



Quality of Life Specified for Polycystic Ovary Syndrome and its Relationship With Nutritional Attitude and Behavior

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Abstract

Objectives: Polycystic ovarian syndrome (PCOS) is a common hormonal disorder that can lead to hirsutism, menstrual disorders, obesity, acne, and sometimes abortion and infertility. Considering the effect of PCOS-induced obesity on quality of life, the present study was aimed to evaluate the quality of life specified for polycystic ovary syndrome and its relationship with nutritional attitude and behavior.

Materials and Methods: This cross-sectional study was done on 150 PCOS cases through convenience sampling in educational hospitals of Tabriz, Iran, in 2015. The used tools included socio-demographic questionnaire, Polycystic Ovarian Syndrome Questionnaire (PCOSQ), Three-Factor Eating Questionnaire (TFEQ-R18: uncontrolled eating (UE), cognitive restraint (CR), and emotional eating (EE)), and a questionnaire of eating attitudes (Eat-26: including food preoccupation, dieting, and oral control). The relationship between the quality of life and nutritional attitudes and behaviors was evaluated by Pearson correlation and multivariate regression analysis. In this study, $P < 0.05$ was considered significant.

Results: A mean quality of life score of 16.58 ± 4.18 was obtained out of 0-35. Nutritional behavior averaged 42.28 ± 19.63 out of a min-max range of 18 to 72. Mean nutritional attitude score was 24.64 ± 12.55 out of 0-78. A significantly inverse relationship was observed between the quality of life and nutritional attitude ($P < 0.001$, $r = -0.317$), as well as nutritional behavior ($P = 0.015$, $r = -0.198$) in participants. In other words, the quality of life scores increased when nutritional attitude and behavior (positive attitude and behavior) decreased. Multivariate regression analysis showed that EE, dieting, and history of pregnancy were predictive variables affected the quality of life.

Conclusions: There was a relationship between nutritional attitude and behavior and quality of life specified for polycystic ovary syndrome. Therefore, it is necessary to pay attention to nutritional and other predictors through better health planning for these women.

Keywords: Polycystic ovary syndrome, Quality of life, Nutritional behavior, Nutritional attitude, Predictors

Introduction

Polycystic ovarian syndrome (PCOS) is one of the most common metabolic and endocrine disorders in reproductive aged women and important reason for infertility due to failure in ovulation (1,2). Diagnosis of this syndrome is possible by rejecting other causes that lead to irregular menstruation and increased androgen levels, which is generally based on clinical and laboratory criteria or ultrasound. In this disorder, at least 2 out of total conditions should be present, including oligo/anovulation (e.g., oligomenorrhea: irregular cycles above 34 days), increased androgen levels or clinical symptoms of hyperandrogenism, and ultrasound findings (3,4). This syndrome leads to increased risk factors such as diabetes (type II), obesity, hypertension, cardiovascular diseases, dyslipidemia, ovarian cancer, breast and endometrial disorders, insulin resistance, and hyperinsulinemia (4, 5).

Quality of life is one of the most important indices of

general and mental health (6), which has been suggested as the basis for disease control and treatment (7). Moreover, health-related quality of life measurement plays a substantial role in evaluating the effects of chronic diseases on people (8). PCOS is a chronic disease and, due to different symptoms, can affect various aspects of people's life; therefore, measuring quality of life can provide great information about the profits of treatment or intervention from the patient's perspective (9). Some studies have reported negative effects of PCOS symptoms including acne and hirsutism on quality of life, but they have applied a general quality of life questionnaire for individuals (2,10,11).

