz biyokimya ve hormon laboratuvarında Beckman Coulter AU680 (Beckman Coulter, Miami, FL, USA) ve Roche Cobas E801 (Roche Diagnostics, Mannheim, Germany) ile çalışıldı, değerler hasta takip formuna kaydedildi.

NLR, PLR ve SII (nötrofil x platelet/lenfosit) değerleri hasta takip formuna kaydedildi.

'Dual Enerji X ray Absorbsiyometri (DEXA) D.M.S STRATOS (France) cihazı ile yapılan KMY sonuçlarından ortalama lumbal KMY T-skoru değerine göre; T- skoru <-2.5 osteoporoz, T-skoru -2,5 ile -1 arası osteopeni, T-skoru> -1 normal KMY olarak kabul edildi. Ve hastalar osteoporozu olan (n:49) ve olmayan (n:44) postmenopozal kadınlar olarak iki gruba ayrıldı. Reproduktif dönem hastalar çalışmaya dahil edilmedi.

İstatiksel Analiz

Elde edilen verilerde normalliği test etmek için Skewness/Kurtosis (Basıklık/Çarpıklık) değerleri kullanıldı ve değerler, ortalama ± standart sapma, medyan (minimum- maksimum) veya frekans (yüzde) olarak ifade edildi. İki grup arasındaki sürekli değişkenlerin karşılaştırılmasında bağımsız örneklem T- testi ve Mann Whitney testi kullanıldı. Kategorik verilerin karşılaştırılmasında ise Ki-Kare test kullanıldı. Sürekli değişkenler arasındaki ilişkiler Spearman/Pearson korelasyon analizi ile incelendi. Tüm analizler, 0.05 anlamlılık düzeyi ile SPSS 20 programı kullanılarak yapıldı. İstatistik sonuçları, literatür ile uyumluluğu ve aralarında fark olup olmadığı açısından değerlendirildi.

3. Bulgular

Çalışmaya dahil edilen hastaların demografik özellikleri Tablo 1'de gösterilmiştir. Osteoporoz olan hastalarda yaş ortalaması 62,53 ±7,96 olup osteoporoz olmayan gruba göre anlamlı yüksek izlendi (p<0,05). Osteoporoz olan hastalarda menopozda bulunma süresi 14,76 ± 10,52 yıl olup osteoporoz olmayan gruba göre istatiksel olarak anlamlı yüksek izlendi (p<0,05). Osteoporoz olan hastalarda gravida, parite sayıları osteoporoz olmayan gruba göre istatiksel olarak anlamlı yüksek izlendi (p<0,05). Osteoporoz olmayan hastalarda vücut kitle indeksi (VKİ) 31,97 ± 4,77 kg/m² olup osteoporoz olan gruba göre istatiksel olarak anlamlı yüksek izlendi (p<0,05). Ek hastalıklar yönünden gruplar arasında anlamlı bir fark izlenmedi (p>0,05) (tablo 1).

Çalışmaya dahil edilen hastaların laboratuvar değerleri ve T-skorları Tablo 2'de gösterilmiştir. Osteoporoz olan ve osteoporoz olmayan hastalar arasında BUN, kreatinin, total kolesterol, trigliserit, HDL, LDL, VLDL, 25-Hidroksi Vitamin D değerleri açısından istatiksel olarak anlamlı fark izlenmedi (p>0,05). Osteoporoz olan hastalarda ortalama T-skoru -3,05, osteoporoz olmayan grupta 3,64 olup istatistiksel olarak anlamlı fark izlendi (p<0,05) (Tablo 2).

Tablo 1. Osteoporoz Olan ve Olmayan Grupların Demografik Özellikleri

Demografik Özellikler	Osteoporoz Var (n: 49) (%52,7)	Osteoporoz Yok (n: 44) (%47,3)	p
Yaş	62,53 ± 7,96	58,12 ± 7,42	**0,007***
VKİ (kg/m²)	28,79 ± 4,78	31,97 ± 4,77	**0,05***
Menopoz Yaşı	47,77 ± 5,72	49,16 ± 3,95	0,17*
Menopoz Süresi	14,76 ± 10,52	8,95 ± 7,27	**0,003***
Gravida	3 (1-9)	3 (1-7)	**0,03***
Parite	3 (1-9)	2 (1-6)	**0,02***
Ek Hastalık			0,25 **
Yok	10	7	
DM	8	8	
HT	9	13	
Diğer	22	16	

*Student T Test ** Ki Kare(X2) Test, (VKİ: Vücut kitle indeksi, DM: Diyabetes Mellitus, HT: Hipertansiyon)

Tablo 2. Osteoporoz olan ve olmayan grupların laboratuvar değerleri ve T-skoru karşılaştırılması			
Laboratuvar Parametreleri	Osteoporoz Var (n: 49) (%52,7)	Osteoporoz Yok (n: 44) (%47,3)	p
BUN	14,27 ± 4,08	14,08 ± 3,78	0,82*
Kreatinin	0,62 ± 0,12	0,63 ± 0,13	0,81*
Total Kolesterol	216,95 ± 47,66	229,62 ± 40,84	0,27*
Trigliserit	145,26 ± 65,72	152,23 ± 74,97	0,81**
HDL-Kolesterol	55,78 ± 12,62	58,07 ± 14,02	0,50*
LDL-Kolesterol	133,36 ± 44,67	141,72 ± 37,31	0,44*
VLDL-Kolesterol	28,89 ± 13,29	30,40 ± 14,93	0,75**
25-Hidroksi Vitamin D	20,22 ± 9,61	24,61 ± 15,43	0,67*
T Skoru	-3,05 ± 0,44	3,64 ± 0,53	**0,00***
*Student T Test ** Mann Whitney-U Test (BUN: Kan üre azotu, HDL-Kolesterol: Yüksek yoğunluklu lipoprotein-Kolesterol, LDL-Kolesterol: Düşük yoğunluklu lipoprotein-Kolesterol, VLDL-Kolesterol: Çok düşük yoğunluklu lipoprotein-Kolesterol)			

Çalışmaya dahil edilen hastaların inflamatuar belirteçleri Tablo 3'de gösterilmiştir. Osteoporoz olan ve osteoporoz olmayan hastalar arasında NLR, PLR ve SII değerleri açısından istatistiksel olarak anlamlı fark izlenmedi (p>0,05) (Tablo 3).

Korelasyon analizinde T-skoru ile NLR, PLR ve SII değerleri arasında korelasyon izlenmedi (p>0,05) (Tablo 4).

4. Tartışma

Osteoporoz, geriatrik yaş grubunda fraktürlerin ve buna bağlı morbiditenin önemli bir nedenidir. Endokrin kökenli patofizyolojiler ve bağışıklık sisteminin bileşenlerinin kemik üzerine olan etkileri osteoporoz patogenezinde yer almaktadırlar. 'Osteoimmünoloji' terimi, osteoblast-osteoklast dengesindeki inflamatuar sitokinlerin rolünü ve kronik inflamatuar patolojilerle osteoporoz arasındaki ilişkiyi açıklamaya yardımcı olmaktadır (10).

Çalışmamızda inflamatuar biyobelirteçlerden, NLR, PLR ve SII değerlerinin osteoporoz olan ve olmayan gruplar arasındaki farklılıkları incelenmiştir, istatiksel olarak anlamlı fark izlenmese de, NLR, PLR ve SII değerleri osteoporoz olan grupta daha yüksek izlenmiştir. NLR, PLR, SII değerleri ile KMY T-skoru arasında ise korelasyon izlenmemiştir.

