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SCREENING OF POLYCYSTIC OVARIAN SYNDROME AMONG ADOLESCENT GIRLS AT CAIRO UNIVERSITY

Sahar Mansour Ibrahim[1*], Yossria Ahmed Elsayed[2], Reda Esmail Reyad[3] and Hanan Fahmy Azzam[4]

[1]*Assistant Lecturer, Faculty of nursing, Cairo University, Egypt*
[2]*Professor, Faculty of nursing, Cairo University, Egypt*
[3]*Professor, Faculty of medicine, Cairo University, Egypt*
[4]*Assistant Professor, Faculty of nursing, Cairo University, Egypt*

**Corresponding Author Email: lely_jesus@yahoo.com*

ABSTRACT

Background: Polycystic ovarian syndrome (PCOS) is one of the most common reproductive endocrinological disorder with a broad spectrum of clinical manifestations affecting about 5-10 of women of reproductive years. It can be very difficult to diagnose PCOS in teenage girls as they often experience irregular or absent menses and acne.

Aim: To explore prevalence of PCOS among adolescent girls.

Materials and methods: Descriptive exploratory design was adopted to achieve the aim of the current research. Total of 500 adolescent girls were recruited at convenience according to certain criteria such as age ranged between 17-21 years from Cairo University. Two tools were developed to collect data; 1) - PCOS Risk Assessment Questionnaire to identify the risky cases; and 2) - PCOS Diagnostic Measures, which contained the results of biochemical parameters (hormonal essay) and ultrasound-scanning results. Research utilized Rotterdam criteria 2003 to confirm the diagnosis of PCOS.

Results: Findings of current study revealed that, 6.6% of adolescent girls were diagnosed with PCOS according to Rotterdam criteria 2003.

Conclusion: the prevalence of PCOS among adolescent girls is 6.6% and this increase attention to the importance of early diagnosis for this syndrome among this age group.

Keywords: Polycystic ovarian syndrome, Prevalence, Adolescent girls, Diagnosis

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is the most common endocrine disorder among women at reproductive age worldwide. Approximately 5% to 10% of the female population has PCOS which is the leading cause of infertility among those in reproductive age group (Hoffman *et al.,* 2012; NIH, 2012). There is uncertain etiology for this complex syndrome as it has a genetic component, characterized by multiple small ovarian cysts, oligoovulation or anovulation, androgen excess signs, hyperinsulinemia and obesity (George & Malini, 2014).

PCOS prevalence among adolescent girls is still not well known, few studies examined its prevalence. The prevalence of PCOS was 22.5% among adolescent girls in India as reported by Joshi *et al.,* (2014). In Egypt there are scattered published studies to assess the prevalence of this disease among adolescents. In addition, there is a lack of awareness about PCOS among adolescents. So, this study research aims to explore the prevalence of PCOS among adolescent girls.

Research Question: What is the prevalence of polycystic ovarian syndrome among adolescent girls?

MATERIAL AND METHODS

A descriptive exploratory design was adopted to achieve the aim of the current research.

Sample: A total of 500 adolescent girls were recruited from the Cairo University, Egypt at convenience.

Inclusion criteria were according to the following criteria: not married, age ranged from 17 to 21 years, had been having menarche for more than 2 years. The sample size was calculated using power analysis, a power of 0.95 (β=1-0.95=0.05) at alpha 0.05 (one-sided) with medium effect size (0.3) was used as the significance level.

Tools: Two tools were used to collect data in the current study research 1)PCOS Risk Assessment Questionnaire to screen the risky cases and 2)PCOS Diagnostic Measures, this appendix contained the results of biochemical parameters and ultrasound-scanning results.

Procedure: An official permission was obtained from the Cairo University faculty of nursing ethics research committee, the investigator contacted the students who were willing to participate and met the inclusion criteria in groups or individual as availability and asked written consent to confirm their acceptance. PCOS risk assessment questionnaire, it was a self-administered questionnaire filled by the students to screen the risky cases. This questionnaire included data related to menstrual history, clinical parameters data and family history, total score equal 9 students who had a score 4 or more were considered risky cases for PCOS. A hormonal assay including (serum testosterone, follicular stimulating hormone (FSH), luteinizing hormone (LH), esterone, fasting insulin and fasting glucose) were done for these risky cases and the findings were documented in PCOS diagnostic measure.

