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Health-related quality of life (HRQoL) and associated factors among women with polycystic ovary syndrome (PCOS) attending an infertility center in Nepal: a cross-sectional study

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Abstract

Background Polycystic ovary syndrome (PCOS) significantly impairs women's health-related quality of life (HRQoL), yet evidence from Nepal remains limited. This study aimed to assess HRQoL and associated factors among women with PCOS attending an infertility center in Kathmandu, Nepal.

Methods A hospital-based cross-sectional study was conducted from March to September 2023 among 135 women aged 18–45 years diagnosed with PCOS, selected through simple random sampling. Data were collected through face-to-face interviews using validated instruments: the Polycystic Ovary Syndrome Questionnaire (PCOSQ), the International Physical Activity Questionnaire-Short Form (IPAQ-SF), and the Perceived Stress Scale (PSS-4). Statistical analyses included descriptive statistics, bivariate analyses, and multiple linear regression to identify the factors associated with HRQoL.

Results The mean overall HRQoL score was 5.04 ± 1.44 on a 7-point scale, with the lowest domain scores observed for infertility (3.34 ± 1.72), emotional well-being (4.29 ± 0.97), and menstruation (4.32 ± 1.13) domains, while the body hair domain was least affected (8.58 ± 1.86). In adjusted regression, younger age, marital status, higher BMI, acne, menstrual irregularities, fertility-related history, physical inactivity, substance use, and high stress were significantly associated with poorer HRQoL ($p < 0.05$).

Conclusion Women with PCOS in Nepal experience significant impairment in HRQoL, most notably in relation to infertility, emotional well-being, and menstrual irregularities. Both modifiable and non-modifiable factors were associated with poorer HRQoL. These findings highlight the need for a holistic, patient-centered approach that integrates medical, psychological, and lifestyle interventions, particularly in resource-limited settings.

Keywords Associated factors, Health-related quality of life, Infertility center, Polycystic ovary syndrome, Women

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Background

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder affecting women of reproductive age, with a global prevalence estimated between 6% and 13%, depending on the diagnostic criteria [1, 2]. It is characterized by a spectrum of reproductive, metabolic, and psychological manifestations. Reproductive concerns include menstrual irregularities, infertility, and pregnancy complications, while metabolic comorbidities encompass insulin resistance, type 2 diabetes mellitus, hypertension, and dyslipidemia [3]. In addition, women with PCOS frequently experience dermatological symptoms such as acne, alopecia, and hirsutism, along with weight gain and obesity. These features not only compromise physical health but also affect self-esteem, social relationships, and overall well-being [4].

The multifaceted presentation of PCOS significantly impacts health-related quality of life (HRQoL), which reflects an individual's perception of how health conditions influence daily functioning, emotional state, and social interactions. Research has consistently demonstrated that women with PCOS report lower HRQoL compared to women without the condition, particularly in domains related to emotional well-being, body image, infertility, and menstrual problems [5, 6]. These impairments extend beyond physical symptoms, highlighting the need for multidimensional assessments of outcomes in PCOS.

While clinical manifestations are central to disease burden, sociodemographic, lifestyle, and psychosocial factors have emerged as important determinants of HRQoL in PCOS. Younger women and those who are married often report poorer HRQoL due to greater concerns about infertility and reproductive expectations [7]. Similarly, elevated body mass index (BMI) has been strongly associated with reduced HRQoL, as excess weight may exacerbate both metabolic risk and body image dissatisfaction [8]. Lifestyle behaviors, particularly physical activity, also play a key role. Evidence suggests that regular physical activity not only improves metabolic health but also enhances psychosocial resilience, while physical inactivity is linked to lower HRQoL [9]. Conversely, women with PCOS often report higher perceived stress, which aggravates psychological distress and reproductive health, consistent with the Transactional Model of Stress and Coping, where stress appraisal contributes to impaired quality of life [7, 8]. These findings underscore the importance of adopting a biopsychosocial framework in studying HRQoL in women with PCOS.

Despite a growing body of international evidence, research on PCOS-related HRQoL remains limited in low-and middle-income countries (LMICs), where outcomes may be further shaped by cultural, economic, and healthcare access barriers. In South Asian societies, infertility and reproductive health concerns are

often compounded by stigma and social taboos, creating additional emotional and social burdens for affected women [10]. In Nepal, a study among medical students reported a PCOS prevalence of 9.18% [11], suggesting that the disorder is relatively common. However, systematic assessments of HRQoL in Nepali women with PCOS are lacking. Given the sociocultural emphasis on fertility and motherhood, women with PCOS in Nepal may experience unique challenges not fully captured in existing global literature.

