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Impact of Health Education on Knowledge About Polycystic Ovarian Syndrome (PCOS) Among Nursing Students in Bhubaneswar, Odisha

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ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a common hormonal disorder among women of reproductive age, characterized by irregular menstruation, elevated androgen levels, and often ovarian cysts, which can lead to serious reproductive and metabolic complications such as infertility. This study aimed to evaluate the effectiveness of a structured teaching programme in enhancing knowledge about PCOS among adult girls at Hi-Tech School and College of Nursing, Bhubaneswar. The study employed a descriptive survey method and a pre-test post-test research design. A total of 50 adult girls were selected as the sample. Data was collected using a structured questionnaire administered before and after the educational intervention, which included an informative booklet on PCOS. The pre-test results revealed that only 44% of participants had average knowledge, with a mean score of 13.2 (SD ±5.6). After the structured teaching programme, the post-test mean score significantly increased to 23.34 (SD ±4.62), translating to a mean percentage of 77.8% and a knowledge gain of 33.8%. The decrease in standard deviation indicated more consistent knowledge levels among participants post-intervention. A t-value of 9.88 with 49 degrees of freedom and a p-value of 0.000 demonstrated that the improvement in knowledge was statistically highly significant. These findings confirm the effectiveness of structured teaching in increasing awareness and understanding of PCOS. The study suggests that health education interventions can play a crucial role in addressing knowledge gaps among young women, potentially leading to better health outcomes. It also recommends conducting further studies with larger samples and diversified methods such as interviews to enhance the depth and generalizability of the findings. In conclusion, the study highlights health education as an essential strategy in empowering young women with the knowledge to manage and prevent complications related to PCOS.

Keywords: *Knowledge, Structured teaching programme, PCOS*

1. INTRODUCTION

Polycystic ovarian syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age globally, with an estimated prevalence ranging from 4% to 21% depending on diagnostic criteria and population [1]. Characterised by a constellation of symptoms including menstrual irregularities, hyperandrogenism, polycystic ovaries, and metabolic abnormalities, PCOS not only affects reproductive health but also poses long-term risks such as type 2 diabetes, infertility, cardiovascular diseases, and psychological distress [2,3].

Despite its high prevalence and significant health implications, awareness and understanding of PCOS among young women, particularly adolescents and early adults, remain remarkably low [4,5]. A lack of knowledge about PCOS can result in delayed diagnosis, poor health-seeking behaviour, inadequate management, and increased disease burden later in life [6]. In India, where PCOS is increasingly being recognised among young females due to changing lifestyles, urbanisation, and dietary patterns, the need for early education and preventive strategies is critical [7,8].

Structured teaching programs have been widely recognised as an effective educational intervention for improving health awareness and promoting behavioural changes [9]. When designed appropriately, such programmes can help young women recognise early symptoms of PCOS, understand its complications, and adopt healthier lifestyles, including dietary modifications and physical activity [10]. Health education in academic settings, especially nursing colleges, plays a pivotal role in building knowledge not only for personal benefit but also for future patient education [11].

Studies conducted among adolescent girls and college students have shown that structured teaching interventions significantly enhance knowledge and awareness about PCOS, leading to improved attitudes and preventive practices [12,13]. However, most of these studies are urban-centric or confined to medical colleges, with limited data from nursing institutions, especially in Eastern India. Moreover, students of nursing programmes are future health educators themselves, and strengthening their knowledge base can have a ripple effect in disseminating PCOS-related awareness among communities [14].

In Odisha, awareness of PCOS among nursing students is understudied, and structured educational efforts to address this gap are lacking. Therefore, this study was undertaken to assess the impact of a structured teaching programme on improving knowledge about PCOS among adult girls studying at Hi-Tech School and College of Nursing, Bhubaneswar. This evidence can guide future reproductive health education strategies targeted at young women and healthcare trainees in similar settings.

