

Quality of Life and Its Correlation with Pain and Body Mass Index in Patients with Polycystic Ovary Syndrome: A Cross-Sectional Study

Dr. Seema Sunil Kumar Sharma (PT)¹, Jay Baraiya², Suhani Damodar³, Vaibhav Kalsariya⁴,
Riya Kharva⁵, Prachi Panchal⁶

¹MPT Preventive and Community Health, Assistant Professor, Pioneer Physiotherapy College, Vadodara, Gujarat, India.

Corresponding Author Email: [seemaasharma1514\[at\]gmail.com](mailto:seemaasharma1514[at]gmail.com)

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^{2,3,4,5}Pioneer Physiotherapy College, Vadodara, Gujarat, India

Abstract: **Background:** Polycystic ovary syndrome (PCOS) is a common endocrine and metabolic disorder affecting women of reproductive age. It is associated with reproductive, metabolic, physical, and psychological manifestations that may adversely affect quality of life. Pain and increased body mass index (BMI) may further contribute to the overall burden experienced by women with PCOS. Understanding the relationship between these factors and quality of life may assist in developing comprehensive management strategies. **Aim:** To determine the correlation of quality of life with pain intensity and body mass index in patients with polycystic ovary syndrome. **Methods:** A cross-sectional study was conducted among 150 women diagnosed with PCOS. Participants were recruited using convenience sampling from colleges, clinical settings, and the community. PCOS was diagnosed according to the Rotterdam criteria, with at least two of the three diagnostic components being present. Quality of life was assessed using the Polycystic Ovary Syndrome Questionnaire (PCOSQ), while current pain intensity was assessed using the Numeric Pain Rating Scale (NPRS). Height and weight were measured to calculate BMI. Data were analysed using descriptive statistics. The Shapiro–Wilk test was used to assess the distribution of the data. As the data were non-normally distributed, Spearman rank-order correlation was used to determine the correlation between PCOSQ scores and NPRS scores and between PCOSQ scores and BMI. Statistical significance was set at $p < 0.05$. **Results:** Spearman's rank-order correlation analysis showed a strong negative correlation between PCOSQ scores and pain intensity measured using the NPRS ($r = -0.87$, $p = 0.004$), which was statistically significant ($p < 0.05$). This indicates that higher PCOSQ scores were associated with lower pain intensity. A strong negative correlation was also observed between PCOSQ scores and BMI ($r = -0.91$, $p = 0.008$), which was statistically significant ($p < 0.05$), indicating that higher PCOSQ scores were associated with lower BMI. **Conclusion:** Quality of life was significantly and negatively correlated with BMI in women with PCOS. Although pain intensity showed a negative correlation with quality of life, the relationship did not reach statistical significance. These findings highlight the importance of considering pain and BMI while assessing the overall quality of life of women with PCOS and support a comprehensive, patient-centred approach to management.

Keywords: Polycystic ovary syndrome; Quality of life; Pain; Body mass index; PCOSQ; Numeric Pain Rating Scale; Spearman correlation; Cross-sectional study.

1. Introduction

Polycystic ovary syndrome (PCOS) is a common and heterogeneous endocrine disorder affecting women of reproductive age. It is characterized by a combination of reproductive, endocrine, metabolic and psychological manifestations, including menstrual irregularities, ovulatory dysfunction, hyperandrogenism, obesity and infertility. The clinical presentation and severity of symptoms vary considerably among women, resulting in substantial differences in overall disease burden.^{1,2}

The pathophysiology of PCOS is complex and multifactorial, involving genetic, hormonal and metabolic mechanisms. Genetic studies indicate that PCOS is influenced by multiple genetic pathways rather than a single causative factor.³ Insulin resistance and hyperinsulinemia are also closely related to PCOS and may contribute to androgen excess and reproductive as well as metabolic abnormalities.⁴ Lifestyle and nutritional factors, particularly those related to body weight and metabolic health, are also relevant to the management of PCOS.⁵ Although PCOS may become apparent during adolescence, diagnosis can be challenging

because physiological pubertal changes may overlap with features of the syndrome.⁶

