Research Article

Awareness of polycystic ovarian syndrome among Saudi females

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ABSTRACT

Background: Awareness of polycystic ovarian syndrome (PCOS) symptoms and complications is essential for early treatment and to prevent further serious complications of it. **Objectives:** To assess the level of knowledge of PCOS, clinical presentation, risk factors and complications among Saudi female's population, to identify factors that influenced the awareness, and to improve health care and lower the treatment cost. **Materials and Methods:** A population-based cross-sectional study was conducted in Saudi Arabia, in 2016, about PCOS awareness, using paper and soft copy questionnaire. A 40 items research questionnaire specifically targeted to a woman of reproductive age (aged 18-50), a pilot study was carried before the large scale one. The questionnaire included personal data, awareness and method of knowledge of PCOS, clinical presentation, risks, and complications. Data were analyzed statistically using SPSS software. **Results:** Total number of participants was 2000. Majority of the studied population 96.4% were from urban back ground. 86.4%, 72.9%, and 84% were from the central region of KSA, University graduates, and Non-health colleges graduates, respectively. 41% and 49.6% were single and married. The level of awareness of PCOS in this study was 56.7%. Among them 15.3% were PCOS patient, 21.3% have known about PCOS via internet, then patient, doctors, and books, respectively. Among aware females, the majority were aware of symptoms pertaining to endocrine disorders, contraception intake, and a healthy diet. In contrast, most of them were unaware of the relationship between it and occurrence of chronic diseases, early puberty, heart diseases, and inheritance. The level of awareness of PCOS was significantly related to higher educational levels ($P = 0.000$), and women with health college qualifications ($P = 0.000$). Area of residence, marital status, and diabetes mellitus had no major impact. **Conclusion:** There is a high level of awareness of PCOS among Saudi women. The internet was the prevalent source. Educational level and to graduates of health colleges scored higher. Awareness of symptoms was higher than of complications.

KEY WORDS: Polycystic Ovarian Syndrome; Women Health; Gynecology

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a very common endocrine system disorder affecting about 5-10% women of reproductive age.[1,2] The real causes of the syndrome have not been yet identified precisely and symptoms of presentation vary greatly from case to case, which makes it a challenge for physicians to diagnose.[3]

However, it is very crucial to be diagnosed early to reduce the disease undesirable complications. There are some alarming symptoms that suspect PCOS case diagnosis, amenorrhea make a 90% chance of having PCOS.[4,5] Menstrual irregularity in adolescence is a good sign of hyperandrogenemia, and it is a leading cause of the development of PCOS.[6] Other associated symptoms include: Hirsutism, acne, central obesity, and subfertility.[5,7-9] In many cases, women will not be diagnosed until they try to conceive.[2] Subfertility in PCOS is explained by the effects of obesity, metabolic, inflammatory and endocrine abnormalities on ovulatory function, oocyte

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quality, and endometrial receptivity.[4] Moreover, PCOS women have a higher miscarriage rate compared to other subfertile women. This is explained by obesity and/or insulin resistance.[4,5]

Females suffering from polycystic syndrome have 25-30% chances of developing impaired glucose tolerance once they reach 30 years of age and 8% of them will get type 2 diabetes every year.[10] The obesity is common to be an abdominal fat deposition due to a high level of testosterone as the hyperandrogenemia is an important sign of PCOS.[2,8] A 24 h blood pressure monitoring revealed that young women have an increase in both mean and systolic blood pressure. Moreover, postmenopausal women who suffered from PCOS are 3 times at risk of developing hypertension.[11]

Several studies highlighted the association between PCOS and gynecological cancers.[12] Cancer risk increases in PCOS as a result of the hormonal disturbance and the prolonged an ovulatory state.[12] A meta-analysis concluded: Women with PCOS have a 3 times more risk than other women to develop endometrial cancer.[12,13] Moreover, it is found that PCOS is associated with considerable stress because of the physical and psychological problems especially obesity and infertility.[1] In fact, delayed diagnosis of PCOS is also associated with anxiety and depression.[14,15]

Awareness of PCOS symptoms and complications is essential for early treatment and to prevent further serious complications of it. To the best of our knowledge, no previous similar studies were conducted on PCOS awareness in Saudi Arabia. The aim of our study is to assess the level of knowledge of PCOS, clinical presentation, risk factors and complications among Saudi female's population, to identify factors that influenced the awareness, and to improve health care, and lower the treatment cost.