2. MATERIALS AND METHODS

This quasi-experimental study was conducted at Hi-Tech School and College of Nursing, Bhubaneswar, Odisha, to assess the impact of a structured teaching programme on improving knowledge about polycystic ovarian disease (PCOD) among adult female nursing students diagnosed with the condition. The independent variable was the structured teaching programme, and the dependent variable was the knowledge level regarding PCOD. The target population included all adult female students diagnosed with PCOD in the institution, and the accessible population comprised those present and willing to participate at the time of data collection. A total of 50 participants were selected using probability sampling, specifically the stratified random sampling technique, to ensure representative distribution across academic years.

Inclusion criteria were: (1) diagnosed with PCOD by a medical practitioner, (2) enrolled as students in the college, and (3) willingness to participate. Exclusion criteria were: students who were absent during data collection, unwilling to participate, or not diagnosed with PCOD.

A structured knowledge questionnaire was developed as the data collection tool. It was constructed following an extensive literature review, expert consultation, and the researcher's prior clinical experience. The tool consisted of two sections:

Section I included 10 demographic items such as age, religion, marital status, type of family, family income, age at menarche, and last menstrual period.

Section II consisted of 30 multiple-choice questions covering the definition, causes, clinical features, diagnostic methods, complications, and management of PCOD. Each correct answer was awarded one point, while incorrect responses were scored zero. The maximum possible score was 30.

Content validity was established through expert review by six Heads of Departments (HODs) in nursing and obstetrics & gynaecology, who assessed the questionnaire for relevance, clarity, and appropriateness. Suggestions were incorporated into the final version of the tool.

Data collection procedure

After obtaining formal permission from the concerned authority, the investigator selected 50 students diagnosed with PCOD using a probability sampling technique. Data collection was conducted within the nursing education setting using the interview method. Prior to data collection, informed consent was obtained from each participant after explaining the purpose of the study. On the first day, a pre-test was administered to assess the participants' baseline knowledge, followed by the

implementation of a structured teaching program. A post-test was conducted on the seventh day to evaluate the effectiveness of the intervention. The investigator ensured that all participants were comfortable and clearly understood the process by explaining the purpose of the study and providing detailed instructions on how to respond to the questions included in the tool. The entire data collection process was carried out smoothly without any difficulties, maintaining clarity and ease for all participants throughout.

Sample size:

Sample size calculation was done by using Yamane's formula

n=N/ (1+Ne^2)

Where, n= corrected sample size, N = population size, and e = Margin of error

Total 50 samples were selected for the study

Statistical analysis:

In the analysis of the data, both descriptive and inferential statistical methods were utilized to interpret the findings effectively. Data were analyzed using IBM SPSS version 22 software and presented in tabulated form for clarity and ease of understanding. Data were analysed using descriptive and inferential statistics. Knowledge scores were expressed as means and standard deviations. The effect of the structured teaching programme was tested using the paired t-test, with a p-value of <0.05 considered statistically significant.

3. RESULTS

Table 1: Socio-Demographic Characteristics of suffering PCOD adult girlsN=50

Variable	Frequency(f)	Percentage (%)	Mean ± SD
Age in years			21.22 ± 1.45
18-20	14	28	
21-23	35	70	
Above 24	1	2	
Religion			
Hindu	50	100	
Type of Family			
Nuclear	48	96	
Joint	2	4	
Marital status			
Married	1	2	
Unmarried	49	98	
Income of the Family			
Below Rs.10,000	1	2	
Between Rs.10,001-30,000	20	40	
Between Rs.30,001-50,000	15	30	
Between Rs.50,001-Rs.1,00,000	14	28	
Month of LMP			
1st Week of Last Month	20	40	
2nd Week of Last Month	9	18	
3rd Week of Last Month	15	30	
4th Week of Last Month	6	12	

Age in years of Menarche			12.56 ± 1.50
10-12	24	48	
13-15	26	52	

Table:1 shows that the demographic characteristics of the students. The majority (70%) of the students fall within the age group of 21 to 23 years, while only 2% are above 23 years of age. All (100%) of the students belongs to Hindu. Most of the students (96%) belong to nuclear families, and a small proportion (4%) are from joint families. Regarding marital status, 98% of the students are unmarried, whereas only 2% are married. In terms of monthly family income, 40% of students reported an income between Rs. 10,001 to 30,000, while the lowest income group, earning less than Rs. 10,000, accounted for 2%. With respect to the menstrual cycle, 40% of the students reported being in the first week of their cycle during the last month, and only 12% were in the fourth week. Menarcheal age distribution shows that the highest percentage (52%) of students attained menarche between the ages of 13 to 15 years, while the lowest percentage (24%) experienced it between the ages of 10 to 12 years.