Addressing this gap is essential for informing clinical care and developing culturally appropriate interventions. Therefore, this study aimed to assess HRQoL and its associated factors among women with PCOS attending an infertility center in Nepal. Findings from this study are expected to enrich the limited evidence from South Asia and guide the integration of medical, psychological, and lifestyle support into PCOS management, particularly in resource-constrained settings.

Methods

Study design, site and participant

A hospital-based cross-sectional study was conducted at an infertility center located in Bijulibazar, Kathmandu, over a six-month period from March to September 2023. Infertility center is one of the institution for the treatment of PCOS and infertility under the supervision of qualified doctors. Women of reproductive age (18–45 years) visiting the center, diagnosed with PCOS based on the Rotterdam's 2003 criteria [12] and willing to provide consent were included in the study. The reporting of the study was performed based on Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [13].

Sample size and sampling technique

Cochran's formula $n = \frac{z^2 \times p \times q}{d^2}$ was used to calculate the required sample size at a 95% confidence interval and 5% margin of error. Prevalence of PCOS in Nepal was taken to be 9.18% as a reference from a previous study conducted in 2020 [11]. Considering this, an initial sample size of 123 was obtained, which after adjusting for 10% non-response rate, was optimized to 135. Participants were selected using a simple random sampling technique. Each day, a list of eligible women visiting the infertility center's outpatient department was prepared, and a computer-generated random number table was used to randomly select participants from this list until the daily recruitment target was met.

Data collection

Data were collected through face-to-face, interviewer-administered questionnaires using a semi-structured

format. Standard validated tools, described below, were used to measure the dependent and independent variables. The questionnaire was initially developed in English in consultation with a gynecologist and clinical pharmacy experts, incorporating both self-constructed and standardized instruments. It was then translated into Nepali and back translated to ensure accuracy. In-person interviews were conducted in Nepali by trained undergraduate pharmacy students, who received one day of in-depth training on the study objectives and procedures. A pretest of the questionnaire was conducted with 14 women with PCOS in a similar setting. The internal consistency of the tool, assessed using Cronbach's alpha coefficient, was 0.91, indicating good reliability [14].

Measures

Outcome variable: health related quality of life

Health related quality of life was measured using the 26-item Polycystic Ovary Syndrome Questionnaire (PCOSQ) [15]. The PCOSQ is a validated tool containing the five domains: emotions (8 items), body hair (5 items), body weight (5 items), infertility (4 items), and menstrual disorders (4 items). A Likert scale with 7 options ranging from 1 (always) to 7 (never) was used to answer the questionnaire, where higher scores indicate better function.

Explanatory variables

Explanatory variables included women's age; education level (unable to read and write, primary, secondary, higher, and bachelor's degree); marital status (never married or ever married—married, separated, divorced, or widowed); occupation (business, homemaker, professional, agriculture, or student); residence (urban or rural); self-reported economic status (low, moderate, or high); family history of disease (yes/no); duration of PCOS (≤ 3 years or > 3 years); acne status (chronic, occasional breakouts, or no noticeable change); menstrual pattern (regular, irregular, or delayed/late); age at menarche (≤ 12 years or > 12 years); substance abuse history (ever consumed alcohol or smoked); and family history of type II diabetes (yes/no).

Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m^2). BMI categories were classified according to the World Health Organization (WHO) guidelines: underweight ($\text{BMI} < 18.5 \text{ kg}/\text{m}^2$), normal weight ($\text{BMI} 18.5\text{--}24.9 \text{ kg}/\text{m}^2$), overweight ($\text{BMI} 25.0\text{--}29.9 \text{ kg}/\text{m}^2$), and obese ($\text{BMI} 30.0\text{--}34.9 \text{ kg}/\text{m}^2$) [16].

Physical activity levels were assessed using the International Physical Activity Questionnaire—Short Form (IPAQ-SF) [17]. The IPAQ-SF captures three domains of physical activity: walking, moderate-intensity activity, and vigorous-intensity activity. For each domain, participants reported both the frequency (number of days per

week) and the duration (minutes per day) of engagement. Standardized metabolic equivalent of task (MET) values were applied: 3.3 METs for walking, 4.0 METs for moderate-intensity activity, and 8.0 METs for vigorous-intensity activity. The weekly energy expenditure (Met-minutes/week) for each activity type was calculated using the formula: $\text{MET value} \times \text{minutes per day} \times \text{days per week}$. The total physical activity score was derived by summing the Met-minutes/week across all domains. Based on total scores, participants were categorized into three levels of physical activity: low, moderate, and high.