MATERIALS AND METHODS

A population-based cross-sectional study was conducted in all over Saudi Arabia, in 2016, about PCOS awareness. Team developed a 40 items research questionnaire specifically targeted to a woman of reproductive age (aged 18-50). First 7 items for personal data, 3 items about awareness and method of knowledge of PCOS in general, the rest of questions are about the awareness of PCOS clinical presentation, risk factors, and complications. Awareness questions answered by choosing a single answer from the three choices; yes, no, I do not know. We tested the questionnaire validity with 10 pilot studies.

Data were collected using paper and soft copy questionnaire. The paper questionnaires were distributed in multiple colleges in Princess Nora Bint Abdul Rahman University and in other public places and gatherings. The soft copy questionnaire link was distributed mainly using the social media and messengers. The soft copy questionnaire was designed using the website monkey survey found from: https://www.surveymonkey.com. The PCOS questionnaire was posted in Arabic language throughout the months of January and February 2016. Participation in this open study was not restricted to PCOS patients; it is for all females within the assigned age group.

Questionnaires from none matching age group, i.e., above 50 or <18 were not used and online questionnaires completed from outside Saudi Arabia were excluded. The study did not required direct patient contact or medical record review. Only investigators were permitted to access the questionnaire responses of the study. The research design was submitted to research community before questionnaire implementation, and we have got the IRB approval number 22121502, and it was issued from Princess Nora Bint Abdul Rahman University, Riyadh.

We had a total of 2000 sample size for analysis. Data were entered using the IBN, SPSS version 22, for statistical analysis, data entry was completed during 3 weeks in February 2016. Chi-square test and *t*-test were used to correlate variables.

RESULTS

This study was conducted on 2000 Saudi females, scanning the period between January and February of 2016. 82.4% of the questionnaires were collected online by the website Monkey survey, and the remaining 17.6% were collected through hard copy surveys.

The majority of the studied population which is 96.4% were from urban background while 3.6% were from rural background. 86.4% of the females who participated in this study were from the central region of Saudi Arabia while 3.2%, 7.6%, 1.2%, and 1.6% were from eastern, west, north, and southern regions, respectively. Moreover, 72.9% of the studied females were university graduates and the least 1.2% were graduated from primary school. Non-health colleges participants perform the majority of the studies as 84%. The marital status of the females participants were 41% single female and 49.6% married. Furthermore, the minority of them which were 8.6% and 6.0% were divorced and widowed, respectively. The economic status was somewhat equally distributed among the studied population (Table 1).

The level of awareness of PCOS among Saudi population was 56.7%, while 43.3% of Saudi female were not aware or do not have prior knowledge about PCOS (Figure 1). Among people who had prior knowledge of the disease; 15.3% were already PCOS patient, 21.3%, 10.4%, 10.8%, and 3.0% have known about PCOS via internet, patients, doctors, and books, respectively (Figures 2 and 3).

