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PCOS Symptoms and Quality of Life: Links to Anxiety and Self-Esteem Among Women with PCOS in Slovakia

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Abstract

This study examines the relationship between quality of life, self-esteem, and anxiety in Slovak women of reproductive age diagnosed with polycystic ovary syndrome (PCOS). The research was carried out with a non-experimental correlation survey design, and the data was obtained using the World Health Organization Quality of Life Questionnaire (WHOQOL-BREF), the Generalized Anxiety Disorder 7-item scale (GAD-7), the Rosenberg Self-Esteem Scale (RSES), and the Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire (PCOSQ). The research sample consisted of 244 women aged from 18 to 52 years with a confirmed PCOS diagnosis. The results revealed that lower health-related quality of life scores among women with PCOS were associated with lower self-esteem and higher levels of anxiety. Furthermore, higher general quality of life in the domains of Physical health, Psychological Health, Social relationships, and Environment were associated with higher self-esteem and lower anxiety among women with PCOS. The results also show the effect of emotional problems as a symptom of PCOS for anxiety, self-esteem, and general quality of life, especially in the areas of physical and psychological health. New insights in this area may contribute to the improvement of women's awareness of PCOS and its consequences and emphasise the need for support of both physical and mental health.

Keywords: polycystic ovary syndrome; quality of life; anxiety; self-esteem

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1. Introduction

Gynaecological disorders are among the most frequently diagnosed disorders in the female population, which have a negative impact on both the quality of life and psychological well-being of women [1]. Polycystic ovary syndrome (PCOS) is defined as a chronic endocrine disorder that affects reproductive, metabolic, and psychological aspects of life. PCOS impacts 5–21% of women in reproductive age, and its diagnosis requires the presence of at least two out of three criteria: ovarian dysfunction, hyperandrogenism, and ultrasound confirmation of polycystic ovaries (based on the Rotterdam criteria that are widely used for diagnosing) [2]. Reproductive difficulties related to PCOS include infertility, difficulties with conception, menstrual cycle disorder, ovulation dysfunction, ovarian abnormalities, and hyperandrogenism, i.e., an excess of male sex hormones. Metabolic consequences include obesity, insulin resistance, and a risk of developing type 2 diabetes mellitus. Furthermore, the psychological consequences include depression, increased anxiety, reduced quality of life, self-esteem, or self-worth [3–5]. A longitudinal population-based study

demonstrated that women with PCOS have much higher baseline rates of psychopathology, including an increased risk of psychotic symptoms. Oestrogen plays a key role in regulating neurotransmitter systems, such as serotonin and dopamine, which have direct impact on mood regulation. Disruptions in oestrogen levels, which are frequently observed in PCOS, may therefore be a contributing factor to the onset or worsening of psychopathological symptoms. Research has shown that both hypoestrogenism and oestrogen dominance can be associated with mood instability, depressive symptoms, and higher risk for major depressive disorder and anxiety disorders [6,7].

Polycystic ovary syndrome thus has a negative impact on women's quality of life across various aspects of life in terms of physical, psychological, social, sexual, and health [8]. An association between the severity of PCOS and the assessment of overall quality of life has been identified. According to Ligocka et al. [9], women who were struggling with bothersome symptoms of PCOS rated their quality of life lower compared to those who rated their symptoms as less bothersome. Obesity, hirsutism, irregular menstruation, and infertility may all be contributing factors to a lower quality of life, as they are accompanied by negative psychological consequences [8]. Irregular menstrual cycle may be perceived as a cause of infertility, which causes stress in women with PCOS. This then further worsens ovulation and symptoms of the syndrome, creating a vicious circle that lowers the quality of life of these women [10]. However, women with PCOS experience a decline in quality of life, not only due to numerous clinical symptoms but also due to anxiety, poor self-image, low self-esteem, depressive symptomatology, and often insufficient information or explanation about the condition by healthcare professionals [11]. Ignoring the psychological consequences of PCOS can worsen the overall health of women with this condition [12].

According to Ligocka et al. [9], more than half of the women in their study struggled to accept their physical appearance, and almost three-quarters stated that they have low self-esteem as well as a lower quality of life as a result of PCOS. Women with PCOS often face challenges such as avoiding social interactions, public events, or even mirrors and experience feelings of unattractiveness, low self-esteem, as well as a desire to lose weight. These factors may have profound effects on psychological well-being and increase the risk of developing mental health issues. Self-esteem, body satisfaction, and fear of negative evaluation of physical appearance are all negatively associated with PCOS symptoms [13]. However, there are not only visible symptoms, such as being overweight and hirsutism, but also hidden ones, such as the absence of menstruation, that are associated with an increased fear of physical appearance evaluation due to a diminished sense of femininity [14]. Hence, women diagnosed with PCOS tend to be less self-confident, less satisfied with their bodies, more likely to avoid social interactions and experience a lack of attractiveness as well as self-esteem as compared to healthy women [12], which is again related to their quality of life in terms of their social relationships and environment.

