

Perceived Dietary Knowledge among women with polycystic ovarian syndrome: A case-control study

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Abstract: Background: Polycystic Ovary Syndrome (PCOS) is a common endocrine condition in women of reproductive age, marked by symptoms including monthly abnormalities, hyperandrogenism, and the presence of polycystic ovaries. Dietary choices significantly influence symptoms and overall health outcomes. This study assesses the level of perceived dietary knowledge among women with PCOS.

Methods: A case-control study was conducted on a purposive type of sample consisted of 200 women giving Tikrit Teaching Hospital and outpatient gynecology clinics. A case group of 100 cases (PCOS) and a control group of 100 cases (healthy women). Data were collected via a validated structured interview questionnaire and analyzed using Statistical Package for Social Science Program (IBM SPSS) version 26.0.

Result: The mean age of the participant was 28 ± 6.5 years. The study found that there was a significant differences between two groups in marital status, educational level and economic status ($p < 0.05$). Women with PCOS showing significantly high level of knowledge comparing to healthy women in specific aspects, particularly regarding the benefits of whole grains ($P = .003$) and lean proteins ($P = 0.038$) in managing PCOS symptoms.

Conclusion: the study concludes that women with PCOS generally possess good level of nutritional knowledge particularly the benefits of whole grains and proteins. While perceived knowledge is good The study emphasizes the need for specialized nutritional counseling for women with PCOS, providing accurate information regarding the benefits of healthy dietary patterns.

Keywords: Perceived Dietary Knowledge; Polycystic ovarian syndrome; case-control

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Introduction

Polycystic ovary syndrome (PCOS) is one of the endocrine disorders that are prevalent among females of reproductive age (Al-Taii & Jankeer, 2025). The prevalent symptoms noted include hirsutism, alopecia, and acne, accompanied by

oligomenorrhea and amenorrhea, which are associated with the diagnostic criteria (Hoeger et al., 2021). The current clinically accepted criterion for diagnosing PCOS is the presence of at least two of the following three traits: oligo-ovulation or anovulation, polycystic ovaries, and hyperandrogenism as identified by ultrasound analysis (Chang & Dunaif, 2021). Women with PCOS are at an elevated risk for a variety of conditions, including glucose intolerance and type 2 diabetes mellitus, hepatic steatosis and metabolic syndrome, hypertension, dyslipidemia, vascular thrombosis, cerebrovascular accidents, and potentially cardiovascular events, subfertility and obstetric complications, endometrial atypia or carcinoma, and potentially ovarian malignancy, as well as mood and psychosexual disorders (Azziz, 2018). Globally, prevalence of PCOS ranges from 10% to 13%, with marginally higher rates noted in certain populations compared to other (Teede et al, 2023). Diet significantly influences the clinical presentation and laboratory results of PCOS (XENOU & GOUROUNTI, 2021). Recent data indicates the substantial impact of food quality on women with PCOS. Despite the fact that dietary modification is essential for the management of PCOS, a small number of women with PCOS report receiving nutrition education. Dietary behaviours and diet quality may be influenced by nutrition knowledge; however, the extent of nutrition knowledge among women with PCOS remains unknown (Douglas et al., 2021). Nutritional management, encompassing knowledge, attitude, and practice, is vital in the treatment and management of PCOS, as dietary selections profoundly affect symptoms and overall health outcomes (Kaur et al., 2025). This study aims to assess the perceived dietary knowledge among women with PCOS.

Methodology

Study design

A quantitative case-control study was conducted to compare perceived nutritional knowledge between two groups. This design was chosen to determine the differences in knowledge levels between women diagnosed with PCOS (case) and a group of healthy women (control).

Study setting

The research was conducted in Tikrit city, Iraq. Data were collected from gynecology consultant at Tikrit Teaching Hospital and outpatient gynecological clinics.

Study sample

A non-probability purposive sample consisting of 200 women, divided into a case group consisting total of 100 women diagnosed with polycystic ovarian syndrome (PCOS) by a gynecologist according to the Rotterdam criteria, along with a control group of 100 age- and BMI-matched healthy women.

Study instrument

A structured interview questionnaire, divided into two main sections: first socio-demographic data, while the second section focused on assessing the perceived knowledge.

Validity and reliability

The study instrument validity was ensured by a panel of expert in gynecologist and nurses. Additionally, pilot study was conducted to ensure the questionnaire reliability. The internal consistency was confirmed using Cronbach's alpha (0.950).