Almost 50% of women with PCOS are obese or overweight, who complain of uncontrolled and excessive consumption of carbohydrate sources without a sense of satiety. In such women, weight gain is associated with hyperandrogenism (12). Furthermore, an imbalanced



diet can cause weight gain and chronic illness. Suitable interventions can be associated with improved nutritional behaviors and healthy diet patterns to prevent disease. In order to design a proper nutritional intervention, it is important to understand the factors associated with the choice of foodstuff by the individual, including nutritional knowledge, attitude, and practice (13,14). Nutritional disorders are now a major threat to women's physical and mental health. Such behaviors are associated with an increase in drug abuse, misconduct, unhealthy sexual behavior, and committing suicide (15). Rodent's models show that hyperandrogenism increases the risk of abdominal obesity by increasing insulin resistance and reducing energy consumption (16).

In addition, obesity is a complex, costly, and multifaceted condition, whose emergence is significantly caused by overeating. Known overeating behaviors, such as emotional eating (EE), impulsive eating, non-refusal to eat, and cognitive dietary restraint are significantly linked to obesity (17).

Benbaibeche et al compared 3 groups of obese people with type II diabetes with healthy subjects, and found that obese people displayed a higher incidence of hyperphagia than healthy subjects and that both hyperphagia and hypophagia were more common in diabetic cases than healthy people. Examination of these individuals indicated a strong relationship between the pattern of nutritional behavior and metabolic syndrome and insulin resistance (18). The findings of a review study showed that different tools were used to survey the association of quality of life with nutritional disorders (19).

Using Rotterdam's benchmark, Tehrani et al reported an increasing prevalence (14.4%) of PCOS (20) among Iranian young women. Additionally, despite the PCOS-induced obesity effects on quality of life and in turn the impact of nutritional behaviors on obesity and its complications, there are limited researches on this issue. Therefore, this study was conducted to evaluate the quality of life specified for polycystic ovary syndrome and its relationship with nutritional attitude and behavior.

Materials and Methods

Study Type and Participants

This is a cross-sectional study with an analytical approach. The study population was women with PCOS who referred to the Endocrine Clinic of Imam Reza hospital, Women and Infertility Clinic of Al-Zahra hospital in Tabriz during 2015. A total of 150 subjects with PCOS who were identified by Rotterdam criteria were selected by convenience sampling method.

The inclusion criteria for the research were recognition of PCOS on the basis of Rotterdam criteria over the past year, married women of reproductive age between 19 and 45 years, tendency to participate in the study, possibility of phone calls, and not having a shift in work. Exclusion criteria included being on a specific diet, other endocrine

or chronic diseases, mental illness, or a history of admission to a psychiatric hospital, or a history of psychotropic drug use, a history of abortion, preterm delivery, pregnancy and breast-feeding at the time of study, facing with problems such as death of close relatives, severe crashes, a family member with severe diseases, financial problems, loss of their own and spouse jobs, or the stress caused by displacement of their residence places in the past 6 months.

Because a similar study was not found to investigate the relationship between the quality of life score and nutritional attitudes and behaviors in women with PCOS, the sample size was computed on the basis of a pilot study on 30 subjects. It was estimated to be 150 individuals according to the relationship between quality of life and nutritional behavior scores ($r = -0.225$, $\alpha = 0.05$, power = 80%). In addition, a total of 78 subjects were calculated according to the relationship between quality of life and nutritional attitude scores ($r = -0.307$, $\alpha = 0.05$, Power = 80%), and ultimately, a total of 150 participants were selected as the sample size.

Data Collection Tools

Data were gathered by 4 kinds of questionnaires.

1. A questionnaire consisted of socio-demographic information (age, height, weight, occupation, education, etc.).

2. The Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire (PCOSQ) designed for PCOS cases by Cronin et al (21) containing 26 questions that evaluates people's quality of life in sub-domains of emotional (8 questions), hirsutism (5 questions), obesity (5 questions), infertility (4 questions), and menstrual disorders (4 questions), scoring each option on a seven-point Likert scale with scores of 7 and 1 representing the best and the weakest performances, respectively. Thus, the scores for emotional domain, hirsutism and obesity, infertility and menstrual problems range between 8-56, 5-35, and 4-28, respectively. The total score of each area is calculated based on the score obtained divided by the number of queries raised in the related area. Attainable scores range from 0 to 7 for each subscale and a total score of quality of life varies from 0 to 35 (21). Amini et al reported a Cronbach α coefficient of over 0.7 for all domains except menstrual disorders (10).