Women with PCOS have also been found to have a higher prevalence of eating disorders, negative self-evaluation, and overall negative emotional experience, which may exhibit features of depressive and anxiety symptomatology [15,16]. Research indicates that enhancing self-esteem among women with PCOS can lead to a decrease in their psychological distress [17]. Kolhe et al. [16] indicate that there is an association between the higher levels of depression and their quality of life and lower self-esteem in women with PCOS. Further, research indicates that there is up to five times higher likelihood of anxiety symptoms in women with PCOS compared to healthy women [18] and a greater likelihood of generalised anxiety disorder [19]. Challenges with weight or being overweight are the most common symptoms associated with anxiety [10,15,18,20]. It has also been found that elevated BMI values in women with PCOS may increase the likelihood of developing anxiety symptoms as well as generalised anxiety disorder [21]. However, pronounced

symptoms of anxiety in women with PCOS may be triggered by issues such as the absence of regular menstruation, infertility, and difficulties with conception [22].

Furthermore, the association between individual PCOS symptoms and increased levels of anxiety may be affected by cultural and ethnic factors, as well as the prolonged duration of the diagnostic process. Without a stated diagnosis, some of the symptoms, such as excessive facial hair or irregular menstrual cycles, are often considered abnormal or unnatural, and women, as a result, may be exposed to increased stress levels and anxiety [15,23]. The impact of the disorder, as well as the most distressing symptoms, is culturally and socially determined [24]. For example, in Iran, hirsutism has the most negative impact on women's quality of life, which may be due to darker pigmentation of body hair and prevailing social norms related to female beauty. In contrast, infertility was reported to have the least impact on the quality of life among Iranian women, probably due to the availability of advanced treatment options [25]. Higher body weight and obesity were the most contributing factors to the lower quality of life of adolescent girls in countries such as Australia [26], Pakistan [27], the United States [28], and the United Kingdom [29]. On the other hand, in countries such as Sri Lanka and across South Asia, obesity does not affect quality of life scores. This may be because obesity is perceived negatively only in Western societies, whereas in many Eastern societies, it is often seen as a symbol of wealth and prosperity [30].

In addition to the above factors, it may be relevant to point out the consequences of the COVID-19 pandemic in relation to the issue of PCOS. Recent research has highlighted the increased vulnerability of women with PCOS during the COVID-19 pandemic, based on the fact that the virus causes an infection that simultaneously affects several organs, from the kidneys to the heart, blood vessels, liver, pancreas, and immune system to the reproductive system. Given existing conditions such as insulin resistance, obesity and systemic inflammation, women with PCOS may be at higher risk of a more severe course of COVID-19 and its impact on aspects of PCOS. A recent systematic review has shown that COVID-19 has extensive effects beyond physiological functions and also affects lifestyle and mental health [31,32]. This is explained by weight gain, reduced physical activity, increased consumption of sugar-sweetened beverages, significant increases in anxiety and stress, impaired sleep quality, and increased menstrual irregularities during the COVID pandemic, which negatively affects the endocrine and reproductive systems [33].

Despite the great attention given to the study of polycystic ovary syndrome (PCOS) abroad, research focused on the Slovak population of females is considerably lacking. At the same time, existing studies, e.g., [23–25,27,29] indicate that the impact of PCOS on women's psychological well-being depends on sociocultural factors and ethnicity. Gibson-Helm et al. [34] found that only a small proportion of women from different global regions, particularly from Europe, expressed satisfaction with the information they received when diagnosed with PCOS. Over fifty per cent of women indicated that they lacked information about the long-term effects linked to PCOS, as well as guidance about emotional support or counselling opportunities. In the context of the above, the present study aims to deepen the understanding of how women from the Slovak population experience the symptoms of PCOS to gain a more comprehensive psychological perspective and raise awareness of the psychological consequences of gynaecological conditions within our cultural and healthcare context.

Research Problem, Objectives and Research Questions

The research problem of the study is the exploration of the associations between the quality of life, self-esteem, and anxiety among Slovak women of reproductive age diagnosed with PCOS about the subjective experience of challenges related to the PCOS

symptoms. Quality of life, a key variable in this study, is interpreted through the integrative model established by the World Health Organization (WHO), which defines quality of life as "how individuals perceive their position in life in the context of the culture and value systems in which they live, and about their life goals, expectations, standards, and interests" (WHO). According to Rosenberg's theory, self-esteem refers to an individual's perception of themselves and their interpretation of their thoughts and feelings [35]. In this research, anxiety is defined based on ICD-10 criteria for generalised anxiety disorder, described as a combination of various emotional states and a condition characterised by ongoing and excessive worry and anxiety that is not related to a particular situation or object but instead triggered by a wide range of everyday circumstances, often accompanied by physical symptoms such as sweating, palpitations, or headaches [36]. In order to solve the mentioned problem, we formulate the following objectives and research questions:

- To identify the PCOS symptoms that women with the condition perceive as the most limiting in their daily lives.
- To clarify the relationships between general quality of life, Anxiety, and self-esteem in women diagnosed with PCOS.
- To examine the relationships between the quality of life related to PCOS symptoms experienced and the general quality of life in women affected by the syndrome.