Data collection

The data were collected from women diagnosed with polycystic ovary syndrome and healthy women by face-to-face interview on an average of 6 days per week, with each interview lasting around 15 minutes.

Statistical analysis

The data were analyzed and interpreted through use of the application of Statistical Package for Social Sciences (SPSS), version 26.0. The Kolmogorov-Smirnov test was applied to check for data normality. Descriptive statistics were including (frequencies, percentages, mean and SD) summarized the data. Mann-Whitney U test identified differences and associations between variables.

Result

Table 1: Comparison of Socio-demographic Variables (SDVs) for Women with PCOS (Case) and Healthy Women (Control)

| No. | Variable | Case (n=100) | | Control (n=100) | | Variance test | |
|-----|----------------------|--------------|-------------|-----------------|---------------|---------------|-----------------------|
| | | F | % | F | % | | |
| 1 | Age (year) | ≤ 19 | 5 | 5 | 6 | 6 | Λ= .010 P= .921 |
| | | 20 – 29 | 54 | 54 | 51 | 51 | |
| | | 30 – 39 | 34 | 34 | 36 | 36 | |
| | | 40 + | 7 | 7 | 7 | 7 | |
| | | <i>M±SD</i> | <i>28±6</i> | | <i>28±0.6</i> | | |
| 2 | Marital status | Single | 27 | 27 | 49 | 49 | Λ= 7.993 P= .005* |
| | | Married | 70 | 70 | 49 | 49 | |
| | | Divorced | 3 | 3 | 2 | 2 | |
| 3 | Level of education | Illiterate | 2 | 2 | 2 | 2 | Λ= 14.992 P= .001* |
| | | Primary | 20 | 20 | 7 | 7 | |
| | | Intermediate | 9 | 9 | 2 | 2 | |
| | | Secondary | 16 | 16 | 10 | 10 | |
| | | Bachelor | 47 | 47 | 65 | 65 | |
| | | Postgraduate | 6 | 6 | 14 | 14 | |
| 4 | Body Mass Index | Normal | 27 | 27 | 27 | 27 | Λ= .007 P= .935 |
| | | Overweight | 35 | 35 | 35 | 35 | |
| | | Obesity I | 35 | 35 | 34 | 34 | |
| | | Obesity II | 3 | 3 | 4 | 4 | |
| 5 | Residency | Urban | 97 | 97 | 96 | 96 | Λ= .147 P= .702 |
| | | Rural | 3 | 3 | 4 | 4 | |
| 6 | Socioeconomic status | Low | 45 | 45 | 19 | 19 | Λ= 15.920 P= .001* |
| | | Moderate | 49 | 49 | 69 | 69 | |
| | | High | 6 | 6 | 12 | 12 | |

No: Number, f: Frequency, %: Percentage, Λ= Levene's Test, P: Probability value, *Significant

Table 1 presents the comparison between case and control groups in the study; the findings indicate that there are significant differences in several variables such as marital status (P=.005), level of education (P=.001), and socioeconomic status (P=.001). Age, body mass index, and residency reported no significant difference between the two groups, indicating homogeneity of these variables. The description of variables shows close age groups with the same average age for each group (28±6) years. Married women were seen in the case group with 70% while in the control group were distributed between single (49%) and married (49%). Highest percentage was graduated with bachelor's degree in both groups; case (47%) and control (65%). The BMI was approximately close in both groups; 35% in each group seen with overweight, obesity I were also reported among 35% in the case group and 34% in the control group. The majority of women were residing in urban in both groups; case (97%) and control (96%). The socioeconomic status indicates moderate level in the case (49%) and control (69%) group.

Table 2: Mean Scores Assessments of Perceived Dietary Knowledge Items among Women with PCOS (Case) and Healthy Women (Control)

| Perceived Dietary Knowledge | | Case (n=100) | | | Control (n=100) | | | P |
|---|---|--------------|------|------|-----------------|------|------|------|
| Items | | Mean | SD | Ass. | Mean | SD | Ass. | |
| Knowledge about dietary that worsen PCOS symptoms | Do you believe diet affects PCOS symptoms? | .73 | .446 | Good | .78 | .416 | Good | .141 |
| | Do you think Sugary foods and drinks (e.g. Pepsi, sweets, pastries and coffee) worsen the PCOS? | .95 | .219 | Good | .92 | .273 | Good | .392 |
| | Do you think Fried foods (e.g., French fries, fried chicken) worsen the PCOS? | .83 | .378 | Good | .82 | .386 | Good | .853 |
| | Do you think Processed meats (e.g., sausages, hot dogs) worsen the PCOS? | .83 | .378 | Good | .75 | .435 | Good | .167 |