Tablo 3. Osteoporoz olan ve olmayan grupların inflamatuar belirteçlerin karşılaştırılması			
İnflamatuar belirteçler	Osteoporoz Var (n: 49) (%52,7)	Osteoporoz Yok (n: 44) (%47,3)	p
PLR	146,46 ± 132,31	131,28 ± 42,41	0,46*
NLR	2,06 ± 1,34	2,01 ± 0,95	0,58**
SII	590,77 ± 442,53	546,26 ± 302,14	0,70**
*Student T Test ** Mann Whitney-U Test (NLR: nötrofil/ lenfosit oranı, PLR: platelet/lenfosit oranı, SII: Sistemik immün inflamasyon indeksi)			

Tablo 4. Osteoporoz olan ve olmayan grupların inflamatuar belirteçlerin T Skoru ile korelasyonunun incelenmesi			
	PLR	NLR	SII
T Skoru	0,27*	0,23**	0,33**
*Pearson Korelasyon analizi ** Spearman Korelasyon analizi (PLR: platelet/lenfosit oranı, NLR: nötrofil/ lenfosit oranı, SII: Sistemik immün inflamasyon indeksi)			

İnflamatuar durumlarda, IL-4 ve TNF-α gibi inflamatuar sitokinler tarafından uyarılan nötrofiller, hücre zarlarına transfer edilen NF-kappa B-ligandı (RANKL) uyarımını arttırır. Buna bağlı artan osteoklast aktivitesi nedeniyle de inflamatuar durumlarda kemik kaybı oluşmaktadır (11). NLR'nin osteoporoz öngörüsündeki rolünü inceleyen çalışmalardan, Huang ve ark. tarafından diyabetes mellitus (DM) olmayan 233 postmenopozal kadının verilerinin incelendiği çalışmada, NLR arttıkça osteoporozun arttığı gösterilmiştir (12). Yılmaz ve ark. tarafından yapılan, osteoporoz, osteopeni ve kontrol gruplarından oluşan 438 postmenopozal kadın hasta ile yapılan bir çalışmada ise NLR değeri osteoporoz grubunda daha yüksek bulunmuş, NLR ile KMY arasında da negatif korelasyon izlenmiştir (13).

Trombositlerin kemik dokusu üzerinde farklı etkileri olabilmektedir. Anjiyogenezi artırarak osteoblastların migrasyonunu ve proliferasyonunu indükleyerek kemik rejenerasyonunu desteklediği gösterilmiştir. Buna ek olarak, inflamatuar stimülasyon sonrası artan trombosit aktivasyonu, prostaglandin ve RANKL'a bağlı mekanizma yoluyla osteoklast oluşumunu etkilediği de gösterilmiştir (14). Lee ve ark. tarafından yapılan 407 postmenopozal kadının verilerinin incelendiği çalışmada, bizim çalışmamız sonucuna benzer şekilde PLR ile KMY arasında korelasyon izlenmemiştir (8).

SII, vücudun immün ve inflamatuar durumunu genel olarak yansıtabilen bir indekstir. Trombosit, nötrofil ve lenfositin yaş, cinsiyet ve komorbidite gibi bireysel farklılıklardan kolayca etkilenebileceği göz önüne alındığında, SII bu indekslerin oranıyla oluşturulan ve bireysel farklılıkların etkilerinin en aza indirildiği bir indekstir (15). Fang ve ark. tarafından yapılan 92'si postmenopozal osteoporoz tanılı 238 postmenopozal kadının dahil edildiği çalışmada, yüksek SII değerlerinin PMOP tanısını öngörmede yeri olduğunu, ek olarak SII, PMOP hastalarında osteoporotik kırık riskini öngörmede de kullanılabileceği gösterilmiştir (16). Du ve ark. tarafından yapılan 413 postmenopozal kadının dahil edildiği çalışmada ise SII ve KMY arasındaki ilişki incelenmiş ve yüksek SII düzeylerinin düşük KMY ile ilişkili olduğu gösterilmiştir (17).

Sigara kullanımı, D vitamini seviyeleri gibi osteoporotik süreçleri etkileyebilecek diğer faktörlerin analiz edilmesi ve çalışmaya dahil edilen postmenopozal kadınların gruplamasında osteopenik hastaların da gruplandırılması bu konuda yapılacak çalışmaların sonuçlarını daha da güçlü kılacağını düşünüyoruz. Sonuç olarak, çok merkezli ve daha geniş hasta sayılı çalışmalara ihtiyaç olmakla beraber, literatürdeki çalışmalar hemogram parametrelerinden elde edilen inflamatuar biyobelirteçlerin postmenopozal osteoporozun taranması ve önlenmesinde önemli bir rol oynayabileceğini göstermektedir.

Yazar katkısı
Araştırma fikri ve tasarımı: REP, BŞ, GEÇ ve YEÜ; veri toplama: REP ve BŞ; sonuçların analizi ve yorumlanması: REP ve YEÜ; araştırma metnini hazırlama: REP, BŞ, GEÇ ve YEÜ. Tüm yazarlar araştırma sonuçlarını gözden geçirdi ve araştırmanın son halini onayladı.

Etik kurul onayı
Bu araştırma için Etlik Zübeyde hanım Kadın Hastalıkları Eğitim ve Araştırma Hastanesi SUAM Tıpta Uzmanlık Eğitim Kurulundan onay alınmıştır (Karar no: 09/26.07.2022).

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Author contribution
Study conception and design: REP, BŞ, GEÇ ve YEÜ; data collection: REP ve BŞ; analysis and interpretation of results: REP ve YEÜ; draft manuscript preparation: REP, BŞ, GEÇ ve YEÜ. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval
The study was approved by the Etlik Zübeyde Hanım Womens Health Teaching and Research Hospital SUAM Medical Specialization Education Board (Protocol no: 09/26.07.2022).

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Orijinal Makale

A retrospective perspective on abnormal uterine bleeding and the PALM-COEIN classification: Experiences of a tertiary center

Anormal uterin kanama ve PALM-COEIN sınıflandırmasına retrospektif bakış açısı: Tersiyer merkezin deneyimleri

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Abstract

Background: The Menstrual Disorders Working Group of the International Federation of Gynecology and Obstetrics (FIGO) created a new classification system called "PALM-COEIN" for abnormal uterine bleeding in 2011. The aim of our study is to investigate the new classification system and compare it with the classical terminology for abnormal uterine bleeding.

Materials and Methods: Our study was conducted retrospectively between February 2022 and July 2022 in the gynecology clinic of Keciören Training and Research Hospital. Premenopausal women without known chronic disease were enrolled in the study. Each patient enrolled in the study was examined based on anatomical structure, physical examination, and pelvic ultrasonography. If necessary, endometrial specimens and hysterectomy material were obtained for histopathologic examination. Possible causes were classified according to the new classification system.

Results: The study included 135 premenopausal women with abnormal uterine bleeding. In general, the patients with bleeding complaints had leiomyoma uteri and polyps according to the classical terminology. They were grouped under the labels of hypermenorrhea, menorrhagia, metrorrhagia, and menometrorrhagia, which were due to various causes, including polyps, adenomyosis, hyperplasia, and iatrogenic causes. According to the classification PALM-COEIN, 35 (25.9%) polyps, 16 (11.8%) adenomyosis, 38 (28.1%) leiomyomas, 4 (2.9%) malignancies and hyperplasia were detected.

Conclusion: The classification of abnormal uterine bleeding is generally inconsistent. The new classification system, created for many reasons, is an important step towards understanding complex situations. Another need is that a widely accepted and known classification system should facilitate communication among clinicians and clarify the review of the target population. It is also clear that the new classification system will improve communication between patients. Widespread use of the system will also reveal new treatment options for abnormal uterine bleeding.

Keywords: Abnormal uterine bleeding; classification; dysfunctional uterine bleeding; menstrual disorders

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Öz

Amaç: 2011 yılında Uluslararası Jinekoloji ve Obstetrik Federasyonu'nun (FIGO) Menstrüel Bozukluklar Çalışma Grubu, anormal uterin kanama için "PALM-COEIN" adlı yeni bir sınıflandırma sistemi oluşturdu. Çalışmamızın amacı, anormal uterin kanama için yeni sınıflandırma sistemini araştırmak ve klasik terminoloji ile karşılaştırmaktır.

Gereç ve Yöntem: Çalışmamız Şubat 2022 ile Temmuz 2022 tarihleri arasında Keçiören Eğitim ve Araştırma Hastanesi kadın hastalıkları kliniğinde retrospektif olarak yapılmıştır. Bilinen kronik hastalığı olmayan premenopozal kadınlar çalışmaya dahil edilmiştir. Çalışmaya alınan her hasta fizik muayene ve pelvik ultrasonografi ile değerlendirilmiştir. Gerekirse histerektomi materyali ve endometriyal spesmen histopatolojik inceleme için alındı. Olası nedenler yeni sınıflandırma sistemine göre sınıflandırıldı.

Bulgular: Çalışmaya anormal uterin kanaması olan 135 premenopozal kadın dahil edildi. Kanama şikayeti ile başvuran hastalar; polipler, adenomiyozis, hiperplazi ve iyatrojenik nedenler gibi çeşitli nedenlere bağlı hipermenore, menoraji, metroraji ve menometroraji etiketleri altında gruplandırılmıştır. PALM-COEIN sınıflamasına göre 35 (%25,9) polip, 16 (%11,8) adenomyozis, 38 (%28,1) leiomyom, 4 (%2,9) malignite ve hiperplazi tespit edildi.

