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Research Article

The Prevalence of Metabolic Syndrome in Patients with Polycystic Ovarian Syndrome Attending the DAHC in Dubai, UAE

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Abstract

Introduction: Metabolic syndrome refers to a condition, which includes particular risk factors that are specific for cardiovascular diseases. This research critically examines the prevalence of metabolic syndrome in patients with polycystic ovarian syndrome attending the DAHC in Dubai, UAE.

Methods: The study was conducted as a retrospective cross-sectional study at the Primary health facility in Dubai Academic Health Corporation (DAHC). The metabolic syndrome of participants of the study is analysed in terms of five factors. They are BMI over 30, blood pressure, HDL, Triglyceride, and Blood sugar level. The sample size of the study included 267 female patients.

Results: The results revealed that 12.5% of participants are there with the three factors. 10 females included in the study have 4 factors out of 5, which is only 3.8% of the sample. However, there is only one female with all five factors within the cluster of metabolic syndrome which is insignificant in percentage as it is only 0.4%.

Discussion: The results of the present study have several differences when compared to the studies conducted by other researchers. A potential reason can be due to the use of different measures in the present study.

Conclusion: It is concluded that the prevalence of metabolic syndrome in patients with PCOS in the UAE is identified as only 16.7% which is lower than the studies conducted in other countries about PCOS women with metabolic syndrome. It is recommended that future research should conduct the study with a large sample size to find the deviations in the findings.

Keywords: *Metabolic Syndrome; Polycystic Ovarian Syndrome (PCOS); Blood Pressure; HDL; BMI; Blood Sugar Level; Triglyceride*

Introduction

Polycystic ovary syndrome (PCOS) is a condition that prevails among women who are in the reproductive stage [1]. The prevalence of PCOS is identified as the most common condition by many researchers based on different geographical locations and different samples. The features of PCOS are different due to the different races, ethnicities, and criteria used for diagnosis [2]. It is estimated that 8 - 13% of women belonging to reproductive age have PCOS across the world [3]. However, nearly 70% of the world's population is still not diagnosed. In the context of the Middle East, there is 20% - 25% of the female population who have PCOS [4].

Metabolic syndrome is a constellation of metabolic disorders, mainly abdominal obesity, impaired glucose metabolism, hypertension, and dyslipidemia. It is a cluster of metabolic disorders and women with polycystic ovary syndrome are at greater risk because they're exposed to risk factors at a young age [5]. Metabolic syndrome is assessed using diagnostic criteria suggested by National Cholesterol Education Program Adult Treatment Panel-III (NCEP ATP III) criteria if three or more of the following are present: Waist circumference ≥ 80 cm (in Asian women), Triglyceride > 150 mg/dl, Systolic BP ≥ 130 mmHg, Diastolic BP ≥ 85 mmHg, HDL ≤ 50 mg/dl, and Fasting glucose ≥ 100 mg/dl [6]. The prevalence of metabolic syndrome in PCOS is popular research among scholars where different researchers identified different percentages of females in the population of the country.

The differences in data available about the percentage of females with metabolic syndrome in PCOS, the researcher decided to carry out this study in the context of UAE.

Aim of the Study

This study is aimed at finding out what percentage of the UAE population with PCOS is being screened for metabolic syndrome and at identifying the prevalence of metabolic syndrome in PCOS patients.

Materials and Methods

The study was conducted as a retrospective cross-sectional study at the Primary health facility in Dubai Academic Health Corporation (DAHC). The researcher started conducting the study once receiving approval from the institutional review board. The sample of the study is the patients with a diagnosis of PCOS who attended DAHC within the last 6 months (January 2022 - June 2022). The expected sample size was 400 patients. Patients' records were reviewed for Metabolic syndrome including insulin resistance, dyslipidemia, central obesity, hypertension, and glucose intolerance. However, the actual sample of the study is 267 patients, as only 267 patients completed the lab tests when screening was done. In terms of the criteria considered for the study, patients with a confirmed diagnosis of PCOS age group (18 - 45) years are included while the other causes of hyperandrogenism like adult-onset congenital adrenal hyperplasia, hyperprolactinemia, and androgen-secreting neoplasm, Cushing's syndrome are not part of the study. The data of the study is analysed using SPSS version 28 when the data sheet is prepared using Excel. Descriptive statistics are used to evaluate the data of the study.

