Polycystic Ovary Syndrome in University Students: Occurrence and Associated Factors

Amita Attlee, Ph.D.*, Asma Nusralla, B.Sc., Rashida Eqbal, B.Sc., Hanaa Said, B.Sc., Mona Hashim, M.Sc., Reyad Shaker Obaid, Ph.D.

Department of Clinical Nutrition and Dietetics, College of Health Sciences, University of Sharjah, Sharjah, United Arab Emirates

Abstract

Background: The aim of this study was to assess the occurrence of polycystic ovary syndrome (PCOS) and its association with body composition among students in University of Sharjah (UOS).

Materials and Methods: This cross-sectional study included a total sample size of 50 female students registering in undergraduate programs at the University of Sharjah using convenience sampling technique. A pretested interview schedule was administered to elicit information pertaining to personal background and medical history related to PCOS. A diagnostic ultrasound scan was performed for determining PCOS along with a body composition analysis using bioelectrical impedance analysis (BIA) technology.

Results: Twenty percent (10 out of 50 participants) were diagnosed with PCOS, of whom only 4 individuals were previously diagnosed with PCOS and aware of their conditions, while the reports showed 16% with oligomenorrhea, 4% with polymenorrhea, and none with amenorrhea. A positive family history was indicated as reported by 22% of the total participants. Significant difference between the body weights of participants having PCOS (66.7 kg) and those without it (58.8 kg) were noted (p=0.043, t=2.084). On the other hand, the body composition related variables including waist-hip ratio (WHR), fat-free mass (FFM), percent body fat (PBF) and visceral fat area (VFA) were relatively higher in participants having PCOS than those without it. However, there was no statistical significance of differences. Comparatively, the participants with PCOS had lower bone mineral density (BMD) than those without it, whereas the difference was statistically non-significant.

Conclusion: The occurrence of PCOS in the present study is consistent with the global prevalence. Comparatively, the body composition of PCOS females is different from the normal females. Further studies are required in the Middle East region on larger sample sizes and broader aspects of health including lifestyle and dietary components to understand these differences.

Keywords: PCOS, Body Composition, Menstrual, Ultrasound

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litus, hypertension and inflammation. It has been 
demonstrated that women with PCOS may have 
higher risks of cardiovascular, sleep apnea and in-
fertility (5-8). Diagnosis of PCOS is usually based 
on typical signs and symptoms, physical appear-
ance, biochemical evidence of hyperandrogenism 
and ovarian dysfunction (9). An ultrasound ex-
amination of the uterus/ovaries is the most reliable 
technique used due to morphological diagnosis of 
polycystic ovaries (10).

Considering the magnitude and consequences of 
PCOS compounded by the social apprehensions re-
lated to the nature of problem, it is important to assess 
its occurrence in the young adults. University female 
students constitute a homogenous group of popula-
tion whose outreach is feasible and they are the future 
mothers of the society. Ironically, university students 
may appear healthy and not realize that they have 
PCOS until problems in conceiving are encountered 
during marriage. Lack of information about associa-
tion of PCOS with other health parameters and una-
wareness of its diagnostic criteria may have a major 
impact on the presence of this disease among univer-
sity females. Therefore, the objectives of the present 
study were to assess the occurrence of PCOS and to 
study its association with body composition among 
female students at University of Sharjah, United Arab 
Emirates.

Materials and Methods

A cross-sectional study was conducted at Uni-
versity of Sharjah in United Arab Emirates be-
tween January 2012 and June 2012. All female stu-
dents registering in undergraduate programs at the 
University of Sharjah were included in the present 
study. However, those students who were pregnant 
at the time of the survey period were excluded. Ac-
cordingly, fifty female students were selected using 
the convenience sampling technique (11). Ob-
jectives of the study and assessment needed were 
explained, and an informed consent was then ob-
tained from all the participants. Furthermore, the 
study was approved by the Research Committee 
of Department of Clinical Nutrition and Dietetics, 
College of Health Sciences, University of Sharjah.

A pretested interview schedule was administered 
to collect information from the subjects. Herein, the 
students provided demographic information that in-
cluded personal information (age, college and marit-
tal status); medical history related to PCOS; status of 
menstrual cycle like normal (bleeding at intervals 
between 22 to 40 days intervals), oligomenorrhea 
(bleeding at intervals of greater than 40 days) and 
polymenorrhea (bleeding at intervals of less than 
22 days); use of hormonal pills; family history of 
PCOS; perception of body weight; and attempt to 
lose weight. Body composition data were also col-
lected systematically at the initial clinic visit.

