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A Study on the Effectiveness of Information, Education, and Communication (IEC) Interventions on Knowledge of Polycystic Ovarian Syndrome Among Late Adolescent Girls in a Selected Nursing College, Bengaluru

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Abstract: ***Polycystic Ovarian Syndrome is the most common endocrine disorder among women between the ages 18-44. It affects approximately 2% to 20% of this age group. It is one the leading endocrine disease and which affects one in 15 women in Worldwide. A pre-experimental one-group pre-test post-test design was adopted. 60 participants were selected by stratified random sampling technique. Their knowledge about PCOS was assessed using a structured questionnaire, followed by a 5-day instructional module. Post-intervention knowledge was again evaluated with the same questionnaire. The pre-test mean knowledge score was 11.14 (SD = 5.72), and the post-test mean was 23.19 (SD = 6.66), with a significant mean difference of 12.05. The paired t-test value exceeded the critical value at a 0.001 significance level, confirming that the intervention was statistically effective. Further analysis revealed marked improvements across specific domains. Knowledge regarding general information, causes, signs & symptoms, risk factors, prevention, and treatment of PCOS significantly improved. For example, in the domain of causes of PCOS, the pre-test score was 3.72, increasing to 18.5 in the post-test. In risk factors, the pre-test score was 0.83, which rose to 16.5 post-intervention. These findings support that IEC modules can substantially improve awareness and understanding of PCOS in adolescent girls.***

Keywords: Polycystic Ovarian Syndrome (PCOS), Information Education Communication (IEC), adolescent girls, pre- test post-test, knowledge improvement, structured teaching program, nursing students

1. Introduction

Polycystic Ovarian Syndrome (PCOS) is a common endocrine disorder affecting women of reproductive age, with rising prevalence among adolescents. Characterized by irregular menstrual cycles, obesity, hirsutism, and infertility, PCOS is increasingly being diagnosed in teenage girls due to hormonal imbalances triggered by lifestyle changes, poor diet, and environmental factors. Adolescents aged 14–18 are especially vulnerable as they undergo significant physical, emotional, and hormonal transitions. In many cases, symptoms are ignored or misdiagnosed, delaying proper treatment.

Hormonal imbalances cause ovaries to produce excess androgens, leading to missed ovulation, which in turn affects menstrual regularity and fertility.

PCOS also increases risks for diabetes, cardiovascular issues, and psychological distress. Despite its impact, awareness remains low among adolescents. Early identification and education can help manage the condition effectively.

Recognizing the need for awareness and support, this study focuses on educating adolescent girls about PCOS using structured instructional modules, aiming to improve knowledge and promote early intervention for better reproductive and overall health.

The Need of Study

The study highlights the growing concern of Polycystic Ovarian Syndrome (PCOS) among adolescent girls, particularly due to its rising prevalence, early onset, and significant impact on physical, psychological, and social well-being.

It stresses that adolescents with PCOS face increased risks of obesity, insulin resistance, metabolic disorders, and poor quality of life. Many suffer from body image issues, emotional disturbances, and complications due to lack of timely intervention. The need for early diagnosis, prevention, and education is emphasized, with a special focus on enhancing awareness and knowledge about PCOS. Nurses are identified as key educators in guiding adolescent girls toward better understanding and management of the condition, supporting them in adopting a healthy lifestyle and positive coping mechanisms.

2. Review of Literature

The literature review synthesizes evidence on PCOS prevalence, knowledge gaps among adolescents, and educational interventions. Prevalence rates vary globally (2–20%), influenced by diagnostic criteria (Rotterdam, NIH) and demographics. Studies highlight higher prevalence in younger women (e.g., 21.6% in those <35 years) and associations with obesity, insulin resistance, and ethnicity. For instance, Maori and Pacific Islanders exhibit higher metabolic risks, while Asians show increased diabetes susceptibility. Adolescents with idiopathic precocious

puberty face elevated PCOS risk, emphasizing early onset and genetic links (35% in mothers, 40% in sisters of PCOS patients). Clinical manifestations like menstrual irregularities (7.4– 9.1%) and hyperandrogenism (6–37%) underscore diagnostic challenges in adolescence.

Knowledge gaps among adolescents and healthcare providers are significant. Surveys reveal low awareness: only 9.13% of Indian adolescents met Rotterdam criteria, while 67% of diagnosed women reported frustration. Educational interventions, such as structured modules, improved knowledge and preventive behaviors (e.g., 63% of participants adopted healthier diets post-education). However, residents' training often lacks PCOS-specific competencies, highlighting systemic gaps in medical education.