Sonuç: Anormal uterin kanamanın sınıflandırılması genellikle tutarsızdır. Birçok nedenden dolayı oluşturulan yeni sınıflandırma sistemi, karmaşık durumları anlamak için önemli bir adımdır. Diğer bir ihtiyaç ise, yaygın olarak kabul edilen ve bilinen bir sınıflandırma sisteminin klinisyenler arasındaki iletişimi kolaylaştırması ve hedef popülasyonun gözden geçirilmesini netleştirmesidir. Yeni sınıflandırma sisteminin hastalar arasındaki iletişimi iyileştireceği de açıktır. Sistemin yaygın kullanımı anormal uterin kanamalar için de yeni tedavi seçeneklerini ortaya çıkaracaktır.

Anahtar Kelimeler: Anormal uterin kanama; sınıflandırma; disfonksiyonel uterin kanama; menstrüel düzensizlik

1. Introduction

Abnormal uterine bleeding (AUB) is usually defined as an abnormality in the pattern, quantity, frequency, or duration of the menstrual cycle (1,2). Abnormal uterine bleeding can be classified as acute or chronic. Acute AUB means a severe episode. It is a severe uterine bleeding episode that may require immediate intervention to prevent hemodynamic instability (3). Abnormal uterine bleeding that persists over a 6-month period is called chronic AUB (3). It occurs in about 10 to 35 percent of women during their fertile years (4). Chronic heavy or persistent uterine bleeding can cause anemia, interfere with daily activities and require emergency medical care. Patients are also at increased risk for uterine cancer (5).

The causes of AUB are multifactorial, and the causes are usually common. The Menstrual Disorders Working Group of the International Federation of Gynecology and Obstetrics (FIGO) has presented a classification system and revised terminology (2). This new classification system was intended to avoid inadequate coverage or confusion of the terms menorrhagia, menometrorrhagia, polymenorrhea, oligomenorrhea, etc. previously used to describe AUB (6). This system classified the etiologies of AUB as "associated with structural abnormalities of the uterus" and "not associated with structural abnormalities of the uterus." Under these main headings, AUB is categorized according to the abbreviation PALM-COEIN: Polyp, Adenomyosis, Leiomyoma, Malignancy and Hyperplasia, Coagulopathy, Ovulatory Disorder, Endometrial, Iatrogenic, and Not Otherwise Classified (2). Determining the etiology of uterine bleeding is critical to select the most appropriate and effective treatment strategies for individual patients. The overall inconsistency of the classification used to define AUB was cited as the primary reason for the creation of this FIGO approved classification system. Another requirement for the use of a new, widely accepted, and well-known classification system is to facilitate communication between clinicians, researchers, and also patients. This system can clarify the terms and target populations to be used in clinical trials. The widespread adoption of the PALM-COEIN system will pave the way for the development of new treatments and research into AUB. For this reason, we wanted to find out how the relationship between the common definitions and the terms used in the new classification can be explained with our data.

2. Material and Methods

This descriptive cross-sectional study was conducted between February 2022 and July 2022 in the gynecology clinic of Keciören Training and Research Hospital in Ankara. The study was planned as a retrospective study and the study protocol was approved by the Institutional Review Board (2/22/2012#2012-KAEK-15/2463). The study included 135 premenopausal women of reproductive age (25-45 years) who presented to the outpatient clinic with complaints of abnormal uterine bleeding characterized by unpredictable, irregular, excessive duration, abnormal volume, and/or abnormal menstrual frequency, and intermenstrual bleeding. An anatomic

structure, physical examination, and pelvic ultrasonography were performed in each patient. If necessary, endometrial specimens and hysterectomy specimens were obtained for histopathological examination. Possible causes were classified according to the new classification system. Women with bleeding attributable to cervical causes were excluded from the study. The category "coagulopathy" was assigned to all cases with multiple coagulation disorders. In the classification of PALM-COEIN, definitions other than organic pathologies were evaluated under the title "others". An iatrogenic grouping was also made. The "iatrogenic" category was characterized by the use of hormones or steroids. "Ovulatory dysfunction" was defined as a condition manifested by a combination of unpredictable bleeding timing and variable bleeding volume (2). Hypermenorrhea was defined as excessive menstrual bleeding, wetting more than one tampon or pad in an hour; menorrhagia was defined as a condition in which prolonged menstruation is accompanied by heavy bleeding; metrorrhagia was defined as increased menstrual flow for more than 7 days that occurs irregularly during the cycle; and menometrorrhagia was defined as heavy, prolonged, and irregular bleeding.

Statistical analysis

SPSS 22 (SPSS Inc. Chicago, IL) was used for statistical analysis. The distribution of parameters was tested for normality using the Kruskal-Wallis test. Descriptive statistics were expressed as mean ± standard deviation (SD), minimum and maximum values, number (n), and percentage (%).

3. Results

The study involved 135 women who complained of abnormal uterine bleeding. Patients complaining of abnormal uterine bleeding were categorized according to classical terminology and examined under the designations hypermenorrhea, menorrhagia, metrorrhagia, and menometrorrhagia. Pathologic final samples with these complaints were then examined, and an attempt was made to explain the bleeding patterns based on the PALM-COEIN classification for cause. The mean age of the patients was 42.6 years, the mean body mass index (BMI) was 30.5 kg/m2, and the mean number of births was 2.75. Routine ultrasonography revealed a mean thickness of the endometrium of 11.4 mm. Polyps occurred in hypermenorrhea, menorrhagia, metrorrhagia, and menometrorrhagia in different cases; 60% of polyps occurred in hypermenorrhea, 2.8% in menorrhagia, 11.4% in metrorrhagia, and 25.7% of polyps in menometrorrhagia. Of the adenomyosis, 62.5% occurred in hypermenorrhea, 12.5% in menorrhagia, 6.2% in metrorrhagia, and 18.7% in menometrorrhagia. Menometrorrhagia occurred in 39.4% of leiomyomas. Among malignancies, menometrorrhagia occurred most frequently (n=3, 75.0%). In the cases categorized according to the PALM-COEIN classification system, there were 35 (25.9%) polyps, 16 (11.8%) adenomyosis, 38 (28.1%) leiomyomas, 4 (2.9%) malignancies, and hyperplasia (Table 1).

4. Discussion

This study was conducted to identify the causes of AUB based on the PALM-COEIN classification and to compare the clinical and histopathological features to determine the final etiology for appropriate treatment of AUB. Identification of the probable etiology is the most important milestone for effective treatment of AUB. Treatment modalities vary depending on the patient, physician experience, cause of bleeding, and response to drug therapy. The common interpretation of the results of numerous clinical studies on the epidemiology, etiology, treatment, and prognosis of AUB is complicated by the lack of uniformity in

Tablo 1. Comparison of cases according to classic terminology and the PALM-COEIN system

PALM-COEIN system	Hypermenorrhea	Menorrhagia	Metrorrhagia	Menometrorrhagia
P (Polyp) n=35	21 (60.0%)	1 (2.8%)	4(11.4%)	9 (25.7%)
A (Adenomyosis) n=16	10 (62.5%)	2 (12.5%)	1 (6.2%)	3 (18.7%)
L (Leiomyoma uteri) n=38	14 (36.8%)	5 (13.1%)	4 (10.5%)	15 (39.4%)
M (Malignancy) n= 4	-	1(25.0%)	-	3(75.0%)
O (Others) n=31	3 (9.6%)	1(3.2%)	2 (6.4%)	25 (80.6%)
I (Iatrogenic) n=11	3 (27.2%)	5 (45.4%)	1 (9.0%)	2 (18.1%)

classification (7). Dysfunctional uterine bleeding is defined as irregular uterine bleeding that occurs without identifiable pelvic pathology, general medical illness, or pregnancy. “Dysfunctional uterine bleeding (DUB)” is now a redundant term for women (8).

