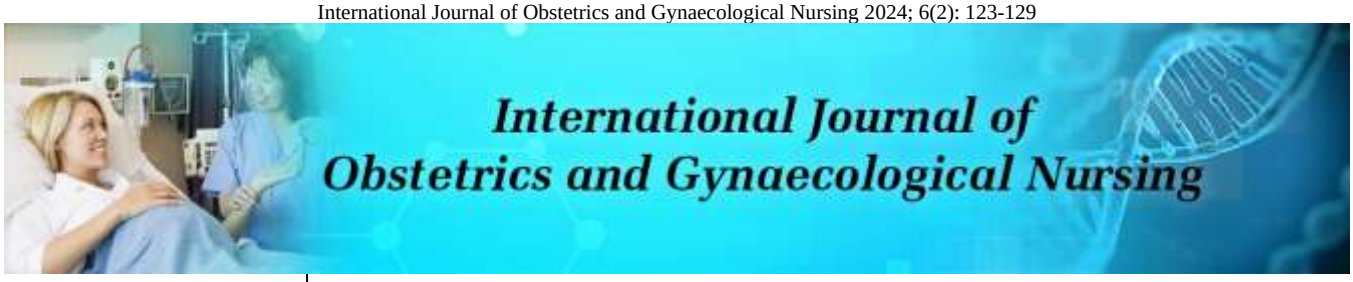

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A study to assess the effectiveness of Information booklet on knowledge regarding polycystic ovarian syndrome (PCOS) among adolescent girls in selected higher secondary schools of East Khasi Hills, Meghalaya

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Abstract
A quasi -experimental one-group pre-test post-test research design was conducted among 92 adolescent girls studying in class XII at BSF Senior Secondary Schools in East Khasi Hills, Meghalaya using total census enumeration sampling technique. The data were collected using structured questionnaire to assess the knowledge level of polycystic ovarian syndrome (PCOS) before and after the administration of the Information Booklet regarding polycystic ovarian syndrome (PCOS). Analysis of the collected data was done by using descriptive and inferential statistics. The findings of the study revealed that prior to the intervention, only 22 adolescent girls (23.9%) had good knowledge of polycystic ovarian syndrome, 46 (50%) had average knowledge, and 24 (26.1%) had poor knowledge. After the intervention, 68 girls (73.9%) demonstrated good knowledge, 19 (20.7%) had average knowledge, and just 5 (5.4%) had poor knowledge. The mean ± SD scores were 18.43 ± 4.53 for the pre-test and 23.28 ± 3.76 for the post-test, with a mean difference of 4.85. The obtained t-value was -10.324 with 91 degrees of freedom, which was statistically significant at $p < 0.001$ using a paired t-test. This indicates that the Information Booklet effectively increased knowledge about polycystic ovarian syndrome (PCOS). Furthermore, the study also found that there was a significant association between pre-test knowledge scores and selected demographic variables such as age, religion, stream, age of menarche, family history of PCOS, and previous information about PCOS at a significance level of $p \leq 0.05$.
Conclusion: In conclusion, the Information Booklet was effective in enhancing knowledge about PCOS among adolescent girls, as evidenced by the significant increase in mean post-test knowledge scores compared to pre-test scores across all measured areas.

Keywords: Effectiveness, information booklet, knowledge, adolescent girl, polycystic ovarian syndrome

Introduction
Polycystic Ovarian Syndrome (PCOS) stands as the most widespread female endocrine disorder and is the leading cause of infertility. Its prevalence globally falls within a range of 6-26%, while in India, it spans from 3.7% to 22.5% [1]. In 2023, the World Health Organization (WHO) projected that Polycystic Ovary Syndrome (PCOS) impacts approximately 8–13% of women in their reproductive years. Alarmingly, up to 70% of women affected by PCOS worldwide are undiagnosed.
Polycystic Ovarian Syndrome (PCOS) commonly presents itself around the onset of menstruation with irregular and prolonged menstrual cycles. The impact of modernization and technological advancements on our lifestyle has been profound. With the advent of fast-food chains, ready-to-eat meals, and sugary beverages, it's become easier and more convenient to opt for these choices over healthier alternatives. Such lifestyle choices are linked to a range of health issues, such as polycystic ovarian syndrome (PCOS), which is especially common among adolescent girls. Adolescent girls frequently experience symptoms such as oligomenorrhea (Infrequent menstrual periods), amenorrhea (Absence of menstrual periods), and hirsutism, characterized by excessive and increased body hair growth, often following a male pattern on areas such as the face, chest, and legs [2].