Blood samples were taken for hormonal assay after an overnight fasting under complete aseptic technique at the 2nd or 3rd day of menstruation for the student having oligomenorrhea, while for the student who have amenorrhea at any time after at least one month of amenorrhea and sent to Kasr Al-Aini Hospital chemical pathology department. The HOMA-IR index calculated as follows: HOMA-IR=fasting glucose (mg/dl) × fasting insulin (μIU/ml)/405. If the results of HOMA-IR were less than 1.0 meant insulin-sensitive was optimal, while above 1.9 indicated early insulin resistance and more than 2.9 indicated significance insulin resistance.

The students with abnormal hormonal finding were referred for doing pelvic ultrasound in the outpatient clinic at El-Manial University Hospital for confirming the diagnosis and the results were documented in the same questionnaire (PCOS Diagnostic Measures). Polycystic ovarian morphology on ultrasound defined as increased ovarian volume more than 10 cm3/ovary and/or 12 or more follicles measured 2–9 cm in diameter.

In the current study the diagnosis of the cases for PCOS used Rotterdam (2003) criteria, included two of the following three: oligo- and/or anovulation, clinical and/or biochemical hyperandrogenism, and polycystic ovaries on ultrasound with exclusion of other etiologies. Data were tabulated and analyzed using statistical package for the social science (SPSS program version 20). Descriptive statistics: the mean and standard deviations in addition to frequencies and percentages distributions were utilized.

RESULTS

Out of 500 adolescent girls, 12.2% were considered as risky cases for PCOS had score more than 4 out of nine in PCOS risk assessment questionnaire, 6.6% of them were actually diagnosed with PCOS according to Rotterdam criteria (2003). The age of the adolescent girls ranged between 18-21 years old with a mean age of 20.2 ±0.93. The majority of the adolescents girls (69.7%) resided in urban areas while, 30.3% of them resided in rural areas and 66.7% of the adolescent girls was in the third level of university education and 60.6% of the sample was overweight with mean BMI of 27.5 ± 5.6.

Results of hormonal essay revealed that 81.8% of the diagnosed girls had luteinizing hormone (LH) levels over 7, while 78.8% of them had follicular stimulating hormone (FSH) levels below 6 and 72.7% of the girls had LH/FSH ratio over 2. These findings confirm the diagnosis of PCOS among adolescent girls. The mean fasting blood glucose was 87.6 mg/dl and fasting insulin was 12.4 μIU/ml. When the HOMA-IR test was calculated, the mean was 2.6, which indicated high insulin resistance, 70% in the diagnosed group.

In relation to ultrasound results, 81.8% of the adolescent girls had poly ovarian cysts (more than 10 follicles on the ovaries versus normal less than 10 follicles), and ovarian volume ranged between 3.4-17.8 mc^3 with mean 10.3 mc^3 ± 3.3 (versus normal less than

10 mc^3).

Out of 33 adolescent girls diagnosed with PCOS, one case (3%) had regular menstruation while 32 (97%) of them had irregular menstruation and bleeding found in six cases (18.2%). Seventeen cases (51.5%) had Oligomenorrhea and 11 (2.39%) amenorrhea. Clinical hyperandrogenism, (75.8%) had hirsutism, presence of Acne in 33.3% and 51.5% had alopecia, Nigrican was presented in (21.2%). Regarding family history 45.5% of the sample had family history of diabetes mellitus and 12.1% had PCOS.

Table 1: Distribution of the study sample according to hormonal essay(n=33).

Characteristics	Range	Mean	±SD
Serum testosterone	0.2 -0.8	0.5	0.19
LH	2.4 -21.4	10.1	5.32
FSH	2.1 -7.3	4.9	1.5
LH/FSH ratio	0.4 - 3.9	2.1	0.87
Estrone	19.2 -33	64.7	52
Fasting glucose	77 -102	87.6	6.3
Fasting insulin	3 -25.6	12.4	5.5
HOMA test	0.6 - 5.3	2.6	1.2
0verian volume	3.4 -17.8	10.3	3.3