Women previously classified in this category actually fall into the FIGO categories of various combinations of coagulopathies, ovulatory disorders, or endometrial pathologies and are considered “unrelated to the uterus” (8). Polyps are defined by a combination of ultrasound (including saline infusion sonography) and hysteroscopic imaging with or without histopathology (9). Although most polyps are asymptomatic, the percentage of polyps in AUB varies from 3.7% to 65% (10). In this study, polyps were found in 27.4% of women with AUB, leading to AUB. It is also important to exclude a polypy-looking endometrium, as this appearance may be a variant of a normal, estrogen-affected endometrium. Diagnostic criteria for adenomyosis have traditionally been based on histopathologic assessment of the depth of “endometrial” tissue in the endometrium, particularly in hysterectomy specimens (11). This feature is a factor that severely limits the need to diagnose adenomyosis. In this system, diagnostic criteria based on both sonography and magnetic resonance imaging (MRI) were used (12). The adenomyosis rate in our study was 11.8%. This rate is comparable to the rate reported in the literature. Most leiomyomas (fibroids) are asymptomatic and are often not considered a cause of AUB (13). Leiomyomas are classified into a subclassification system that includes submucous and other leiomyomas and provides a common language for clinicians leading to appropriate treatment (14). Leiomyomas are the most common cause of AUB in the literature. Leiomyomas can be divided into submucosal (L- SM) and other (L-O) subclasses depending on their location (15). Submucosal fibroids are thought to disrupt the uterine cavity and are more likely to cause heavy menstrual bleeding (HMB). In our study, leimyoma uteri was the most common cause.

Endometrial hyperplasia, i.e. abnormal proliferation of the uterine glands, is a serious cause of AUB and endometrial cancer (16). Obesity has been shown to be a major cause of AUB. Lifetime exposure to estrogen through peripheral aromatization of adrenal androgens increases the incidence of polyps, leiomyomas, and endometrial cancer in obese women (relative risk 3-10%) (13). In the present study, the mean BMI of the patients was in the obese category. Therefore, caution should be exercised in obese women with regard to AUB. Most bleeding is due to exogenous hormone therapy or drugs that affect hormones. Medications such as anticonvulsants, hormonal steroids, and antipsychotics can cause hormonal imbalances that can lead to AUB (17). An intrauterine device (IUD) can cause low-grade endometritis leading to AUB (10). According to recent studies, iatrogenic causes account for 1.56 % of AUB. In our study, cases were classified based on the positive results of endometrial specimens, hysterectomy specimens (if possible), ultrasound findings, and laboratory results. Endometrial samples do not exclude possible adenomyosis or uterine fibroid. There may be one or more causes, and it is not possible to determine the exact cause of AUB without performing the same diagnostic tests in all cases (hysterectomy specimens, coagulation parameters, imaging, and a detailed medication and medical history). These are the weaknesses of our study.

It is expected that the use of the PALM-COEIN system will help to eliminate confusion about the etiology of AUB and this diagnosis will allow more effective communication with other health professionals, which in turn will lead to better treatment management. In conclusion, further studies are needed to clarify the causes of AUB in the system PALM-COEIN. This analysis will allow us to better understand the classification of etiologic factors in order to develop appropriate management strategies for the treatment of AUD.

Yazar katkısı

Araştırma fikri ve tasarımı:CT, MCI; veri toplama: BMS ve CT; sonuçların analizi ve yorumlanması: CT, HNO, BMS ve MC; araştırma metnini hazırlama: MCI. Tüm yazarlar araştırma sonuçlarını gözden geçirdi ve araştırmanın son halini onayladı.

Etik kurul onayı

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Author contribution

Study conception and design: CT,MCI; data collection: BMS, CT; analysis and interpretation of results: CT, HNO, BMS ve MC; draft manuscript preparation: MCI. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

The study was approved by the University of Health Sciences, Ankara Atatürk Sanatorium Training and Research Hospital Clinical Research Ethics Committee (Protocol no. 2012-KAEK-15-2463/22.02.2022).

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Conflict of interest

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Orijinal Makale

Evaluation of obstetric outcomes in adolescent pregnancies delivered by cesarean section: Single center experience

Sezaryen ile sonuçlanan adolesan gebeliklerde obstetrik sonuçların değerlendirilmesi: Tek merkez deneyimi

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Abstract

Aim: Adolescent pregnancies; defined as pregnancies in women aged 10-19 years old are still an important public health problem and must be considered as high risk pregnancies with increased maternal and fetal mortality and morbidity rates. In this study, we aimed to examine the obstetric and perinatal outcomes in adolescent pregnancies delivered with cesarean section (CS) and compare the outcomes in determined adolescent age groups.

Materials and Methods: In this retrospective study, the obstetric and perinatal outcomes in 2665 adolescent patients who delivered with cesarean section were examined in three groups divided according to the age of delivery: group 1 included the patients aged 14-15 years old, group 2 the patients aged 16-17 years old and group 3 the patients aged 18-19 years old. The outcomes were compared between the identified age groups.

Results: The incidence of preterm delivery was higher in group 1 compared with group 2 and group 3 (p=0.001) and 52.3% of group 1 patients had delivered between 29-34 gestational weeks. Fetal birth weight and APGAR scores were lower and need for neonatal intensive care unit (NICU) was higher in group 1. In group 3 116 (8.4%) patients had postpartum hemorrhage which was higher than group 1 and group 2 with statistically significant difference (p=0.001).

Conclusion: Preterm delivery, low birth weight, low APGAR scores and need for NICU are higher in 15-17 years old adolescents delivered with C/S whereas postpartum hemorrhage and need for blood transfusion is higher in adolescents aged 18-19 years old.

Keywords: Adolescent pregnancy; cesarean section; maternal outcome; fetal outcome

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Öz

Amaç: 10-19 yaş arası kadınların gebeliği olarak tanımlanan adölesan gebelikler halen önemli bir halk sağlığı sorunudur ve maternal ve fetal mortalite ve morbidite oranlarının arttığı yüksek riskli gebelikler olarak kabul edilmelidir. Bu çalışmada sezaryen (CS) ile sonuçlanan adolesan gebeliklerde obstetrik ve perinatal sonuçların incelenmesi ve belirlenen adolesan yaş gruplarında bu sonuçların karşılaştırılması amaçlandı.

Gereç ve Yöntem: Bu retrospektif çalışmada sezaryen ile doğum yapan 2665 adolesan hastanın obstetrik ve perinatal sonuçları doğum yaşlarına göre oluşturulan 3 grupta incelendi: Grup 1; 14-15 yaş grubu, grup 2; 16-17 yaş grubu ve grup 3;18 -19 yaş grubundan oluşmaktaydı. Sonuçlar belirlenen yaş grupları arasında karşılaştırıldı.

Bulgular: Erken doğum insidansı grup 1'de grup 2 ve grup 3'e göre daha yüksekti (p=0,001) ve grup 1'deki hastaların %52,3'ü 29-34 gebelik haftaları arasında doğum yapmıştı. Grup 1'de fetal doğum ağırlığı ve APGAR skorları daha düşük ve yenidoğan yoğun bakım ünitesi ihtiyacı daha yüksekti. Grup 3'te 116 (%8.4) hastada görülen postpartum kanama, grup 1 ve grup 2'ye göre istatistiksel olarak anlamlı farkla daha yüksekti (p=0.001).

Sonuç: 15-17 yaş arası sezaryen ile doğum yapan adolesanlarda erken doğum, düşük doğum ağırlığı, düşük APGAR skorları ve yenidoğan yoğun bakım ihtiyacı daha yüksek iken, 18-19 yaş arası adolesanlarda doğum sonu kanama ve kan transfüzyonu ihtiyacı daha yüksektir.

Anahtar Kelimeler: Adölesan gebelik; sezaryen; maternal sonuçlar; fetal sonuçlar

1. Introduction

Maternal age has been increased as a result of educational, economic and social issues in the last decades but adolescent pregnancies still remain to be an important public health problem with its medical and legal aspects in both developed and developing countries. Pregnancy in women aged 10-19 years old is defined as adolescent pregnancy by World Health Organization (WHO) and it is estimated that around 16 million adolescents get pregnant and give birth every year all around the world (1). In our country, 6% of adolescents aged between 15 and 19 years old get pregnant every year (2).

The accelerated somatic development and psychological differentiation are the main features of adolescence and can be negatively affected by an adolescent pregnancy. The insufficient knowledge about reproductive physiology, contraception methods, pregnancy and its outcomes in this age group and the weak relationships with the parents can lead to unwanted pregnancies.

