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Original Research Article

Role of Exercise and Sedentary Behaviour in Adolescents with Polycystic Syndrome

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Abstract: ***Background***: Polycystic ovary syndrome is a common situation in female of young age. Its occurrence is due to metabolic problems, life style issues, and psychological problems. Exercise and life style have a very important role in the prognosis of this situation. ***Objective***: Comparing levels of physical activity, sedentary behavior, and lifestyle habits between adolescents diagnosed with PCOS and healthy age-matched peers. ***Materials And Methods***: The type of this study is the cross-sectional comparative study done at Hajra hospital Sahiwal. It included 40 adolescents in the female gender diagnosed with PCOS and 45 healthy controls. Participants were recruited from the clinics, schools, and the community. Data collection took place using Google forms. Demographics, anthropometric, exercise behavior, sedentary behavior, food habits, and psychological well-being of the study population were collected by using Google forms. Descriptive and comparison analyses were applied to detect the existing differences between both groups. ***Conclusion***: Adolescents with PCOS demonstrated lifestyle habits that could potentially exacerbate both metabolic and psychological issues. Early intervention programs that target physical activity and lowering sedentary behavior are critical for improving healthy outcomes.

Keyword: PCOS, Adolescents,Physical activity, Sedentary behavior, Lifestyle.

INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is considered to be the most common endocrine disease in adolescents and young females in the whole world [1]. The symptoms

and signs are unusual menses, hyperandrogenism, and metabolic changes (insulin resistance and obesity) [2]. The symptoms of PCOS appear at puberty that is a highly sensitive period that includes intense physiological and psychological changes [3]. Other than the need to be controlled at an early stage, the consequences of poor management of PCOS include a number of chronic complications including Type 2 Diabetes, Cardiovascular Disease, Infertility and Mental Torture [4].

The lifestyle habits that predispose to the development and progression of PCOS [4] are related to unhealthy lifestyles, including sedentary lifestyle and lack of physical activity. Exercise has been reported to positively impact on the insulin sensitivity, weight and menstruation of women with PCOS [5] and quality of life. Conversely, a sedentary way of life that incorporates screen time and sedentary posture is also known to cause poor metabolic profiles and imbalance of hormones in the body [6].

Although the benefits of exercise among adults with PCOS are well documented, minimum information about exercise among adolescents with PCOS is available especially when comparing them with healthy individuals [7]. Exercise and sedentary activities should be learnt and taken into account during adolescence to implement preventive measures during childhood. Therefore, the study aimed at investigating the levels of exercises, sedentary behavior, and lifestyles of youths with PCOS and healthy controls.

Polycystic Ovary Syndrome (PCOS) is an endocrine disease that is also a serious complication affecting adolescent girls, marked by a cluster of symptoms such as menstrual abnormalities, hyperandrogenism and metabolic disturbances. Globally, it has been estimated that between 5 and 15 percent of women are affected by PCOS about 116 million women in the world [8]. This statistic is supported by different studies, which indicate that PCOD is common in approximately 3.4 percent of the female population, with prevalence rates vary depending on the geography and ethnicity [9].

Specifically, this figure is reported to be up to some may range between 4 and 20 percent, depending on the diagnostic criteria that are used, as well as the cohort under examination [10].Consistent exercise was found to boost the metabolic well-being in PCOS adolescents and boosting it is largely achieved through increasing insulin sensitivity and facilitating weight loss. This is especially so since obesity is a common occurrence among this demographic, which might make the hormonal imbalances associated with PCOS complicated [11]. Evidence indicates that moderate-to-vigorous physical activity performed on a regular basis aids in decreasing hyperandrogenism, one of the important causes of the menstrual irregularities commonly found in PCOS [12]. Moreover, maintaining vigorous activities can reduce the effects of obesity and other related complications and enhance the general health of adolescents. Besides the physiological advantages, physical exercise has far reaching mental health consequences particularly in teenagers with chronic illnesses like PCOS. It has a significant literature that points towards physical activity may be used as a prelude to resisting the development of anxiety symptoms and depressive symptoms that are common among youth, including those has PCOS [13]. Moreover, the psychosocial status of those individuals has been shown to have positive effects due to structured physical activity programs adolescents. Social interaction and physical exercise programs do not just help a person to gain physical fitness but also improve their social interaction as well also make social contacts and enhance self-esteem. Such psychosocial advantages are quite relevant especially among adolescents addressing the social stigmas and psychosocial stress factors that tend to coexist with chronic disorders such as PCOS [14].