Need of the study

The adolescent period marks a significant transition from childhood to adulthood, encompassing physiological, psychological, social, and emotional changes. Any deviation in secondary sex characteristics during this phase can impact the physical and emotional adjustment of adolescents. Polycystic ovarian syndrome (PCOS) is characterized by an imbalance of female sex hormones in women, leading to alterations in the menstrual cycle, ovarian cysts, difficulties in conceiving, and other health issues. It is a prevalent health concern among adolescent girls, and if left untreated, it can result in serious health complications [4]. Polycystic ovarian syndrome (PCOS) is a common yet underdiagnosed condition affecting 6-18 percent of women at reproductive age, but its side effects extend beyond infertility and menstrual irregularities [5]. Polycystic Ovarian Syndrome (PCOS) in adolescent girls is associated with risk factors such as obesity, particularly abdominal obesity. At least 30.0 percent of adult females affected by polycystic ovarian syndrome (PCOS) are obese. Hyperinsulinemia, caused by insulin resistance, is a common feature, affecting 50-70% of adult females with polycystic ovarian syndrome (PCOS). It is linked with several clinical outcomes and disabilities, including reproductive issues such as menstrual irregularity and infertility, metabolic complications like insulin resistance, diabetes mellitus, and cardiac disorders, as well as psychological challenges such as anxiety and depression [6]. In spite of high prevalence (9.13-22.5%), polycystic ovarian syndrome (PCOS) is usually misdiagnosed and requires more than one visit [7]. Early diagnosis and treatment might reduce the complications faced by the patients due to long-standing diseases. Diagnosis of the early symptoms of polycystic ovarian syndrome (PCOS) is possible in individuals with late puberty and early adolescence, both of which are commonly correlated with lifestyle and environmental changes [8, 9]. A number of cases in the community due to lack of awareness and proper guidance, it remains undiagnosed [10]. Timely identification of polycystic ovarian syndrome (PCOS) is crucial for prompt intervention to mitigate both the immediate and long-term complications associated with the condition. The management of polycystic ovarian syndrome (PCOS) should prioritize support and education, with a strong emphasis on adopting a healthy lifestyle. Lifestyle modification is recommended as the initial approach for the non-pharmacological and noninvasive management of Polycystic Ovary Syndrome (PCOS). Targeted medical therapy should be employed as necessary [11]. Considering the importance of knowledge regarding polycystic ovarian syndrome (PCOS) among the female population and its association with the prognosis of the disorder, assessing the knowledge level is an essential part of disease management [12]. This study aims to evaluate the extent of knowledge among adolescent girls in selected higher secondary school of East Khasi Hills, Meghalaya. Additionally, it seeks to investigate the effectiveness of an information booklet in enhancing their understanding of polycystic ovarian syndrome (PCOS).

Objectives

1. To assess the level of knowledge regarding polycystic ovarian syndrome (PCOS) among adolescent girls in selected Higher Secondary Schools of East Khasi Hills, Meghalaya.
2. To determine the effectiveness of Information Booklet regarding polycystic ovarian syndrome (PCOS) among adolescent girls in selected Higher Secondary Schools of East Khasi Hills, Meghalaya.
3. To find the association between the level of knowledge with selected demographic variables.

Research Methodology

This study incorporated a quantitative research approach and a quasi-experimental one group pre-test post-test research design. Total enumeration sampling technique was used to select 92 adolescent girls studying in class XII at BSF Senior Secondary School, East Khasi Hills, Meghalaya. Furthermore, a structured self-administered questionnaire was designed to assess the level of knowledge regarding polycystic ovarian syndrome (PCOS) comprising of 30 multiple choice items. As an additional resource, an information booklet was developed to serve as both a teaching aid and a key intervention tool within the study. Karl Pearson correlation coefficient formula and Spearman's Brown Prophecy formula were used to determine the tool's reliability and the obtained reliability coefficient was 0.86.

Ethical consideration was sought from the Thesis Review and Monitoring committee (TRMC), NEIGRIHMS and Institutional Ethical Committee (IEC), NEIGRIHMS (North Eastern Indra Gandhi Regional Institute of Health and Medical Sciences). Formal Permission was obtained from Principal College of Nursing, NEIGRIHMS as well as from the principal of BSF Senior Secondary School, East Khasi Hills, Meghalaya, prior explanation about the study being conducted was given to the participants and Prior written consent was obtained from the study participants.