According to WHO, maternal mortality rates are four times higher and neonatal mortality is twice as high in pregnant adolescents under the age of 16. There are many studies reporting that adolescent pregnancies must be considered as high risk pregnancies because of the increase in adverse obstetric and perinatal outcomes (3-5). Preterm delivery, hypertensive disorders of pregnancy, anemia, gestational diabetes, low birth weight, stillbirth, low APGAR scores are found to be increased in adolescent pregnancies (5-7).

In most of the studies, the obstetric and perinatal outcomes in adolescent pregnancies has been compared with the outcomes in adult pregnancies (8, 9), and were not classified according to the route of delivery and age of the adolescent. In this study we aimed to examine the demographic characteristics and obstetric and perinatal outcomes of adolescent pregnancies delivered with cesarean section in determined adolescent age groups.

2. Materials and Methods

This study was conducted as a retrospective trial at the Sanlıurfa Research and Training Hospital between January 2017 and December 2019. Patients who delivered with cesarean section in adolescence period were analyzed. This study protocol was approved by the Harran University ethics committee (15.05.2020/15) and was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from the guardians of all participants at the time of hospitalization.

Adolescent delivery was determined as patients giving delivery at 14-19 years of age. Patients aged over 19 years, patients who delivered with vaginal delivery or who delivered in another center despite having their follow-up in our hospital and patients whose all data could not be accessed from the records were excluded. The patients were divided into three groups according to the age of delivery: group 1 included the patients aged 14-15 years old, group 2 the patients aged 16-17 years old and group 3 the patients aged 18-19 years old.

Data of the patients including age, parity, body mass index (BMI), smoking, gestational week at delivery, indication for cesarean delivery (CS), fetal birth weight, newborn APGAR scores, need for neonatal intensive care unit (NICU), diagnosis of maternal post-partum hemorrhage, and need for maternal

transfusion were recorded by the scanning of the files. The demographic characteristics, maternal and neonatal outcomes in the determined age groups were compared according to the recorded data.

The gestational week was calculated according to the first date of the last menstruation and ultrasonographic measurements of the fetus at 9-12 weeks of gestation. Fetal distress was diagnosed by the International Federation of Gynecology and Obstetrics (10). In the diagnosis of preeclampsia, hypertension was defined as the first occurrence of a systolic blood pressure ≥ 140 mmHg and a diastolic blood pressure ≥ 90 mmHg after the 20th week of pregnancy, measured at least twice at four hour intervals in the left lateral decubitus position. All patients diagnosed with preeclampsia were followed up for 12 weeks after birth (11). Abnormal labor included an active-phase arrest in the first or second stage of labor. The arrest of labor in the first stage was defined as ≥ 6 cm of dilation with ruptured membranes and failure to progress despite (a) 4 hours of adequate uterine activity or (b) at least 6 hours of oxytocin administration with inadequate uterine activity and no cervical change. Arrest of labor in the second stage was diagnosed after at least 2 hours of pushing in multiparous women and at least 3 hours of pushing in nulliparous women. All women with abnormal labor underwent cesarean delivery. Birth weight >4,000 g was defined as macrosomia. Postpartum hemorrhage was diagnosed when more than 500 ml of bleeding occured in the first postpartum 24 hours (12).

Statistical Analysis

SPSS 20 (IBM Corp. released 2011. IBM SPSS Statistics for Windows, version 20.0, Armonk, NY: IBM Corp.) was used to evaluate the data. The data were investigated using visual (histograms, probability plots) and analytical methods (Kolmogorov–Smirnov/ Shapiro–Wilk's tests) to determine their normal distribution. A one-way ANOVA and Kruskal–Wallis test were used to compare continuous variables with a normal and non-normal distribution, respectively. Relationships between categorical variables were analyzed using a chi-squared test. A p-value <0.05 was considered to indicate statistical significance.

3. Results

A total of 107.659 live births took place in our hospital during the study period. The number of patients who had cesarean section was 39,452 and 3260 of these patients were under the age of 19. Considering the exclusion criteria, 2665 patients were included in the study. There were 363 (13.6%) patients in group 1, 924 (34.6%) patients in group 2 and 1378 (51.8%) patients in group 3.

Demographic characteristics of the adolescent pregnancies delivered by cesarean section are provided in Table 1. There

Tablo 1. Demographic characteristics according to adolescent maternal age groups

	Total cohort (n=2665)	Group 1 (n=363)	Group 2 (n=924)	Group 3 (n=1378)	p
Maternal age (years)	18 (14-19)	15 (14-15)[b,c]	17 (16-17)[a,c]	18 (18-19)[a,b]	**0.001**
Gravida	1 (1-3)	1 (1-2)[b,c]	1 (1-3)[a,c]	2 (1-3)[a,b]	**0.001**
Parity	0 (0-2)	0 (0-1)[b,c]	0 (0-2)[a,c]	1 (0-2)[a,b]	**0.001**
Body mass index (kg/m^2)	27 (18-42)	27 (a 18-40)	26.5 (18-42)	27 (18-42)	0.915
Smoking					0.313
Yes	62 (2.3)	12 (3.3)	23 (2.5)	27 (.0)	
No	2603 (97.7)	351 (96.7)	901 (97.5)	1351 (98.0)	
Gestational week at delivery	37 (26-41)	31 (28-41)[b,c]	37 (26*41)[a,c]	37 (32-40)[a,b]	**0.001**
<28 weeks	19 (0.7)	5 (1.4)	14 (1.5)	0	
29-34 weeks	332 (12.5)	190 (52.3)	84 (9.1)	58 (4.7)	
34-37 weeks	694 (26)	68 (18.7)	182 (19.7)	444 (32.2)	
>37 weeks	1620 (60.8)	100 (27.5)	644 (69.7)	876 (63.3)	

Data presented as median (min-max) and n (%). *p* values with statistical significance (p<0.05) are shown in bold.
[a]There was a significant difference with compared group 1 in post-hoc comparison.
[b]There was a significant difference with compared group 2 in post-hoc comparison.
[c]There was a significant difference with compared group 3 in post-hoc comparison.

was a statistically significant difference between the groups in terms of gravity and parity (p=0.001). The incidence of preterm delivery was higher in group 1 compared with group 2 and group 3 and the difference was statistically significant (p=0.001). In group 1, 52.3% of patients had delivered between 29-34 weeks whereas the median gestational week at delivery was 37 weeks in 69.7% of the patients in group 2 and in 63.3% of the patients in group 3.

Considering the total cohort, the main cesarean indication for adolescents was previous cesarean section (n=1145; 43%) and the second indication was fetal distress (n=982; 36.8%). Table 2 summarizes the cesarean section indications by age groups. In group 1, 324 patients (89.3%), in group 2, 455 (49.2%) patients and in group 3, 203 (14.7%) patients had undergone cesarean section with the diagnosis of fetal distress and the difference between the groups was statistically significant (p=0.001). The incidence of cesarean section due to previous CS in group 3 was higher (73.9%) than group 1 and group 2 (p=0.001).

Fetal outcomes of adolescent pregnancies are presented in Table 3. Fetal birth weight and APGAR scores were lower and neonatal need for intensive care unit was higher in group 1 compared with group 2 and group 3 and the difference was statistically significant (p=0.001). The indication for need for NICU was prematurity in all groups.

Maternal outcomes are listed in Table 4. Postpartum transfusion was needed in 12.3% of the patients in group 3 and it was higher than group 1 and group 2 with a statistically significant difference (p=0.001). In group 1, only 8 (2.2%) patients were diagnosed to have postpartum hemorrhage whereas 70 (7.6%) patients in group 2 and 116 (8.4%) patients in group 3 had postpartum hemorrhage.

4. Discussion

Adolescent pregnancies are still a public health problem especially due to its adverse maternal and neonatal outcomes. Our hospital is in the province with the highest birth rate in Turkey. Considering the early marriages in the region, the incidence of adolescent pregnancies is also high and over 1000 adolescent pregnancies were reported during 2019. In this study, of the 2665 adolescent pregnancies resulted with cesarean delivery, the main cesarean indication for the patients aged 14-17 was fetal distress whereas it was previous cesarean section in patients aged 18-19 years. Preterm delivery was higher in patients under 18 years of age and need for NICU was also high in this age group related with prematurity. On the other hand postpartum hemorrhage and need for blood transfusion was higher in 18-19 years old adolescent group.