Beyond reproductive and metabolic manifestations, PCOS can adversely affect psychological well-being and health-related quality of life (HRQoL). Women with PCOS have been reported to experience greater anxiety and depressive symptoms, together with poorer quality of life, highlighting the importance of considering psychological and patient-reported outcomes in PCOS management.^{7,8} Indian studies have similarly demonstrated considerable impairment in quality of life. Studies from Mumbai and South India have identified infertility, obesity, psychological factors and social concerns among factors influencing HRQoL in women with PCOS.^{9,10} A recent study from Kolkata also reported impairment across multiple quality-of-life domains, with psychological well-being being particularly affected.¹¹

Pain is an additional symptom that may contribute to the overall burden of PCOS but has received comparatively less attention than reproductive, metabolic and psychological manifestations. Women with PCOS may experience dysmenorrhea and pelvic or other bodily pain, and a review of the available evidence reported greater pain perception

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among women with PCOS, with obesity, infertility, inflammation, adipokine dysregulation and insulin resistance proposed as possible contributing factors.¹² A recent scoping review further highlighted the limited evidence concerning chronic pain in PCOS and emphasized the need for further research examining the relationship between pain and quality of life.¹³

The Polycystic Ovary Syndrome Questionnaire (PCOSQ) is a disease-specific patient-reported outcome measure designed to assess the impact of PCOS on quality of life across important domains including emotional problems, body hair, weight, infertility and menstrual problems.⁹ Assessment of quality of life together with pain intensity may therefore provide a broader understanding of the patient-experienced burden of PCOS. However, evidence directly examining the relationship between quantitative pain intensity, body mass index (BMI), and PCOS-specific quality of life remains limited, particularly in Indian women with PCOS.

Therefore, the present study, entitled “Quality of Life and Its Correlation with Pain and Body Mass Index in Patients with Polycystic Ovary Syndrome: A Cross-Sectional Study,” aimed to assess quality of life using the PCOSQ and pain intensity using the Numeric Pain Rating Scale (NPRS), and to determine the correlation of quality of life with pain intensity and BMI among women with PCOS. Understanding these relationships may contribute to a more comprehensive, patient-centred assessment of women with PCOS.

2. Method

Study Design

A cross-sectional study design was used to determine the correlation between quality of life, pain intensity, and body mass index (BMI) among women with polycystic ovary syndrome (PCOS).

Study Participants

The study included 150 women diagnosed with PCOS. Participants were recruited from different colleges, clinical settings, and the community using convenience sampling.

Study Setting

The study was conducted among women with PCOS recruited from college settings, clinical settings, and the community in Vadodara, Gujarat.

Sample Size

A total of 150 participants were included in the study.

Sampling Technique

Convenience sampling was used for participant recruitment.

Inclusion Criteria

- Women aged 18–44 years⁹ with PCOS diagnosed by Rotterdam criteria.¹⁴
- Willing to participate and provide written informed consent.
- Able to understand and follow study instructions.

Exclusion Criteria

- Gynaecological conditions other than PCOS.
- Significant musculoskeletal, neurological, cardiovascular, or respiratory conditions.
- Conditions preventing completion of outcome measures.
- Other medical conditions affecting study outcomes.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethical Committee before commencement of the study. The purpose and procedure of the study were explained to all eligible participants. Written informed consent was obtained from each participant before data collection. Participants were informed that their participation was voluntary and that their information would be kept confidential.

Diagnostic Criteria

PCOS was diagnosed according to the Rotterdam criteria. A diagnosis of PCOS was considered when at least two of the three Rotterdam diagnostic components were present, after appropriate clinical evaluation.

Outcome Measures

The primary outcome measure used to assess quality of life was the Polycystic Ovary Syndrome Questionnaire (PCOSQ). Pain intensity was assessed using the Numeric Pain Rating Scale (NPRS). Body mass index was calculated using measured height and body weight.

Polycystic Ovary Syndrome Questionnaire (PCOSQ)¹⁵

The Polycystic Ovary Syndrome Questionnaire (PCOSQ) is a disease-specific questionnaire designed to assess health-related quality of life in women with PCOS. The questionnaire consists of 26 items distributed across five domains: emotional problems, body hair, weight, infertility problems, and menstrual problems. Each item is scored using a 7-point Likert scale. Higher scores indicate better quality of life. The questionnaire generally requires approximately 10–15 minutes to complete.