Stress level was measured using the short version of the Perceived Stress Scale (PSS-4) tool [18]. The PSS-4 questionnaire comprises 4 items that assess participants' feelings and thoughts related to stress over the past month, using a 5-point Likert response scale (0 = never to 4 = very often). Items 2 and 3 are reverse scored, and the scores for the four items are summed to obtain the total PSS-4 score, which ranged between 0 and 16, with higher scores indicating higher perceived stress. Based on the total scores, stress levels were categorized as low (0–5), moderate (6–10), and high (11–16). The PSS-4 has been widely used and validated across different populations.

Statistical analysis

Data were entered using EpiData version 3.0 and analyzed with SAS software version 9.4 (SAS Institute, Cary, NC). Normality of continuous variables was assessed using the Shapiro-Wilk test. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were computed. Differences in HRQoL scores across participant characteristics were assessed using independent sample t-tests or ANOVA, as appropriate. Multiple linear regression analyses, both unadjusted and adjusted, were conducted to identify factors associated with HRQoL. Multicollinearity was evaluated using the Variance Inflation Factor (VIF), with all variables in the model showing a VIF of less than 2, indicating no concerns regarding multicollinearity. A Pearson correlation matrix was computed to assess the relationships between the overall HRQoL score and its five domains: emotions, body hair, body weight, infertility, and menstrual disorders. Statistical significance was set at a p-value of < 0.05 .

Ethical considerations

Ethical approval was obtained from the Institutional Review Committee of CiST [IRC-CiST, Ref no. 66/079/080], and permission for data collection permission was granted by the Infertility Center at Bijulibazar, Kathmandu. Written informed consent was obtained from all participants prior to data collection. For participants who were unable to read or write, the consent form was read aloud in the Nepali in the presence of an impartial witness, who then signed the form; participants

provided consent by affixing a thumbprint. Participants were clearly informed about the voluntary nature of their participation, the confidentiality of their responses, and their right to withdraw from the study at any stage without any consequences. To uphold anonymity, each participant was assigned a unique identification code, and all identifiable information was securely stored separately from the main dataset.

Results

Table 1 presents the socio-clinical characteristics of the 135 women with PCOS and their bivariate associations with HRQoL. Most participants were aged 26–35 years (65.2%), ever married (77.0%), and residing in urban area (68.2%). More than half were engaged in professional work (58.5%). Regarding education, 42.2% had completed higher secondary education, while 38.5% held a bachelor's degree or higher.

Most women reported no family history of PCOS (87.4%) and type II diabetes (82.2%). With respect to BMI, 44.4% fell in the overweight category (25–29.9 kg/m²), while 36.3% had normal BMI (19–24.5 kg/m²). Approximately half of the participants (51.1%) reported a moderate economic status, followed by 32.7% with a high economic status. Only a minority reported substance use, including smoking (12.5%) and alcohol consumption (18.5%).

Menstrual irregularities were reported by 70.4% of participants, while 48.1% experienced occasional acne breakouts. Additionally, 63.7% had menarche at or before 12 years of age, 52.6% had a history of difficulty conceiving, and 70.8% had a diagnosis of PCOS within the past three years.

Low levels of physical activity were reported by 66.7% of the participants. Stress levels were high, with 41.5% reporting moderate stress and 37.8% reporting high stress.

Bivariate analyses revealed statistically significant associations between HRQoL and several factors, including age, marital status, family history of PCOS, BMI, menstrual patterns, acne type, fertility-related history, duration of PCOS, physical activity, substance use, and stress levels. However, no statistically significant associations were found with occupation, educational background, residential area, self-reported economic status, age at menarche, or family history of type II diabetes mellitus.

Table 2 presents the domain-specific health-related quality of life (HRQoL) scores among the women with PCOS. The mean overall domain scores revealed the lowest functioning in infertility (3.34 ± 1.72), followed by emotions (4.29 ± 0.97), menstrual problems (4.32 ± 1.13), and body weight (4.68 ± 1.52), while the body hair domain (8.58 ± 1.86) reflected comparatively fewer concerns.

In the emotional domain, 26.7% of women reported feeling depressed, most of the time, while 24.4% patients felt tired hardly any of the time and reported being moody only a little of the time. Notably, 32.6% experienced no low self-esteem, and 62.2% were not frightened of developing cancer. On the other hand, 51.9% were worried about PCOS most of the time, 25.9% felt self-conscious some of the time, and almost 50.0% experienced late menstrual periods most of the time, though only 2.2% reported this problem some of the time.

The body weight domain showed mixed perceptions. While 26.7% of women were concerned about being overweight a little of the time and 26.7% reported difficulty maintaining ideal weight, nearly two-third (65.2%) did not feel less attractive due to overweight, and 28.1% reported no frustration in trying to lose weight.