The required measurements were taken as fol-
lows: i. body composition of the participants was 
determined using the bioelectrical impedance 
technology (Biospace Co. Ltd., Seoul, Korea); ii. 
body mass index (BMI) was calculated in kg/m² 
and defined according to World Health Organiza-
tion (WHO) (12); iii. waist-hip ratio (WHR) was 
determined by the waist circumference divided 
by the hip circumference; iv. fat free mass (FFM) 
was determined by fat free mass including weight of 
skin, bones, ligaments, tendons, organs and 
water content; v. percent body fat (PBF), defined 
according to Li et al. (13) was calculated by the 
amount of fat in the body composition; vi. vis-
ceral fat area (VFA; the area in cm² of organ fat 
or intra-abdominal fat) is located inside the peri-
toneal cavity, packed in between internal organs 
and torso, as opposed to subcutaneous fat found 
underneath the skin and intramuscular fat, which 
is interspersed in skeletal muscle (14); vii. bone 
mineral density (BMD; gram per square centim-
eter) is the bone mass after developmental period 
is completed (15). BMD was also measured using 
the Body Composition Analyzer.

Polycystic ovary was defined as the presence of 
at least 1 ovary at >10 cm³ in volume and/or at 
least 1 ovary with ≥12 follicles that measured 2-9 
mm in diameter. Ovarian assessments were made 
using an ultrasound instrument (Siemens, Erlan-
gen, Germany). The procedure of the instrument 
manufacturer was followed.

Statistical analysis

Data obtained were statistically analyzed using 
Statistical Package for the Social Science (SPSS: 
SPSS Inc., Chicago, IL, USA) software version 
17. Descriptive data were reported as means ± SD. 
Demographic and medical history variables were 
expressed in frequencies and percentages. Signifi-
cance of difference in the variables between par-
ticipants with or without PCOS was determined 
using student’s t test. A p value of less than 0.05 
was considered to be statistically significant.
Results

Demographic characteristics of the participants are given in table 1. Among participants, 72% were from the medical and health sciences colleges and 28% were from other different colleges. The age of the participants ranged from 17 to 23 years with the mean age of 19.4 years. Only one out of 50 participants was married. Her gynecology history revealed that she had para 1 - one live child.

| Variable     | Participants % |
|--------------|----------------|
| Colleges     |                |
| Medical and health colleges | 72 (36) |
| Other colleges | 28 (14) |
| Age (Y)      |                |
| (17-19)      | 58 (29)        |
| (20-23)      | 42 (21)        |
| Marital status |            |
| Unmarried    | 98 (49)        |
| Married      | 2 (1)          |

The distribution of participants according to medical history related to PCOS is presented in table 2.

Medical history revealed that the status of menstrual cycle was normal in majority (80%) of the participants, while the finding showed that 16% had oligomenorrhea, 4% had polymenorrhea, and none had amenorrhea. Out of these, 8% had been dealing with PCOS for more than two years, 6% for over a year, and another 4% for less than 6 months. Glucose intolerance was reported in 2%, while 14% described other associated problem, specified as anemia. Twelve percent of participants took hormone pills for regularizing their menstrual cycles. While 8% of participants were on the treatment for less than 6 months, 4% were on treatment between 6 months to a year.

Ironically, only 8% of participants were previously diagnosed with PCOS, 76% had not been diagnosed earlier, and 16% were unaware of any previous diagnosis of PCOS. About 22% showed to have the positive family history, 76% had no family history, and 2% were unaware of their family history regarding occurrence of PCOS. Amongst the individuals with positive family history, 8% reported in their mothers and sisters, 4% in cousins and 6% in their aunts. Thirty percent of participants reported to have difficulties in maintaining normal weight. When enquired about their perception of body weight, two-third of them confessed that they perceived their body weight as "normal", 14% as "underweight", 18% as "overweight" and 4% as "obese".

During the last one year, weight loss was attempted by almost half of the participants (n=24). Out of these, 16% sought out professional support for losing weight during this period. The ultrasound scan results confirmed the diagnosis of PCOS in 10 out of 50 participants (20%).

The means and standard deviations of body composition variables of the participants are represented in table 3. In addition, significance of difference between the group with PCOS and that without PCOS is presented for each variable.

The weight of the participants ranged from 39 kg to 98 kg, with a mean weight of 60 ± 11 kg. Participants with PCOS (66.7 kg) were found to be significantly heavier than those without it (58.8 kg) (p=0.043, t=2.08).

Mean BMI of the participants was 22.9 ± 3.5 ranging from 16.5 to 31.3. Almost three-fourths of the total students were categorized as "normal", while BMI of 26% was above normal. Participants with PCOS had higher BMI than those without it; however, no significant difference was found.

As evident from the table 3, the mean values of WHR, PBF, FFM, and VFA were found to be higher in participants with PCOS in contrast to those without PCOS. However, statistically significant difference could not be established at p<0.05.