Numeric Pain Rating Scale (NPRS)¹⁶

Pain intensity was assessed using the Numeric Pain Rating Scale. The NPRS is an 11-point numerical scale ranging from 0 to 10, where 0 represents no pain and 10 represents the worst possible pain. Participants were asked to report their current pain intensity by selecting the number that best represented their perceived pain.

Anthropometric Assessment

Height and body weight were measured for each participant. Height was recorded in metres and weight was recorded in kilograms. Body mass index was calculated using the following formula:

$$\text{BMI} = \text{Weight (kg)} / \text{Height}^2 (\text{m}^2)$$

Procedure

After obtaining ethical approval and written informed consent, eligible participants were screened according to the inclusion and exclusion criteria. Demographic and relevant clinical information was collected from each participant.

Height and body weight were measured using standard anthropometric procedures, and BMI was calculated. Quality of life was assessed using the PCOSQ. Participants were then asked to report their current pain intensity using the NPRS.

All collected data were recorded systematically and subsequently entered into Microsoft Excel for statistical analysis.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using statistical software. The Shapiro–Wilk test was used to assess the normality of the data distribution. The data were found to be non-normally distributed; therefore, non-parametric statistical analysis was performed.

Spearman's rank-order correlation test was used to determine the correlation between PCOSQ scores and NPRS scores and between PCOSQ scores and BMI. The correlation coefficient (r) and corresponding p -value were reported. A p -value of less than 0.05 was considered statistically significant.

3. Result

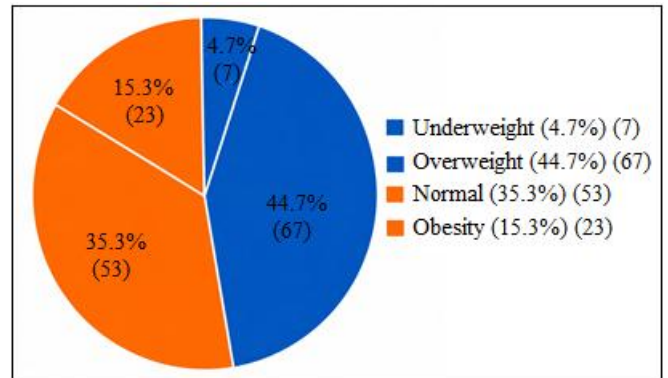
Table 1.1: Anthropometric and Lifestyle Characteristics of Participants

Variable	Minimum	Maximum
Age (year)	18	43
Height (cm)	149	170
Weight (kg)	35	91
BMI (kg/m ²)	15.4	36.02
WHR (ratio)	0.41	0.95
Sleep duration (hr/day)	5	10

Interpretation: The study included 150 participants. The age of the participants ranged from 18 to 43 years. The height ranged from 149 to 170 cm, while the body weight ranged from 35 to 91 kg. The BMI ranged from 15.40 to 36.02 kg/m². The waist-to-hip ratio (WHR) ranged from 0.41 to 0.95, while the sleep duration ranged from 5 to 10 hours per day.

Table 1.2: Distribution according to BMI Category

BMI category	Frequency (n)	Percentage (%)
Underweight (<18.5)	7	4.7
Normal (18.5-24.9)	53	35.3
Overweight (25.0-29.9)	67	44.7
Obesity (≥ 30)	23	15.3
Total	150	100



Interpretation: The table shows the distribution of participants according to BMI category. Among the participants, 7 (4.7%) were underweight, 53 (35.3%) had normal BMI, 67 (44.7%) were overweight, and 23 (15.3%) were obese. The highest proportion of participants belonged to the overweight category.

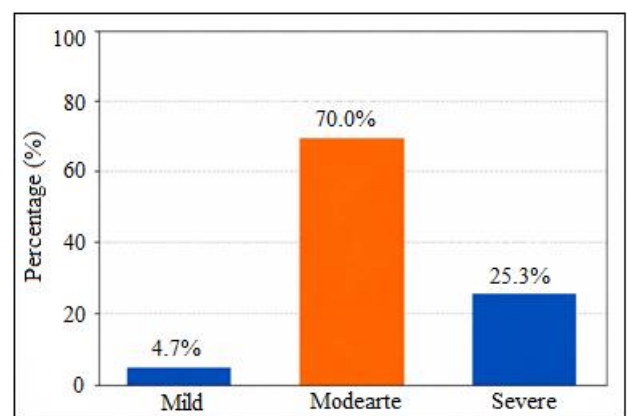


Table 1.3: Distribution according to NPRS pain severity

Pain severity	Frequency (n)	Percentage (%)
Mild	7	4.7
Moderate	105	70
Severe	38	25.3
Total	150	100