| | | | | | | | | |
|---|---|-----|------|----------|-----|------|----------|--------------|
| | Do you think White bread worsen the PCOS? | .90 | .302 | Good | .86 | .349 | Good | .387 |
| | Do you think Full-fat dairy products worsen the PCOS? | .62 | .488 | Moderate | .57 | .498 | Moderate | .474 |
| | Do you think Fast food or takeout meals worsen the PCOS? | .98 | .141 | Good | .89 | .314 | Good | .010* |
| Knowledge about dietary that improve PCOS symptoms | Do you think Fresh fruits and vegetables (such as pomegranate, kiwi, berries and cucumber) improve PCOS symptoms? | .60 | .492 | Moderate | .57 | .498 | Moderate | .669 |
| | Do you think Whole grains (e.g., oats, brown rice, and quinoa) improve PCOS symptoms? | .81 | .394 | Good | .62 | .488 | Moderate | .003* |
| | Do you think Lean proteins (e.g., chicken breast, fish, legumes Salmon) improve PCOS symptoms? | .94 | .239 | Good | .85 | .359 | Good | .038* |
| | Do you think Low-fat dairy or dairy alternatives improve PCOS symptoms? | .71 | .456 | Good | .59 | .494 | Moderate | .076 |
| | Do you think Nuts and pumpkin seeds improve PCOS symptoms? | .67 | .473 | Good | .70 | .461 | Good | .650 |
| | Do you think Herbal teas (e.g., spearmint, cinnamon) improve PCOS symptoms? | .67 | .473 | Good | .70 | .461 | Good | .650 |

SD: Standard Deviation, Ass: Assessment, P: Probability value (≤ 0.05), *Significant

Poor= 0.00 – 0.33, Moderate= 0.34 – 0.67, Good= 0.68 – 1.00

Table 2 shows that both groups demonstrating good level of dietary knowledge among most of items regarding that worsen or improve the symptoms of PCOS. However, women with PCOS showing high level of knowledge comparing to healthy women in specific aspect such as thinking that grains (e.g., oats, brown rice, and quinoa) improve PCOS symptoms ($P=.003$) and thinking that Lean proteins (e.g., chicken breast, fish, legumes Salmon) improve PCOS symptoms ($P=.038$).

Table 3: Overall Assessments of Perceived Dietary Knowledge among Women with PCOS (Case) and Healthy Women (Control)

| Groups | | Case | | | | | Control | | | | |
|------------------------------------|-----------------|------------|------------|-------------|--------------|-------------|------------|------------|-------------|--------------|-------------|
| | | f | % | M | SD | Ass. | F | % | M | SD | Ass. |
| Perceived Dietary Knowledge | Poor | 2 | 2 | 9.57 | 2.306 | Good | 12 | 12 | 8.92 | 3.017 | Good |
| | Moderate | 27 | 27 | | | | 30 | 30 | | | |
| | Good | 71 | 71 | | | | 58 | 58 | | | |
| | Total | 100 | 100 | | | | 100 | 100 | | | |

f: Frequency, %: Percentage

M: Mean for total score, SD: Standard Deviation for total score, Ass: Assessment

Poor= 0.0 – 4, Moderate= 4.1 – 8.0, Good= 8.1 – 12.00

Table 3 displays the overall assessment of perceived dietary knowledge among women with PCOS in the case group and healthy women in the control group; the findings indicates that women in both groups were demonstrating a good level of knowledge as reported among 71% among women with PCOS ($M\pm SD= 9.57\pm 2.306$) and 58% in the control group ($M\pm SD= 8.92\pm 3.017$).