In the infertility domain, 40.7% of women reported persistent concern about infertility, 31.1% feared not being able to have children, and 44.4% felt sadness related to infertility problems most of the time. These findings highlight infertility as the most distressing aspect of HRQoL in this cohort.

Regarding the body hair domain, most women (≥ 59%) reported no or minimal problems with visible hair on chin, upper lips, or face, nor embarrassment due to excessive body hair. Only a small minority (< 1%) reported severe concerns, suggesting that hirsutism had less impact compared to other domains in this population.

The menstrual problem domain reflected that, nearly 59% reported irregular menstruation as a major or severe problem, while 31.1% experienced moderate menstrual cramps. In contrast, 51.9% reported no problems with headache and 45.2% had no issues with abdominal bloating, indicating heterogeneity in menstrual-related symptoms.

Table 3 presents the Pearson correlation matrix between the overall HRQoL score and its domains. All domains demonstrated statistically significant positive correlations with overall HRQoL ($p < 0.01$). The strongest correlations were observed with emotions ($r = 0.910$), infertility ($r = 0.890$), body weight ($r = 0.850$), and menstrual problems ($r = 0.820$), while body hair showed a slightly weaker but still significant correlation ($r = 0.770$).

Table 4 presents the results of unadjusted and adjusted linear regression analyses. In the adjusted model, younger women aged 18–25 years ($\beta = 1.64$; 95% CI: 0.42–3.97; $p < 0.01$) and 26–35 years ($\beta = 1.12$; 95% CI: 0.28–3.06; $p < 0.05$) had significantly lower HRQoL compared to those aged 36–45 years. Ever married women ($\beta = 0.85$; 95% CI: 0.25–2.55; $p < 0.05$) also reported poorer HRQoL than never married women.

A BMI above 26 ($\beta = 3.21$; 95% CI: 0.85–3.75; $p < 0.01$) and a fertility-related medical history ($\beta = 2.68$; 95% CI: 1.61–3.45; $p < 0.01$) were significantly associated

Table 1 Baseline characteristics of women with PCOS and bivariate analyses by HRQoL

Characteristics	Total	Health related quality of life score		p-value
	n (%)	Mean	SD	
Overall	135(100)	5.04	1.44	
Age (Yrs)				0.021 ^a
18–25	37 (27.4)	4.85	1.52	
26–35	88 (65.2)	5.10	1.38	
36–45	10 (7.4)	4.45	1.70	
Occupation				0.567
Home maker	41 (30.4)	4.90	1.35	
Working Professional	79(58.5)	5.81	1.23	
Students	15(11.1)	4.80	1.60	
Education				0.678
Unable to read and write	3 (2.2)	4.50	1.70	
Primary education	9 (6.7)	4.90	1.50	
Secondary education	14 (10.4)	5.10	1.40	
Higher secondary education	57 (42.2)	5.05	1.40	
Bachelor's and above	52 (38.5)	5.15	1.35	
Marital Status				0.040 ^b
Ever Married	104 (77.0)	4.85	1.60	
Never married	31 (23.0)	5.08	1.42	
Residence				
Urban	92(68.2)	5.05	1.43	0.981
Rural	43 (31.8)	5.02	1.50	
Family history				0.024 ^b
Yes	17 (12.6)	4.90	1.50	
No	118 (87.4)	5.10	1.40	
Family history of type II diabetes				
Yes	24 (17.8)	4.90	1.55	0.778
No	111(82.2)	5.10	1.40	
BMI				0.001 ^a
≤ 18.5	3 (2.2)	4.90	1.60	
19–24.5	49 (36.3)	5.15	1.35	
25–29.9	60 (44.4)	4.98	1.40	
> 30	23 (17.0)	4.80	1.55	
Self-reported economic status				0.774
Low	22 (16.2)	4.90	1.55	
Moderate	69 (51.1)	5.05	1.40	
High	44 (32.7)	5.10	1.38	
Substance use				0.012 ^b
Smoking	17 (12.5)	5.10	1.50	
Alcohol	25 (18.51)	5.00	1.43	
Menstrual pattern				0.002 ^a
Regular	23 (17.0)	5.15	1.30	
Irregular	95 (70.4)	5.00	1.45	
Delayed/Late	17 (12.6)	4.75	1.60	
Acne				0.018 ^a
Chronic acne	31 (23.0)	4.80	1.50	
Occasional breakouts	65 (48.1)	5.10	1.38	
No noticeable change in acne	39 (28.9)	5.15	1.43	
Age at menarche				0.213
≤ 12	86 (63.7)	5.10	1.40	
> 12	49 (36.3)	5.00	1.45	
Fertility related history				