There are studies comparing the maternal and neonatal outcomes of adolescent pregnancies with the outcomes of

Tablo 2. CS indications according to age groups in adolescent pregnant women

	Total cohort (n:2665)	Group 1 (n:363)	Group 2 (n:924)	Group 3 (n:1378)	p
Fetal distress	982 (36.8)	324 (89.3)[b,c]	455 (49.2)[c]	203 (14.7)	**0.001**
Ablatio placenta	226 (8.5)	10 (2.8)[b,c]	112 (12.1)	104 (7.5)	**0.001**
Abnormal presentation	119 (4.5)	11 (3)	56 (6.1)[a,c]	52 (3.8)	**0.042**
CPD	100 (1.3)	16 (4.4)	84 (9.1)	-	-
Previous CS	1145 (43)	-	126 (13.6)	1019 (73.9)	-
Abnormal labor	66 (2.5)	3 (0.8)	63 (6.8)	-	-
Macrosomia	23 (0.9)	2 (0.6)	21 (2.3)	-	-
Preeclampsia	21 (0.8)	-	21 (2.3)	-	-
Fetal anomaly	21 (0.8)	-	21 (2.3)	-	-
Cord prolapsus	7 (0.3)	-	7 (0.8)	-	-
Maternal systemic disease	7 (0.3)	-	7 (0.8)	-	-
Multiple pregnancy	14 (0.5)	-	14 (1.5)	-	-

CPD: cephalopelvic disproportion, CS: cesarean section. Data presented as n (%). *p* values with statistical significance (p<0.05) are shown in bold.
[a]There was a significant difference with compared group 1 in post-hoc comparison.
[b]There was a significant difference with compared group 2 in post-hoc comparison.
[c]There was a significant difference with compared group 3 in post-hoc comparison.

Tablo 3. Comparison of fetal outcomes in adolescent maternal age groups					
	Total cohort (n:2665)	Group 1 (n:363)	Group 2 (n:924)	Group 3 (n:1378)	p
Fetal weight (gr)	2850 (700-4080)	2580 (1500-3900)[b,c]	2980 (700-4080)[a,c]	2900 (1600-3670)[a,b]	**0.001**
APGAR 1	9 (5-9)	9 (5-9)[b,c]	9 (6-9)[a]	9 (7-9)[a]	**0.001**
APGAR 5	10 (7-10)	10 (7-10)[b,c]	10 (7-10)[a]	10 (8-10)[a]	**0.001**
Need for NICU					**0.001**
Yes	375 (14.1)	157 (43.3)	94 (10.2)	124 (9)	
No	2290 (85.9)	206 (56.7)	830 (89.8)	1254 (91)	
NICU indication					0.057
Prematurity	335 (97.1)	147 (94.8)	84 (100)	104 (98.1)	
Nutritional defects	10 (2.9)	8 (5.6)	-	2 (1.9)	

NCIU: neonatal intensive care unit. Data presented as median(min-max) and n(%). *p* values with statistical significance (p<0.05) are shown in bold.
[a]There was a significant difference with compared group 1 in post-hoc comparison.
[b]There was a significant difference with compared group 2 in post-hoc comparison.
[c]There was a significant difference with compared group 3 in post-hoc comparison.

Tablo 4. Comparison of maternal outcomes in adolescent pregnants according to age groups					
	Total cohort (n:2665)	Group 1 (n:363)	Group 2 (n:924)	Group 3 (n:1378)	p
Preoperative hemoglobin value (gr/dl)	12 (8-15)	11 (8-15)	12 (8-15)	12 (8-15)[a,b]	**0.001**
Postoperative hemoglobin value (gr/dl)	10 (7-14)	10 (8-13)	10.50 (8-14)	10 (7-13)[a,b]	0.048
Transfusion					**0.001**
Yes	238 (8.9)	19 (5.7)	49 (5.3)	170 (12.3)[a,b]	
No	2427 (91.1)	344 (94.8)	875 (94.7)	1208 (87.7)	
Anesthesia					**0.001**
General	57 (2.1)	1 (0.3)	56 (6.1)	-	
Spinal	2608 (97.9)	362 (99.7)	868 (93.9)	100 (100)	
Postpartum hemorrhage					**0.001**
Yes	194 (7.3)	8 (2.2)	70 (7.6)	116 (8.4)[a,b]	
No	2471 (92.7)	355 (97.8)	854 (92.4)	1262 (91.6)	
Hospitalization duration (days)	2 (0-7)	1 (1-4)[b,c]	2 (0-7)	2 (1-3)	**0.001**

Data presented as median (min-max) and n (%). *p* values with statistical significance (p<0.05) are shown in bold.
[a]There was a significant difference with compared group 1 in post-hoc comparison.
[b]There was a significant difference with compared group 2 in post-hoc comparison.
[c]There was a significant difference with compared group 3 in post-hoc comparison.

adult pregnancies. Although it was supposed that immaturity of adolescent pelvis and emotional status might increase cesarean delivery as a result of labor progress failure (13), the incidence of CS was reported to be similar in adolescents compared with adults (6). Jennifer L.et al reported in their study that adolescents were half as likely to undergo CS than adults and CS for failure to progress was significantly lower in adolescents and there was no difference in CS delivery for fetal distress between adolescents and adults (14). In our study, repeated CS was the main indication in the whole adolescent population whereas CS

for fetal distress was higher in adolescent groups aged 14-15 and 16-17 years and previous CS was higher in 18-19 years of old age group. CS for failure in labor progress was performed in only 100 (3.7%) adolescents.

Preterm delivery and low birth weight are reported to be the main adverse fetal outcomes in adolescent pregnancies (6, 8, 14-16). In our study similar with these studies preterm delivery and low birth weight incidences were found to be high. Preterm delivery incidence was 39.2% and 13.1% of the deliveries were before 34 weeks of gestation in the adolescent patients and it was higher when compared with previous studies (8). This result was attributed to the selection of patients as adolescents delivered by cesarean section only are included in the study. Preterm delivery was higher in adolescents aged 14-15 years old and most of these deliveries were at 29-34 gestational weeks. In 16-17 and 18-19 age groups the preterm delivery rate was lower compared to 14-15 years old group and most of them occurred between 34-37 gestational weeks. The immaturity of the adolescent skeleton system, lower socioeconomic level related factors such as nutritional deficiency, inadequate pregnancy follow-up are supposed to be the reasons of preterm delivery in adolescents.

The incidence of low birth weight and the need for NICU were also higher in group 1 compared with other groups mostly as a result of increased preterm delivery incidence especially at 29-34 gestational weeks and due to the factors related with adolescent age mentioned above.

Repeated CS is related with increased intraoperative and postoperative complications (17). Kaplanoglu et al. examined the complications and outcomes of repeat CS in adolescent women and reported that gestational week at delivery decreased and lower APGAR score values were observed in the third CS group (15). The risk of placenta previa, placenta acreata and related postpartum hemorrhage were also increased with increased number of repeated CS. In our study, postpartum hemorrhage and need for blood transfusion were higher among adolescents aged 18-19 years old compared with 14-5 and 16-17 years of old groups and this was supposed to be the result of increased CS incidence performed for repeated CS.

The number of the adolescent patients in our study is superior to other studies in the literature since our hospital has the highest birth rate in our country. There are studies discussing the maternal and fetal outcomes of adolescent pregnancies but we could not find any studies comparing adolescent pregnant women according to their age groups and only delivered with CS.

Our study has some limitations. The determination of perinatal risk factors and maternal outcomes were limited due to its retrospective design. The high number of births in our hospital limited our access to some patients and patient records. The patients in the study group were adolescents living in similar geographical conditions. Their living standards and socioeconomic conditions were very similar. In this sense, the lack of homogeneous distribution may be a bias.

In conclusion, fetal distress is the most common cause of cesarean section in adolescent pregnant women under 18 years of age. Preterm delivery, low birth weight, low APGAR scores and need for NICU are higher in this adolescent age group whereas postpartum hemorrhage and need for blood transfusion is higher in 18-19 years old adolescents.

Yazar katkısı

Araştırma fikri ve tasarımı: OA, NNY ve FE; veri toplama: NNY ve FE; sonuçların analizi ve yorumlanması: OA, NNY ve FE; araştırma metnini hazırlama: OA, NNY ve FE. Tüm yazarlar araştırma sonuçlarını gözden geçirdi ve araştırmanın son halini onayladı.

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Author contribution

Study conception and design: OA, NNY, and FE; data collection: NNY, and FE; analysis and interpretation of results: OA, NNY, and FE; draft manuscript preparation: OA, NNY and FE. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

The study was approved by the Harran University Clinical Research Ethics Committee (Protocol no. 15/11.05.2020).