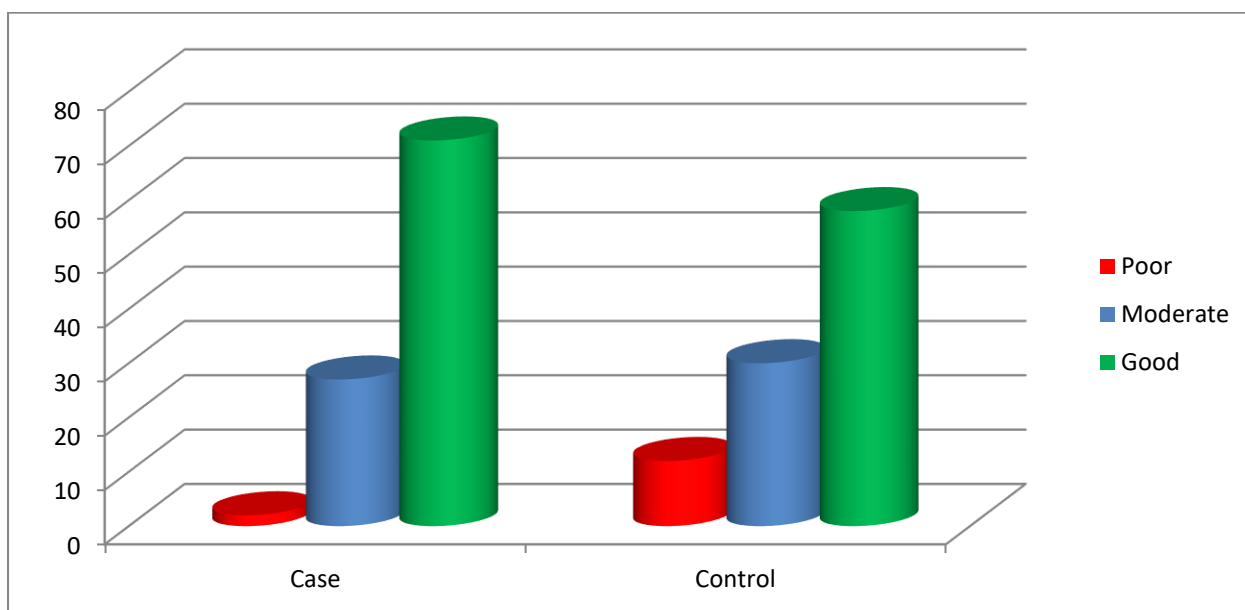


Figure (1): Levels of Perceived Nutritional Knowledge among Women with PCOS (Case) and Healthy Women (Control)

This figure shows that 71% of women in the case group and 58% in the control group perceive high nutritional knowledge about PCOS symptoms.

Discussion

The socio-demographic profile of the participant findings showed that most women in both groups were aged between 20-29 years. This finding is consistent with a study conducted in Iran, which found the PCOS increased in women aged 20-24 years (Motlagh Asghari et al., 2022). Furthermore, the mean age of participants was 28 ± 6 years, this finding is almost similar to previous study conducted in Saudi Arabia (Alqntash et al., 2024). In this study, body mass index showed that 35% of women were overweight, which is in line with study conducted in Jordan (Abutaima et al., 2024). Additionally, 34% of participant were obese, a finding compatible with a study in Baghdaad, Iraq (Alsaadi & Mohamad, 2019). Regarding the socioeconomic status, the finding showed that (49%) of the case group and (69%) in control groups were having moderate level, these findings consistent with study conducted by (Ridha. M. Lefta, 2024) which reported that (68.9%) of the case group and (60%) of the control groups were clasified as having moderate socioeconomic level. Regarding the Perceived Dietary Knowledge, the results showed that both groups demonstrated a good level of dietary knowledge among most of items related to foods that worsen or improve PCOS symptoms. However, women with PCOS demonstrated higher level of knowledge than healthy women in specific aspects, particularly regarding the belief that grains (e.g., oats, brown rice, and quinoa) improve PCOS symptoms ($P=.003$) and that Lean proteins (e.g., chicken breast, fish, legumes Salmon) improve PCOS symptoms ($P=.038$). These finding disagree with sudy conducted by (Bykowska-Derda et al., 2021a), which reported lower nutritional knowledge among women with PCOS. In the current study, the overall assessment of perceived dietary knowledge indicated that both women with PCOS and healthy controls demonstrated good knowledge levels, with 71% of women with PCOS, this finding consistent with study conducted by (A. W. Lin et al., 2018), who reported that the majority of women with PCOS (96%) possessed a fundamental understanding of nutrition. Furthermore, Professional dietary education and enhancement of nutritional knowledge have been shown positively influence food quality and increase the adoption of healthier lifestyle behaviors among women with PCOS (Bykowska-Derda et al., 2021b).

Conclusion

The study concluded that the majority of women participating in the study were aged between (20-29) years old with a high prevalence of overweight and obesity among the participants. Furthermore, significant majority of women with PCOS possess a high level of nutritional knowledge compered to control groups. While perceived knowledge is good,

the study emphasizes the need for dietary counseling to promote effective lifestyle modification and improve long term healthy outcome.

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