3. A Three-Factor Eating Questionnaire (TFEQ-R18) has been designed by Tholin et al (22). It has 18 questions scored on a 4-point Likert scale, with exception of question 18 on an eight-point scale. The questionnaire consists of 3 components of uncontrolled eating (UE), EE, and cognitive restraint (CR). A higher score in each area indicates banning, EE, and more UE, ranging from 18 (Min) to 72 (Max). Badri Gargari et al reported a total reliability of 0.87 for the tool (23).

4. Eating attitude questionnaire (Eat-26) developed by Garner et al (24). Eating attitude test with 26 questions

consists of 3 scales of dietary habits, food preoccupation, and oral control. The responses to phrases 1 to 25 are scored as always (3 points) and never (zero point), and the phrase 26 is scored in a reverse order. The lowest and the highest scores given to an individual are zero and 78. If an individual's score in the test is above 20, she should pursue further examinations and possibly treatment. A correlation coefficient of 0.91 was reported for this questionnaire in Iran by Nobakht and Dezhkam (25).

Face and content and validity were applied to investigate the validity of the socio-demographic tool. It was submitted to 10 members of the faculty. The tool was corrected according to the received responses. In this research, acquired values of Cronbach α for PCOSQ, TFEQ-R18 and Eat-26 questionnaires were calculated to be 0.87, 0.71 and 0.91, respectively.

Sampling

Sampling was started after getting permission from Research Vice Chancellor of Tabriz University of Medical Sciences. Firstly, the researchers introduced themselves to the subjects and surveyed the eligibility criteria. Then eligible individuals were provided with accurate information regarding the causes of study, objectives, benefits, and confidentiality of information. In the case of a desire to participate, written consents were obtained from the participants. Afterward, the participants filled out data collection tools which consisted of demographic questionnaire, PCOSQ, a 3-factor eating scale, and an eating attitude questionnaire.

Data Analysis

After completing the study questionnaires, analysis of data was done through SPSS software (version 21.0). Descriptive statistical methods, including mean and standard deviation, were applied to describe socio-demographic characteristics, quality of life score and its dimensions, and nutritional attitudes and behaviors. Kolmogorov-Smirnov test was used to determine the normal distribution of data. Pearson correlation and multivariate regression analysis were applied to investigate the relationships between quality of life and nutritional behaviors and attitudes. The relationships between PCOS-associated quality of life and nutritional behaviors and attitudes were verified by Pearson correlation. We used a multivariate linear regression analysis adjusted for potential confounding variables.

Results

The results of the study showed that 8.0, 43.3, and 48.67% of subjects aged below 20, between 20-30, and above 30 years, respectively. Body mass index (BMI) in 18.67, 26.67, 29.33, and 25.33% of the women were below 18.5, 18.5-24.9, 25-29.9, and above 30 kg/m², respectively.

The menstruation age averaged 12.09 years and the mean marital age was 22.1 years. None of the surveyed women

used alcohol, drugs, and cigarettes. The results showed that 51.33% had no pregnancy, 33.33% were primiparous, and 15.33% were multiparous. Moreover, tendency towards pregnancy, history of treatment of infertility, and treatment of illnesses were recorded in 20.67, 55.33, and 44% of the subjects, respectively (Table 1).

This research showed that for quality of life, nutritional behavior, and nutritional attitude mean \pm SD (standard deviation) scores were 16.58 ± 4.81 , 42.28 ± 19.63 and 24.44 ± 12.55 , respectively (Table 2).