RQ1: How is the experience of polycystic ovary syndrome (PCOS) symptoms associated with the quality of life in women diagnosed with this condition?

RQ2: What is the relationship between general quality of life and PCOS-specific health-related quality of life and anxiety symptomatology in women with this syndrome?

RQ3: What is the relationship between general quality of life and PCOS-specific health-related quality of life and self-esteem in women with this syndrome?

2. Results

2.1. Variables Description

As the research sample involved participants with a clinical diagnosis, comorbid conditions were also identified. The distribution of chronic illnesses with an incidence higher than 10% is displayed in Table 1. The most frequently reported comorbidities included thyroid disorders (20%), mental health disorders (e.g., depressive and bipolar affective disorders; 15%), and dermatological conditions (14.2%).

Table 1. Description of other chronic conditions in the sample (N = 241).

Other Chronic Conditions	N	%
Thyroid disorders (e.g., hypothyroidism, hyperthyroidism)	48	20
Mental health disorders (e.g., depression, anxiety, bipolar disorder)	36	15
Dermatological conditions (e.g., psoriasis, seborrhoea, atopic dermatitis)	34	14.17
Chronic respiratory conditions (e.g., asthma, chronic rhinitis, chronic obstructive pulmonary disease)	21	8.75
Chronic digestive disorders and intolerances (e.g., Crohn's disease, IBS, celiac disease, lactose intolerance)	21	8.75
Metabolic disorders (e.g., type 2 diabetes, insulin resistance, Gilbert's syndrome)	20	8.33
Cardiovascular diseases (e.g., hypertension, angina pectoris, chronic ischemic heart disease)	20	8.33

Table 2 shows the results of the description of the variables. The domains of QoL-PCOS, which are related to the perceived symptoms of PCOS as problematic for the respondent's life, reached an average score ranging from 2.8 to 4.4. Among these, the most problematic symptom was infertility, while acne was perceived as the least problematic. The total QoL-PCOS score reaches the median value of the theoretical range (AM = 3.5). Table 1 additionally presents descriptive statistics for the Anxiety, Self-Esteem, and QoL-WHO domains, along with the total QoL-WHO score. Among the QoL-WHO domains, the lowest mean score was reported in the Psychological domain (AM = 52.5). The variables Anxiety and Self-Esteem were categorised according to the standardised norms, with the

frequency of their levels illustrated in Figure 1. Self-Esteem, a predominant average level was observed in 44.3% of respondents, whereas 39.3% of respondents indicated low self-esteem. Approximately one quarter of respondents reported a high or moderate anxiety, in accordance with GAD-7 norms.

Table 2. Variables description (N = 244).

	AM	SD	Min–Max
QoL-PCOS—total	3.5	1.1	1.2–6.5
Emotions	3.5	1.2	1–7
Body hair	3.7	2	1–7
Weight	3.4	1.9	1–7
Infertility	2.8	1.5	1–7
Menstrual problems	3.3	1.3	1–7
Acne	4.4	1.8	1–7
Self-esteem	16.3	5.6	0–30
Anxiety	10.3	5.3	0–21
QoL-WHO—total		16.8	6.3–98.5
Physical health		71.4	3.6–100
Psychological health		45.8	0–95.8
Social relations	61.9	66.7	0–100
Environment	59.9	56.3	0–100

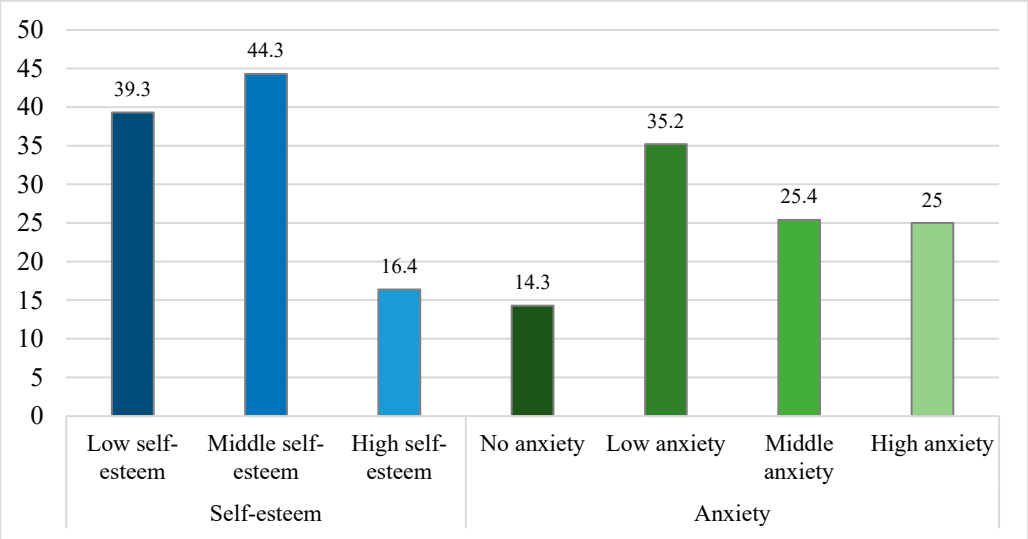


Figure 1. Self-esteem and Anxiety categories occurrence (%).

