Original Research Article

EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME REGARDING POLYCYSTIC OVARIAN SYNDROME AMONG ADOLESCENT GIRLS IN A RURAL AREA OF MAHARASHTRA

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS) is a common endocrinological condition afflicting 4–10% women worldwide and may extend to 15–21% based on Rotterdam diagnostic criteria. Polycystic ovarian syndrome (PCOS) frequently starts during adolescence, but awareness of its symptoms, associated risks, and the importance of seeking help is still limited among girls in rural areas. Insufficient understanding, along with corresponding attitudes and behaviors, hinders timely recognition and necessary lifestyle changes. Implementing structured teaching programs (STPs) in schools could help address this issue. Objectives: To Assess Effectiveness of structured teaching programme on knowledge regarding polycystic ovarian syndrome among adolescent girls in Rural Area. **Materials and Methods:** A quasi-experimental pre and post test design was adopted to assess the effectiveness of a structured teaching programme on knowledge regarding polycystic ovarian syndrome among adolescent girls. A sample of 189 adolescent girls was selected from school and college by convenience sampling. The data collection process was carried out in three phases: Phase I involved conducting a pretest using a structured knowledge questionnaire, which took approximately 20-30 minutes. In Phase II, the researcher delivered the structured teaching program (STP) to each participant on the same day as the data collection. Phase III consisted of a post-test, which was administered to the same participants on the same day, using the same structured knowledge questionnaire. Collected data was analysed by using descriptive and inferential statistics. **Results:** The statistical analysis showed a significant increase in the average knowledge score from 7.80 (pre-test) to 13.98 (post-test), with a p-value of 0.0001. This confirms the effectiveness of the structured teaching program. There was also a remarkable shift in the level of knowledge: Adequate knowledge increased from 8.8% to 94%. Moderate knowledge decreased from 67% to 6%. Inadequate knowledge fell from 24.2% to 0%. This shows not only an increase in overall knowledge but also that nearly all participants moved into the "adequate knowledge" category.
Conclusion: PCOS is a condition that can cause serious health issues and affects young people's reproductive health if not treated properly. Teaching adolescent girls about PCOS helps them understand the condition, which aids in early detection and prevention. The results showed that the girls had limited knowledge about PCOS, but their understanding improved after the program.

Therefore, the study concluded that the structured teaching program is effective in increasing the knowledge of adolescent girls.

Keywords: PCOS, Amenorrhea, Hirsutism, Insulin Resistance, Infertility.

INTRODUCTION

Polycystic Ovary syndrome (PCOS) was previously known as "Stein-Leventhal syndrome" and subsequently referred to as polycystic ovary disease (PCOD) before named PCOS.[1] It is a complex disorder involving endocrine and metabolic factors, marked by the presence of Ovary cysts, irregular or absent ovulation, and elevated androgen levels, which significantly impacts the lives of women in their reproductive years.[2]

According to data from the World Health Organization (2026 WHO fact sheet states PCOS affects an estimated 10 -13% of women of reproductive age worldwide.[3] A review of Indian studies found prevalence in young adult/college-based samples ranging from ~3.7% up to ~22.5%. Pooled prevalence among young adults was ~8.41%.[4] According to information reported by the National Health Portal of India, nearly 17.33% of women in Maharashtra are estimated to be affected by Polycystic Ovary Syndrome (PCOS), highlighting its significant burden at the state level.[5]

Previous research indicates that PCOS may be associated with genetic, lifestyle, and environmental influences, such as an early onset of puberty, fetal development issues, a family history of PCOS in first-degree relatives, lack of physical activity, stress, and obesity.[6] It is a multifaceted condition characterized by high luteinizing hormone levels, low follicle-stimulating hormone levels, and elevated androgens and insulin levels, leading to irregular menstrual cycles such as oligomenorrhea or amenorrhea.[7]

The clinical characteristics of PCOS can be classified into three main categories: reproductive, metabolic, and psychological, and the severity of these features may vary depending on the specific PCOS phenotype identified.[8] Patients might exhibit irregular or absent menstrual cycles alongside symptoms of hyperandrogenism like acne, hirsutism, and the presence of polycystic ovaries observed through pelvic ultrasound. Additional key characteristics commonly seen in individuals with PCOS include weight gain and fluctuations in mood.[9] The diagnosis of PCOS can be done by applying different guidelines or criteria suggested by the National Institute of Health (NIH), the Rotterdam criteria, and the Androgen Excess PCOS Society (AE-PCOS) criteria.[10]