Between quality of life and total nutritional attitude, there was a significant negative (inverse) relationship ($P < 0.001$, $r = -0.317$) (Table 3). In other words, the score of quality of life decreases as the nutritional attitude (negative) score increases. Significant negative (inverse) relationships were observed between quality of life and sub-domains of dieting ($P < 0.001$, $r = -0.340$), food preoccupation ($P < 0.001$, $r = -0.354$) and oral control ($P < 0.003$, $r = -0.262$).

There was a significant negative (inverse) relationship between quality of life and total nutritional behavior scores ($P = 0.015$, $r = -0.198$). Therefore, quality of life

Table 1. Demographic Characteristics of Women with PCOS

Variable	No.	%
Age (y)		
<20	12	8.00
20-30	65	43.33
>30	73	48.67
BMI (kg/m ²)		
<18.5	28	18.67
18.5-24.9	40	26.67
25-29.9	44	29.33
≤ 30	38	25.33
Education		
Illiterate	15	10.00
Primary school	23	15.33
Secondary school	72	48
Diploma	22	14.67
College	18	12.00
Job		
Housewife	95	63.33
Occupied at home	24	16.00
Occupied outside	31	20.67
Gravidity		
Not having	77	51.33
Primiparous	50	33.33
Multiparous	23	15.33
Tobacco use	0	0
Alcoholic drinks	0	0
Drug use	0	0
Tendency of pregnancy	31	20.67
Infertility treatment	83	55.33
PCOS treatment	66	44.00
Age of menstruation* (y)	12.09	1.47
Age of marriage* (y)	22.14	3.54

BMI: body mass index, PCOS: polycystic ovarian syndrome.

* Data was reported according to mean and standard deviation (SD).

Table 2. Mean and Standard Deviation (SD) of Quality of Life, Nutritional Behaviors and Attitudes Scores and Their Related Subscales in Women with PCOS

Quality of life Subscale	Nutritional behaviors			Nutritional attitudes				
	Mean	SD	Subscale	Mean	SD	Subscale	Mean	SD
Emotional domain	2.73	1.31	CR	11.59	8.41	Dieting	13.76	9.60
Hirsutism	2.57	1.20	UE	22.42	12.02	Food preoccupation	6.03	4.32
Obesity	2.86	1.17	EE	8.26	3.65	Oral control	4.95	3.82
Infertility	4.37	1.37	Total	42.28	19.63	Total	24.64	12.55
Menstrual disorders	4.05	1.43						
Total	16.58	4.81						

PCOS: Polycystic ovarian syndrome

The attainable scores vary from 0 to 7 for each subscale. The total quality of life score varies from 0 to 35. A higher score indicate higher quality of life. The attainable scores were 9-36, 6-24, and 3-12 for uncontrolled eating (UE), cognitive restraint (CR), and emotional eating (EE), respectively. The total nutritional behaviors score range from 18 to 72. A higher score in each area indicates bad behavior.

The attainable scores were 0-18, 0-39, and 0-21 for Food preoccupation, Dieting, and Oral control, respectively. Total nutritional attitudes score differs from 0 to 78. A higher score indicates lower attitudes.

score declines as the nutritional behavior score rises (bad nutritional behavior). Significant negative (inverse) relationships were shown between quality of life and sub-domains of CR ($P < 0.012$, $r = -0.205$), UE ($P < 0.001$, $r = -0.270$) and EE ($P < 0.001$, $r = -0.370$) (Table 3).

Based on the multivariate regression test (concurrent method) and according to the tables explaining specified quality of life in PCOS and the nutritional behaviors, attitudes, BMI, pregnancy and abortion variables, it is observed that correlation coefficient, coefficient of determination, and pure determination coefficient were obtained as $R = 0.85$, $R^2 = 0.72$, and $\Delta R^2 = 0.70$, respectively. Effective predictive variables explain up to 70% of variances in quality of life scores. The relationship between predictive variables and the criterion variable is linear according to multivariate regression analysis ($F = 39.32$, $P < 0.01$) (Table 4).