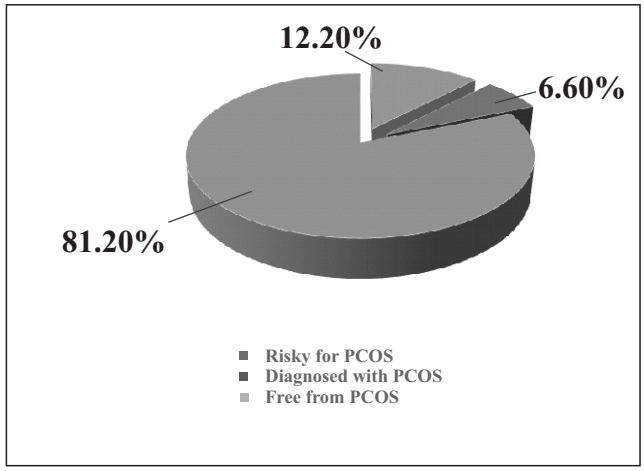

Figure 1: Distribution of the study sample according to risk for and actual diagnosis of PCOS (N=500)

DISCUSSION

The findings of the current research study revealed that the prevalence of PCOS was found to be 6.6%. This prevalence was within the worldwide range (5% to 10%) according to the National Institute of Health (NIH, 2012).The findings of the current study are congruent with the findings of the prospective study carried out by Nidhi *et al.,* (2011). They reported the prevalence of PCOS in South India which was 9.13% among 460 adolescents girls aged 15-18years. In addition, Zhuang *et al.,* (2014) in their study in China, reported the prevalence of PCOS among young women (N=1,645) aged between 15 and 24 years was 11.2% among participants.

On the other hand, the findings of the current study did not match with the findings of the study conducted by Guraya, (2013) who concluded that the prevalence of PCOS in Saudi Arabia was 53.7% among 201 participants with menstrual irregularities, acne, and hirsutism aged 18–28 years. This higher estimation may be due to the high incidence of obesity. In the same line, another study conducted by Bhuvanashree *et al.,* (2013) among 253 adolescent females with mean age 18.57 years in Nellore district, reported that the prevalence of PCOS was 15.4%. As well, Biradar & Shamanewadi (2015) in their descriptive study conducted in Bangalore, among 126 adolescent girls reported the prevalence of PCOS in the proportion of 23.8%.

The results of the current study concluded that the majority of the diagnosed adolescent girls had irregular menstruation, about three quarter of them complained from hirsutism, more than one third of them had acne, alopecia detected in more than half of the diagnosed adolescent girls and more than three quarter exhibited an ultra-sonographic appearance of polycystic ovaries. This might be due to the fact that two third of the sample were obese, family history of diabetes mellitus was detected in near to half of the diagnosed sample and high insulin resistance among the diagnosed group with mean of 2.6.

The findings of the current study are matched with the findings of the study carried out be Li *et al.,* (2012) they reported that among 9 1adolescents with PCOS, 99% complained of menstrual disorders; 84% presented with clinical and/or biochemical hyperandrogenism; and 90% detected an ultra-sonographic appearance of polycystic ovaries. The hirsutism and acanthosisnigricans were higher in the obese PCOS group than in the non-obese PCOS group (72% vs 41% and 44% vs 5%, respectively).

On the contrary, the findings of the current study are

not similar to the findings of the study done by Nidhi *et al.,* (2011) which concluded that 0.22% had oligo/amenorrhea with clinical hyperandrogenism, (6.30%) had oligomenorrhea with polycystic ovaries, (0.22%) had polycystic ovaries with clinical hyperandrogenism and (2.39%) had oligomenorrhea with polycystic ovaries in the presence of clinical hyperandrogenism.

The results of the present study reported that obesity and high insulin resistance were detected in two third of the diagnosed group with mean of 2.6. These findings are congruent with the findings of the study conducted by Rahmanpour, (2012) who concluded that the prevalence of overweight in adolescents with PCOS was 52%, and higher insulin resistance in obese adolescents PCOS with 61.5%. However, the study conducted by Li, (2012) found that the prevalence of obesity was 27% among 91 adolescents with PCOS. As well as, Christensen (2013) reported that the prevalence of PCOS was 1.14% among normal/underweight girls, compared with 3.85%, 10.25%, and 23.10% for overweight, moderately obese, and extremely obese adolescents, respectively.

CONCLUSION

Based on the results of the present research study it is concluded that the prevalence of PCOS among Egyptian adolescent girls is 6.6% and those who are at high risk were 12.6%. Thus, it is necessary to give attention to the importance of early diagnosis for this syndrome among this age group.

RECOMMENDATIONS

Early diagnosis and treatment of PCOS in adolescents are essential to reduce the long-term health complications associated with PCOS.

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