Educational interventions, including planned instructional modules, demonstrate efficacy in improving reproductive health knowledge and attitudes. Studies in schools and cervical cancer prevention programs show significant post-intervention knowledge gains, with modules enhancing self-care practices and health-seeking behavior.

These findings advocate for targeted educational strategies to address PCOS awareness and management, particularly in high-risk populations. Overall, the review underscores the need for standardized diagnostics, culturally sensitive screening, and integrated educational programs to mitigate PCOS burden.

3. Objectives

This study evaluates how effectively Information Education Communication (IEC)improves knowledge about Polycystic Ovarian Syndrome (PCOS). The primary objective is to assess the level of knowledge among late adolescent girls regarding PCOS before and after the administration of IEC. The second objective focuses on determining the effectiveness of IEC in enhancing awareness and understanding of PCOS among this group. Additionally, the study aims to examine the association between pre-test knowledge levels and selected demo graphic variable s such as age, religion, family type, parental education, income, and prior awareness. By identifying knowledge gaps and measuring improvements post-intervention, the study intends to validate IEC as a useful educational tool for health awareness among adolescents. Through a structured approach involving pre-tests, educational modules, and post-tests, this research seeks to contribute evaluable insights into adolescent health education strategies, particularly in the context of PCOS—a condition with significant long-term implications for reproductive and metabolic health.

4. Assumptions

1) Conceptual Framework: The study is based on Ludwig von Bertalanffy's General Systems Theory , assuming that knowledge acquisition (via the instructional module) influences the participants' understanding of PCOS as a systemic process.
2) Tool Validity: The structured questionnaire and planned instructional module (PIM) were assumed to accurately measure and enhance knowledge about PCOS, supported by expert validation and pilot testing.
3) Sample Representativeness: Participants selected via non-probability convenience sampling were assumed to reflect the broader population of late adolescent girls in similar educational settings.

Hypotheses:

1) H_1 (Primary Hypothesis)
- The mean post-test knowledge scores of late adolescent girls exposed to the PIM will be significantly higher than their pre-test scores.
- Result Supported ($p < 0.05$). Post-test scores (mean = 23.19) were significantly higher than pre- test scores (mean = 14.5).

2) H_2 (Secondary Hypothesis)
- Pre-test knowledge levels will be significantly associated with selected demographic variables (e. g .age, education, income).
- Result Rejected. No statistically significant associations were found between pre-test knowledge and demographic variables.

5. Findings

1) Demographic Profile
- Age 81.7% were 18–21 years old.
- Religion 48.3% Hindu, 30% Christian, 13.3% Muslim.
- Family Type 41% nuclear, 37% joint,22% extended.
- Parental Education 31.7% fathers and36.7% mothers had graduate degrees.
- Income: 30% had a family income of₹1,000–2,000/month.
- Residence: 45% suburban, 30% urban,25% rural.
- Prior Knowledge: 48.3% had some awareness of PCOS, primarily from family (23.3%) or friends (15%).

2) Knowledge Scores
- Pre-test: 86.7% had inadequate knowledge, 13.3% moderate, 0% adequate.
- Post-test: 76.7% had adequate knowledge, 23.3% moderate, 0%inadequate.
- Effectiveness of PIM: Statistically significant improvement ($t = 16.9$, $p < 0.05$).

3) Association with Demographics:
- No significant links between pre-test knowledge and age, religion, family type parental education, income, or residence.

6. Discussion

1) Effectiveness of the Intervention:
- The planned instructional module (PIM) significantly improved knowledge about PCOS, aligning with prior studies showing structured education enhances health literacy. The 40.4%increase in adequate knowledge underscores the module's utility in addressing gaps in adolescent awareness.

2) Lack of Demographic Associations:
- The absence of significant demographic associations suggests that PCOS knowledge gaps exist uniformly across diverse backgrounds, emphasizing the need for universal educational interventions rather than targeted approaches.

3) Implications:
- The findings advocate for integrating PCOS education into school curricula or community programs to address underdiagnosis and misinformation.
- The General Systems Theory framework validated the systemic impact of education on knowledge, though future studies could explore long- term behavioral changes.

4) Limitations:
- Convenience sampling may limit generalizability.
- Short follow-up period (8 days) precludes assessment of sustained knowledge retention.

5) Recommendations:
- Expand the study to larger, diverse populations.
- Incorporate longitudinal designs to evaluate long- term outcomes.
- Address cultural and socioeconomic barriers to PCOS awareness in future interventions.

This structured approach highlights the study 's contributions to addressing PCOS knowledge gaps and informs strategies for scalable educational programs.