The standardized beta coefficients and significance level

Table 3. Correlation between Quality of Life and Nutritional Behaviors and Attitudes and Their Subscales Scores in Women with PCOS

Variable	Subscale	Quality of life	
		r	P
Nutritional attitudes	Dieting	-0.340	<0.001
	Food preoccupation	-0.354	<0.001
	Oral control	-0.262	0.003
	Total	-0.317	<0.001
Nutritional behaviors	CR	-0.205	0.012
	UE	-0.270	0.001
	EE	-0.370	<0.001
	Total	-0.198	0.015

PCOS: Polycystic ovarian syndrome; CR, Cognitive restraint ; UE, Uncontrolled eating, EE, Emotional eating

indicate that predictive variables affecting the quality of life were EE ($\beta = -0.147$, $P < 0.01$), dieting ($\beta = -0.154$, $P < 0.01$), and pregnancy ($\beta = -0.766$ ($P < 0.01$)). The beta coefficients reveal that the variables CR, UE, food preoccupation, oral control, BMI, and abortion are not sufficient to predict and explain the quality of life (Table 5).

Discussion

Quality of life specified for polycystic ovary syndrome averaged less than mean attainable score. This score indicates that the lowest scores for the quality of life in terms of priority belonged to areas of hirsutism, emotional-exciting and obesity in this study, so hirsutism and emotional sub-domain had the most negative effects on quality of life. These results are in agreement with those of the study by Amini et al, who assessed Iranian women with PCOS (10), and Jones et al, who showed a significant relationship between all clinical symptoms (hirsutism, amenorrhea, obesity, oligomenorrhea, acne and decreased fertility) with decreased quality of life in affected people (9). Our observations also agree with those reported by Bazaganpour et al, who determined the clinical symptoms in patients with PCOS and their qualities of life (26), as well as with Drosdzol et al, who showed a negative relationship between moderate and severe hirsutism with some dimensions of quality of life such as general health, limitations due to emotional problems, social performance, and emotional health (11). McCook et al found that post-obesity menstrual disorders had the preminent effects on decreased quality of life in people with this syndrome followed by the domains related to infertility, emotional-exciting, and hirsutism with the

Table 4. Multivariate Regression Analysis of Quality of Life in Participants with PCOS Based on Nutritional Behaviors and Attitudes, BMI, Pregnancy, and Abortion

Model	Multiple Correlation Coefficient t (R)	Coefficient of Determination (R ²)	Pure Determination Coefficient (R ²)	Error of Estimation Criteria	F Observational	P
	0.85	0.72	0.70	2.64	39.32	<0.001

PCOS: Polycystic ovarian syndrome.

Predictive variables: Cognitive restraint, Uncontrolled eating, Emotional eating, Dieting, Food preoccupation, Oral control, BMI, Pregnancy, and Abortion

Table 5. The Beta Coefficient of Predictive Variables of Quality of Life in Participants With PCOS

Model	Variables	Unstandardized Coefficients		Standardized Coefficients	T test	P
		Beta coefficient	Standard Error	Beta Coefficient		
1	Cognitive restraint	0.45	0.37	0.13	1.20	0.23
	Uncontrolled eating	-0.39	0.41	-0.11	-0.95	0.35
	Emotional eating	-0.58	0.27	-0.15	-2.19	0.03*
	Dieting	-1.01	0.44	-0.15	-2.30	0.02*
	Food preoccupation	0.75	0.50	0.11	1.48	0.14
	Oral control	0.69	0.74	0.08	0.93	0.35
	BMI	0.22	0.22	0.05	0.99	0.33
	Pregnancy	-5.01	0.47	-0.77	-10.64	<0.001*
	Abortion	0.28	0.72	0.03	0.38	0.71

PCOS: Polycystic ovarian syndrome

* $P < 0.05$.

largest impacts on the quality of life, respectively (27).