Table 1 (continued)

Characteristics	Total	Health related quality of life score		p-value
	n (%)	Mean	SD	
Difficulty getting pregnant	71 (52.6)	4.70	1.40	< 0.001 ^a
Multiple miscarriages	10 (7.4)	4.60	1.70	
History of infertility treatment	10 (7.4)	4.70	1.60	
Not any	44 (32.6)	5.15	1.40	
Duration of PCOS (Yrs)				
≤ 3	95 (70.8)	5.05	1.40	0.041 ^b
> 3	40 (29.2)	4.90	1.50	
Physical activity				
Low	90(67.3)	4.95	1.45	0.003 ^a
Moderate	34 (25.3)	5.10	1.35	
High	11 (8.4)	5.20	1.25	
Stress level				
Low	28 (20.7)	5.20	1.30	0.004 ^a
Moderate	56 (41.5)	5.10	1.40	
High	51 (37.8)	4.85	1.50	

Note: a: One way ANOVA; b: independent t-test; BMI; body mass index of respondents

with reduced HRQoL. Acne was another predictor, with both occasional breakouts ($\beta = 0.92$; 95% CI: 0.28–1.98; $p < 0.05$) and chronic acne ($\beta = 1.15$; 95% CI: 0.42–2.10; $p < 0.01$) linked to lower HRQoL. Menstrual irregularities ($\beta = 1.98$; 95% CI: 1.14–2.82; $p < 0.01$) and delayed menstruation ($\beta = 1.15$; 95% CI: 0.30–2.90; $p < 0.05$) were also significant determinants.

Individuals who were physically inactive ($\beta = 2.52$; 95% CI: 0.60–2.92; $p < 0.01$) or moderately active ($\beta = 2.05$; 95% CI: 0.75–2.65; $p < 0.05$), reported poorer HRQoL compared to those engaging in vigorous activity. Likewise, smokers ($\beta = 1.25$; 95% CI: 0.85–2.90; $p < 0.05$) and alcohol consumers ($\beta = 1.15$; 95% CI: 0.70–3.80; $p < 0.05$) had lower HRQoL compared to non-users. Furthermore, stress level was strongly associated, with those reporting moderate stress ($\beta = 1.25$; 95% CI: 0.35–2.80; $p < 0.05$) and high stress ($\beta = 1.80$; 95% CI: 0.48–2.90; $p < 0.01$) being significantly more likely to experience poorer HRQoL.

Discussion

PCOS is widely recognized for its detrimental impact on women's health-related quality of life (HRQoL). This study assessed HRQoL and associated factors among women with PCOS attending an infertility center in Nepal. The findings revealed reduced HRQoL among the participants, with the greatest impairments in the domains of emotions, infertility, menstrual irregularities, and body weight. Multiple socio-clinical factors, including age, marital status, body mass index (BMI), fertility-related history, acne, menstrual patterns, physical activity, substance use, and perceived stress, were significantly associated with HRQoL.

A study in Iran reported mean HRQoL domain scores of infertility (3.43 ± 1.63), emotions (3.55 ± 1.17),

menstrual problems (3.77 ± 1.36), body hair (3.80 ± 2.05) and weight (4.32 ± 1.80) [19]. These findings align with the global evidence highlighting the profound psychological and social implications of PCOS, extending beyond its well-documented metabolic and reproductive effects [3, 20]. Conversely, a study from Saudi Arabia found that concerns related to body weight had the greatest impact on quality of life, while other domains showed no significant associations [21].

The emotional domain showed the strongest positive correlation with overall HRQoL, underscoring the substantial psychological distress associated with PCOS. Nearly half of the participants reported symptoms such as depression, fatigue, low self-esteem, anxiety, and delayed menstrual periods, consistent with established evidence linking PCOS with mental health disorders [22, 23]. In addition, longer duration of PCOS and higher stress levels were significantly associated with reduced HRQoL in the study, align with studies indicating that prolonged disease exposure increases cumulative psychosocial burden, while elevated stress aggravates hormonal imbalance and symptom severity, contributing to higher rates of depression and anxiety in women with PCOS [7, 19, 24]. This pattern is concerning in Nepal, where mental health services remain underutilized due to stigma and limited accessibility [25]. Integrating routine psychological screening and counseling into PCOS management is therefore recommended, with early identification and referral to appropriate mental health services to mitigate long-term psychological burden.