PCOS in adolescents and young women is often not diagnosed and frequently goes unreported. Additionally, those who do not receive treatment may experience complications like infertility, issues during pregnancy, metabolic disorders, and cardiovascular diseases.[11] Women with PCOS are at a higher risk of experiencing impaired glucose tolerance and may develop type 2 diabetes mellitus (T2DM). Additionally, the link between PCOS and reproductive system cancers is a significant issue that warrants attention.[12]

Polycystic ovary syndrome (PCOS) often begins during adolescence and can persist into adulthood, affecting individuals even after menopause; however, knowledge about its symptoms, related risks, and the need to seek treatment remains low among girls in rural regions. Following parents, schools play a crucial role in offering guidance that equips adolescents for a healthy lifestyle.[13] The lifestyle intervention in PCOS, including dietary, physical activity, and behavioral habits strategies need at least 6–12 months to be effective.[14] Insufficient understanding, along with corresponding attitudes and behaviors, hinders timely recognition and necessary lifestyle changes. Introducing structured teaching programs (STPs) in schools could be an effective strategy to tackle this problem. In view of this, the current study was designed.

Objectives
1. To study the baseline knowledge of adolescent girls regarding PCOS.
2. To compare pre-test and post-test knowledge scores after the STP.
3. To determine association between pre-test knowledge and selected sociodemographic variables.
4. To study Effectiveness of structured teaching programme on knowledge regarding polycystic Ovary syndrome among adolescent girls in a Rural Area of Maharashtra.

MATERIALS AND METHODS

1. Study Design and Setting
The study adopted a quasi-experimental design with a single-group pre-test and post-test approach to study the effectiveness of a Structured Teaching Program (STP) on knowledge regarding Polycystic Ovary Syndrome (PCOS). The setting for the study was a rural educational campus located in the Ambajogai block, in Maharashtra comprising 47 secondary school and 5 higher secondary college. A single school and college located on the same campus were selected by random selection for study. The research was conducted during January 2025.

2. Study Participants and Sampling Method
The study population included adolescent girls aged 14–19 years studying in classes VIII to X (secondary level) and higher secondary levels.
A total of 210 adolescent girls were studying in that campus, and all of them were enrolled in study, 110

in secondary school and 100 in higher secondary college. Out of these, 182 girls were present and participated in the study, while 18 were absent at the time of data collection, and 10 were not willing to participate. Written informed consent was obtained from the school head and participants before the commencement of the study.

Inclusion Criteria
- All adolescent girls enrolled in the selected School & college located in the rural area were included in the study.

Exclusion Criteria
1. Adolescent girls who are absent on the day of data collection.
2. Adolescent girls who are not willing to participate in the study.

Operational definition:

POLYCYSTIC OVARIAN SYNDROME:

Polycystic ovarian syndrome (PCOS) was formerly called **Stein-Levinthal Syndrome**.

In 1935, Dr. Stein and Levinthal described a syndrome in which women suffered irregular and usually rare periods, hirsutism, and varying degrees of infertility. The ovaries produce higher-than-normal amounts of androgens, and this can interfere with egg development and release.

Clinical symptoms of PCOS include: menstrual irregularities, inability to get pregnant due to lack of ovulation, increased hair growth in a male distribution pattern (e.g., on face and chest), acne, and obesity.

3. Data collection tool:

The tool used for the study was a **structured knowledge questionnaire** developed to study knowledge about PCOS. It consisted of **two sections**:

- **Section A – Sociodemographic Data**: Included 12 items related to personal and family information such as age, dietary pattern, marital status, weight, height, BMI, type of family, socioeconomic status, religion, age at menarche, menstrual cycle pattern (regular/irregular), parental education and occupation, personal diagnosis of PCOS, and family history of PCOS.
- **Section B – Knowledge Assessment**: Comprised 11 questions focusing on various aspects of PCOS, including female reproductive anatomy and physiology, meaning of PCOS, risk factors, pathophysiology and manifestations, detection, management, and general care. The total score ranged from **0 to 17**, and knowledge levels were interpreted as:
  - Inadequate knowledge: <50% (Scores 0 to 5)
  - Moderate knowledge: 50%–75% (Scores 6 to 11)
  - Adequate knowledge: >75% (Scores 12 to 17)

A pilot study was conducted prior to the main study to validate the questionnaire, and necessary modifications were done in the questionnaire.