Results and Discussion

Findings related to socio-demographic variables of adolescent girls participating in the study

Table 1: Frequency and percentage distribution of adolescent girls according to their socio-demographic variables. N=92

Demogrphic Variable	Frequency (f)	Percentage (%)
AGE (in years)		
≤16	20	21.70
17-18	69	75.00
≥19	03	03.30
Religion		
Christian	54	58.70
Hindu	33	35.90
Others	05	05.40
Stream		
Commerce	20	21.70
Arts	26	28.30
Science	46	50.00
Family Income Monthly (in rupees)		
≤50000	43	46.70
50001-100000	35	38.00
≥100001	14	15.20
Age of Menarche (in years)		
≤12	46	50.00
≥13	46	50.00
Menstrual Cycle		
Irregular	07	07.60
Regular	85	92.40
Duration of Flow of Menstruation (in days)		
≤3	11	12.00
4-6	62	67.40
≥7	19	20.70
Consumption of Fast Food		
No	05	05.40
Yes	87	94.60
Do you exercise or involve in physical activity? (At least thrice in a week)		
Yes	41	44.60
No	51	55.40
Any Disease Condition Present		
Yes	11	12.00
No	81	88.00
Family History of PCOS		
Yes	03	03.30
No	89	96.70
Previous Information About PCOS		
Yes	07	
No	85	
If yes, source of information is (n=7)		
Health care provider	01	14.28
Family	03	42.86
Internet	03	42.86

Table 1 presents socio-demographic data concerning adolescent girls from BSF Senior Secondary School, Umpling, Meghalaya. Out of the total 92 participants, 69 (75%) are aged between 17 and 18 years. The majority, 54 (58.7%), identify with the Christian religion. Additionally, 46 (50.0%) of the participants are enrolled in the science stream, and 43 (46.7%) come from families with a monthly income of less than 50,001. Furthermore, 46 (50%) of the adolescent girls experienced menarche at the age of 12 years. Most participants, 85 (92.4%), have a regular menstrual cycle, with 62 (67.4%) reporting a menstruation duration of 4-6 days. The majority, 87 (94.6%), consume fast food, and 51 (55.4%) are not engaged in physical activity. Only 11 (12.0%) of the adolescent girls have a present disease condition, and 03 (03.3%) have a family history of polycystic ovarian syndrome (PCOS). Moreover, 07 (07.6%) adolescent girls have prior information about polycystic ovarian syndrome (PCOS).

Findings related to the level of knowledge of adolescent girls regarding polycystic ovarian syndrome (PCOS)

Table 2: Frequency and percentage distribution of adolescent girls based on pre-test knowledge score regarding polycystic ovarian syndrome (PCOS) N=92

Level of Knowledge	Range of score and Percentage	Pre-test	
		Frequency (f)	Percentage (%)
Good	22-30 (≥75%)	22	23.9
Average	16-21 (50-75%)	46	50.0
Poor	0-15 (≤50%)	24	26.1

Maximum score-30: Table 2 depicts that in pre-test, 22 (23.9%) adolescent girls had good knowledge, 46 (50.0%) adolescent girls had average knowledge and 24 (26.1%) adolescent girls had poor knowledge.