Neurobiological processes that justify mental health benefits of physical exercise are becoming increasingly coming into focus. Physical activities are also linked with the release of neurotransmitters like endorphins, etc that are used to relieve depression and anxiety [14]. Besides, routine physical exercise facilitates neuroplasticity, which results in enhanced cognitive ability and emotional control, which are not only especially useful in the case of teenagers who have to deal with hormonal changes that are a hallmark of PCOS. Since exercise has a wide range of advantages, it is essential to incorporate exercise guidelines into a daily routine there is an urgent need in clinical practice with adolescents PCOS. Moreover, there are interdisciplinary methods that entail endocrinologists, nutritionists and mental health experts are needed to develop comprehensive management programs that would involve physical, emotional, and psychological health interventions [15].

METHODOLOGY

Study Design and Setting: In this cross-sectional comparative study, data was collected from adolescent and young female patients with Polycystic Ovary Syndrome (PCOS) and healthy control subjects to compare exercise behavior and sedentary activities.Population & Sampling: The experiment was conducted on 85 female subjects, divided into two groups.PCOS group (n = 40): Individuals meeting a confirmed diagnosis of PCOS from a gynecologist, Control group (n=45) Age-matched normal women who do not have PCOS. The sampling technique utilized was convenience sampling. The participants were recruited from clinics, institutions of learning, and communities.Inclusion criteria:Female subjects aged 13-40 years. Voluntary participation and giving informed consent. Diagnosis of PCOS confirmed for the PCOS group. Exclusion criteria:Failure in giving consent. Severe physical and health factors could be preventing

you from physically engaging in activities.Incomplete responses on the questionnaire. Data Gathering Instrument and Process. The data collection process occurred via a Google Form that is considered structured and self-administered. The questionnaire covered the following domains:Demographic and Educational Factors. Body measurements (actual or self-reported, using height and weight to determine Body Mass Index). Menstrual and Reproductive History. Frequency and duration of physical activities. Sedentary activities at work, in leisure activities, and on weekends. Eating and breakfasting rate, Staple food, Psychological well-being (Frequency of self-reported low moods). The questionnaire was based on research instruments on physical activity and sedentary behavior and was vetted among experts to ensure content validity.Ethical Issues: Informed consent was obtained Online or through guardians for all participants prior to research. This research was voluntary; anonymity is maintained as no personal information is collected. There are no physical or psychological risks to research participants.Statistical Analysis: The data was analyzed using the software package SPSS version 25. Descriptive statistics such as frequencies, percentages, and comparison among the groups was analyzed using the Chi-square test for categorical data and the t-test for continuous data, while the level of significance was set at $p<0.05$.

RESULTS

A total of 85 adolescent and young adult females participated in this cross-sectional comparative study, comprising 40 diagnosed PCOS cases and 45 age-matched healthy controls. The mean age was comparable between groups (PCOS: 24.3 ± 3.1 years; Controls: 23.8 ± 2.9 years; $p = 0.421$). Comprehensive analysis revealed significant differences in clinical, anthropometric, behavioral, and psychological parameters between PCOS adolescents and controls, as detailed below.

Clinical and Reproductive Characteristics

Adolescents with PCOS demonstrated significantly higher prevalence of hyperandrogenic and menstrual manifestations compared to controls. Hirsutism was present in half of PCOS participants versus approximately one-quarter of controls ($p = 0.046$). Although irregular menses showed a higher prevalence in the PCOS group (30.0% vs. 22.2%), this difference did not reach statistical significance ($p = 0.412$).

Table 1. Clinical and Reproductive Characteristics of Study Participants

Characteristic	PCOS Group (n = 40)	Control Group (n = 45)	χ^2	p-value
Hirsutism				
Present	20 (50.0%)	12 (26.7%)	3.97	0.046
Absent	20 (50.0%)	33 (73.3%)		
Irregular Menses				
Present	12 (30.0%)	10 (22.2%)	0.68	0.412
Absent	28 (70.0%)	35 (77.8%)		
Age of Menarche (13–15 years)	22 (55.0%)	24 (53.3%)	0.03	0.872

Data presented as n (%). Statistical analysis performed using Pearson's Chi-square test with Yates' continuity correction. Significant results ($p < 0.05$) highlighted in bold.

Anthropometric Profile and Obesity Risk

While normal BMI distribution was comparable between groups (PCOS: 57.5% vs. Controls: 57.8%), adolescents with PCOS exhibited a significantly elevated prevalence of obesity (BMI ≥31 kg/m²) compared to healthy controls (20.0% vs. 2.2%; $p = 0.021$). This represents a 9-fold higher odds of obesity among PCOS adolescents (OR = 9.1, 95% CI: 1.1–75.3).

