Original Article

Effectiveness of Educational Intervention Regarding Polycystic Ovarian Syndrome Among Undergraduate Students of Tanahu

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ABSTRACT

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Background: Polycystic Ovarian Syndrome (PCOS) is a new emerging complex endocrine disorder affecting a significant number of women worldwide, characterized by hormonal imbalances, reproductive irregularities, and metabolic disturbances. The overall objective was to find out effectiveness of the educational intervention on knowledge on polycystic ovarian syndrome among undergraduate students.

Methods: This true experimental study design was carried out in a selected campus of Tanahun district. The study population was undergraduate students who were 18 years and above. A systematic random sampling technique was adopted to select the sample. Data was collected by a pre-tested self-administered questionnaire before educational intervention. The questionnaire was developed by the researcher herself/himself through consulting subject experts and searching literature. The educational intervention package was developed. After three weeks of intervention, a posttest was conducted. The data was entered on SPSS 21.0 version and the result was analyzed by using descriptive statistics and inferential statistics.

Results: The knowledge levels of respondents before and after the intervention, along with a control group show that in the pre-intervention phase, a substantial majority of students (96.6%) had an unsatisfactory knowledge level, while only 3.4% fell into the satisfactory category. Following the intervention, with 100% of students achieving a satisfactory knowledge level. In the control group there is a maintained high percentage of unsatisfactory knowledge pre-intervention (98.3%), with a marginal decrease to 96.6% post-intervention. In a study the intervention group showed a significant increase in knowledge with a median pretest score of 3 rising to 28 posttest. Their change score of 25 was highly significant (p=0.00). The control group had a smaller increase from a pretest score of 0 to 2 posttest, with a change score of 2 and a significant p value indicating the intervention's effectiveness.

Conclusion: The positive outcomes observed in this study underscore the importance of an educational initiative in the broader context of health education for young adults.

Keywords: Educational Intervention, Polycystic Ovarian Syndrome, Undergraduate Students

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INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a prevalent endocrine disorder affecting women of reproductive age worldwide. It affects approximately 8% to 13% of women in the reproductive age group, making it one of the most common endocrine disorders. The condition not only poses significant challenges to women's health but also impacts their psychological well-being and quality of life [1].

The prevalence of PCOS varies significantly worldwide, with rates ranging from 2.2% to 2.6%. In specific Asian countries, such as China and Sri Lanka, the prevalence has been reported at approximately 2% to 7.5% and 6.3%, respectively. In South India and Maharashtra, the incidence of PCOS has been estimated at 9.13% and 22.5%, respectively, according to various studies [2]. In a tertiary care hospital of Nepal the prevalence was determined to be 9.18% [3].

The study aimed to evaluate the effectiveness of a structured teaching program on the knowledge of PCOS among nursing students. Before the teaching program, 10% of the students had adequate knowledge about PCOS, 68.3% had moderate knowledge, and 21.7% had inadequate knowledge. After the teaching program, the percentage of students with adequate knowledge increased to 51.7%, while 38.3% had moderate knowledge, and 10% still had inadequate knowledge. This indicates the need of a structured teaching program with evidence of significant improvement in the knowledge of nursing students [4].

The review compiled data from various types of studies using different diagnostic Rotterdam criteria for PCOS revealing its prevalence varied globally Southern China, Iran, and the USA reported rates of 2.2%, 3%, and 4%, respectively. Prevalence ranged from 5% to 20%, with Australia, Turkey, and Denmark reporting the highest rates. Currently, 1 in 10 women worldwide is diagnosed with PCOS [5].

The study observed a PCOS prevalence of 6.8% among the participants. Notably, 78.4% were unaware of PCOS, and 6.8% were receiving treatment. The primary reason for the low awareness was attributed to a lack of information and insufficient publicity (63%) [6].

Research has suggested that little data on intervention and studies on PCOS among young female adults knowledge on Polycystic Ovarian Syndrome for early recognition and prompt treatment which is important to prevent long-term sequelae. The objective of this study was to find out the effectiveness of the educational intervention on knowledge of polycystic ovarian syndrome among this group [7-9].

METHODOLOGY

True- experimental group pretest-posttest design based on a quantitative approach was used as the objective of the study was to find out the effectiveness of educational intervention on PCOS.