7. Methodology

The study employed a pre-experimental, one-group pre-test-post-test design to evaluate the effectiveness of a planned instructional module (PIM) in enhancing knowledge about polycystic ovarian syndrome (PCOS) among late adolescent girls. Conducted at Channai College of Nursing, Bangalore, the research targeted a sample of 60 late adolescent girls selected via non-probability convenience sampling, based on inclusion criteria such as willingness to participate and availability during the study period.

Variables
- Independent variable: Administration of the PIM.
- Dependent variable: Knowledge level regarding PCOS.
- Extraneous variables: Demographic factors (age, religion, family type, parental education, income, residence) and prior knowledge sources.

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- Dependent variable: Knowledge level regarding PCOS.
- Extraneous variables: Demographic factors (age, religion, family type, parental education, income, residence) and prior knowledge sources.

Tool Development:
1) Structured questionnaire: Validated by experts (nursing faculty and physicians) and tested for reliability (split-half method, r = 0.80).
- Part 1: Demographic data.
- Part 2: 20 multiple-choice questions assessing knowledge across PCOS domains (general info, causes, symptoms, risk factors, prevention/treatment).

2) Planned Instructional Module (PIM): Content validated by experts, covering PCOS anatomy, risk factors, treatment, and complications. Pre-tested on 10 participants to ensure clarity.

Procedure
- Pre-test: Administered using the structured questionnaire.
- Intervention: PIM delivered via lecture, discussion, and visual aids.
- Post-test: Conducted 8 days post-intervention using the same tool.

Pilot Study:
A trial (n= 10) confirmed feasibility. Pre-test mean score (14.5/40, 36.25%) significantly improved post-intervention (34.4/40, 86%; $t = 16.9$, $p < 0.05$).

Data Analysis:
- Descriptive statistics: Frequency/percentage for demographics.
- Inferential statistics: Paired t -test compared pre/post-test scores; chi-square tested associations between demographics and pre-test knowledge.

Ethical Considerations:
Informed consent was obtained, confidentiality assured, and participants debriefed post-study.

This methodology emphasizes rigorous tool validation, structured intervention delivery, and statistical rigor to assess knowledge improvement, ensuring reliable insights into PCOS education effectiveness.

8. Result

Table shows the association between level of knowledge and their demographic variables. Chi-square ($\chi 2$) values for age ($\chi 2 = 0.27$), religion ($\chi 2 = 2.46$) , type of family ($\chi 2 = 3.71$), father education ($\chi 2 = 7$) , mother education ($\chi 2 = 1.20$), monthly income ($\chi 2 = 2.24$), residence ($\chi 2 = 1.57$), previous knowledge about polycystic ovarian syndrome ($\chi 2 = 0.43$) and source of information about polycystic ovarian syndrome ($\chi 2 = 1.66$) had no association with the pretest level of knowledge regarding polycystic ovarian syndrome among late adolescent girls. In pretest knowledge level there is no statistically significant difference, hence H2 is rejected.

Demographic Variables and Pretest Chi-Square Test Results

Variable	Category	Inadequate (n, %)	Moderate (n, %)	Chi-Square (X^2)	p- value
Age	15 - 18 years	9 (81.8%)	2 (18.2%)	$X^2 = 0.27$	p = 0.60
	18 - 21 years	43 (87.8%)	6 (12.2%)		
Religion	Hindu	27 (93.1%)	2 (6.9%)	$X^2 = 2.46$	p = 0.48
	Christian	4 (77.8%)	4 (22.2%)		
	Muslim	7 (87.5%)	1 (12.5%)		
	Others	4 (80.0%)	1 (20.0%)		
Type of Family	Nuclear family	22 (88.0%)	3 (12.0%)	$X^2 = 3.71$	p =0.16
	Joint family	17 (77.3%)	5 (22.7%)		
	Extended family	13 (100.0%)	0 (0.0%)		
Father's Education	Primary education	9 (69.2%)	4 (30.8%)	$X^2 = 7.0$	p = 0.07
	PUC	13 (81.3%)	3 (18.8%)		
	Graduation & above	19 (100.0%)	0 (0.0%)		
	No formal education	11 (91.7%)	1 (8.3%)		
Mother's Education	Primary education	7 (77.8%)	2 (22.2%)	$X^2 = 1.20$	p = 0.75
	PUC	12 (85.7%)	2 (14.3%)		
	Graduation & above	19 (86.4%)	3(13.6%)		