Results

Electronic medical records from 399 participants were collected from January 2022 to June 2022 and 80.5% of participants were from the United Arab Emirates. Only the participants from Oman (3%), Syrian Arab Republic (2.8%) and India (2.5%) were above 10 in terms of number of participants. 5 participants were from Yemen whereas countries like Comery Island, Egypt, Jordan, Pakistan, Palestine, Philippines, and Tanzania have 4 participants each for the study. When 3 participants were each from Saudi Arabia and Sudan, Algeria had only 2 participants in the study. However, there is one participant each from the countries of Bangladesh, Comoros, Georgia, and Iran. However, not all the participants are considered for the screening as only 267 (66.9%) are screened for the study to investigate BMI over 30, blood pressure, HDL, Triglyceride, and blood sugar level.

Table 1 shows the distribution of electronic medical records related to BMI over 30. Out of 267 responses, 138 participants (51.7%) are over 30 of BMI whereas 129 participants (48.3%) are below 30 of BMI. This indicates that more than half of the participants belong to the obesity category.

BMI Over 30?	Number of Patients	Total	Proportion (%)
Yes	138	267	51.7
No	129	267	48.3

Table 1: *Electronic medical records related to BMI over 30.*

A total of 266 medical records were screened to check blood pressure levels, and 233 participants (87.6%) did not have blood pressure above 140/90, whereas only 33 participants (12.4%) had blood pressure above 140/90. This means only 33 women considered for the study have 140/90mmHg or higher. The distribution of responses for blood pressure is shown in the table 2.

Blood Pressure	Number of Patients	Total	Proportion (%)
Yes	33	266	12.4
No	233	266	87.6

Table 2: *Blood pressure level.*

Table 3 illustrates the distribution of HDL cholesterol. Among 267 participants, less than 20% participants, 44 females with 16.5% have high-density lipoprotein, which means they have HDL cholesterol of fewer than 50 milligrams per deciliter (mg/dl) whereas the rest of the 223 participants (83.5%) do not have HDL cholesterol as they are in the range of 60mg/dl and above.

HDL	Number of Patients	Total	Proportion (%)
Yes	44	267	16.5
No	223	267	83.5

Table 3: *HDL cholesterol level.*

Regarding triglyceride, the study revealed that there were 68 participants (25.5%) with high triglyceride levels and it had 199 participants (74.5%) who did not have a high triglyceride. Participants who do not have a high triglyceride are below 150 mg/dl where borderline high is within the range of 150 and 199 mg/dl and high range is above 200 mg/dl. The distribution of responses for triglyceride levels is shown in table 4.

Triglyceride	Number of Patients	Total	Proportion (%)
Yes	68	267	25.5
No	199	267	74.5

Table 4: *Triglyceride level.*

Table 5 represents the distribution of responses for the blood sugar level. Within a total of 263 participants, the majority of participants (219) do not have high blood sugar which is indicated by 83.3% and only 44 participants (16.7%) have high blood sugar. This indicates that 219 females have a blood sugar level which is less than 100 mg/dl rest of the participants have over 100 mg/dl.

