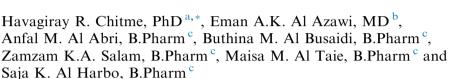Taibah University

Journal of Taibah University Medical Sciences

Original Article

Anthropometric and body composition analysis of infertile women with polycystic ovary syndrome

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الملخص

أهداف البحث: لتقييم مكونات الجسم، والملف الشخصي للجسم البشري للنساء المصابات بالعقم اللاتي تم تشخيصهن بمتلازمة المبيض المتعدد التكيسات، والتحقق في الإصابة والعلاقة النسبية لمكونات دهون الجسم ومتلازمة المبيض المتعدد التكيسات.

طرق البحث: أجريت دراسة مراقبة الحالة في المستشفى على مجموعة مكونة من ١٣٢ من المريضات مع أو بدون متلازمة المبيض المتعدد التكيسات. تم استخدام تحليل المقاومة الكهربائية البيولوجية لتسجيل مكونات الجسم مثل إجمالي الدهون بالجسم، والدهون بالأحشاء، والدهون تحت الجلد، ومكونات عضلات الهيكل العظمي وتوزيعها في الجذع، والساقين والذراعين بالإضافة إلى ضغط الدم. كما تم تسجيل الملف الشخصي للجسم البشري ويتضمن مؤشر كتلة الجسم، ووزن الجسم المثالي، ومحيط الخصر، ومحيط الورك ونسبة الخصر إلى الورك.

النتائج: متوسط عمر الإصابة لمتلازمة المبيض المتعدد التكيسات كانت ٢٩٫٧٤ ±٣٫٣٢عاما وكانت الغالبية منهن في الأعلى إلى العالي جدا لفئة الدهون بالأحشاء مع ارتباط كبير. وإجمالي توزيع الدهون بالجسم، وكامل الدهون تحت الجلد، وللجذع، والذراع والساق كانت أعلى بكثير في متلازمة المبيض المتعدد التكيسات. كما كان معدل مؤشر كتلة الجسم، ومحيط الخصر والورك لمجموعة متلازمة المبيض المتعدد التكيسات ٢٨٫٢±٦٫٠٨، ٩٧٫٤٤±١٥٫١١سم، ١٠٩٫٢٢±١٧٫٣٩سم على التوالي. وأظهرت النتائج أيضا زيادة ملحوظة في ضغط الدم الانبساطي والمتوسط لمرضى متلازمة المبيض المتعدد التكيسات بالمقارنة بمجموعة التحكم.

الاستنتاجات: أظهرت الدراسة مستويات عالية لمؤشر كتلة الجسم، وتوزيع الدهون بالجسم، ومحيط الخصر والورك، وضغط الدم الانبساطي والمتوسط، والدهون بالأحشاء، وزيادة غير متكافئة في مستوى الدهون الشاملة وتوزيعها

الكلمات المفتاحية: القياسات البشرية؛ مكونات الجسم؛ العقم؛ متلازمة المبيض المتعدد التكيسات؛ مؤشر كتلة الجسم

Abstract

Objectives: To evaluate the body composition and anthropometric profile of infertile women who have been diagnosed with polycystic ovary syndrome (PCOS) and to investigate the incidence of PCOS and to examine body fat composition as a risk factor for this disease.

Methods: This hospital-based case controlled study was conducted on a cohort of 132 patients with and without PCOS. Bioelectrical impedance analysis was used to record body composition parameters, such as total body fat, visceral fat, subcutaneous fat, skeletal muscle composition and their distribution in the trunk, legs and arms, as well as blood pressure. Anthropometric profile parameters, including body mass index (BMI), ideal body weight (IBW), waist circumference, hip circumference and waist-to-hip ratio, were also recorded.

Results: The mean age of incidence of PCOS was 29.74 ± 3.32 years (OR 1.417), and most of the cohort exhibited high to very high visceral fat with significant correlation ($p < 0.001$). Total body fat distribution and whole, trunk, arm and leg subcutaneous fat were

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Peer review under responsibility of Taibah University.

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significantly higher in patients with PCOS (p < 0.001). The mean BMI, waist and hip circumference of the PCOS group were 28.2 ± 6.08, 97.44 ± 15.11 cm and 109.22 ± 17.39 cm, respectively. The results also indicated significant increases in DP and MAP (OR 1.528) in patients with PCOS compared to the control group (p < 0.001).