All the complications of this syndrome especially hirsutism, obesity, and infertility can cause emotional and psychological burden in many societies, including Iran, where women are very concerned about beauty and also where women’s fertility is very important. Furthermore, as all the participants in the study were selected from Endocrine, Women’s and, Infertility Clinics, obtaining lower scores for areas of hirsutism and emotional excitement and their adverse effects on quality of life were somewhat beyond expectations implying that the location of research had no significant impacts on the bias of the results obtained.

Data analysis showed a meaningful inverse correlation between mean scores of quality of life and nutritional attitudes in PCOS. The quality of life score (a proper condition) increases with decreasing nutritional attitude (positive attitude). These findings are partly consistent with those of Turner-McGrievy et al, who showed a significant correlation between high calorie intake, poor quality of life score, and infertility areas (28).

In this study, there was a significant negative (inverse) correlation between mean scores of quality of life and nutritional behaviors in women with PCOS. Otherwise, the quality of life score (an appropriate condition) declines as score of nutritional behavior (inappropriate behavior) rises. Due to a lack of attention to the concept of nutritional behavior and attitude, there are few studies beyond the field of nutritional sciences and their relationships with general medical problems and/or quality of life in cases. Though, some limited researches have addressed their relationships with some medical disorders. It is worth noting that none of these studies have been done on PCOS. Therefore, our research is the first to address the role of nutritional attitudes and behaviors in patients with PCOS, making it unique in this regard. Sedighi et al also detected a significant correlation between poor diet and low physical activity and a lower lifestyle score in women with PCOS (29). Moreover, Schillinger observed improvements in healthy eating habits and lifestyle of women with PCOS who received nutritional skills (30).

The findings of this study indirectly confirm those of the above-mentioned studies.

As noted, there are few studies in this field examining the role of nutrition in the quality of life of patients with PCOS. Moreover, no research was found on the role of nutritional attitudes and behaviors in the quality of life in PCOS women, which could indicate a lack of sufficient attention to nutritional factors and quality of life in these cases. It is obvious that other studies have mostly focused on the quality of life, obesity and high BMI, and the pattern of diet in such patients, ignoring the effective factors, or considering the role of nutritional behavior and attitudes in the findings. However, different individuals with PCOS may also have dissimilar qualities of life due to various nutritional patterns, attitudes, and behaviors, requiring specific training in this context in order to help with proper control of the illness. It is, therefore, recommended that serious attention should be paid to training programs for patients newly diagnosed with PCOS, in addition to changing nutritional patterns, modifying nutritional behaviors and attitudes, and, if necessary, consulting relevant specialists.

Since the present study is solely a descriptive research and has not compared the quality of life of the subjects with the general public, no conclusions can be made whether or not such patients have higher or lower perceptions of their quality of life than the general public. Some PCOS patients refer for the diagnosis and treatment of the disease after infertility or severe hirsutism or in some cases, the illness had occurred long before the symptoms appeared. Accordingly, it was not possible to access to complete and reliable information regarding the disease duration or the complications, accounting for one of the limitations of this study.

Conclusions

PCOS is prevalent in women and the results of this study represented decreased quality of life in all aspects. Additionally, this disease is correlated with many demographic factors along with the effects of the nutritional attitudes and behaviors on the quality of life

in such cases. It is, therefore, recommended that these points should be taken into consideration in promoting the quality of life along with educational planning to improve lifestyle, weight loss, and proper nutritional skills for such patients. Moreover, the wide range of variables affecting the quality of life in women with PCOS in different cultures, races, and individuals as well as the importance of patients' perception about the role of the nutritional attitudes, habits, and behaviors all necessitate further studies.

Conflict of Interests

The authors declare no conflict of interests. This paper was a part of an MSC thesis (No: 55/5/6320).

Ethical Issues

The research was approved by Tabriz University of Medical Sciences, and permission was acquired from the Ethics Committee (TBZMED.REC. 1394.480).

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