Blood Sugar Level	Number of Patients	Total	Proportion (%)
Yes	44	263	16.7
No	219	263	83.3

Table 5: *Blood sugar level.*

Considering the five factors of BMI over 30, blood pressure, HDL, Triglyceride, and Blood sugar level, participants within the range of 33 to 44 have three conditions such as blood pressure, HDL, and blood sugar level with percentages of 12.4%, 16.5%, and 16.7% respectively. This indicates that similar levels of blood pressure, HDL and blood sugar levels are within the participants screened for the study. Yet, 68 people have triglyceride which represents 25.5% of the sample which is slightly higher than the other three conditions of blood pressure, HDL, and blood sugar level. However, when analysing the BMI of the participants, 138 participants have been above 30 in the BMI which is indicated by 51.7%. This has deviated from the average numbers of the participants who have other conditions.

The metabolic syndrome of participants of the study is analysed in terms of five factors as represented in table 6. They are BMI over 30, blood pressure, HDL, Triglyceride, and Blood sugar level. The study indicates that 12.5% of participants are there with the three factors where the study found 10 females considered for the study have four factors out of five which is only 3.8% of the sample. However, there is only one female with all five factors within the cluster of metabolic syndrome which is insignificant in percentage as it is only 0.4%.

Metabolic syndrome	Number of Patients	Total	Proportion (%)
Zero	87	263	33.1
One	84	263	31.9
Two	48	263	18.3
Three	33	263	12.5
Four	10	263	3.8
Five	1	263	0.4

Table 6: *Prevalence of metabolic syndrome.*

Table 7 shows the number of patients with metabolic syndrome identified in the study. 44 participants (16.7%) have metabolic syndrome whereas 2019 participants (83.3%) do not have metabolic syndrome.

Number of patients with Metabolic syndrome	Number of Patients	Total	Proportion (%)
Yes	44	263	16.7
No	219	263	83.3

Table 7: *Overall number of patients with metabolic syndrome.*

Discussion

The sample of 267 females was considered for the screening in this study which is fairly acceptable. However, it is lower than the sample sizes used in similar studies reviewing the international literature.

The first condition related to metabolic syndrome is BMI and more than majority of the screened participants are above 30. In other words, this indicates that 51.7% of females are in the obesity level. The researcher [6] used BMI to measure obesity where they identified 25% of women with PCOS characteristics out of 2732 total are over 30 as per the BMI. It also used BMI as a measure of obesity of people in their study where they found 29.7% of females from 749 Qatari women as obese [7]. However, waist circumference was also used along with BMI by [6] and [7]. The researchers [8] also used BMI as an indicator to measure the obesity of the participants. In the research of [8], they have 28.3% of women who are in the obesity range as per BMI. However, obesity of females with metabolic syndrome in Iran is very

high it is 95.2% of the total participants. However, these researchers use waist circumference (WC) to measure obesity which is different from the present study. Another study intended to compare white women and black women who have metabolic syndrome with PCOS identified that the obesity of black women is higher than white women as per the results of BMI measure [10]. In comparison with past research studies, the current research study identified that the percentage of females with obesity was at a moderate range when other researchers identified both the lowest and highest ranges.

In terms of the second condition, which is blood pressure, the study found only 12.4% of females with high blood pressure. It is identified that 13.2% of females in the study have high blood pressure in the context of metabolic syndrome in PCOS [8]. This reveals that the findings related to blood pressure in the present study are similar to the results of [8]. 27.4% of females with metabolic syndrome have high blood pressure [9]. In the research of [10] both white and black women have a similar percentage which is 64%. The females with metabolic syndrome with PCOS in the UAE are less in percentage when comes to blood pressure. However, other researchers calculated the mean and p value of blood pressure which is not done in the present study.

HDL is the third condition covered in the study it identified that only 16.5% of participants have a low HDL cholesterol. These females are considered the ones at high risk when identifying the prevalence of metabolic syndrome in patients with PCOS. However, the findings related to HDL of the present study are not in line with the study of [9] and [8] as there are 98.4% and 84.9% of females have less than 50 mg/dl respectively which is greater in number. Also, in the comparison of black women and white women in [10], 89.5% of black women have HDL over 56% of white women.