2.2. Statistical Testing

The results related to the research questions are presented in Tables 3 and 4. The first research question examined the experience of polycystic ovary syndrome (PCOS) symptoms and its associations with the quality of life in women diagnosed with this condition. The analysis of the relationships between QoL-PCOS and general QoL-WHO including its domains, revealed statistically significant ($p < 0.001$) positive correlations. These correlations ranged from moderate intensity (Social Relationships, Environment) to strong intensity (Physical Health, Psychological Health). Specifically, the domains of QoL-PCOS showed predominantly moderate positive correlations ($p < 0.001$) with the domains of QoL-WHO. To summarise, primarily in the domain of Physical Health, strong correlations were found with QoL-PCOS Emotions (R = 0.573) and QoL-PCOS Body Hair (R = 0.590); in the domain of Psychological Health, there was observed a strong relationship with QoL-PCOS Emotions (R = 0.524) and QoL-PCOS Weight (R = 0.534). On the contrary, weak correlations were found between the domain Social Relationships and QoL-PCOS Body Hair (R = 0.239), QoL-PCOS Menstrual Problems (R = 0.227), and QoL-PCOS Acne

(R = 0.279); and between the domain Environment and QoL-PCOS Body Hair (R = 0.256). Overall, the weakest relationships were observed between general QoL-WHO as well as its domains and QoL-PCOS related to the experience of Infertility where, in the case of the domains of Physical and Psychological Health, we interpret weak positive relationships (R = 0.286; R = 0.246). In relation to Social Relationships and Environment, non-significant relationships were found (after Bonferroni's correction).

Table 3. Results of the correlation analysis (Spearman's R) between QoL-PCOS and QoL-WHO total scores and domains (N = 244).

	QoL-WHO				
QoL-PCOS	**Physical Health**	**Psychological Health**	**Social Relationships**	**Environment**	**QoL-WHO Total**
QoL-PCOS—Total	0.648 **	0.523 **	0.377 **	0.457 **	0.605 **
Emotions	0.573 **	0.524 **	0.318 **	0.409 **	0.558 **
Body hair	0.590 **	0.327 **	0.235 **	0.256 **	0.421 **
Weight	0.461 **	0.534 **	0.360 **	0.397 **	0.535 **
Infertility	0.258 **	0.246 **	0.105	0.156 [b]	0.228 **
Menstrual problems	0.492 **	0.337 **	0.227 **	0.377 **	0.418 **
Acne	0.341 **	0.307 **	0.279 **	0.355 **	0.386 **

** $p < 0.001$; [b] nonsignificant after Bonferroni's correction.

Table 4. Results of the correlation analysis (Spearman's R) between Anxiety, Self-esteem and QoL variables (N = 244).

QoL Variables	Anxiety	Self-Esteem
QoL-PCOS—Total	−0.453 **	0.418 **
Emotions	−0.516 **	0.432 **
Body hair	−0.314 **	0.290 **
Weight	−0.290 **	0.379 **
Infertility	−0.208 **	0.189 **
Menstrual problems	−0.369 **	0.262 **
Acne	−0.297 **	0.259 **
QoL-WHO—Total	−0.527 **	0.655 **
Physical health	−0.516 **	0.542 **
Psychological health	−0.524 **	0.737 **
Social relationships	−0.269 **	0.408 **
Environment	−0.409 **	0.460 **

** $p < 0.001$.

The second research question focused on the relationship between general quality of life and PCOS-specific health-related quality of life and anxiety symptomatology in women with this syndrome and similarly, the third research question focused on the relationship between general quality of life and PCOS-specific health-related quality of life and self-esteem in women with this syndrome. Based on the findings shown in Table 4, there were identified statistically significant relationships ($p < 0.001$) between QoL-PCOS, QoL-WHO (along with its domains), and both Anxiety and Self-Esteem. The analysis indicated primarily weak to moderate negative correlations between Anxiety and QoL-PCOS related to symptoms, observed both in the overall score (R = −0.453) and within specific domains. A strong negative relationship was observed between Anxiety and the QoL-PCOS Emotions (R = −0.516), whereas the weakest correlation was found in relation to the QoL-PCOS Infertility (R = −0.208). These inverse associations indicate that higher anxiety levels are associated with greater life limitations due to PCOS symptoms, while lower anxiety levels are linked with fewer perceived limitations. Furthermore, strong negative correlations were identified between Anxiety and overall general QoL-WHO (R = −0.527), as well as with the domains of Physical Health (R = −0.516) and Psychological Health (R = −0.524).

A weak correlation was found between Anxiety and Social Relationships (R = −0.269), and a moderate correlation was found between Anxiety and Environment (R = −0.409).