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Conflict of interest

The authors declare that there is no conflict of interest.

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Türk Kadın Sağlığı ve Neonatoloji Dergisi

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Review

The Most Important Health Problem of the 21st Century: Investigation of Obesity in Women According to Their Life Periods

21. yüzyılın en önemli sağlık problemi: Yaşam dönemlerine göre obezitenin incelenmesi

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Abstract

Obesity is a complex disease involving an excessive amount of body fat and an important public health problem affecting all ages in both men and women. It has been shown that obesity is responsible for many genetic, environmental, neurological, physiological, biochemical, cultural and spiritual factors. World Health Organization (WHO) recommends Body Mass Index (BMI) for obesity classification due to its simplicity, cost-effectivity, and high accuracy. Apart from BMI, waist circumference measurement, weight-to-height, skinfold thickness, and circumference measurements are also used. According to the WHO, 2.8 million people die every year due to obesity. Although obesity affects all ages and social groups, women have been more overweight compared to men since and has been linked to many biological factors. However, even with the medical problems, obese women live longer than men, but not without higher healthcare costs. In this review, the effects of obesity on women's health and life will be discussed.

Keywords: Obesity; Women's Health; Nursing

Öz

Obezite, vücutta aşırı yağ birikimini içeren kompleks bir hastalıktır ve her yaştan kadın ve erkeği etkileyen önemli bir halk sağlığı sorunudur. Obeziteden genetik, çevresel, nörolojik, fizyolojik, biyokimyasal, kültürel ve ruhsal birçok faktörün sorumlu olduğu gösterilmiştir. Dünya Sağlık Örgütü (WHO) basitliği, maliyet etkinliği ve yüksek doğruluğu nedeniyle obezite sınıflandırması için Vücut Kitle İndeksi'nin (VKI) kullanılmasını önermektedir. Ancak VKI'nin dışında, bel çevresi ölçümü, kilo-boy, deri kıvrım kalınlığı ve çevre ölçümleri de kullanılmaktadır. Dünya Sağlık Örgütü'ne göre her yıl 2,8 milyon insan obezite nedeniyle ölmektedir. Obezite her yaş ve sosyal grubu etkilemekle birlikte, kadınlar birçok biyolojik faktörle ilişkili olarak erkeklerden daha kiloludurlar. Ancak, medikal problemi olan kadınlar bile erkeklerden daha uzun yaşar ancak daha yüksek sağlık bakım harcamalarına sahiptir. Bu derlemede obezitenin kadın sağlığı ve yaşamı üzerindeki etkileri tartışılacaktır.

Anahtar Kelimeler: Obezite; Kadın Sağlığı; Hemşirelik

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1. Introduction

Obesity is an important public health problem affecting all ages in both men and women (1). Obesity, once considered an indicator of power, prosperity, wealth and health, is now considered a disease and the most important contributor to premature deaths in many developed countries (2, 3). According to the World Health Organization (4), 2.8 million people die every year due to obesity.

Obesity is responsible for many genetic, environmental, neurological, physiological, biochemical, cultural and spiritual factors (5, 6). Due to the multifactorial etiology, it is difficult and complex to prevent and treat. According to WHO (4), obesity is defined as "abnormal or excessive fat accumulation in the body to the extent that it impairs health". Obesity is a chronic disease that increases the risks of other complications including cardiovascular and metabolic disease and cancer (7).

According to WHO (4), the rate of mild obesity (BMI≥25 kg/m2) in individuals 20 years and older was 34% in men, 35% in women. Severe obesity (BMI≥30 kg/m2) was 10% in men and 14% in women. The obesity rate in the world has doubled over ten years (1998-2008) (8). According to Turkey Statistical Institute (9) data, while obesity rate was 15.2% in Turkey in 2008, it increased to 31.1% by 2016 with a higher association in women (23.9%) than men (15.2%).

Although obesity affects all ages and social groups, women have been more overweight compared to men since and has been linked to many biological factors. Weight gain and obesity in women have been linked to increased pregnancies (10) and excess weight gain (11), oral contraceptive use, and lack of physical activity (12). Beginning adolescence, body fat increases faster than muscle mass in women physiologically and is associated with estrogen hormones. Menopause also contributes to increased adipose tissue. Although the effect menopause transition on body fat distribution is not clear, the formation of intra-abdominal fat tissue is known to increase (6). As stated above, obesity is a risk factor for disease. Even with these medical problems, obese women live longer than men, but no without higher healthcare costs (13, 14). In this review, the effects of obesity on women's health and life will be discussed.

2. Obesity

WHO recommends Body Mass Index (BMI) for obesity classification due to its simplicity, cost-effectivity, and high accuracy. BMI is calculated by dividing body weight by the square of the height [kg/height (m2)]. However, BMI is not recommended for pregnant women, athletes, and diseases with edema (15). Obesity classification according to BMI is shown in Table 1 (16).

Tablo 1. Obesity Classification According to BMI

CLASSIFICATION	BMI
Underweight	<18.5
Normal	18.5-24.9
Overweight	25.0-29.9
Obese I	30.0-34.9
Obese II	35.0-39.9
Obese III (Morbid Obesity)	≥40
Reference: WHO [22]	

Apart from BMI, waist circumference measurement, weight-to-height, skinfold thickness, and circumference measurements are also used (17). The BMI normal values in adults are 18.5-24.9 kg/m2, and waist circumference poses a high risk for obesity in men above 102 cm and in women above 88 cm (9, 18). The increase in waist circumference increases obesity risk and disease (9).

3. Obesity and Young Adolescents

Adolescence is an important process for growth and development and encompasses cognitive and psychosocial development (19, 20). Interestingly, 15% of adult height and 50% of body weight are gained in this period (21, 22). During the growth process, changes in the amount of fat, water, and hormones occur in the body. Height and weight in adolescent girls changes in the year before menarche and continue two years following menarche (21, 22). At the beginning of adolescence, fat tissue increases in the body compared to muscle mass due to estrogen (6). The need for energy and nutrients also increases due to physiological changes and rapid body growth (21, 22). In the adolescent period, adequate and balanced nutrition is important to achieve growth and proper bone density. In addition, nutrition helps to initiate and continue menstruation in adolescent girls (23).

According to WHO (24), adolescents are considered a high-risk group for nutrition. This is due to the high prevalence of obesogenic risk factors including excessivecalorie intake (25). Behaviors such as eating out the home/fast-food, skipping main meals, snacking, and eating disorders may develop (26). Today it is common for adolescents to have a more sedentary lifestyle and increased calorie consumption and consequently obesity (21). These bad habits can be permanent and negatively affect health throughout life (21).

Adolescent girls have higher obesity rates than males in primary school and puberty (20). A previous report showed that obesity prevalence increases with increasing age in girls (20). Psychological factors may be an underlying cause (20) including eating disorders (anorexia and bulimia), depression, poor body image, and/or stigma-triggered obesity (27). Young obese girls enter puberty earlier than their normal-weight peers. According to the study conducted by Kaltila-Heino et al. (28), early puberty is a risk factor for depression in young girls. Problems experienced by obese adolescent women include sexual maturation and reproductive system disorders, changes in menstruation, dysmenorrhea, risky sexual behavior and contraception, polycystic ovarian syndrome, bone density abnormalities, macromasti and increased risk of breast and endometrial cancer. In addition, many other factors may occur during the pregnancy of adolescents with obesity (29).

4. Obesity and Pregnancy

In the literature, BMI is not recommended in the evaluation of pregnant women (15). However, it is recommended to measure the BMI because it provides a useful and practical assessment and is the first screening step for pregnant women in terms of obesity. The prevalence of obesity during pregnancy is observed at rates ranging from 7.56% (30) to 20% (31). One of every five women of childbearing age (2) becomes obese during pregnancy. This affects the health of pregnant women and future generations significantly (32), and causes serious health problems (33).

During pregnancy, many physiological/psychological changes occur including The excess weight gain (5). Factors such as the presence of obesity before, excess weight after (34), and late gestational age cause obesity during pregnancy (35). Obesity during pregnancy is accepted as high risk (36) and complications can develop during the antenatal, intrapartum, postpartum and neonatal periods (37).