Table 1: Sociodemographic characteristics of study population

Characteristics	*n* (%)
Residence (*n*=1859)	
Urban	1798 (96.72)
Rural	67 (3.60)
Region (*n*=1865)	
Central	1607 (86.17)
Eastern	59 (3.16)
Western	141 (7.56)
North	23 (1.23)
Southern	29 (1.55)
Education level (*n*=1989)	
Primary school	24 (1.21)
Middle school	58 (2.92)
High school	309 (15.54)
University	1449 (72.85)
Higher education	149 (7.49)
Field of study (*n*=1893)	
Health care	303 (16.01)
Non-health care	1590 (83.99)
Marital status (*n*=1967)	
Unmarried	809 (41.13)
Married	976 (49.62)
Divorced	170 (8.64)
Widow	12 (0.61)
Monthly income in Riyal (*n*=1924)	
<5000	675 (35.08)
5000-10000	699 (36.33)
>10000	550 (28.59)

PCOS: Polycystic ovarian syndrome

The level of awareness of PCOS symptoms and risk factors was also assessed. Among aware females, most women were aware of associated symptoms, as irregular menstrual cycle, facial acne, hirsutism, reduce fertility, weight gain, abortion, pelvic pain (Table 2) and some of its complications as breast and uterus cancer, increase level of androgen, anxiety, and psychological disturbance (Table 3). Most were also aware of the therapeutic factors as exercise, reduce weight, contraception intake, diet rich in vegetables, and fruits (Table 4). Most of the studied population, who have prior knowledge of PCOS, were aware of the effect of PCOS on the ovary itself as effect on ovulation and they believe that the regulation of menstrual cycle helps in regulation of ovulation cycle (Table 5).

The level of awareness of PCOS was significantly related to educational levels, it increased with higher education level (P = 0.000), not surprisingly most people who are having a health college background were aware of PCOS (P = 0.000). The level of monthly income, urban versus rural background, region of residence in Saudi Arabia and marital status did not seem to have any significant impact on PCOS knowledge.

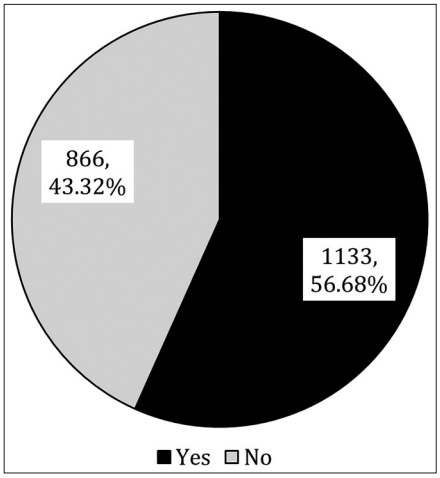

Figure 1: Previous knowledge about polycystic ovarian syndrome (*n*=1999)

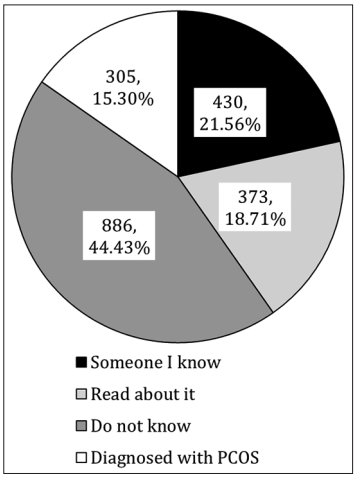

Figure 2: Methods of knowledge about polycystic ovarian syndrome (*n*=1996)

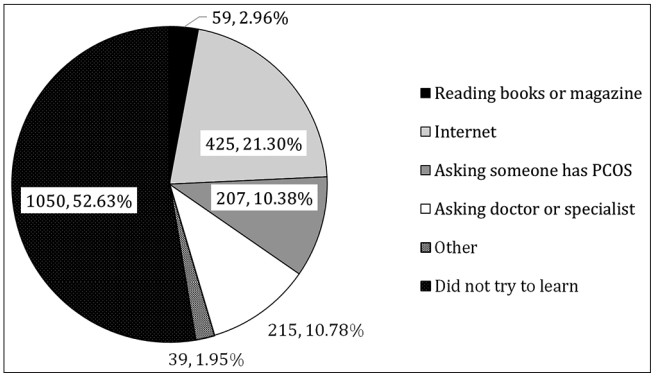

Figure 3: Trying to learn about polycystic ovarian syndrome (*n*=1995)