Additionally, Table 4 presents results regarding the association between Self-Esteem and QoL variables. The results indicate significant ($p < 0.001$) positive correlations of weak to moderate intensity between the domain Self-Esteem and both the total QoL-PCOS score and its specific domains. Weak correlations were identified among the following QoL-PCOS domains: Body Hair (R = 0.290), Infertility (R = 0.189), Menstrual Problems (R = 0.262), and Acne (R = 0.259), whereas moderate correlations were interpreted between Self-Esteem and the overall QoL-PCOS score (R = 0.418) and the QoL-PCOS Weight domain (R = 0.379). Following this, the associations between Self-Esteem and general QoL-WHO, including its domains, were identified. There was a strong positive correlation between Self-Esteem and overall general QoL (R = 0.655), and likewise, the correlation with the Physical Health domain (R = 0.542). A strong correlation was found between Self-Esteem and the Psychological Health domain (R = 0.737), as well as moderate correlations with the domains of Social Relationships (R = 0.408) and Environment (R = 0.460). All interpreted relationships were statistically significant at the $p < 0.001$ level, indicating that higher levels of self-esteem are associated with higher scores of QoL.

3. Discussion

The research problem of this study initiated from the insufficient empirical studies on the quality of life and psychological well-being of women diagnosed with PCOS in Slovakia, as well as in countries with similar standards of healthcare and public awareness of the condition. The main objective was to explore relationships between self-esteem, anxiety symptoms, and quality of life, both in its general sense as defined by the WHO (including its specific domains) and in terms of limitations tied directly to PCOS symptomatology, such as excessive body hair, concerns about weight and fertility, emotional distress, irregular menstruation, and acne. Compared to the reported incidence of other mental health conditions in our sample, where approximately 15% of participants were diagnosed with anxiety disorder, depression, or bipolar disorder, the prevalence of self-reported anxiety symptoms was notably higher. This finding indicates that a considerable number of women with PCOS may suffer from substantial anxiety that goes undiagnosed. This situation is relatively common in Slovakia due to the cultural stigma associated with mental health that often discourages individuals from seeking professional help. Another issue is the delayed diagnosis of mental health disorders in Slovakia.

Firstly, we focus on the characteristics of the research sample, which consisted of 244 women diagnosed with PCOS. Given that this population had a clinically confirmed diagnosis, we also included information on comorbid conditions in the sample description. The descriptive analysis revealed that Slovak women with PCOS frequently report thyroid disorders and mental health disorders such as depression, anxiety, or bipolar disorder. Even though there was a proportion of the sample only 15% of respondents who reported that they had a mental health condition diagnosed by a doctor, the findings from the GAD-7 anxiety scale revealed that almost 25% of the respondents reported high levels of anxiety symptoms. This discrepancy highlights an undiagnosed occurrence of the condition in the population, highlighting the issue that reflects the broader reality in Slovakia, where the stigma associated with mental illness and psychiatric treatment often prevents individuals from seeking professional help. Another significant issue is the generally delayed diagnosis of mental health disorders in Slovakia. These circumstances contributed to our decision to include participants with comorbid disorders, including anxiety disorders, within the research sample. The findings regarding anxiety prevalence are consistent with international studies, which also report higher risks of anxiety, depression, or other mental health

issues among women with PCOS [15,18,20]. Additionally, participants frequently reported dermatological conditions such as atopic eczema, as well as chronic digestive disorders and intolerances, including Crohn's disease, celiac disease, histamine intolerance, and lactose intolerance. They have also reported a range of metabolic disorders, particularly insulin resistance and type 2 diabetes mellitus, which are among the most common metabolic consequences of PCOS [3]. Other conditions observed among participants included various cardiovascular and autoimmune diseases, tetany, joint diseases, neurological disorders, blood clotting disorders, cancers or other tumours, endometriosis, chronic venous diseases, kidney and urinary tract disorders, and chronic liver conditions.

Within the scope of quality of life limitations related to PCOS symptoms in the Slovak population, the results varied. The highest values, and therefore the most minor limitations, were reported by Slovak women for symptoms such as acne and excessive body hair. On the contrary, respondents reported the most limiting factors to daily life concerns about infertility and menstrual difficulties. These findings may be due to the age composition of the research sample, which consisted of individuals aged 18 to 35 years, a group for whom fertility and menstrual regularity are often a primary concern. These findings are in line with those of Ligocka et al. [9] and Moghadam et al. [8], who indicated that infertility and irregular menstruation are serious aspects of polycystic ovary syndrome that may contribute to a negative impact on the quality of life among affected women. At the same time, we may conclude that although the visible physical symptoms of PCOS, such as acne and excessive body hair, can be limiting and unpleasant for women, given the wider availability of treatment and management options, they do not have as much of an impact on women's quality of life compared to the more emotionally demanding symptoms related to fertility and menstrual difficulties.