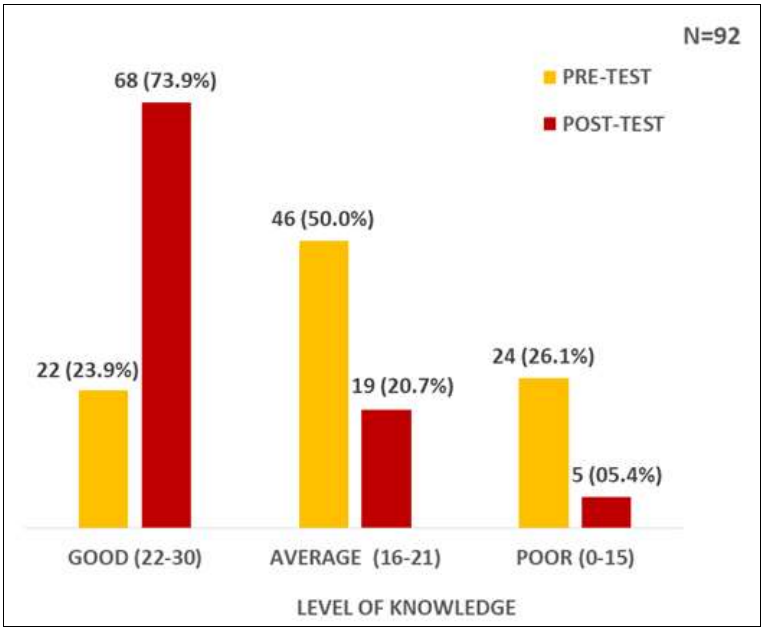

Fig 1: Bar diagram showing frequency and percentage distributions of the pre-test and post-test Knowledge scores of adolescent girls regarding polycystic ovarian syndrome (PCOS).

The data presented in the above figure 1, illustrates that initially, only 22 (23.9%) adolescent girls demonstrated good knowledge in the pre-test. However, following the distribution of information booklets, the number increased significantly to 68 (73.9%) in the post-test. Similarly, 46 (50%) adolescent girls exhibited average knowledge in the pre-test, which decreased to 19 (20.7%) in the post-test. Additionally, 24 (26.1%) adolescent girls had poor knowledge in the pre-test, but this decreased to only 5 (05.4%) in the post-test.

Effectiveness of information booklet on knowledge regarding polycystic ovarian syndrome (PCOS).

Table 3: Pre-test and post-test Mean and Standard Deviation of the Knowledge Score of the adolescent girls regarding polycystic ovarian syndrome (PCOS). N=92

Knowledge Score	Mean	SD	Mean Difference	Paired t-test value	p value	df
Pre-test	18.43	4.53	4.85	-10.324	.00*	91
Post-test	23.28	3.76				

* p value ≤0.05 level of significance

The data presented in the above table 3 shows that, mean ±SD is 18.43±4.53 in pre-test and 23.28±3.76 for post-test. The mean difference in the pre-test and post-test knowledge score is 4.85. The obtained t value was -10.324 and degree of freedom of 91 which was statistically highly significant at p <0.001* level using paired t-test.

This shows that, there is an effectiveness of Information Booklet on knowledge regarding polycystic ovarian syndrome (PCOS).

Pre-Test and post-test knowledge scores of the adolescent girls according to individual components on various domains regarding polycystic ovarian syndrome (PCOS)

Table 4: Pre-test and post-test knowledge scores of adolescent girls according to individual components on various domains regarding polycystic ovarian syndrome (PCOS). N=92

Domain	Maximum score	Pre-test		Post-test		Gain (%)	Mean difference
		Mean score	Mean (%)	Mean score	Mean (%)		
Introduction of Female Reproductive System	3	02.55	65.20	02.83	87.00	21.80	00.28
Meaning of PCOS	4	03.03	43.50	03.80	83.70	40.20	00.77
Causes/ Risk Factors of PCOS	4	02.05	08.70	02.94	34.80	26.10	00.89
Sign and Symptoms of PCOS	7	03.46	00.00	05.00	15.20	15.20	01.54
Management of PCOS	4	02.82	31.50	03.16	42.40	10.90	00.34
Lifestyle Modification of PCOS	5	02.64	02.20	03.79	28.30	26.10	01.15
Complications of PCOS	3	01.23	02.20	01.73	17.40	15.20	00.50

Total Score=30

Table 4 depicts the comparison between the pre-test and post-test knowledge scores obtained by adolescent girls regarding polycystic ovarian syndrome (PCOS), categorized into seven sub-areas. The pre-test knowledge scores in each area were as follows: introduction of the female reproductive system (2.55, 65.2%), meaning of PCOS (3.03, 43.5%), causes/risk factors of PCOS (2.05, 08.7%), signs and symptoms of PCOS (3.46, 0.00%), management of PCOS (2.82, 31.5%), lifestyle modification of PCOS (2.64, 02.2%), and complications of PCOS (1.23, 02.2%). In comparison, the post-test knowledge scores were: introduction of the female reproductive system (2.83, 87.0%), meaning of PCOS (3.80, 83.7%), causes/risk factors of PCOS (2.94, 34.8%), signs and symptoms of PCOS (5.00, 15.2%), management of PCOS (3.16, 42.4%), lifestyle modification of PCOS (3.79, 28.3%), and complications of PCOS (1.73, 17.4%).The data indicates that the post-test mean scores and mean percentages in all content areas are higher than the pre-test mean scores and mean percentages. This suggests a significant increase in the mean post-test knowledge scores compared to the mean pre-test knowledge scores across all areas following the distribution of the information booklet regarding polycystic ovarian syndrome (PCOS).