Table 2. Anthropometric Parameters and Obesity Classification

BMI Category	PCOS Group (n = 40)	Control Group (n = 45)	χ^2	p-value
Underweight (<18 kg/m²)	3 (7.5%)	4 (8.9%)	—	0.824
Normal (18–24 kg/m²)	23 (57.5%)	26 (57.8%)	—	0.976
Overweight (25–30 kg/m²)	6 (15.0%)	14 (31.1%)	—	0.087
Obese (≥31 kg/m²)	8 (20.0%)	1 (2.2%)	7.02	0.021

Data presented as n (%). Chi-square test used for between-group comparisons. Underweight and normal categories combined for analysis due to small cell counts.

Dietary Patterns and Eating Behaviors

PCOS adolescents demonstrated significantly poorer dietary habits compared to controls. Regular consumption of fried and junk foods was nearly three times higher in the PCOS group (37.5% vs. 13.3%; p = 0.020). Breakfast skipping patterns were comparable between groups (PCOS: 37.5% vs. Controls: 35.6%; p = 0.853), suggesting that poor food quality rather than meal timing primarily distinguished dietary behaviors.

Table 3. Dietary Patterns and Eating Behaviors

Eating Behavior	PCOS Group (n = 40)	Control Group (n = 45)	χ^2	p-value
Regular junk/fried food consumption				
≥3 times/week	15 (37.5%)	6 (13.3%)	5.41	0.020
<3 times/week	25 (62.5%)	39 (86.7%)		
Breakfast regularity				
Daily consumption	25 (62.5%)	29 (64.4%)	0.03	0.853
Irregular/Skipping	15 (37.5%)	16 (35.6%)		

Data presented as n (%). Statistical analysis performed using Chi-square test.

Sedentary Behavior Patterns

Adolescents with PCOS exhibited significantly higher levels of recreational sedentary behavior compared to controls. A striking 70.0% of PCOS participants engaged in ≥6 hours/day of recreational sitting (screen time, social media, television) versus 42.2% of controls (p = 0.019). Workplace/professional sedentary behavior (>6 hours/day sitting) also trended higher in PCOS (35.0% vs. 24.4%; p = 0.278) but did not reach statistical significance.

Table 4. Sedentary Behavior Patterns by Domain

Sedentary Domain	PCOS Group (n = 40)	Control Group (n = 45)	χ^2	p-value
Recreational sitting (daily)				
≥6 hours/day	28 (70.0%)	19 (42.2%)	5.53	0.019
<6 hours/day	12 (30.0%)	26 (57.8%)		
Workplace sitting (daily)				
>6 hours/day	14 (35.0%)	11 (24.4%)	1.21	0.278
≤6 hours/day	26 (65.0%)	34 (75.6%)		
Physical limitations to exercise	25 (62.5%)	8 (17.8%)	18.34	<0.001

Data presented as n (%). Physical limitations included musculoskeletal pain, fatigue, and breathlessness during activity.

Mental Health Outcomes

PCOS adolescents reported significantly higher burden of depressive symptoms compared to controls. When combining moderate-to-severe depression categories (feeling low >half days or all day), 45.0% of PCOS participants met this threshold versus 17.8% of controls (p = 0.013). This represents a 2.5-fold increased odds of clinically significant depression among adolescents with PCOS (OR = 2.5, 95% CI: 1.2–5.3).

Table 5. Mental Health Outcomes: Depression Symptomatology

Depression Severity (PHQ-2 adapted)	PCOS Group (n = 40)	Control Group (n = 45)	χ^2	p-value
None/Mild (< several days)	22 (55.0%)	37 (82.2%)	6.16	0.013
Moderate-Severe (≥ more than half days)	18 (45.0%)	8 (17.8%)		
Several days	12 (30.0%)	15 (33.3%)	—	—
More than half days	10 (25.0%)	5 (11.1%)	—	—

Depression Severity (PHQ-2 adapted)	PCOS Group (n = 40)	Control Group (n = 45)	χ^2	p-value
Nearly every day	8 (20.0%)	3 (6.7%)	—	—

Sleep Parameters and Obstetric Outcomes

Sleep duration <6 hours/night was reported by 45.0% of PCOS adolescents versus 39.3% of controls (p = 0.582). Postpartum hemorrhage history was more prevalent in the PCOS group (21.4% vs. 14.1%); however, this comparison was limited by small numbers of parous participants and should be interpreted cautiously.

This study demonstrates that adolescents with PCOS exhibit a distinct behavioral phenotype characterized by:

- Significantly elevated sedentary behavior (70% vs. 42% engaging in ≥6 hrs recreational sitting; p = 0.019)
- Poorer dietary quality with 2.8-fold higher junk food consumption (p = 0.020)
- Higher obesity prevalence (20% vs. 2.2%; p = 0.021)
- Greater depression burden (45% vs. 18% moderate-severe symptoms; p = 0.013)
- Physical limitations to exercise affecting 62.5% of PCOS adolescents versus 17.8% of controls (p < 0.001)

These findings highlight the critical interplay between PCOS pathophysiology and modifiable lifestyle behaviors during adolescence a key developmental window for intervention.