To address the research problem, we first focused on exploring the associations between different aspects of quality of life, incorporating the general concept as defined by the WHO and the health-related quality of life, particularly the specific symptoms of PCOS. Pinto, Cera, and Pignatelli [24] emphasise that the quality of life among women with PCOS varies depending on ethnicity, sociocultural and psychosocial factors, available healthcare, and family structure or family situation, which prompted our interest and need to explore this issue within the Slovak population. According to the WHO's quality of life measurement, up to 50.4% of women scored in the low quality of life range.

Research show that women who tend to perceive the individual symptoms of PCOS more negatively, their quality of life tend to decrease too. Alkheyr et al. [12] highlight that PCOS symptoms can present challenges that affect daily lives of women to the extent that they may begin to avoid social interactions and social events. This is supported by our findings, where we found significant associations between the Environment domain and all PCOS symptoms, as well as between the Social Relationships domain and all PCOS symptoms, aside from the concern about infertility. Within the Psychological Health domain, the strongest associations were found between symptoms related to weight concerns and emotions, which is in line with previous findings in Western cultures around the world, including Australia [26], the United States [28], and the United Kingdom [29]. Similarly, Wang et al. [22] demonstrate that difficulties with weight maintenance in women with PCOS may negatively impact their psychological well-being, as it is associated with feelings of suffering or distress that contribute to overall mental health. The Psychological Health domain is focused on aspects such as body image, physical appearance, perception of their bodies, and emotional aspects, particularly how experiencing negative feelings impacts an individual's daily life [37]. Within the Physical Health domain, the strongest relationship was found with the symptom of emotion, which confirms that experiencing negative emo-

tions related to PCOS may negatively affect overall mood, increase fatigue, reduce energy, impair sleep quality, and impact both workability and overall daily functioning.

Next, the relationship between quality of life (QoL) and self-esteem was examined. Descriptive analysis of the self-esteem variable showed that 39.2% of the women showed low self-esteem, while high self-esteem was found in only 16.4% of women with PCOS. In the correlational analysis, it was found that women with PCOS who rated their QoL-PCOS as higher also reported their self-esteem higher. The strongest positive associations were demonstrated between self-esteem and PCOS-related symptoms, emotion and weight concerns. Additionally, there were found weak associations between Self-esteem and external symptoms such as excessive body hair, irregular menstruation and infertility concerns. These findings are in line with the study of Bazarganipour et al. [14], who found that not only visible symptoms, such as acne or excessive body hair, but also less visible symptoms, such as menstrual irregularities and fertility issues, are related to self-esteem and negative self-image of women suffering from PCOS. The results from the sample of Slovak women are in line with international studies that suggest that the clinical symptoms of PCOS may be associated with an increased risk of low self-esteem in women. Tay et al. [17] also emphasised that enhancing self-esteem may potentially contribute to reducing the overall psychological distress of women with this condition.

In terms of exploring the relationships between self-esteem and overall quality of life (QoL) including its various domains, the findings confirmed that a higher score of QoL in these areas is associated with higher self-esteem among women diagnosed with PCOS. The domain of psychological health, which is concerned with one's assessment and perception of one's own body, self-worth, and emotional well-being, showed the strongest correlation with self-esteem. According to Vatehová and Vateha [37], women who have better relationships with themselves are more likely to be more satisfied with their bodies, experience positive emotions and enjoyment from good things in life and tend to exhibit higher levels of self-esteem. Furthermore, a strong association was found between self-esteem and the Physical Health domain, indicating that women with higher energy, less fatigue, pain, or discomfort and are able to perform daily activities with fewer physical constraints, also tend to demonstrate higher self-esteem. Additionally, self-esteem was moderately associated with the Environment and Social Relationships domains. This suggests that the more accessible and high-quality healthcare is for women with PCOS, as well as the greater ability to live with fewer restrictions, higher engagement in leisure activities, and enhanced satisfaction with their social interactions, including emotional support and sexual health, the higher self-esteem in women with PCOS is [37].

The final area investigated was anxiety. The description showed that almost half of the women with PCOS experienced moderate to high levels of anxiety, totalling up to 45.4%. In comparison, 35.2% experienced low anxiety, and only 14.3% of the women reported no anxiety at all. In comparison to the findings of Deeks et al. [3], where up to 57% of women with PCOS suffered from anxiety (19% experiencing severe anxiety, 17% moderate anxiety, and 21% low anxiety), it can be concluded that the prevalence of anxiety symptoms is higher in the Slovak population.

According to results of association analysis, women who demonstrated a lower quality of life related to PCOS experienced more challenges associated with PCOS as well as higher levels of anxiety. International studies indicate that higher anxiety in women with PCOS is significantly associated with weight difficulties or overweight, e.g., [18,20,21] and excessive body hair issues, e.g., [4,10,23]. In the Slovak sample, the strongest association was found in relation to the symptom of emotion, same as for self-esteem; however, in line with international studies, significant associations were only found with irregular menstruation, concerns about weight and fertility, as well as symptoms such as acne and excessive body

hair. This study reveals that the Slovak population of women with PCOS has a lower quality of life and a higher level of anxiety the more they experience individual symptoms.