Association between level of knowledge with selected demographic variables

Table 5: Association between pre-test knowledge scores adolescent girls regarding polycystic ovarian syndrome (PCOS) and selected demographic variables. N=92

Demographic Variables	Level of Knowledge						P Value
	Good (22-30)		Average (16-21)		Poor (0-15)		
	F	%	f	%	f	%	
Age (In years)							
≤16	04	04.34	13	14.13	03	03.26	0.03*
17-18	18	19.56	33	35.86	18	19.56	
≥19	00	00.00	00	00.00	03	03.26	
Religion							
Hindu	04	04.34	16	17.40	13	14.13	
Christian	15	16.30	29	31.52	10	10.86	0.05*
Others	03	03.26	01	01.08	01	01.08	
Stream							
Arts	01	01.08	16	17.40	09	09.78	
Science	20	21.73	24	26.08	02	02.17	0.00*
Commerce	01	01.08	06	06.52	13	14.13	
Age of Menarche (in years)							
≤12	13	14.13	27	29.34	06	06.52	0.017*
≥13	09	09.78	19	20.65	18	19.56	
Menstrual Cycle							
Regular	18	19.56	44	47.82	23	25.00	0.10
Irregular	04	04.34	02	02.17	01	01.08	
Family History of PCOS							
Yes	03	03.26	00	00.00	00	00.00	0.007*
No	19	20.65	46	50.00	24	26.08	
Previous Information About PCOS							
Yes	05	05.43	01	01.08	01	01.08	0.009*
No	17	18.47	45	48.91	23	25.00	

* p value ≤0.05 level of significance

The data presented in Table 5 shows that there is a significant association between the adolescent girls' pre-test knowledge score and their age, religion, stream, age of menarche, family history of PCOS and previous information of PCOS of the adolescent girls as indicated by p value is ≤0.05 by using chi square tests.

However, there is no association between the adolescent girl's pre-test knowledge score and menstrual cycle of the adolescent girls.

Discussion

This study attempts to assess the effectiveness of Information booklet on knowledge regarding polycystic ovarian syndrome (PCOS) among adolescent girls in selected Higher Secondary Schools of East Khasi Hills, Meghalaya. The relevant data was collected and analysed statistically based on the objectives of the study.

In this study, among total of 92 adolescent girls, 69 (75%) fall within the 17-18 age bracket. The largest portion of these girls, comprising 54 (58.7%), identifies with the Christian religion, while 46 (50.0%) are enrolled in science streams, and 43 (46.7%) come from families with incomes ≤50000. Additionally, 46 (50%) experienced menarche at age 12. The majority, 85 (92.4%), have regular menstrual cycles, and a significant portion, 87 (94.6%), consume fast food. Findings indicate that only 11 (12.0%) have a present disease condition, and 03 (03.3%) have a family history of polycystic ovarian syndrome (PCOS). Furthermore, 07 (07.6%) of the adolescent girls were previously informed about PCOS. Similarly, Sonja J.N (2021) study on the effectiveness of a planned teaching program regarding PCOS revealed that out of 50 adolescent girls, 17 (34.0%) were between 13-14 years old, while only 05 (10.0%) were above 15. The majority, 23 (46.0%), identified with the Hindu religion, and 15 (30.0%) reported family incomes exceeding Rs.10,000 per month. Among them, 25 (50.0%) had regular menstrual cycles, and 36 (72.0%) experienced regular menstruation cycles. Conversely, 07 (14.0%) had a

family history of obesity.

The results of the current study indicate that initially, only 22 (23.9%) adolescent girls demonstrated good knowledge, 46 (50%) had average knowledge, and 24 (26.1%) had poor knowledge of polycystic ovarian syndrome in the pre-test. Following the intervention, 68 (73.9%) adolescent girls showed good knowledge, 19 (20.7%) had average knowledge, and only 5 (05.4%) had poor knowledge in the post-test. These findings align with prior research. For instance, a study by Rajni *et al*. (2022) on the effectiveness of an informational module regarding polycystic ovarian syndrome on knowledge among young women in a selected college in Lucknow found that initially, 34 (48.6%) had poor knowledge, 35 (50%) had average knowledge, and 1 (1.4%) had good knowledge. However, after the intervention, 52 (74.3%) had good knowledge, and 18 (25.7%) had average knowledge, with none demonstrating poor knowledge.