Interpretation: The table shows the distribution of participants according to pain severity measured using the Numerical Pain Rating Scale (NPRS). Among the participants, 7 (4.7%) experienced mild pain, 105 (70.0%) experienced moderate pain, and 38 (25.3%) experienced severe pain. The majority of participants experienced moderate pain.

Table 1.4: Descriptive statistics of PCOSQ

PCOSQ	Mean	S.D	Minimum	Maximum
	107.88	25.61	25	167

Interpretation: The table shows the descriptive statistics of PCOSQ scores among the study participants. The mean PCOSQ score was 107.88 ± 25.61 , with scores ranging from a minimum of 25 to a maximum of 167.

Table 1.5: Descriptive statistics of NPRS

NPRS	Mean	S.D	Minimum	Maximum
	5.83	1.15	2	9

Interpretation: The table shows the descriptive statistics of NPRS scores among the study participants. The mean NPRS score was 5.83 ± 1.15 , with scores ranging from a minimum of 2 to a maximum of 9.

Table 1.6: Spearman's Correlation (PCOSQ vs NPRS)

Variable	Correlation coefficient (r)	p-value
PCOSQ vs NPRS	-0.87	0.004*

($p < 0.05$)

Interpretation: There was a strong negative correlation between PCOSQ score and NPRS pain severity ($r = -0.87$). The correlation was statistically significant ($p = 0.004$, $p < 0.05$), indicating that higher PCOSQ scores were associated with slightly lower NPRS pain severity.

Table 1.7: Spearman's Correlation (PCOSQ vs BMI)

Variable	Correlation coefficient (r)	p-value
PCOSQ vs BMI	-0.91	0.008*

($p < 0.05$)

Interpretation: There was a strong negative correlation between PCOSQ score and BMI ($r = -0.91$). The correlation was statistically significant ($p = 0.008$, $p < 0.05$), indicating that higher PCOSQ scores were associated with slightly lower BMI.

4. Discussion

The present cross-sectional study was conducted to determine the correlation of quality of life with pain intensity and body mass index (BMI) in women with polycystic ovary syndrome (PCOS). PCOS is a heterogeneous endocrine and metabolic disorder that can affect reproductive, physical, metabolic and psychological health, thereby influencing overall quality of life. The 2023 International Evidence-Based Guideline for PCOS emphasizes that quality of life and emotional well-being are important components of PCOS management in addition to reproductive and metabolic outcomes.¹⁴ In the present study, the PCOS-specific quality-of-life questionnaire (PCOSQ) was used to assess the impact of PCOS-related symptoms on quality of life, with higher PCOSQ scores indicating better quality of life. The findings demonstrated significant inverse correlations between PCOSQ and both pain intensity and BMI, indicating that greater pain intensity and higher BMI were associated with poorer quality of life among women with PCOS.

A statistically significant strong negative correlation was observed between PCOSQ and pain intensity measured using the Numerical Pain Rating Scale (NPRS) ($r = -0.87$, $p = 0.004$). This finding indicates that women reporting higher pain intensity tended to have lower PCOSQ scores, reflecting poorer quality of life, whereas women with lower pain intensity tended to have higher PCOSQ scores. The negative direction of the correlation is clinically meaningful because pain can interfere with physical activity, daily functioning, emotional well-being and participation in social and personal activities. Previous literature has also recognized pain as an important but relatively underexplored symptom in women with PCOS. Sacca et al. reported that the relationship between PCOS and chronic pain and its

effect on quality of life requires further investigation, particularly because PCOS involves multiple interconnected symptoms and clinical manifestations.¹³ The present finding therefore supports the importance of assessing pain as part of the clinical evaluation of women with PCOS rather than focusing only on reproductive or metabolic characteristics.