Negative associations were found in the general quality of life, as defined by the WHO, across all its domains. Anxiety was the most strongly associated with the Psychological Health and Physical Health domains. A moderate association was found with the Environment domain, and a weak association was found with the Social Relationships domain. This suggests that women with PCOS show higher anxiety levels if they do not have access to adequate healthcare, experience limitations in daily activities, leisure activities and have unsatisfactory social relationships without sufficient support and their needs for closeness and a sense of fulfilment from their sexual life are not met [37].

Limitations

A key limitation of the research is the fact that a significant proportion of women with polycystic ovary syndrome (PCOS) also suffer from other chronic conditions, ranging from more severe to less severe health issues. However, it was not possible to restrict the research population to only women who are exclusively affected by PCOS and no other medical conditions. Hence, we cannot guarantee the extent to which the obtained results are affected by other medical conditions and the extent to which PCOS itself contributes to the findings. Despite efforts to ensure approximately equal representation of women across different age groups, the majority of the research sample consisted of women aged 18 to 35 years, with significantly fewer women in the older age range. The reason for this was the selection method: older respondents were not included because younger women were more likely to be part of the online groups where the data were gathered. As a result, the data may be slightly biased in terms of quality of life, self-esteem, and anxiety levels, as older women may have different perceptions of these aspects compared to younger women. Another limitation of the study is the use of self-report questionnaires as we cannot guarantee that the participants' responses were entirely honest or fully reflective of their actual experiences. Finally, the high degree of subjectivity, particularly in the perception of symptoms or in the assessment of the quality of life related to PCOS, can be considered as another limitation.

4. Methods

4.1. Participants and the Study Design

The research was a non-experimental correlation study (survey) with data collection using a questionnaire method. The research sample consisted of adult women aged from 18 to 52 years (M = 27.85). A total of 241 respondents were included in the study, all of whom had been diagnosed with polycystic ovary syndrome (PCOS). Respondents were selected by criterion selection, where the criteria were the confirmed diagnosis of PCOS by a physician and the age 18–55 years. The data were collected online through a self-administered questionnaire. The online questionnaire was administered in online groups dedicated to women with gynaecological conditions, particularly those focused on PCOS. The dissemination of the questionnaire was assisted by various specialists, including gynaecologists, psychologists, fertility coaches, and the Holi Foli project—a Slovak initiative working with women living with PCOS. Data were collected from December 2024 to January 2025. Participants who did not meet the criteria for PCOS diagnosis, age, who reported ongoing acute illness, or history of serious illness or surgery (e.g., cancer, organ transplantation, amputation, kidney disease with dialysis, etc.) were excluded from the study. Uncompleted questionnaire protocols were also excluded. Research ethics were strictly controlled and ensured in two ways: through informed consent and approval of

the research within the standard processes of the academic department (approval of the student thesis project).

4.2. Instruments and Variables

The World Health Organization Quality of Life—Brief Version (WHOQOL-BREF by WHO Group [38]) is a self-report questionnaire consisting of 26 items that assess the general quality of life. The items are classed into four domains: Physical Health, Psychological Health, Social Relationships, and Environment. The results of the questionnaire are converted into domain scores, which may range from 4 to 20 points, with higher scores indicating a better quality of life. For this study, internal consistency was assessed using Cronbach's alpha, which reached a value of $\alpha = 0.93$ in our sample. Variables derived from this instrument are referred to as General Quality of Life (QoL-WHO), and the scores of the specific domains of quality of life are named accordingly (Physical Health, Psychological Health, Social Relationships, Environment).

The Polycystic Ovary Syndrome Questionnaire—PCOSQ (Cronin et al., 1998 [39]; revised by Jones et al., 2004 [40]) is a self-report scale that measures aspects of quality of life related to the symptoms of polycystic ovary syndrome. The revised version includes 30 items monitoring six domains: Emotions, Body Hair, Weight Concerns, Infertility Concerns, Menstrual Irregularities, and Acne. All items are rated on a 7-point Likert scale, with lower scores indicating greater limitations caused by PCOS symptoms. The reliability of the scale and its domains demonstrated satisfactory value, with Cronbach's alpha ranging from 0.70 to 0.97 [39]. To ensure the appropriateness of the instrument used for the Slovak population, a precise adaptation process was conducted. Two independent translations were created by professionals in psychology, compared, and then reviewed by other professionals from the field. The most appropriate wording of the items was chosen to maintain content consistency. This was followed by a back-translation of the questionnaire into English by a native speaker to confirm the semantic consistency. Cronbach's alpha was used to analyse the internal consistency of the adapted version in a sample of 244 respondents, reaching a reliability coefficient of $\alpha = 0.93$. No problematic items were identified. Given the specificity of the research population and the primarily descriptive purpose of the questionnaire, a separate pilot study was not conducted. The analysis demonstrated the appropriateness of using the questionnaire for the Slovak population of women with PCOS. The variables obtained by this instrument are referred to as Quality of Life related to the experience of PCOS symptoms (QoL-PCOS) and Quality of Life domains associated with specific symptoms (e.g., QoL-Acne, QoL-Weight, etc.).