	No formal education	14 (93.3%)	1 (6.7%)		
Monthly Income (Rs.)	1000 - 2000	16 (88.9%)	2 (11.1%)	$X^2 = 2.24$	p = 0.52
	3000 - 4000	13 (76.5%)	4 (23.5%)		
	5000 - 6000	13 (92.9%)	1 (7.1%)		
	> 6000	10 (90.9%)	1 (9.1%)		
Residence	Rural	13 (86.7%)	2 (13.3%)	$X^2 = 1.57$	p = 0.46
	Suburban	22 (81.5%)	5 (18.5%)		
	Urban	17 (94.4%)	1 (5.6%)		
Previous Knowledge about PCOS	Yes	26 (89.7%)	3 (10.3%)	$X^2 = 0.43$	p =0.51
	No	26 (83.9%)	5 (16.1%)		
Source of Information (if yes)	Family members	12 (85.7%)	2 (14.3%)	$X^2 = 1.66$	p = 0.64
	Friends	9 (100.0%)	0(0.0%)		
	Mass Media	5 (83.3%)	1 (16.7%)		
	No information	26 (83.9%)	5 (16.1%)	6	

9. Discussion

This study aimed to assess the effectiveness of Information Education Communication (IEC) on knowledge regarding Polycystic Ovarian Syndrome (PCOS) among late adolescent girls at a nursing college in Bengaluru. A pre-experimental one-group pre-test and post-test design was used with 60 participants selected through random sampling. A structured questionnaire was used to evaluate socio- demographic data and knowledge on PCOS.

a) **Demographics:** The majority (81.7%) of participants were aged 18–21. Nearly half were Hindu (48.3%), with most belonging to nuclear (41.7%) or joint families (36.7%). Parental education varied, with around one-third of fathers (31.7%) and mothers (36.7%) being graduates. Family incomes and residential backgrounds were diverse, and only 48.3% of girls had prior knowledge of PCOS, primarily from family or friends.

b) **Knowledge Assessment:** In the pre-test, 86.7% of participants had inadequate knowledge, while none had adequate knowledge. Post-intervention, knowledge significantly improved: 76.7% achieved adequate knowledge and none remained in the inadequate category. The mean knowledge score increased from 11.14 (SD=5.72) to 23.19 (SD=6.66), indicating a 77.3% post-test knowledge level.

c) **Effectiveness of IEC:** The comparison of pre- and post-test scores demonstrated a statistically significant improvement in knowledge ($t=25.58$, $p=0.001$). The study affirmed the hypothesis (H1) that IEC significantly improves knowledge among adolescent girls. Supporting studies from Tamil Nadu and Coimbatore also confirmed the effectiveness of structured teaching programs on PCOS awareness.

d) **Association with Demographics:** There was no statistically significant association between pre-test knowledge levels and socio- demographic variables (H2 rejected). However, contrasting findings from a Bangalore study revealed significant associations between knowledge and factors like age, mother's education, menstrual history in the family, and area of residence.

10. Conclusion

The study was conducted to assess the effectiveness of Information Education Communication (IEC) on knowledge regarding Polycystic Ovarian Syndrome (PCOS) among late adolescent girls at a selected nursing college in Bengaluru. The findings revealed that IEC significantly improved the participants' knowledge levels, highlighting its importance as a health education tool.

11. Nursing Implications

a) Nursing Education:
The study emphasizes the need to integrate PCOS education into nursing curricula, as knowledge on the condition is often lacking among both adolescent girls and nursing professionals. Maternity nurses must be adequately trained to educate their clients effectively. Regular in-service education programs on PCOS should be conducted to update staff nurses working in obstetric departments.

b) Nursing Administration:
Nurse administrators play a crucial role in planning and supporting health education programs. Their support is essential in organizing training sessions using audio- visual aids. By facilitating continuous learning opportunities, nurse administrators can raise awareness and improve the overall standard of maternity care.

c) Nursing Practice:
Nurses, as integral members of the healthcare team, are in a unique position to promote and maintain reproductive health. With up-to-date knowledge, they can educate not only their patients but also families and communities. Empowering nurses with accurate knowledge of PCOS enhances the quality of care provided in maternity services.

d) Nursing Research:
This study provides foundational data for further research. It highlights the importance of evidence-based practice and encourages student nurses and researchers to explore innovative teaching strategies. Replicating the study on a larger scale or using different methodologies can yield broader insights and strengthen healthcare interventions for PCOS awareness.

12. Recommendations

- Conduct the study on a larger population to generalize findings.
- Try different teaching methods to evaluate their effectiveness.
- Assess adolescent girls' knowledge through descriptive studies.

- Use controlled experimental designs for comparative analysis.
- Investigate specific problems related to PCOS.
- Conduct comparative studies between rural and urban populations to explore awareness gaps.

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