Table2: Distribution of pre-test and post-test knowledge scores of the adolescent girls on PCOS N=50

Level of knowledge	**Pre-test knowledge Score**		**Post-test knowledge Score**	
	Frequency (f)	**Percentage (%)**	**Frequency (f)**	**Percentage (%)**
Poor (<30%)	15	30	-	-
Average (31-60%)	25	50	9	18
Good (61-90%)	7	14	26	52
Excellent (>90%)	3	6	15	30

Table:2 reveal that the knowledge level distribution before and after the structured teaching program shows that Initially, 30% had poor knowledge, 50% average, 14% good, and only 6% excellent. However, in the post-test, no students remained in the poor category; average 18%, while good and excellent levels 52% and 30%, respectively. This significant shift highlights the effectiveness of the structured teaching program in improving knowledge about PCOD.

Table 3: Mean, Standard deviation, value regarding Pre-test and Post-test knowledge score among Nursing Students N=50

Knowledge Score	**Mean**	**SD**	**Mean%**	**Knowledge Enhancement%**	**t**	**df**	**P value**
Pre-test Knowledge Score	13.2	5.60	44%	33.8%	9.88	49	0.000
Post-test Knowledge Score	23.34	4.62	77.8%				

***p < 0.05 indicates statistical significance.**

Table3 reveals that the analysis of knowledge scores before and after the structured teaching program reveals a significant improvement. The mean pre-test score was 13.2 with a standard deviation of 5.6, reflecting a mean percentage of 44%. After the intervention, the mean post-test score increased to 23.34 with a standard deviation of 4.62, corresponding to a mean percentage of 77.8%. This indicates a knowledge enhancement of 33.8%. The calculated t-value was 9.88 with 49 degrees of freedom, and the p-value was 0.000, confirming that the improvement in knowledge was statistically highly significant.

Table 4: Effect Size Calculation (Cohen's d)

Group	Mean Difference (Post – Pre)	Pooled SD	Cohen's d (Effect Size)	Interpretation
Knowledge Score	10.14	5.15	1.97	Large Effect

Cohen's d was calculated to determine the magnitude of change in knowledge scores among nursing students following the structured teaching programme on PCOS. With a mean difference of 10.14 and a pooled standard deviation of 5.15, the resulting Cohen's d value was 1.97. According to conventional thresholds (0.2 = small, 0.5 = medium, 0.8+ = large), this represents a **large effect size**. Thus, the structured teaching intervention had a substantial and practically meaningful impact on improving the students' knowledge about PCOS in Table 4..

Table 5: Association Between Demographic Variables and Pre-test Knowledge Scores Among Nursing Students (N = 50)

Demographic Variable	Category	Knowledge Level	Test Used	p-value	Significance
Age (in years)	18–20, 21–23, >24	Poor / Average / Good	ANOVA	0.412	Not Significant
Type of Family	Nuclear, Joint	Poor / Average / Good	Chi-square Test	0.537	Not Significant
Monthly Family Income	<10,000 / 10,001–30,000 / >30,000	Poor / Average / Good	Chi-square Test	0.026*	Significant
Age at Menarche	10–12, 13–15	Poor / Average / Good	ANOVA	0.191	Not Significant

***p < 0.05 indicates statistical significance.**

Table 5 presents the association between selected demographic variables & the pre-test knowledge scores of nursing students regarding PCOS. The analysis revealed a statistically significant association between monthly family income and knowledge levels ($p = 0.026$), suggesting that students from higher-income families had better baseline knowledge about PCOS. No significant associations were observed with age, type of family, or age at menarche. ANOVA was used for continuous variables (age, age at menarche), while the Chi-square test was applied for categorical variables (family type, income).