The Generalised Anxiety Disorder 7-item Scale (GAD-7) (Spitzer et al., 2006 [41]; Slovak version published by the Ministry of Health of the Slovak Republic, 2020 [42] is a 7-item self-assessment scale that emphasise on screening anxiety symptoms and assessing their severity. Respondents record the frequency of seven anxiety-related symptoms they experienced over the past two weeks on a 4-point Likert scale (0—not at all, 3—nearly every day). The total GAD score ranges from 0 to 21 points, with a score of 5–9 indicating mild anxiety, score of 10–14 indicating moderate anxiety, and score of 15–21 indicating severe anxiety. The reliability, measured by Cronbach's alpha, reached a value of 0.90 [43].

The Rosenberg Self-Esteem Scale, RSES (original English version: Rosenberg, 1965 [44]; Slovak version by Halama & Bieščad, 2006 [45]), captures the overall self-esteem and overall positive or negative self-image and attitude towards oneself. The Slovak version of the scale has demonstrated satisfactory internal consistency, with a Cronbach's alpha of 0.760. The scale consists of 10 statements, one of the half statements assess positive attitudes, and the other half assess negative attitudes towards oneself. Responses are rated on a 4-point

Likert scale, with higher scores indicating higher self-esteem and lower scores indicating lower self-esteem [45].

4.3. Analysis

The obtained data were processed using statistical description and inference procedures. Descriptive analysis was used to describe the variables, including verification of normal distribution by the Kolmogorov–Smirnov test. Since the assumption of normality was not confirmed in all cases, non-parametric inferential procedures were applied. The non-parametric Spearman rank order correlation coefficient was used to verify the correlations between variables. The IBM SPSS 27.0 software was used for statistical results processing

5. Conclusions

The main contribution of this study is its relevance due to the prevalence of PCOS among the population of women in Slovakia and the absence of relevant research on the psychological aspects of the condition within the Slovak context. Among Slovak women with PCOS, significant levels of anxiety, decreased self-esteem, and a decreased quality of life across all its domains are present due to the aside from the concern about infertility experienced symptoms of the disease. Thus, the treatment process should focus on the domains of experience, self-esteem, and self-confidence of women with PCOS. Psychological interventions and the improvement of quality of life for women with PCOS become crucial to preventing potential negative impacts on mental health. Ignoring the psychological consequences of PCOS, as well as the links between health and psychological outcomes of PCOS, it may have negative implications for both quality of life and overall health, so raising the awareness is important to reduce stigma and pressure on these women while emphasising the need for physical and mental health screening and prevention. Destigmatizing and systematically raising awareness about the psychological aspects of PCOS, such as an increased risk of anxiety disorders, reduced quality of life, and self-esteem, can contribute to strengthening the mental well-being of women with this condition. At the same time, it can motivate women with PCOS to seek professional help and psychological support early, which is especially important in countries like Slovakia, where mental health in the context of reproductive health is often overlooked and not perceived as an integral part of standard healthcare. New insights in this area may contribute to the improvement of women's awareness of PCOS and its consequences and emphasise the need for support of both physical and mental health. Women with polycystic ovary syndrome (PCOS) often struggle with symptoms that can be mentally and emotionally challenging. Therefore, it is necessary to focus on the specific symptoms each patient experiences and help alleviate them. A comprehensive treatment approach, one that goes beyond generic PCOS management to focus on individualised symptoms and needs, while integrating both physical and mental healthcare, can be an appropriate and effective treatment strategy for women with this condition. Because of the nature of PCOS, a multidisciplinary treatment approach should integrate gynaecological and endocrinological care, psychological support and counselling, nutritional counselling and, if necessary, support from psychiatrists, fertility coaches, or other specialists. Mental healthcare for women with PCOS should be recognised as a core component of standard healthcare, not a secondary aspect of treatment.

The results not only increase awareness but also expand scientific knowledge in this area and provide a foundation for future research on polycystic ovary syndrome. Future research should aim to design and implement targeted prevention and mental health promotion strategies that are culturally sensitive to the experiences of women with PCOS. These strategies could include multidisciplinary intervention programmes that integrate

medical, psychological, and lifestyle support, as well as mental health early screening among newly diagnosed patients. Furthermore, digital health tools such as mobile apps and online platforms could be developed to offer accessible psychoeducation, peer support, and coping resources for women who may face barriers to traditional healthcare. Longitudinal studies are also needed to evaluate the long-term effectiveness of these strategies in improving mental health outcomes and overall quality of life. These prevention and promotion efforts may lead to more holistic, patient-centred care models and reduce the impact of PCOS on individuals and healthcare systems.

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Data Availability Statement: The data presented in this study are available upon request from the corresponding author due to ethical reasons (the participants provided personal data about their health, and their disclosure was not foreseen in the informed consent).

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Abbreviations

The following abbreviations are used in this manuscript:

QoL	Quality of Life
PCOS	Polycystic Ovary Syndrome
WHO	World Health Organization

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