Infertility and menstrual problems were other major contributors to reduced HRQoL with many reporting distress over potential childlessness and a perceived lack of control. Women's age, marital status, and

Table 2 HRQoL domains of women with polycystic ovarian syndrome (n=135)

Domains	All the time	Most of the time	A good bit of the time	Some of the time	A little of the time	Hardly any of the time	None of the time
Emotion's domain							
Depressed due to PCOS	10 (7.4)	36 (26.7)	6 (4.4)	36 (26.7)	24 (17.8)	13 (9.6)	10 (7.4)
Easily tired	9 (6.7)	22 (16.3)	5 (3.7)	24 (17.8)	27 (20.0)	33 (24.4)	15 (11.1)
Moody	4 (3.0)	14 (10.4)	6 (4.4)	26 (19.3)	33 (24.4)	21 (15.6)	31 (23.0)
Low self esteem	3 (2.2)	10 (7.4)	5 (3.7)	25 (18.5)	23 (17.0)	25 (18.5)	44 (32.6)
Frightened of getting cancer	3 (2.2)	7 (5.2)	1 (0.7)	15 (11.1)	20 (14.8)	5 (3.7)	84 (62.2)
Worried about PCOS	7 (5.2)	70 (51.9)	4 (3.0)	33 (24.4)	9 (6.7)	5 (3.7)	7 (5.2)
Self-conscious	15 (1.1)	27 (20.0)	8 (5.9)	35 (25.9)	16 (11.9)	6 (4.4)	28 (20.7)
Late menstrual period	16 (11.9)	69 (50.4)	22 (16.3)	3 (2.2)	4 (3.0)	5 (3.7)	17 (12.6)
Mean±SD							4.29±0.97
Body weight domain							
Concerned about overweight	10 (7.4)	25 (18.5)	9 (6.7)	27 (20)	36 (26.7)	9 (6.7)	19 (14.1)
Trouble dealing with weight	8 (5.9)	28 (20.7)	5 (3.7)	21 (15.6)	21 (15.6)	17 (12.6)	35 (25.9)
Feel you are not sexy because of overweight	2 (1.5)	7 (5.2)	3 (2.2)	11 (8.1)	4 (3.0)	20 (14.8)	88 (65.2)
Frustration in trying to lose weight	14 (10.4)	19 (14.1)	6 (4.4)	23 (17.0)	27 (20.0)	8 (5.9)	38 (28.1)
Difficulty staying at ideal weight	12 (8.9)	36 (26.7)	4 (3.0)	26 (19.3)	21 (15.6)	10 (7.4)	26 (19.3)
Mean ± SD							4.68±1.52
Infertility Problem domain							
Concerned about infertility	17 (12.6)	55 (40.7)	7 (5.2)	15 (11.1)	17 (12.6)	4 (3.0)	20 (14.8)
Afraid of not being able to have children	34 (25.2)	42 (31.1)	1 (0.7)	19 (14.1)	13 (9.6)	4 (2.0)	22 (16.3)
Lack of control over situation with PCOS	13 (9.6)	39 (28.9)	11 (8.1)	27 (20.0)	20 (14.8)	14 (10.4)	11 (8.1)
Sad because of infertility problems	27 (20.0)	60 (44.4)	7 (5.2)	8 (5.9)	10 (7.4)	3 (2.2)	20 (14.8)
Mean±SD							3.34±1.72
Body hair domain							
	Severe problem	Major problem	Moderate problem	Some problem	A little problem	Hardly any problem	No problem
Visible hair on chin	1 (0.7)	5 (3.7)	6 (4.4)	15 (11.1)	9 (6.7)	9 (6.7)	90 (66.7)
Visible hair on upper lips	1 (0.7)	6 (4.4)	11 (8.1)	17 (12.6)	15 (11.1)	5 (3.7)	80 (59.3)
Visible hair on face	1 (0.7)	8 (5.9)	9 (6.7)	12 (8.9)	8 (5.9)	1 (0.7)	96 (71.1)
Embarrassment about excessive body hair	1 (0.7)	6 (4.4)	5 (3.7)	10 (7.4)	7 (5.2)	5 (3.7)	101 (74.8)
Mean ± SD							8.58±1.86
Menstrual problem domain							
Headaches	1 (0.7)	10 (7.4)	11 (8.1)	16 (11.9)	14 (10.4)	13 (9.6)	70 (51.9)
Irregular menstrual period	17 (12.6)	79 (58.5)	16 (11.9)	3 (2.2)	2 (1.5)	3 (2.2)	15 (11.10)
Abdominal bloating	5 (3.7)	10 (7.4)	11 (8.1)	21 (15.6)	13 (9.6)	14 (10.4)	61 (45.2)
Menstrual cramp	6 (4.4)	30 (22.2)	42 (31.1)	23 (17.0)	15 (11.1)	2 (1.5)	17 (12.6)
Mean ± SD							4.32±1.13

