Polycystic Ovary Syndrome Risk Factors among Women in Baghdad: A Case-Control study

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ABSTRACT

Aims The objective of this study was to determine the risk factors for polycystic ovarian syndrome among Baghdad women.

Material & Methods The current case-control study was performed on 100 PCOS women and 100 controls without PCOS in Baghdad hospitals from 1 Sep 2019 to 15 Dec 2019. Data were collected by face-to-face interviews and a questionnaire including socio-demographic characteristics, menstrual history, BMI, waist circumference, physical activity, family history of PCOS, diet, drug use, and clinical symptoms of PCOS. Among other methods, the data were analyzed using SPSS 22, the Chi-square test, and logistic regression analysis.

Findings Some of the significant factors of PCOS included age (P=0.02), occupational status (p=0.004), educational level (p=0.003), BMI (p=0.003), waist circumference (p=0.004), family history of PCOS (p=0.000), diet (p=0.001), regular menstrual cycle (p=0.00) and Clomid use (p=0.00). other risk factors were regular physical exercise (p=0.16) and having children (p=0.55) which were not significant.

Conclusion Target the risk factors of age, educational level, occupational status, BMI, waist circumference, family history, diet, regular menstrual cycle, and Clomid used, we should perform early screening, the diagnosis and treatment of POCS and identify its risk factors for decreasing PCOS incidence and improve its prognosis.

Keywords Risk Factors; Polycystic Ovary Syndrome; Women

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Introduction

PCOS, or polycystic ovarian syndrome, is a hormonal disorder that affects women of childbearing age and causes many physical and mental symptoms [1]. PCOS affects 5% to 10% of women throughout their reproductive years [2]. Although some women with PCOS have normal menstrual cycles, the majority of them suffer from monthly irregularities such as oligomenorrhea, amenorrhea, and prolonged irregular bleeding [3].

Women with PCOS frequently exhibit hyperandrogenism, infertility, and hirsutism as clinical symptoms [4, 5]. Also, acne is another marker of hyperandrogenism but is less specific than hirsutism. The prevalence of acne has been reported to be 15%–30% in PCOS adult women [6]. Moreover, 40% of women with PCOS have infertility [7]. Also, spontaneous abortion is observed more frequently in PCOS women [8].

Some metabolic changes of PCOS are blood lipids, insulin resistance, inflammation, obesity, increased oxidative stress, and changes in hormones [9]. Even though no one knows for sure what causes PCOS, it seems that both genetics and the environment play a role [9].

One of the risk factors of PCOS is obesity [10]. It is reported that increased weight often intensifies the development of PCOS [11]. Obese women had a 28.3% prevalence of PCOS [12]. A healthy lifestyle in women with PCOS results in decreased weight and abdominal fat, reduced testosterone, and improved insulin resistance [13]. PCOS increases the risk of type 2 diabetes, dyslipidemia, and heart disease in women [13]. PCOS women have four times the incidence of endometrial cancer, according to cohort research [14].

Another risk factor for PCOS is having a family history of the condition. Genetic factors can be seen in the increased frequency of PCOS or its symptoms among first-degree relatives [15]. Patients with PCOS are also more likely to develop dyslipidemia. An elevated triglyceride level and decreased (HDL-C), as well as increased (LDLC) levels, are all signs of lipid disorders (LDL-C) [16]. PCOS's economic impact on society is expected to be roughly $3.7 billion per year in 2020 based on the expenses of diagnosis and reproductive endocrine morbidities, but not pregnancy-related or long-term morbidities [17].

Treatment for women suffering from PCOS is based on the symptoms, although no specified treatment for PCOS is determined. Treatment options include dietary and exercise modifications, as well as weight loss [18]. An oral contraceptive pill may regulate menstruation and reduce hirsutism and acne. Metformin and antiandrogens also have a role in PCOS [19]. The majority of women with PCOS are overweight or obese, and metabolic issues associated with obesity typically coexist with PCOS, at least in part. It is still unclear, despite the substantial study, whether the polycystic ovarian syndrome is a risk factor for metabolic diseases and cardiovascular disease. Due to the lack of research identifying the risk factors of the polycystic ovarian syndrome in Baghdad, the purpose of this study was to determine the risk factors of polycystic ovary syndrome among women in Baghdad to inform judgments for early screening and preventative measures against PCOS.