Conclusion: This study exhibits higher levels of BMI, body fat distribution, waist and hip circumference, diastolic and mean blood pressure, visceral fat, and a disproportionate increase in the level of global fat and its distribution.

Keywords: Anthropometry; Body composition; Body mass index; Infertility; PCOS

Introduction

Approximately 10−15% of reproductive aged females are affected by a complex endocrine disorder, polycystic ovary syndrome (PCOS).[1] PCOS is associated with multiple factors and has a complex pathogenesis that adversely affecting the health of women.[2] It is known to cause endocrine abnormalities, such as the release of gonadotropin-releasing hormone (GnRH), leading to increased LH secretion and decreased FSH levels. It is also known to affect the hypothalamus−pituitary−ovarian axis and ovarian stromal thecal hyperfunctioning, resulting in chronic oligo-anovulation and hyperandrogenism, leading to not only biochemical but also metabolic and reproductive dysfunction.[3] Adolescents diagnosed with PCOS are also diagnosed with menstrual irregularities, increased waist circumference (WC), impaired glucose tolerance (IGT), subclinical atherosclerosis characterized by visceral fat changes and epicardial fat thickness.[4,5]

A retrospective cross-sectional study on the prevalence of PCOS carried out in Oman at Sultan Qaboos University Hospital (SQUH) reported a frequency of 7.0%. The overall incidence of PCOS was 2.8 per 1000 patients in 2010. The prevalence was higher among women in the age group of 25−34, especially in the Muscat region, followed by the Dhakliya and Al Batinah regions. The study concluded that the prevalence and diagnosis rate was almost similar to that in global population.[6]

Some studies support a higher risk of developing obesity due to impaired metabolic function in women with PCOS, and the incidence differs from country to country depending on lifestyle, environmental and dietary factors.[7,8] However, the relationship between PCOS incidence and body composition, especially in infertile women, has not yet been studied. Therefore, this case-control study was designed with the aim of investigating the differences, relative risk and correlation between the incidence of PCOS and anthropometric factors, as well as body composition.

Materials and Methods

Materials

The study data were collected using an Omron HBF 375 Karada Scan Body Composition Monitor−Body Fat Analyser to analyse body composition; an OMRAN Digital BP apparatus was used to measure systolic pressure (SP) and diastolic pressure (DP).

Study participants

This case-control study examined equal numbers of infertile women diagnosed with PCOS and not diagnosed with PCOS from a total of 132 women visiting Al-Bushra Medical Specialty Complex, Muscat for infertility treatment in 2016. PCOS was defined in accordance with the Rotterdam criteria.[9] Criteria for excluding patients from this study included women with hypothyroidism, hyperthyroidism, liver failure, hyperprolactinemia, adrenal hyperplasia and diabetes. Women receiving oral contraceptives, hypoglycaemics and anti-dyslipidaemics were also excluded from the study.

Methods

Anthropometric profile

All subjects involved in the study underwent physical examination to assess height, weight, waist and hip circumference, total body fat, total skeletal muscle, distribution of fat, body mass index (BMI) and Ideal Body weight (IBW); the parameters were calculated following standard procedures and the instructions supplied with the digital body composition analyser.[10,13] Hypertension and prehypertension was defined as 140/90 mmHg and 120/80 mmHg, respectively.[11]

Assessment of body composition

Body composition and weight were measured in a standardized way[12] following the instructions supplied with the Omron Body Composition analyser.[13] This instrument is approved by the FDA for use in research involving adults and children.

Medical ethics

This study was approved by the Institutional Ethics Committee and the study centre. Data were collected only from the patients who provided written consent after the objectives were specified and assurances of privacy, anonymity and confidentiality were given. Every patient was given the liberty to withdraw from the study at any time.

Statistical analysis

Each case was given a case number, and the information collected in this study was entered directly into SPSS version 19 (SPSS Inc. Chicago, IL, USA) and was analysed using descriptive statistics such as the mean and standard deviation for continuous numerical data; for categorical data, percentage-frequency distributions were used. Means were compared between groups using the t test, and medians were compared using the post hoc Tukey C test. Logistic