DISCUSSION

PCOS is a chronic multisystem disorder, which is caused by endocrine abnormalities. It present with a wide range of symptoms including: Irregular menstrual cycle, obesity, hirsutism, androgenisation, insulin resistance, and subfertility.[16] PCOS is a potential for many long-term

Table 2: Awareness of symptoms of PCOS

Symptoms	*n* (%)
Irregular menstrual cycle	
I don't know	914 (45.9)
Yes	1034 (51.9)
No	43 (2.2)
Total	1991 (100.0)
Facial acne	
I don't know	1243 (63.2)
Yes	544 (27.7)
No	179 (9.1)
Total	1966 (100.0)
Hirsutism	
I don't know	1196 (60.5)
Yes	626 (31.7)
No	154 (7.8)
Total	1976 (100.0)
Reduce fertility	
I don't know	1149 (58.6)
Yes	764 (39.0)
No	48 (2.4)
Total	1961 (100.0)
Weight gain	
I don't know	1195 (60.9)
Yes	644 (32.8)
No	122 (6.2)
Total	1961 (100.0)
Frontal hair loss	
I don't know	1433 (73.0)
Yes	372 (18.9)
No	159 (8.1)
Total	1964 (100.0)
Pelvic pain	
I don't know	1195 (60.6)
Yes	684 (34.7)
No	93 (4.7)
Total	1972 (100.0)
Abortion	
I don't know	1344 (69.0)
Yes	452 (23.2)
No	153 (7.9)
Total	1949 (100.0)
Early puberty	
I don't know	1569 (80.4)
Yes	126 (6.5)
No	257 (13.2)
Total	1952 (100.0)
Diabetes	
I don't know	1434 (74.1)
Yes	250 (12.9)
No	251 (13.0)
Total	1935 (100.0)
Hypertension	
I don't know	1543 (79.0)
Yes	150 (7.7)
No	261 (13.4)
Total	1954 (100.0)
Psychological disturbance	
I don't know	1239 (62.8)
Yes	617 (31.3)
No	117 (5.9)
Total	1973 (100.0)

PCOS: Polycystic ovarian syndrome

complications as breast cancer, cyclic vomiting syndrome, diabetes mellitus, and hypertension.[17-19]

It is a very common disorder among women in reproductive age,[20] and in Saudi Arabia, it reaches up to 42.8%. In this study, we sought to address the level of awareness of PCOS and its most common symptoms, risk factors, and complications.

In this study, a number of females included in the study had prior knowledge about PCOS is up to 56.7%. This level of awareness is considered satisfactory especially considering the large number of women participating in this study. To the best of our knowledge, this is the first study to evaluate the level of awareness of PCOS in Saudi Arabia.

The source of knowledge was mostly from internet, followed almost equally by asking doctors or patients and the last used resource is reading, which gives us an impression about preferred method of gaining knowledge in Saudi community. In addition, most of studied female who have prior knowledge about PCOS have also knowledge about its most common symptoms as irregular menstruation, acne, hirsutism, decrease fertility, weight gain, psychological disturbance, anxiety, abortion, pelvic pain, breast cancer, and increase androgen release also they were aware of its effect on ovulation.

Some of the studied females were aware of the effect of doing excises, decreasing the weight, using contraceptives, and eating fruit and vegetables on reliving PCOS symptoms. Most participants were unaware of the long-term complications as hypertension, diabetes mellitus, and cardiovascular abnormality. They were mostly unaware of its relationship to early puberty and inheritance as well.

The level of awareness, not unexpectedly was related to the high educational level and being student or worker in health background.