Material and Methods

This case-control study was done on women referring to the hospitals of Baghdad from [1] Sep 2019 to [15] Dec 2019. The non-probability convenient approach was used to collect the samples. And the sample size was determined using Raosoft's sample size calculator:

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + (\frac{z^2 \times p\,(1-p)}{e^2 N})}$$

z= Standard critical of 95% confidence level = 1.96;
p= Probability of knowledge (0.5);
e = Margin of error (0.05);
N= Population size

Based on this computation, 170 people comprised the overall sample. We add 15% (25.5) to ensure compensation for the loss or refusal to participate by some respondents, so the total number becomes 25.5+170=195.5≈200 to more accurate. Participants were chosen from Baghdad Hospital in the medical city because it is the main hospital for provides services to patients with (PCOS). PCOS was diagnosed using the Rotterdam ESHRE/ASRM PCOS Consensus Workshop Group 2003. If two of the following conditions were met, PCOS was diagnosed: There are several clinical and biochemical symptoms of hyperandrogenism (hirsutism), including acne or alopecia, as well as an increased testosterone and/or androstenedione, as well as a polycystic ovaries (PCOS) diagnosis [20]. Inclusion criteria were all women of reproductive age referring to the Gynecology Clinic of the hospitals who had willing to participate in the study. Pregnant and postmenopausal women, those on hormone therapy, and those who refused to participate in the study due to their refusal were eliminated, as were individuals with cancerous tumors, cardiovascular illness, severe organic disease, and psychological disorders.

A paper-based questionnaire developed by a researcher was used to conduct an interview. The research questionnaire consisted of four parts which were distributed as follows:

Part I: Age, degree of education, and employment are socio-demographic variables.

Part II: Patients' lifestyle and biomedical factors which include physical activity (regular physical exercise), family history of PCOS; diet (unhealthy diet, for example, pickled food, coarse food, drink, and salty food), menstrual history (regular or irregular menstruation), a drug used (contraception drugs, cortisone, Clomid).

Part III: Anthropometric measures were taken, including body mass, height, and waist circumference (WC). Body weight (kg) and height (cm) were measured by standing position and without shoes, Anthropometric measurements for measuring height, and waist circumference, using the metric tape, and measuring weight utilizing an electronic scale. Classification of participants' BMI according to World Health Organization (WHO) guidelines for Asian populations was as follow:(<18.5-22.5 kg/m² underweight, 23-24.9 kg/m² normal weight, 25-29.9 kg/m² overweight and >30 kg/m² obese) [21].

Part IV: Clinical symptoms of PCOS.

Ethical approval and all administrative agreements were obtained from the College of Health and Medical Technology/ Baghdad/ Community Health Department and the research committee at Middle Technical University. Protecting the participant's values and dignity is one of the most fundamental pre-collection concepts.

SPSS version 22 was used to analyze data, and the Chi-square test was applied to assess the data. The level of significance was fixed at P< 0.05. To assess the probability of PCOS, odds ratios and confidence intervals of 95% were calculated.

Table 1) Distribution of Socio-demographic characteristics, BMI, and Waist circumference in the case and control groups

Characteristics	Case N (%)	Control N (%)	Total N (%)	p-value
Age (years)				
≤20	11 (11)	26 (26)	37 (18.5)	0.02
21-25	46 (46)	45 (45)	91 (45.5)	
26-30	22 (22)	11 (11)	33 (16.5)	
≥31	21 (21)	18 (18)	39 (19.5)	
Educational Level				
Illiterate	0	3 (3)	3 (1.5)	0.003
Primary school	9 (9)	17 (17)	26 (13)	
Secondary school	23 (23)	30 (30)	53 (26.5)	
College and higher	68 (68)	50 (50)	118 (59.0)	
Occupational status				
Housewife	51 (51)	40 (40)	91 (45.5)	0.004
Employed	25 (25)	11 (11)	36 (18)	
Student	24 (24)	49 (49)	73 (36)	
BMI				
Underweight	1 (1)	4 (4)	5 (2.5)	0.003
Normal	31 (31)	47 (47)	78 (39)	
Overweight	36 (36)	30 (30)	66 (33)	
Obese	32 (32)	19 (19)	51 (25.5)	
Waist circumference (cm)				
<80	59 (59)	63 (63)	122 (61)	0.004
>80	41 (41)	37 (37)	78 (39)	

Table 2) Results of the probability of PCOS in the case and control group

Variables	Case N (%)	Control N (%)	OR	95%CI	p-value
Family history of PCOs	28 (28)	8 (8)	4.472	1.922-10.402	0.0001
Diet	46 (46)	23 (23)	2.852	1.55-5.246	0.001
Regular exercise	33 (33)	24 (24)	1.56	0.839-2.899	0.16
Have children	35 (35)	31 (31)	1.99	0.664-2.163	0.55
Regular menstrual cycle	20 (20)	72 (72)	0.097	0.05-0.187	0.0001
Clomid use	38 (38)	0	2.613	2.149-3.177	0.0001

Findings

This research involved 200 women in total. Table 1 displays the socio-demographic data of the study's case and control populations. Table 1 showed that 46% of the case group and 45% of the control group were in the age group of 21-25 years. Poly Cystic Ovarian Syndrome was shown to be more common in women between the ages of 21 and 25. In terms of BMI, most of the patients with PCOS were overweight, while most of the control group had normal BMI. The results of the univariate analysis of risk factors for PCOS in Table 1 showed that age, BMI, educational level, occupational status, and waist circumference were all significantly related to PCOS.