strong Negative correlation between PCOSQ and NPRS may also be related to the multidimensional effect of pain on quality of life. Persistent or recurrent pain may contribute to limitations in physical activity and may negatively influence emotional well-being and general daily functioning. Since the PCOSQ assesses several domains affected by PCOS, including emotional problems, weight concerns, infertility problems, menstrual problems and body-hair-related concerns, pain may influence quality of life through its interaction with these different aspects of the condition. Although the NPRS primarily measures pain intensity, the strong correlation observed in the present study suggests that pain severity was an important factor associated with perceived quality of life in this sample. However, the cross-sectional nature of the study does not establish that pain directly causes poorer quality of life; it demonstrates a significant relationship between the two variables. Further studies using detailed assessment of pain duration, location, frequency and interference with activities may provide a more comprehensive understanding of this relationship¹³.

The present study also demonstrated a statistically significant strong negative correlation between PCOSQ and BMI ($r = -0.91$, $p = 0.008$). This finding indicates that women with higher BMI tended to have lower PCOSQ scores and consequently poorer quality of life, whereas women with lower BMI tended to report better quality of life. Increased body weight is commonly encountered in PCOS and may be accompanied by metabolic abnormalities, reduced physical activity, body-image concerns and psychological distress, all of which may influence quality of life. The international PCOS guideline recognizes the importance of metabolic health, healthy lifestyle, quality of life and consideration of weight-related concerns in PCOS management¹⁷. Previous systematic reviews have also identified weight-related concerns as an important contributor to reduced health-related quality of life in women with PCOS¹⁸. Therefore, a significant negative correlation found in the present study supports the relevance of BMI when considering the overall quality of life of women with PCOS.

The relationship between BMI and quality of life may involve both physical and psychosocial factors. Higher BMI may be associated with reduced physical functioning and difficulty in maintaining regular physical activity, while concerns related to body image and weight may negatively influence emotional and social well-being. Quality of life in PCOS is therefore not determined by a single clinical symptom but reflects the combined effects of multiple physical, reproductive and psychosocial manifestations. Previous research has consistently demonstrated that PCOS can negatively affect different aspects of quality of life and that disease-specific instruments such as the PCOSQ are useful for identifying these effects¹⁵. The Negative correlation observed in the present study highlights the

importance of addressing body weight and related lifestyle factors as part of comprehensive PCOS management. Nevertheless, BMI should not be considered in isolation, and management should focus on overall health, physical activity, metabolic risk and individual patient needs rather than weight alone.

From a physiotherapy perspective, the findings have clinical relevance because both pain and BMI were significantly correlated with quality of life in the present study. Physiotherapists can contribute to the multidisciplinary management of women with PCOS through individualized exercise prescription, physical-activity promotion, functional training, pain-management strategies and lifestyle education. Regular physical activity and exercise are important components of PCOS management and may provide benefits for metabolic health, physical function and quality of life¹⁷. Exercise-based interventions may also support healthy body composition and improve psychological well-being. Therefore, assessment and management of women with PCOS should consider not only menstrual and reproductive symptoms but also pain, body composition, physical activity and quality of life. A patient-centred approach may help address the different factors contributing to the individual's symptom burden and functional limitations.

Overall, the present study demonstrated a statistically significant Negative correlation between quality of life and pain intensity (PCOSQ vs NPRS: $r = -0.87$, $p = 0.004$) and between quality of life and BMI (PCOSQ vs BMI: $r = -0.91$, $p = 0.008$). These findings indicate that higher pain intensity and higher BMI were associated with lower PCOSQ scores and poorer quality of life in women with PCOS. The findings emphasize the importance of a comprehensive and patient-centred approach that considers pain, body composition, physical activity and quality of life alongside the reproductive and metabolic manifestations of PCOS.

Future studies with larger samples, longitudinal designs and multidimensional assessment of pain and lifestyle factors are recommended to further clarify these relationships and determine whether improvements in pain and body composition are accompanied by improvements in quality of life.

5. Conclusion

The present study concluded that quality of life in women with PCOS was significantly correlated with pain, BMI and physical activity. Higher pain intensity and BMI were correlated with poorer quality of life. A significant Negative Correlation was also found between Body mass index and quality of life. These findings highlight the importance of a comprehensive and patient-centred approach in the management of women with PCOS.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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