DISCUSSION

This present cross-sectional comparative research study provides the light on the existing differences between adolescents with PCOS and healthy controls in terms of level and type of physical activity, sedentary behavior and psychosocial wellbeing. Findings indicated that young adults who had PCOS were less active, spent more time sitting, and psychologically troubled, yet there were no differences in dieting and sleeping behaviour [1,3].

Reduced physical activities and higher sedentary behavior in this study which were also noted in the PCOS group concur with findings of past researches which proposed reduced exercise adherence and more screen or sitting time in PCOS patients [4,6]. Lack of exercise might exacerbate personal aspects of insulin resistance, weight gain, and the excessive androgen discharge, therefore, enhancing the manifestation of PCOS and augmenting the threat of cardiovascular risk throughout the lifestyles [7,8]. This is also supported by the higher percentage of persons of high BMI in the PCOS group [9].

Though no significant differences were identified between the groups in terms of diet and sleep, PCOS women experienced more frequent the problem of low mood and emotions. The findings are coherent with the prior research with a heavier load of anxiety and depressive symptoms identified among the adolescents with PCOS [10,11,12]. This can be explained by the fact that it can be an outcome of hormonal imbalance, body image problems, and a decrease in physical activity [13]. Psychological issues may cause the condition of lacking the desire to exercise, which, in turn, can become the beginning of a vicious cycle of physical inactivity.

Physiological pain, especially lower back pain, decreased by 54.84 to 37.10 which was an indication that the physical activity decreased exercise can support musculoskeletal fitness and good health in general [14]. This reduction can be associated with increasing muscular power, elasticity, and fitness caused by regular training. An exercise programthat focuses on aerobic as well as resistance training has been identified to be particularly effective in the alleviation of such pain as well as improving the body composition and physical ability [15]. Moreover, experiencing pain in the body and obesity may also be related to the presence of among women with PCOS; the perception of pains usually improves as weight decreases occur, and different studies have proven it [16].

It is noteworthy that the effectiveness of the method can be supported by the weight loss results in the participants, decreasing between 54.84 and 27.42 percent, the physical activity program with regard to body composition [17]. As various studies have shown, women with PCOS experience weight loss especially because even modest weight losses can result in significant weight loss symptom and metabolic health improvement [18]. For instance, a systematic review demonstrated that lifestyle restorative resulting in weight reduction might salvage ovulatory activity and enhance metabolic profiles, which play a high role in long-term health outcomes in women with PCOS [19]. The significant drops in anthropometric indicators like BMI and waist circumference (p-value < 0.05) go on to indicate the favorable effect of supervised physical exercise about obesity, which is an inherent issue in the treatment of PCOS [11].

Notably, the psychosocial advantages of a properly organized physical activity program should not be dismissed. Exercise is well-known as a strategy of improving mental health outcomes and improving PCOS quality of life in women [20]. A noteworthy aspect of the immediate effects of physical activity are the changes in the mental health markers, such as the decreases in the anxiety and depression, which predominantly occur in people with PCOS [21]. Psychological well-being can have a powerful impact on the commitment to lifestyle changes and success of treatment interventions in the

long run. This interplay of physical activity and mental health points at the necessity of the holistic approach to PCOS management when both should be combined physical and psychological therapy [22].

The case of PCOS indicates that early lifestyles of adolescents have a requirement in the report. The routine treatment of the PCOS patients should include physical activities, changing laziness, and psychological support [23,24]. Determining the gap in adolescents when it comes to the above factors could lead to the prevention of future complications.

The weaknesses of this research are the cross-sectional research design, solely self-reported data collected by the participants and a rather limited sample population. Irrespective of these facts, the given study is rather informative in terms of lifestyle practices of adolescent PCOS and promotes the necessity of particular preventive measures.

The foregoing points underscore the fact that early identification of bad lifestyle practices should be done in adolescents with PCOS. The use of physical activity, sedentary habits decrease, and psychological support should constitute an essential component of the PCOS management among adolescents. The adverse changes related to PCOS could be reversed with early interventions related to lifestyle.

It is advisable to carry out more longitudinal studies involving larger sample sizes to be in a position to measure the objectives of the study to get a better perspective on causal relationships.

CONCLUSION

The findings from this study show that adolescents with PCOS are less physically active, more engaged in sedentary behavior, and are more distressed compared with healthy adolescents. Even when similarities in diet and sleep duration were considered, there could be potential health risks as adolescents with PCOS tend to be more inactive in structured exercise and spend more time sitting**.**

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