BMD of the participants, on an average, was 2.3 ± 0.28 g/cm² and it ranged from 1.8 to 3.1 ± 0.28 g/cm². There was no significant difference between the BMD of those with PCOS and those without it at p<0.05.
Table 2: Medical history of participants related to PCOS (n=50)

| Variable                              | Participants % |
|---------------------------------------|----------------|
| **Status of menstrual cycle**         |                |
| Normal                                | 80 (40)        |
| Oligomenorrhea                        | 16 (8)         |
| Polymenorrhea                         | 4 (2)          |
| **Relevant diseases**                 |                |
| None                                  | 84 (42)        |
| Glucose intolerance                   | 2 (1)          |
| Other                                 | 14 (7)         |
| **Use of hormonal pills**             |                |
| No                                    | 88 (44)        |
| Yes                                   | 12 (6)         |
| **Previous diagnosis of PCOS**        |                |
| No                                    | 76 (38)        |
| Yes                                   | 8 (4)          |
| Doesn’t know                          | 16 (8)         |
| **Family history of PCOS**            |                |
| No                                    | 76 (38)        |
| Yes                                   | 22 (11)        |
| Doesn’t know                          | 2 (1)          |
| **Perception of own body weight**     |                |
| Normal                                | 64 (32)        |
| Underweight                           | 14 (7)         |
| Overweight                            | 18 (9)         |
| Obese                                 | 4 (2)          |
| **Weight loss attempt**               |                |
| No                                    | 52 (26)        |
| Yes                                   | 48 (24)        |

PCOS; Polycystic ovary syndrome.
Table 3: Means and standard deviations of body composition variables in participants with PCOS and those without PCOS

| Variables                  | With PCOS         | Without PCOS     | t     | P value |
|----------------------------|-------------------|------------------|-------|---------|
| Weight (kg)                | 66.7 ± 14.4       | 58.8 ± 9.7       | 2.08  | 0.043*  |
| Body mass index (kg/m²)    | 24.1 ± 3.9        | 22.6 ± 3.43      | 1.21  | 0.230   |
| Waist hip ratio            | 0.87 ± 0.06       | 0.84 ± 0.04      | 1.82  | 0.076   |
| Percent body fat (%)       | 36.8 ± 8.7        | 33.7 ± 6.8       | 1.20  | 0.235   |
| Fat free mass (kg)         | 48.1 ± 12.4       | 43.1 ± 10.6      | 1.28  | 0.207   |
| Visceral fat area (cm²)    | 77.6 ± 26.3       | 64.9 ± 28.0      | 1.29  | 0.202   |
| Bone mineral density (g/cm²)| 2.31 ± 0.21      | 2.33 ± 0.30      | 0.173 | 0.863   |

*; Significant at p<0.05 and PCOS; Polycystic ovary syndrome.

Discussion

Polycystic ovary syndrome is the most common endocrine disturbance that affects women. The aim of this study was to assess the occurrence of PCOS and its association with body composition among students in University of Sharjah. Our study reported that oligomenorrhea occurred in 16% of female students. Avvad et al. (16) reported that the menstrual irregularity in the early postmenarchal years may be an early sign of PCOS. Kitzinger and Wilmot (17) supported the presence of either irregular, absent or disrupted periods in women. van Hooff et al. (18) suggested that about 50% of the oligomenorrhic adolescents will develop PCOS as adults. A positive family history has been indicated in PCOS (19). Comparatively higher figures have been reported in earlier studies, 35% in mothers and 40% in sisters (20). Body dissatisfaction is observed to a greater extent in females suffering from PCOS. Himelein and Thatcher (21) as well as Trent et al. (22) confirmed that the common symptoms in PCOS (menstrual irregularities, obesity, male-pattern facial and body hair, acne, and other skin problems) contributed to poor body image and self-esteem and correlated with low quality-of-life scores. Moran et al. (23) concluded that there are potential barriers to successful weight management in young women who do not suffer from PCOS and additional barriers in women having PCOS.

The prevalence of PCOS (20%), based on our ultrasound findings, is consistent with those of other studies reporting prevalence of PCOS (8-33%) in women of reproductive age (24, 25). One-fourths of the total subjects in the current study were found to have BMI above normal; however, there was no significant difference between the BMI of subjects with or without PCOS. Yucel et al. (26) also revealed similar findings. Eleftheriadou et al. (27) reported a slightly higher percentage of overweight adolescents with PCOS than those without it. The histogram of BMI distribution in participants was found to be skewed towards the left, though it was not statistically significant. Similar to the current findings, no significant differences were reported between females with PCOS and controls in terms of WHR (28), PBF (29) as well as BMD (30). Barber et al. stated that it was global obesity (weight in the current study) rather than the abnormal regional fat distribution (VFA and WHR values in the current study) that characterized the PCOS women (30). However, WHR value of PCOS women was reported significantly higher than that of control subjects (29).

Conclusion

The prevalence of PCOS in the present study is consistent with the global occurrence. Comparatively, the body composition of PCOS females is different from the normal females in
terms of favoring more body weight, body fat, WHR and BMI. On the other hand, BMD is lesser in PCOS females than their normal counterparts. However, the further studies are needed in the Middle East region on larger sample sizes and broader aspects of health including the lifestyle and dietary components to understand the differences in weight in females suffering from PCOS.

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