The results of Table 2 showed that a high percentage of the case group had a family history of PCOS, while 8% of the control group reported a family history of PCOS (p<0.05). In addition, 46% of the case group had a diet, whereas only 23% of the control group did; this difference was statistically significant. However, there was no statistically significant difference between the two groups in terms of regular exercise or having children (p<0.05).

Discussion

The cause of PCOS is still unknown because of its complexity. PCOS is caused by the interplay of hereditary and environmental variables [22]. PCOS leads to changes in lifestyle, increased stress, and reduced cycle impairment. The most effective treatment for PCOS is to prevent its development and diagnose its risk factors to prevention of serious long-term complications [23]. The goal of this study was to find out what makes women in Baghdad more likely to get polycystic ovary syndrome.

The majority of women in both groups were between 21 and 25 years of age, demonstrating that age is a key risk factor for PCOS. Similar findings were observed in another study, which revealed that the majority of PCOS patients (34.2%) were between the ages of 21 and 25 [24]. A similar experiment in Bhopal had equivalent results [25].

The findings of the current investigation reflected that educational level is significantly related to PCOS which is consistent with the findings of the study in 2015 that reported educational level is a fundamental risk factor for PCOS [26], however in their study, most women had an educational level of

primary school and in our study, most participants had an educational level of college and higher. This disparity is likely attributable to the fact that females in Iraq may not receive a PCOS diagnosis during their early pubertal years.

The findings of the current study indicated that housewives were a more risky group for PCOS; this result was confirmed in the study done in Pakistan [27]. This is because housewives women are more interested to diagnose the cause of delayed pregnancy or menstrual disorders. Moreover, a family history of PCOS was detected to be a highly significant risk factor for PCOS. Some studies reported similar findings [28-30].

According to the findings of the current study, an unhealthy diet including pickled food, coarse food, drink, and salty food was the other significant risk factor for PCOS (p=0.001). This finding was in agreement with the study conducted in China [31]. Unhealthy foods with high amounts of calories cause an imbalance of hormones which increases the weight.

Also, the present study showed that physical exercise was not a significant risk factor for the development of PCOS. This result is in agreement with the investigation performed in UAE [28]. Although the result was not consistent with the study's conclusion that a lack of physical activity was statistically related to PCOS [26]. Uneven distribution of body fat is caused by a lack of physical activity, which is a significant risk factor for central obesity. We observed that overweight and obese participants were riskier for the development of PCOS compared to normal BMI women. This result is following the study done in UAE [28], and the study done in Spain [12]. This is likely due to a lack of physical activity and bad eating habits. In addition to central obesity and overweight, an increased waist circumference is an additional risk factor for the development of PCOS. Our investigation displayed that PCOS was significantly associated with waist circumference (<80cm). This finding is in agreement with the investigation performed in UAE [28]. It is mostly caused to excessive intake of fast food, unhealthy eating habits, and a poor diet.

Irregular menstrual cycle and infertility are highly significant risk factors for PCOS. A high index for the diagnosis of PCOS in teens with irregular menstrual cycles was reported in Nicandri's study, which showed a similar outcome [32]. In the current study, there was a highly significant association between the use of Clomid and PCOS. The result is in agreement with the study done in the USA [33].

According to the results of this study, recommended to establish more health programs regarding early diagnosis, effective treatment, and follow-up of patients, use a different type of media to stimulate public awareness about the risk factors of PCOS, improve the programs of health education about maintaining a healthy weight, establish health educational programs about reducing high carbohydrates and low-fat foods, designing programs about regular physical activity, and regular follow-up.

One problem with this study is that it didn't look at some risk factors for PCOS, like being married or having a family history of diabetes. In the next study, we should make the project design even better.

Conclusion
Targeting the high-risk factors of age, educational level, occupational status, BMI, waist circumference, family history, diet, regular menstrual cycle, and Clomid used, we should perform early screening, diagnosis, and treatment of POCS and identify its risk factors to decrease the incidence of PCOS and progress its prognosis.

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