4. Data Collection and Ethical Considerations

Prior to data collection, the researcher introduced herself and explained the purpose and objectives of the study to all participants. The entire process of data collection was carried out in three phases:
- Phase I – Pre-Test: Participants completed the structured knowledge questionnaire, which took approximately 20–30 minutes.
- Phase II – Intervention: On the same day, a Structured Teaching Program (STP) on PCOS was delivered by the researcher to all participants using PowerPoint content slide-wise for 20 min which includes all information regarding PCOS like what is PCOS, causative factors, signs and symptoms, early diagnosis and its treatments and future risks if not treated.
- Phase III – Post-Test: The same structured questionnaire was re-administered to study changes in knowledge after the intervention.
- The study received ethical approval from the Institutional Ethics Committee. In addition, formal written permission was obtained from the principals of both the secondary and higher secondary schools. All participants were informed about the study details, and written informed assent was obtained prior to participation. Confidentiality and anonymity of the participants were strictly maintained throughout the research process.

5. Data Analysis

The data collected were systematically entered into a Microsoft Office Excel and were used to prepare tables and calculate the mean and percentage. The data collected were processed using Jamovi statistical software.
- **Descriptive statistics** such as frequency, percentage, mean, and standard deviation were used to summarize the sociodemographic characteristics of the participants and their levels of knowledge related to PCOS.
- **Inferential statistics:**
1. A paired 't'-test was used to compare the mean knowledge scores before and after the Structured Teaching Program to determine its effectiveness.
2. Chi-square tests were applied to examine the association between Pre test knowledge score and selected demographic variables such as age group, marital status, type of family, socioeconomic status, religion and parents education.

RESULTS

The findings are discussed under the following headings;

A total of 182 female students were enrolled in the survey of this study. The largest group consisted of adolescents aged 14 to 16 years (66.5%) who were mostly unmarried (98.4%). Participants came from a variety of family structures, with 51.1% residing in nuclear families and 41.8% in joint families. Most

of adolescents belongs to Hindu religion (91.2%). The dietary habits of adolescent girls show that 50.5% follow a mixed diet, while 41.8% adhere to a vegetarian diet, and the remaining 7.7% practice a non-vegetarian diet. The socioeconomic status of participants differed, with the largest percentage belonging to the lower (34.1%) and lower-middle (31.9%) classes. Concerning the educational background of parents, 63.2% had parents whose education reached the secondary level. The most common age for the onset of menarche was between 12 and 16 years (65.9%), and majority (80.8%) reported having regular menstrual cycles.
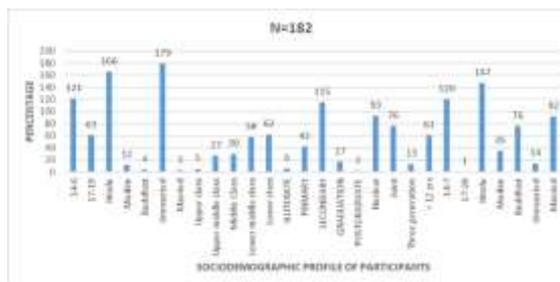

Figure 1: Socio demographic characteristics

Table 1: Distribution of study participants according to Socio demographic characteristics. N=182

CHARACTERISTICS	Category	Respondants	
		NUMBER	PERCENT
AGE	14-16	121	66.5
	17-19	61	33.5
RELIGION	Hindu	166	91.2
	Muslim	12	6.6
	Buddhist	4	2.2
MARITAL STATUS	Unmarried	179	98.4
	Married	3	1.6
SOCIO ECONOMIC STATUS	Upper class	5	2.7
	Upper middle class	27	14.8
	Middle Class	30	16.5
	Lower middle class	58	31.9
	Lower class	62	34.1
PARENTS EDUCATION	Illiterate	6	3.3
	Primary	42	23.1
	Secondary	115	63.2
	Graduate	17	9.3
	Postgraduate	2	1.1
TYPE OF FAMILY	Nuclear	93	51.1
	Joint	76	41.8
	Three generation	13	7.1
AGE OF MENARCHE	< 12 yrs	61	33.5
	12-16 yrs	120	65.9
	>16 yrs	1	0.5
MENSTRUAL PATTERN	Regular	147	80.8
	Irregular	35	19.2
TYPE OF DIET	Veg	76	41.8
	Nonveg	14	7.7
	Mix	92	50.5