Table 3: Awareness of complications of PCOS

Complications	*n* (%)
Diabetes	
I don't know	1484 (76.0)
Yes	284 (14.5)
No	185 (9.5)
Total	1953 (100.0)
CVS disease	
I don't know	1557 (79.4)
Yes	100 (5.1)
No	303 (15.5)
Total	1960 (100.0)
Breast and uterus cancer	
I don't know	1289 (65.2)
Yes	598 (30.2)
No	90 (4.6)
Total	1977 (100.0)
Androgen increase	
I don't know	1281 (65.2)
Yes	556 (28.3)
No	129 (6.6)
Total	1966 (100.0)
Anxiety	
I don't know	1284 (66.2)
Yes	583 (30.0)
No	74 (3.8)
Total	1941 (100.0)
Psychological disturbance	
I don't know	1228 (62.1)
Yes	674 (34.1)
No	75 (3.8)
Total	1977 (100.0)

PCOS: Polycystic ovarian syndrome, CVA: Cyclic vomiting syndrome

Table 4: Awareness of measures to decrease the symptoms of PCOS

Measures	*n* (%)
Doing exercise	
I don't know	1131 (57.2)
Yes	788 (39.9)
No	58 (2.9)
Total	1977 (100.0)
Losing weight	
I don't know	1040 (52.6)
Yes	895 (45.3)
No	42 (2.1)
Total	1977 (100.0)
Using contraceptives	
I don't know	1187 (60.2)
Yes	585 (29.7)
No	201 (10.2)
Total	1973 (100.0)
Eating vegetables and fruits	
I don't know	1248 (63.2)
Yes	676 (34.2)
No	52 (2.9)
Total	1976 (100.0)
Eating protein rich food	
I don't know	1471 (74.6)
Yes	319 (16.2)
No	182 (9.2)
Total	1972 (100.0)
Eating fat rich food	
I don't know	1317 (66.7)
Yes	88 (4.5)
No	570 (28.9)
Total	1975 (100.0)

PCOS: Polycystic ovarian syndrome

Limitations

As with any questionnaire-based research, there were some important limitations with our study that should be acknowledged. Our research method relied on an unscreened but motivated audience and a functional computer interface, with the result that PCOS patients lacking the means and/or ability to access the study questionnaire were excluded from our sample. The fact that study participation depended on internet use likely explains the high self-reported familiarity and knowledge level for PCOS in this group. While PCOS preferentially affects women of reproductive age, and patients in this age group may tend to have a greater fluency with computer-based research tools, a full exploration of this demographic association was beyond the scope of our investigation. Conversely, the possibility also existed that some of our respondents had not been properly diagnosed with PCOS and therefore inappropriately inflated the sample. We regarded these two balanced sources of selection bias to be of essentially equivalent magnitude and therefore mutually negating. Whether or not the observations reported by computer-assisted questionnaire are representative of all PCOS patients is difficult to establish, although this represents the focus of ongoing research at our institutions. It may be that results obtained exclusively from an anonymous, confidential computer-accessed questionnaire are more likely to depict extreme views not typical of those encountered clinically, yet the sample size registered here was considered sufficiently large to attenuate this effect.

CONCLUSION

There is a high level of awareness of PCOS among Saudi women. The internet was the prevalent source. Educational

Table 5: Awareness of disease information of PCOS

Information	*n* (%)
Inherited	
I don't know	1201 (60.7)
Yes	205 (10.4)
No	574 (29.0)
Total	1980 (100.0)
Regulation of menstrual cycle helps in regulation of ovulation	
I don't know	962 (48.5)
Yes	986 (49.7)
No	35 (1.8)
Total	1983 (100.0)
Treating PCOS reduce chance of getting cancer	
I don't know	1232 (62.3)
Yes	687 (34.7)
No	60 (3.0)
Total	1979 (100.0)
Ovaries shape change	
I don't know	1380 (70.1)
Yes	471 (23.9)
No	119 (6.0)
Total	1970 (100.0)
Ovulation effect	
I don't know	1048 (52.7)
Yes	911 (45.8)
No	30 (1.5)
Total	1989 (100.0)

PCOS: Polycystic ovarian syndrome

level and to graduates of health colleges scored higher. Awareness of symptoms was higher than of complications.

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