Table 3 Correlation matrix between health-related quality of life (HRQoL) and its domain

Characteristics	1	2	3	4	5	6
PCOSQ	1					
Emotions	0.910**	1				
Body Weight	0.850**	0.700**	1			
Infertility	0.890**	0.750**	0.640**	1		
Body Hair	0.770**	0.680**	0.760**	0.600**	1	
Menstrual Problem	0.820**	0.790**	0.710**	0.720**	0.670**	1

**Correlation is significant at 0.01 level

history of infertility were significantly associated with HRQoL, reflecting how reproductive expectations and social roles shape well-being among women with PCOS [26]. Younger and married women face greater pressure to conceive, making infertility particularly distressing,

consistent with findings from Iran and Saudi Arabia [18, 21]. Menstrual irregularities, reported by most participants further compounded this burden. International evidence shows that disturbances such as amenorrhea are strongly linked with infertility concerns, making them

Table 4 Simple and multiple linear regression analysis of factors associated with low health-related quality of life among women with polycystic ovarian syndrome

Characteristics	Unadjusted			Adjusted		
	β	95% CI	p-value	β	95% CI	p-value
Age (Years)						
18–25	1.68	0.46–4.00	< 0.01**	1.64	0.42–3.97	< 0.01**
26–35	1.15	0.32–3.08	< 0.05*	1.12	0.28–3.06	< 0.05*
36–45	Ref.			Ref.		
Marital Status						
Never married	Ref.			Ref.		
Ever Married	0.95	0.30–2.60	0.051	0.85	0.25–2.55	< 0.05*
BMI						
Below 26	Ref.			Ref.		
Above 26	3.50	0.90–4.80	< 0.01**	3.21	0.85–3.75	< 0.01**
Fertility-Related Medical History						
No	Ref.			Ref.		
Yes	2.71	0.96–3.78	< 0.01**	2.68	1.61–3.45	< 0.01**
Duration of PCOS (years)						
≤ 3	Ref.			Ref.		
> 3	-1.51	0.45–3.01	0.481	-1.45	0.32–1.98	0.510
Acne						
No acne	Ref.			Ref.		
Occasional breakouts	0.98	0.32–2.70	< 0.05*	0.92	0.28–1.98	< 0.05*
Chronic acne	1.31	0.45–3.05	< 0.05*	1.15	0.42–2.10	< 0.01**
Menstrual pattern						
Regular period	Ref.			Ref.		
Irregular period	2.12	1.58–3.86	< 0.01**	1.98	1.14–2.82	< 0.01**
Delayed/Late	1.11	0.45–2.95	< 0.05*	1.15	0.30–2.90	< 0.05*
Family history						
No	Ref.			Ref.		
Yes	0.88	0.15–2.51	0.354	0.85	0.12–2.48	0.391
Physical Activity						
Inactive	3.25	0.85–3.95	< 0.01**	2.52	0.60–2.95	< 0.01*
Moderate	2.15	0.90–3.70	< 0.01**	2.05	0.75–2.65	< 0.05*
Vigorous	Ref.			Ref.		
Substance use						
None	Ref.			Ref.		
Smoking	1.51	0.90–3.11	< 0.05*	1.25	0.85–2.90	< 0.05*
Alcohol	1.32	0.80–3.90	< 0.05*	1.15	0.70–3.80	< 0.05*
Stress level						
Low	Ref.			Ref.		
Moderate	1.50	0.45–3.85	< 0.05*	1.25	0.35–2.80	< 0.01**
High	2.20	0.55–3.95	< 0.05*	1.80	0.48–2.90	< 0.01*

* Statistically significant at p-value < 0.05 level; ** significant at p-value < 0.01 level; Ref Reference, CI Confidence interval, PCOS Polycystic Ovarian Syndrome

among the most distressing HRQoL domains for women with PCOS [19, 27]. Because irregular or absent menses signal impaired fertility, they heighten anxiety and reinforce perceptions of illness, especially when bleeding is absent for prolonged periods [28]. Collectively, these reproductive challenges markedly reduce HRQoL. Targeted reproductive counseling and patient education are therefore recommended, emphasizing fertility options, menstrual regulation strategies, and reassurance to alleviate anxiety and restore a sense of control.