Antenatal complications observed in pregnancy with obesity include miscarriage, congenital anomalies (32), fetal death (38), gestational hypertension (33), chronic hypertension (32), preeclampsia, gestational/chronic diabetes (33), increased hospitalization, limitations in ultrasound imaging (32), Urinary Tract Infection (UTIs) and early membrane rupture (31), and increased risk of developing metabolic syndrome (33).

Complications associated with obesity may be seen intrapartum including difficulties in monitoring fetal and uterine contractions, birth abnormalities, and anesthesia complications (32), operative vaginal delivery, prolongation of action, increase in induction use (39), bladder/perineum traumas, cesarean delivery (31, 32), difficulty in intubation, maternal death, venous thromboembolism, birth trauma, stillbirth (40), shoulder dystocia, difficulties with epidural, and increase in postterm delivery frequency (41).

Postpartum complications include inability to lose weight (32), increased risk of infection (32, 42), breastfeeding complications (32, 43), postpartum depression (44), postpartum hemorrhage, thromboembolism (32), stress incontinence and maternal death (45). Breastfeeding complications are caused by increased prematurity and intervened birth rates as well as excessive weight in the postpartum period (13).

Neonatal complications include birth defects (46), apgar score below 4 (47), stillbirth, macrosomia (48), acidosis/respiration complications (49), hospitalization (49) and increased need for intensive care (50). In infants of obese mothers, childhood obesity, adolescent and adult metabolic diseases are more common (33, 51). This shows that children born from obese women carry risk of disease in all periods of their lives.

5. Obesity and Infertility

Infertility affecting one in seven married couples (3, 52), negatively affects women's health especially by depression, anxiety, sexual dysfunction in women, and emotional well-being/quality-of-life (53). Many factors such as postponement of gestational age (53), obesity (3, 54, 55), stress (56), smoking (57) and alcohol use are considered among the causes of infertility (58). Obesity is responsible for 25-50% of infertility in women (58).

The cause of decreased obesity-related fertility/infertility is changes in the secretion and metabolism of sex hormones, estrogens and androgens, and disruption of the balance between the hypothalamus, pituitary and ovarian axes (3, 59). The relationship between adipose tissue and gonads is bidirectional. Adipose tissue affects gonadol functions via adipokine secretions such as resistin, ghrelin, adiponectin and leptin (60). The effect of leptin on reproductive functions regulates early embryo cleavage and development (61). While it has a stimulating effect on the hypothalamic-pituitary axis, it is inhibitory on newly developing follicles (62). Obesity is associated with an increase in serum leptin and follicular fluid. Leptin acts on specific follicular cell receptors, and causes a decrease in insulin-induced steroidogenesis in both granulosa and teka cells (63). Leptin stimulates estrogen in granulosa cells and inhibits LH (62). Insulin changes in obese women is also important for infertility and anovulation (64). Insulin is important for ovarian function and causes increased androgen production in obese women. Increased aromatization of androgens to estrogens causes reduced sex hormone-binding globulin (SHBG) levels resulting in increased estradiol and free

testosterone (3, 52). This condition worsens hyperinsulinemia, resulting in increased androgen/estradiol ratio and LH hypersecretion, which affects the ovarian microenvironment and folliculogenesis (65, 66). As a result, obesity affects assisted reproductive technology and fertility at every stage (67, 68), fertilization, embryo development and implantation (69). It has been shown that there are important differences in various hormones and metabolites of the patients with obesity in the IVF cycle compared to non-the patients with non-obesity (70). Increased insulin resistance (IR) (71), lower oocyte utilization rates, higher need for gonadotropin use, and low number of cryopreserved embryos has been identified in IVF treatment in obese women (68, 72). Since female obesity and infertility are interrelated, healthcare professionals are recommended to educate women in ways to control obesity. When increased BMI and advanced age align, a significant effect on fertility success occurs (3).

6. Obesity and PCOS

PCOS is a hormonal disorder that generally affects women during the peripubertal period. Genetic and environmental factors are thought to play a role in its etiology (73). Although PCOS is not common among women with normal weight, clinical features are associated with IR in obese women (74). Basal metabolic rate decreases with hyperandrogenism and IR in women with PCOS (75). This causes weight gain in women with PCOS (13). Obesity is more common in women with PCOS (76) and emerging obesity worsens PCOS symptoms (13).

With the addition of obesity to PCOS, production of estrogen increases as a result of the peripheral concentration of androgens. One of the most important endocrine changes in obesity is the increase in basal blood insulin. The increase in body fat mass causes increased insulin secretion and IR (77). Following IR and hyperinsulinemia, changes occur in the secretion of gonadotropins secreted from the hypothalamus. Especially LH increases and FSH decreases (78). Hepatic production of SHBG is prevented in obese women following hyperandrogenism. The decrease in SHBG and the increase of peripheral aromatization of androgens to estrogens result in increased circulating free estrogen in obese women (78). This results in increased negative feedback of the hypothalamic-pituitary axis. This negatively affects gonadotropin secretion and ovulation and adequate ovarial follicle development (79). As a result, fertilization ability decreases and abortion rates are quite high in obsese women (78, 80). Interestingly, the follicular phase lasts longer and the luteal phase is shorter in women with BMI≥25. In obese women and PCOS, losing weight increases fertility chance (81, 82). Obesity as well as undernutrition have been considered indicators of reproductive system dysfunction and menstrual irregularity.

Obesity and Female Cancers

Obesity is expected to cause at least 12 types of cancer and recently replaced smoking as the highest risk factor for cancer (83). Obesity is directly related to cancer development, recurrence, and death in women (84). In this respect, the WCRF recommends a BMI between 21 and 23 (85). Obesity is a risk factor for cervix (86), ovarian (87), endometrium (88), and breast cance (89) and is responsible for 88% of cancer-related deaths (90, 91).

Endometrium Cancer: The risk of endometrial cancer has been determined to be 1.52 times higher in obese women (92). Similarly, endometrial cancer-related mortality rates have increased due to obesity (93, 94). Adipose tissue contributes to stimulation of hormone production, inflammatory response, and cellular proliferation pathways (95) and causes endometrial cancer (96). Dysfunctional adipose tissue has been shown to release of pro-inflammatory cytokines, and cause changes in crucial signalling pathways (97). These inflammatory processes cause IR, abnormal responses in natural/adaptive immunity, and lead to a tumogenic environment (98). One of the important adipokines in these pathological processes is leptin (99). Recently, pathological and molecular differences between type-I and type-II endometrial cancer have been revealed. For example, type I tumors are caused by endometrial hyperplasia, while type II tumors are typically associated with pathognomic features. Both types of tumors are frequently seen in obesity (100).

Cervical Cancer: The relationship between cervical cancer and obesity (101) is controversial (102). Conflicting reports have debated obesity as a risk factor for cervical cancer (103, 104). In cervical cancer, IGF-1 has been found to play a role in disease development/progression (105, 106). Insulin and IGF-1 concentrations are associated with obesity. A relationship between obesity, cervical cancer (107), and cancer-related death is higher in obese women (108).

Ovarian Cancer: In ovarian cancer, high BMI before cancer diagnosis increases the risk (109). Community-based studies have shown that every five-kg increase in women's weight is associated with the risk of ovarian cancer (110, 111).

Breast Cancer: Understanding the relationship between obesity and breast cancer is important due to its prevalence in women (112). This relationship has been revealed in many studies (113,

114). Adipose tissue of obese individuals produce inflammatory cytokines/mediators, creating a favorable environment for cancer (115-117). In obesity, high levels of leptin cause more preadipocytes that reduce adipocyte maturation (117). In obesity, as the adipose tissue expands causing an imbalance in oxygen levels, which induces gene expression changes. Hypoxia-inducing Factor-1 (HIF-1), a molecular oxygen sensor, can directly regulate the expression of leptin VEGF, and adinopectin (118). In obese adipose tissue, adinopectin/leptin ratio decreases (119). High serum and intratumor leptin levels may cause worsening of breast cancer prognosis (120).

7. Conclusion

Obesity negatively affects the physical, psychological and sociological health of women and is associated with higher mortality and morbidity rates. It is among the primary roles and responsibilities of caregivers to determine the risk factors related to age, to identify the early phase risks, to provide advice for regular and balanced nutrition and to regularly control weight. It is believed that with proper education will help women understand the complications associated with development of obesity. It is important to integrate obesity practices into care protocols and clinical practice. Healthcare workers should ensure multidisciplinary cooperation in order to prevent obesity in women and offer joint programs with other institutions/organizations to prevent obesity.

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