Table 2: Study Participants knowledge about PCOS

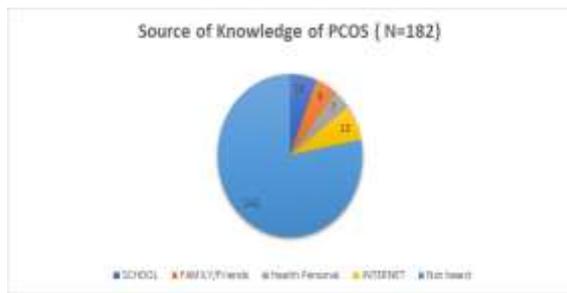| Knowledge		Frequency	Percent
Have you heard about PCOS ?	Yes	40	21.97
	No	142	78.02
where did you hear about PCOS?	School	11	6
	Family/Friends	9	4.9
	Healthcare Professionals	7	3.8
	Internet	13	7.1
	Not heard	142	78
Family H/O PCOS	Yes	20	11
	No	162	89
k/c/o PCOS	Yes	16	8.8
	No	166	91.2

Figure 2: knowledge about PCOS

As indicated in Table 2, only 21.97% (40) of participants were familiar with PCOS, whereas the majority, 78.02 % (142), were not. Among those who were aware, the primary sources of information included the Internet (7.1%), school (6%), friends and family (4.9%), and healthcare professionals (3.8%). A significant proportion (78%) had not received information about PCOS from any source.

In terms of family history, 11% (20) reported having relatives with a history of PCOS, and 8.8% (16) were confirmed cases themselves.

These results suggest a low level of awareness regarding PCOS among adolescent girls, underscoring the necessity for health education initiatives within schools.

Table 3: Pre & Post test score wise distribution of study participants

SR.	QUESTION	MARKS	PRE-SCORE	%	POST-SCORE	%	MAXIMUM
1	What is Polycystic Ovary Syndrome (PCOS)? 1. A type of cancer 2. A hormonal disorder 3. A digestive issue 4. A skin condition	1	128	70.3	174	95.6	182
2	What are common symptoms of PCOS? 1. Irregular periods 2. Excessive hair growth 3. Acne 4. Weight gain	4	227	31.2	568	78	728
3	Can PCOS affect fertility? Yes/No	1	114	57	182	100	182
4	What are some potential long-term health risks associated with PCOS 1. Diabetes 2. Heart disease 3. Osteoporosis 4. Asthma	2	192	52.7	258	70.9	364
5	How is PCOS diagnosed? (Select all that apply) 1. Blood tests 2. Ultrasound 3. Physical examination 4. X-ray	3	144	26.4	388	71.1	546
6	Hormonal therapy (oral contraceptives, hormone intrauterine device etc.) may be used to treat PCOS? Yes/No	1	102	56	144	79.1	182
7	Do you know Anti-diabetic medications (metformin) may be used to treat PCOS? Yes/No	1	71	39	158	86.8	182
8	Do you think weight management helps to reverse PCOS symptoms? Yes/No	1	94	51.6	152	83.5	182
9	Do you think Healthy diet (Fibre, good fats, protein) helps to prevent PCOS? Yes/No	1	110	60.4	167	91.8	182
10	Do you think Physical activity helps to prevent PCOS? Yes/No	1	120	65.9	172	94.5	182
11	Do you think PCOS is curable? Yes/No	1	118	64.8	182	100	182