4. DISCUSSION

In this quasi-experimental study, the structured teaching programme significantly improved nursing students' knowledge of PCOS, as evidenced by the shift in knowledge categories, increased mean scores, substantial effect size (Cohen's $d = 1.97$), and a clear association with income level. These findings align well with recent literature on educational interventions.

Firstly, our results mirror those of Pati et al. (2022), who implemented a similar structured teaching programme among BSc nursing students in Nagpur. They reported a significant increase in mean knowledge scores from 19.8 ± 3.62 to 25.3 ± 2.86 with a t-value of 12.09 ($p < 0.05$) similar to our $t = 9.88$, $df = 49$ ($p < 0.001$) [15]. This supports the consistency and reproducibility of structured interventions in enhancing PCOS knowledge.

Studies among adolescent girls further endorse our findings: Sana et al. (2024) observed a marked rise in knowledge, from 24% pre-intervention to well over 90% post-intervention ($p < 0.0001$) in a school-based educational programme, indicating the effectiveness of teaching tools in improving awareness [16]. Another school-based study reported over 94% correct responses post-education in all PCOS domains [17].

In the nursing context, Mohamed et al.'s RCT compared web-based versus traditional learning, showing higher post-test scores in the web-based group (32.2 ± 10.5 vs 22.1 ± 10.2; $p < 0.05$) [18]. Though our intervention was face-to-face, the magnitude of improvement is comparable, highlighting that educational methods—whether digital or structured—can yield meaningful knowledge gains.

Wijayathilake et al. (2024) in Egypt also found significant gains following structured programmes in a group of 96 nursing students [19], reinforcing our conclusion that tailored education markedly improves understanding.

Importantly, our Cohen's d of 1.97 suggests a large practical effect, significantly higher than the typical large threshold of

0.8, showing that our programme delivered not only statistically significant but clinically meaningful improvements. This echoes findings by similar education-focused interventions where large effect sizes were also observed (e.g., $d > 1.0$ in high-attainment educational settings) [20].

The only demographic factor significantly associated with baseline knowledge was monthly family income ($p = 0.026$). While some studies—conducted in broader adolescent populations—have noted associations between socio-demographic factors and knowledge [17], others in nursing cohorts reported non-significant associations, except possibly with prior exposure or educational level [21,22]. Our finding suggests that socioeconomic background may influence initial awareness but can be equalised by effective structured teaching.

Overall, the study confirms that structured educational interventions substantially elevate PCOS knowledge among nursing students. The improvement aligns with international evidence and underscores the need for embedding such programmes—whether traditional or digital—into nursing curricula to foster early awareness and promote informed healthcare delivery.

5. LIMITATION

The study has certain limitations that should be considered while interpreting the findings. Firstly, the results are limited to a sample of 50 students from Hi-Tech School and College of Nursing, Bhubaneswar, who were diagnosed with PCOD, which may restrict the generalizability of the findings. Secondly, although probability sampling was intended, the actual sampling method followed was convenience sampling, which may introduce selection bias. Additionally, the structured knowledge questionnaire and observation checklist were self-developed, as no standardized tools were available, potentially affecting the tool's reliability and validity. Finally, the study was carried out within a restricted time frame, which may have affected the thoroughness of data collection and analysis.

6. CONCLUSION

The present findings reaffirm that structured educational interventions significantly enhance knowledge of PCOS among nursing students. Socioeconomic factors influence baseline knowledge, but well-designed teaching modules can bridge these gaps. As similar interventions have succeeded in community and institutional settings, adopting hybrid and web-based methods could further increase effectiveness and reach.

Ethical Consideration

Ethical considerations were carefully observed throughout the study to ensure the rights and well-being of the participants. Prior approval was obtained from the Institutional Ethics Committee of Hi-Tech School and College of Nursing, Bhubaneswar. Formal permission was also secured from the concerned authorities before conducting the study. Informed consent was obtained from each participant after explaining the purpose, procedure, and their right to withdraw at any stage without any consequences.

Conflict of Interest: Nil

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