The data presented in the above table shows that, mean ±SD is 18.43±4.53 in pre-test and 23.28±3.76 for post-test. The mean difference in the pre-test and post-test knowledge score is 4.85. The obtained t value was -10.324 and degree of freedom of 91 which was statistically highly significant at p <0.001* level using paired t-test. This shows that, there is an effectiveness of Information Booklet on knowledge regarding polycystic ovarian syndrome (PCOS). Donel. J, et.al (2021) conducted a study which shows that the mean ±SD in pre-test is 16.28±4.23 and 26.25±2.7 for post-test. The mean difference in the pre-test and post-test knowledge score is 9.97. The obtained t value (24.92) was greater than table value at 0.05 level of significance, which shows that there was a significant difference between pre-test and post-test level of knowledge regarding PCOS among adolescent girls.

The present study's findings entail a comparison between pre-test and post-test knowledge scores of adolescent girls regarding polycystic ovarian syndrome (PCOS), segmented into seven sub-areas. Initial knowledge scores in each area were as follows: introduction to the female reproductive system (2.55, 65.2%), meaning of PCOS (3.03, 43.5%), identifying causes/risk factors (2.05, 8.7%), recognizing signs and symptoms (3.46, 0.00%), managing PCOS (2.82, 31.5%), lifestyle modification (2.64, 2.2%), and complications (1.23, 2.2%). Conversely, post-test scores were: introduction to the female reproductive system (2.83, 87.0%), meaning PCOS (3.80, 83.7%), causes/risk factors (2.94, 34.8%), signs and symptoms (5.00, 15.2%), management (3.16, 42.4%), lifestyle modification (3.79, 28.3%), and complications (1.73, 17.4%).The study results indicate that post-test mean scores and percentages in all areas surpass pre-test figures, signifying a significant increase in knowledge following the distribution of information booklets on PCOS. This study aligns with a similar investigation conducted by N. Jothi from the College of Nursing, Madras Medical College, Chennai, examining the effectiveness of a structured teaching program on PCOS knowledge among adolescent girls. The comparison between pre-test and post-test scores in seven sub-areas yielded the following pre-test scores: anatomy and physiology (3.14, 62.80%), causes and risk factors (1.36, 34.0%), clinical manifestations (3.28, 36.44%), diagnosis (1.16, 58.0%), treatment (1.14, 28.50%), complications (0.90, 45.0%), and lifestyle modifications (1.52, 38.0%). Conversely, post-test scores were: anatomy and physiology (4.64, 83.60%), causes and risk factors (3.04, 76.0%), clinical manifestations (7.34, 81.56%), diagnosis (1.20, 75.0%), treatment (2.28, 69.0%), complications (1.76, 79.0%), and lifestyle modifications (2.78, 73.0%).

The data regarding the association of adolescent girl's pre-test knowledge score with selected demographic variables was analyzed using chi square test. The findings in the present study shows that there is a significant association between the adolescent girl's pre-test knowledge score and their age, religion, stream, age of menarche, family history of PCOS and previous information of PCOS of the adolescent girls at ≤0.05 level of significance. However, there is no association between the adolescent girl's pre-test knowledge score and menstrual cycle of the adolescent girls. An Experimental study conducted by Batra. B and Tiwari. S in Higher Secondary School, Madhya Pradesh, depicted that there is significant association of participant's post-test knowledge score with selected demographic variables that is age, sources of information, history of PCOD and family income which was analyzed by using chi square test.

Conclusion

The study involved 92 adolescent girls, with only 22 (23.9%) demonstrating good knowledge about polycystic ovarian syndrome (PCOS) in the pre-test phase. Following the distribution of an information booklet on polycystic ovarian syndrome (PCOS), the number of adolescent girls with good knowledge increased significantly to 68 (73.9%). This highlights the effectiveness of the information booklet in enhancing knowledge about polycystic ovarian syndrome (PCOS). Statistical analysis revealed a significant difference between pre-test and post-test knowledge scores. Additionally, certain demographic variables such as age, religion, academic stream, age of menarche, family history of PCOS, and previous knowledge of PCOS were found to be associated with pre-test knowledge scores.

In conclusion, the study demonstrates that providing information booklets significantly improves knowledge about polycystic ovarian syndrome (PCOS) among adolescent girls.

Conflicts of interest: There are no conflicts of interest.

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