This table shows comparisons of participants' knowledge on different aspects of PCOS before and after the teaching program. There was a significant improvement in correct answers for all 11 questions after the structured teaching program (p < 0.001 for all items). Recognition of PCOS as a hormonal disorder increased from 70.3% to 95.6%. Awareness of symptoms, such as irregular periods, acne, hair growth, and weight gain, along with long-term issues like diabetes and heart disease, also increased significantly. Knowledge about diagnosis methods, including ultrasound, physical examination and blood tests, as well as treatments like hormonal therapy, metformin, and lifestyle changes, showed noticeable improvement. Healthy habits like diet, physical activity, and weight management, along with belief in the curability of PCOS, had high accuracy post-test (above 85-95%).
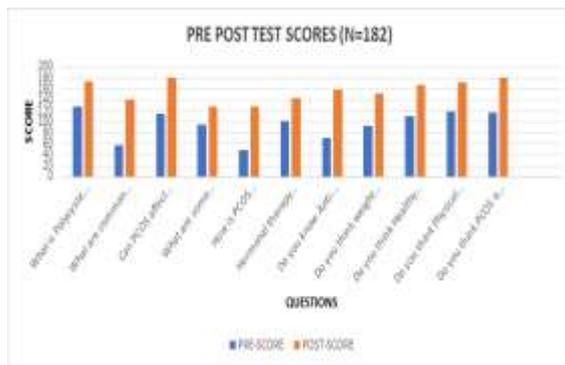
Figure 3: Pre & Post test score wise distribution of study participants

Table 4: Association between the Pre-test knowledge score and selected demographic variables

Demographic variables		ADEQUATE KNOWLEDGE	MODERATE KNOWLEDGE	INADEQUATE KNOWLEDGE	$\chi 2$	D F	P
AGE GROUP	14-16	15	78	28	9.85	1	0.05
	17-19	1	44	16			
MARITAL STATUS	Unmarried	16	120	43	0.58	1	0.829
	Married	0	2	1			
TYPE OF FAMILY	Nuclear	12	61	20	10.04	2	0.035
	Joint	4	55	17			
	Three generation	0	6	7			
SES	Upper Class	0	4	1	11.25	4	0.109
	Upper middle class	2	23	2			
	Middle class	3	24	3			
	Lower middle class	4	35	19			
	Lower class	7	36	19			
RELIGION	Hindu	16	112	38	3.97	3	0.501
	Muslim	0	8	4			
	Buddhist	0	2	2			
	Others	0	0	0			
PARENTS EDUCATION	Illiterate	0	6	0	6.84	4	0.424
	Primary	2	30	10			
	Secondary	14	73	28			
	Graduate	0	12	5			
	Postgraduate	0	1	1			

("The p-value is less than or equal to 0.05, indicating that the association is statistically significant at the 95% confidence interval.)

This part of the study looked at whether personal or background characteristics were related to how much the girls knew about PCOS before the teaching program. Age and family type had a clear association with Pre-test knowledge (P=0.05 and P= 0.035). For example, younger girls and those from joint or three-generation families were more likely to have limited knowledge. Younger girls might have less experience and maturity, whereas families with joint or three generations frequently limit open conversations about reproductive health, resulting in a lower level of knowledge. In contrast, factors like marital status, socioeconomic status, religion, and parents' education did not have a strong connection with knowledge levels before the session. [Table 4]

Table 5: Mean, standard deviation (SD) and paired "t" test between Pre-Post test knowledge scores of study participants

Knowledge scores	Mean	Standard Deviation	't' value	'p' value
Pre score	7.80	2.703	−26.247	0.0001(S)
Post score	13.98	1.650		

The average knowledge score before the structured teaching program was 7.8 out of a possible 17. The standard deviation was 2.7. After the teaching session, the average score was increased significantly to 13.98, with a standard deviation of 1.65. The paired t-test showed a very significant difference (p = 0.0001). This indicates that the teaching session had a strong effect on improving knowledge about PCOS among the participants. [Table 5].

Table 6: Distribution of knowledge scores of the study participants on PCOS (N=182)

Level of Knowledge	Pre Score	Percentage	Post Score	Percentage
Adequate	16	8.8%	171	94%
Moderate	122	67%	11	6%
Inadequate	44	24.2%	0	0%

The combined bar chart shows a marked improvement in adolescents' knowledge about PCOS after the structured teaching program. Before the intervention, most participants had moderate (67%) or inadequate knowledge (24.2%), and only 8.8% had adequate knowledge. After the program, 94% achieved adequate knowledge, while moderate knowledge dropped to 6% and inadequate knowledge to 0%. The sharp rise in the blue bar for "Adequate" and decline in "Moderate" and "Inadequate" categories highlight the effectiveness of the program.