BMI and physical appearance also influence HRQoL. Overweight women (BMI ≥ 26 kg/m²) and those with acne reported markedly lower HRQoL scores, consistent with meta-analyses and Italian studies linking elevated BMI, acne, and poor body image to poorer quality of life in PCOS [29–31]. Excess weight and acne often reflect underlying metabolic and hormonal disturbances such as insulin resistance and hyperandrogenism, which intensify body dissatisfaction and emotional distress. As highlighted in international evidence, these visible PCOS

manifestations negatively affect self-esteem and social confidence, reinforcing psychological burden and further diminishing HRQoL [19, 29–31]. To address these challenges, lifestyle interventions focusing on weight management, diet, and physical activity should be actively promoted. Structured exercise programs, nutritional counseling, and peer groups can simultaneously improve metabolic health and psychological well-being.

Lifestyle and psychosocial factors were also significant. Individuals who were physically inactive or engaged in moderate physical activity reported poorer HRQoL. Physical activity not only manages weight and insulin resistance but also enhances emotional resilience. Despite recommendations that exercise be part of first-line management for PCOS [3, 32], nearly 70% reported low activity levels, indicating a gap in lifestyle management within the Nepalese context. Substance use, though less common, was also linked to poorer HRQoL, in line with studies suggesting smoking and alcohol disrupt endocrine balance and worsen mood disorders [33]. Given the stigma surrounding substance use and the likelihood of underreporting, especially among women in South Asia, the true extent of this problem may be underestimated.

Interestingly, the body hair domain showed comparatively higher HRQoL, contradicting previous studies, where hirsutism was among the most impaired domains and a key predictor of psychological distress and reduced HRQoL among affected women [19, 34]. This difference may reflect cultural attitudes or underreporting in Nepal, highlighting the importance of culturally sensitive approaches when addressing body image concerns in clinical practice. Sociodemographic factors, including education level, occupation, and residence were not associated with HRQoL, echoing findings from other PCOSQ-based studies [9, 27]. This suggests that psychological and reproductive concerns may outweigh the direct influence of socioeconomic markers on quality of life.

Strength and limitations

This study contributes novel evidence from Nepal, where research on PCOS-related HRQoL remains limited. Key strengths include the use of validated tools and adherence to STROBE reporting standards, which enhance methodological rigor. Nevertheless, some limitations must be acknowledged. First, the cross-sectional design precludes causal inferences between associated factors and HRQoL outcomes. Second, reliance on self-reported measures may have introduced recall or social desirability bias. Third, the single-center, urban setting may limit the generalizability of the findings to broader populations, and caution is warranted when extrapolating the results to other settings. Additionally, the six-month study period may not reflect seasonal or temporal variations

in symptoms or HRQoL. Finally, the unmeasured factors such as sleep quality, dietary habits, and hormonal profiles may have influenced HRQoL.

Conclusion

This study demonstrated that women with PCOS in Nepal experience markedly reduced HRQoL, with the greatest impairments observed in infertility, emotional well-being, and menstrual health. Key factors associated with poorer outcomes included younger age, ever-married status, higher BMI, acne, menstrual irregularities, fertility-related history, physical inactivity, substance use, and elevated stress levels. These findings emphasize the urgent need to address both clinical and lifestyle-related determinants of HRQoL. A holistic, patient-centered approach integrating medical management, reproductive counseling, psychological support, and lifestyle interventions is essential, particularly in resource-limited settings, to optimize HRQoL among women with PCOS.

Abbreviations

BMI	Body Mass Index
HRQoL	Health Related Quality of Life
IPAQ-SF	International Physical Activity Questionnaire–Short Form
LMIC	Low-Middle Income country
LH	Luteinizing hormone
MET	Metabolic Equivalent of Task
OPD	Outpatient Department
PCOS	Polycystic ovary syndrome
PCOSQ	Polycystic Ovary Syndrome Questionnaire
PSS	Perceived Stress Scale
QOL	Quality of Life
SD	Standard deviation
WHO	World Health Organization

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

NRM: Conceptualization; Project administration, Resources, Data curation; Methodology; Formal analysis; Supervision; Validation; visualization, Writing – original draft, Writing-review & editing; AA: Conceptualization; Data curation; SM: Conceptualization; Data curation; SG: Conceptualization; Data curation; SST: Conceptualization; Data curation; SP: Writing – review & editing, Validation; NP: Writing – review & editing; SS: Methodology, Validation; Formal analysis; Writing – original draft; Writing – review & editing.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Institutional Review Committee of CiST (IRC-CiST, Ref no. 66/079/080), and data collection permission was taken from the Infertility Center at Bijulibazar, Kathmandu. Written informed consent was obtained from all participants prior to data collection. For participants who could not read or write, the consent form was read aloud in the Nepali language in the presence of an impartial witness, who then signed the form; participants provided consent by affixing a thumbprint.

Consent for publication

N/A.

Competing interests

The authors declare no competing interests.

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