The fourth condition related to metabolic syndrome is triglyceride. In the present study, 25.5% of female participants have high triglyceride levels. The results related to triglyceride in the study of [9] and [8] are 88.7% and 44.33% which are higher than the results in 25.5%. However, the study in which black women are compared with white women identified that the percentage of females is only 15.8% for black women when white women have 48% [10].

The blood sugar level is the fifth condition that is considered in this study about metabolic syndrome. The results indicated that 16.7% of participants have high blood sugar which is in line with the findings of [9] where only 19.4% of women in Iran have high fasting blood sugar. When comparing the percentage of participants who have high blood sugar in the research [8], it is 32.07% which is higher than the present study. Also, 36.8% of black women with metabolic syndrome have fasting glucose which is the same as with white women (36%) in the study [10]. However, researchers like [6] used fasting plasma glucose as a measure instead of blood sugar level. In this study, researchers use fasting glucose level instead of blood sugar level.

When analysing the metabolic syndrome of participants of the study in terms of five factors, the researcher used BMI over 30, blood pressure, HDL, Triglyceride, and Blood sugar level. This is aligned with the study of [8] where the same factors are used such as BMI, Blood pressure, HDI, triglyceridemia, and fasting sugar. The most common component of metabolic syndrome according to the present study is BMI over 30 whereas HDI is in the study of [8]. The second most common component of metabolic syndrome in the present study is triglyceride whereas it is the central obesity in the study [8]. The third component identified by the present study is blood sugar level followed by HDL and blood pressure as the fourth and fifth components. However, the study of [8] indicated that triglyceridemia, fasting sugar, and blood pressure as the third to last components. When comparing the five components, only blood pressure is identified as the least common component of metabolic syndrome in both studies.

In terms of one component, the present study identified 31.9% of participants whereas it is only 27.35% in the study [8]. The participants of 18.3% and 18.86% resulted from two components in the present study and the other study which are similar in results. However, again a deviation for the three components is shown as the present study identified only 12.5% while the other study identified

28.3% participants. Also, a very high difference is there for the four components present as the present study resulted in only 3.8% females whereas it was 15.09% females in the other study. When comes to all five components present, it is only 0.4% in the present study and 3.77% is recorded in the study [8].

The results of the present study have several differences when compared to the studies conducted by other researchers. One reason can be due to the use of different measures in the present study. One example is this research uses BMI to measure fat distribution while other studies use waist circumference. Waistline measurement is considered a better indication in terms of fat distribution compared to BMI which does not have accurate fat measures [11]. Another reason can be the differences in sample sizes. The present study uses a sample size of 267 whereas other studies have relatively small sample sizes.

Conclusion

Based on the findings of the study, the prevalence of metabolic syndrome in patients with PCOS in the UAE is identified as only 16.7% which is lower than the studies conducted in the other countries about PCOS women with metabolic syndrome. Most of these women are identified as obese with moderate levels of triglyceride and lower levels of blood pressure, HDL, and blood sugar. Considering the findings, special strategies to reduce the prevalence of metabolic syndrome in patients with PCOS need to be developed and implemented along with conducting awareness programs to educate the women about the symptoms, risks and impacts, diagnosis, and treatment. In terms of an academic point of view, it is recommended that future researchers use employ a large sample size, utilize different indicators, and adopt specific measures to evaluate the prevalence of metabolic syndrome among females in the UAE to identify the deviations in the result.

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Statement of Ethics

All the research procedures followed are as per the ethical standards of the Dubai Scientific Research Ethics Committee (DSREC), Dubai Health Authority [Reference Number: DSREC-04/2023_12]. The information of the patients had not been shared with any third party and the research was carried out in complete confidence.

Conflict of Interest Statement

The researchers possess no conflicts of interest that need to be disclosed.

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Author Contributions

Leena Rathi - Study conception, design manuscript preparation data analysis.

Majida Naeem - Data collection.

Mervat Abdelmesih - Data collection.

Data Availability Statement

The data supporting the results are available upon request.

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