DISCUSSION

The present study looked at how a structured teaching program increased knowledge about Polycystic Ovary Syndrome (PCOS) among adolescent girls in a rural area. Polycystic Ovary syndrome (PCOS) is a health condition that can lead to serious medical issues and affect reproductive health if left untreated. Prior to the intervention, the majority of participants demonstrated moderate knowledge (67%) or insufficient knowledge (24.2%), with just 8.8% exhibiting adequate knowledge. Following the STP, 94% reached adequate knowledge, while those with moderate knowledge decreased to 6% and none of them had inadequate knowledge. The results of this study align with the research conducted by Davies MJ and Lord J, which focused on "Health education on knowledge of Polycystic Ovary syndrome." The adolescent girls in that study demonstrated limited awareness of PCOS, with 53.7% possessing a moderate level of knowledge. Furthermore, 66.2% of these girls expressed a desire for enhanced knowledge and information on the topic. This study indicated that a pressing need for effective intervention strategies, both at the community and the clinic level.[15]

The study shows that only 20.9% of participants had heard about PCOS, while the majority (79.1%) were not aware of it. Regarding family history, 11% had a positive family history of PCOS, and 8.8% were known cases themselves. This highlights a low level of awareness about PCOS in the study population, with limited health professional involvement in spreading information. While in the previous study conducted at NUINS, the average level of awareness was 76%. In this study, 57.8%, 36.9% and 5.2% of the participants had good, fair and poor knowledge respectively.[16] In research carried out by Pitchai et al., 21% demonstrated good knowledge, 46% exhibited fair knowledge, and 6% showed poor knowledge.[17] Among those who had heard, the main sources of information were the internet

(7.1%), school (6%), family/friends (4.9%), and health personnel (3.8%). A significant proportion (78%) reported that they had never heard about PCOS. Similar results were seen in a study carried out by Alessa A et al., who found that 15.3%, 21.3%, 10.4%, 10.8 and 3% knew about PCOS by getting affected by PCOS, Internet, patients, doctors and books respectively.[18]

Personal and background characteristics were connected to the level of knowledge the girls had about PCOS prior to the educational program. Age and family structure showed a significant link with Pre-test understanding (P=0.054 and P=0.035). For instance, younger girls and those from joint or three-generation households tended to have less knowledge. On the other hand, factors such as marital status, socioeconomic background, religion, and parents' educational attainment did not exhibit a significant relationship with knowledge levels prior to the session.

The present study result revealed that there was significant difference between the mean Pre-test and Post-test knowledge scores regarding PCOS. The mean Pre-test score was 7.80 (SD = 2.703) which was less than the mean Post-test score of 13.98 (SD = 1.650). The 't' value computed between Pre-test and Post-test knowledge scores was -26.247 at p = 0.0001, which was statistically significant. Hence, it was proved that the structured teaching programme (STP) was highly effective in enhancing the knowledge of adolescent girls about PCOS.

CONCLUSION

Polycystic Ovary syndrome (PCOS) is a condition that can cause serious health issues and affects young people's reproductive health if not treated properly. Teaching adolescent girls about PCOS helps them understand the disease and its consequences, which aids in early detection and prevention. This study evaluated the knowledge of adolescent girls about Polycystic Ovary syndrome before and after a structured teaching program. The results showed that the girls had limited knowledge about PCOS before STP, but their knowledge improved after the program. Therefore, the study concluded that the structured teaching program was effective in increasing the knowledge of adolescent girls.

Limitation

- It was conducted at a single center in a specific rural area, which may limit the universal applicability of its findings to other regions with different cultural or socioeconomic contexts.
- The study design also did not study the long-term knowledge retention of the participants or,

more critically, the program's effect on subsequent health-seeking behaviors.

- Early adolescents (10–13 years) are generally unable to comprehend complex medical concepts and therefore require simplified explanations through visuals or story-based methods so they are not included in the study.

Strength of Study

The study focused on an important health problem, PCOS, among adolescent girls in a rural area where awareness is low. Using a structured teaching programme helped in improving knowledge in a systematic way. The Pre-Post-test design clearly showed the effectiveness of the programme. The study also provides useful baseline information that can guide future health education activities.

Recommendation

1. PCOS awareness should be incorporated into adolescence education programmes in schools and colleges.
2. Regular workshops, seminars, and group discussions should be conducted to improve knowledge and early recognition.
3. Adolescents should be sensitized about the need for early medical attention and lifestyle modification.
4. Health professionals should actively provide guidance, counseling, and screening.
5. Further studies with larger samples and long-term follow-up are recommended to assess sustained impact and reproductive health outcomes.

Acknowledgements

Conflict of Interest: No Conflict of Interest.

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