Scores of the pre-intervention was compared with scores of the post-intervention. This study was conducted in Aadikavi Bhanubhakta Campus of Vyas Municipality of Tanahu district among female students of Bachelor level. The required sample size for the study was calculated with the Cochran formula. The sample size was 118. At first, the population frame was obtained from the campus administration. The total number of female undergraduate students were 875. They were serially listed from the 1st Year to the 4th Year of Bachelor level students by using the student's attendance register. Then the female students were separated in the same serial. The systematic random sampling method with 7th interval was used to select the sample. From a sample size of 118 female students, equally 59 students were selected for the intervention group and the control group by lottery method. A structured self-administered questionnaire in the English language was used consisting of socio-demographic information and knowledge regarding PCOS. The obtained score was converted into a percentage. The total possible score was 0 to 30. The overall adequacy of knowledge was graded on unsatisfactory knowledge (<60%), satisfactory knowledge (>60%) [8].

The educational intervention package on PCOS was developed on the basis of the literature review, consulting with subject experts and advisors in the field of women's health and gynecology. The educational package contains **r**eview of female reproductive system, Introduction of PCOS, Prevalence of PCOS, Risk factors, Signs and Symptoms, Diagnostic evaluations, Preventive Measures, Treatment and complications of PCOS. Interactive lecture and discussion method with LCD, Charts and Pamphlets was used. Item content validity index (I-CVI) and scale content validity index (S-CVI)

was measured which value were 0.7 and 0.92 respectively. Content validity index for items was gained through keeping relevance criteria as stating from Not relevant 1 to highly relevant with 4. Pretesting of the instrument was done among 12 female students from Tri Chandra Campus Kathmandu district. The instrument's clarity, sequencing, and feasibility for administration was assessed and corrected according to the feedback. Ethical approval reference number was 38 which was taken on August 2, 2023 obtained from the Institutional Review Committee, Tribhuvan University TU Institute of Medicine. The institutional permission was received for data collection. The educational intervention was given to the group of selected students, session was of 40 minutes as per the required content. A post-test was done after three weeks of intervention to evaluate effectiveness. Before data collection, informed written consent was obtained from each respondent. A separate school building was used with the enumerator's help to prevent contamination. Anonymity was maintained by using code numbers. Confidentiality was maintained by ensuring them not disclose the information of the respondents and using the information only for study purposes. The duration of data collection was 4 weeks from 2080/06/1 to 2080/06/31.

The study was carried out in three phases. In the First Phase (Pre-intervention Phase), self-introduction, topic orientation, the objective of the research, and pre-test regarding the PCOS was done to assess the preexisting knowledge of the respondents. A structured questionnaire was used to find out the student's knowledge of PCOS. In the Second Phase (Intervention Phase) experimental group was gathered in a classroom for intervention purposes. A planned intervention educational session was conducted in one session. The 40 minutes' educational session contained introduction, prevalence of PCOS, risk factors, sign and symptoms, preventive measures, diagnostic test, treatment about the PCOS. In the Third Phase (Post-intervention Phase) three weeks after intervention, post-test was conducted to both experimental and control group. The post-test was administered by the researcher using the same instrument to the same participants who participated in the pretest for evaluation for the effect of the interventional program. Data was entered into Statistical Package for the Social Sciences (SPSS 20.0) version for the data analysis. Data analysis was done through descriptive and inferential statistics. Descriptive analysis was done to calculate frequency, percentage, mean, standard deviation, median, and quartiles to describe socio-demographic variables and to find out the knowledge on PCOS. Inferential statistics Shapiro Wilk test was used for normality of data and Wilcoxon Signed Rank Test was used to compare pre-intervention and post-intervention knowledge on PCOS. The findings were presented in different tables.

RESULTS

Table 1 presents data on various variables related to general information about PCOS. In the intervention group, before any intervention, 72.9% of respondents correctly identified that PCOS mostly affects the ovaries. After the intervention, this awareness increased to 100%, while in the control group, there was a rise from 43.1% to 50%. Regarding the definition of PCOS as multiple cysts on the ovaries and elevated testosterone levels, only 10.2% in both groups correctly identified this concept in the pretest. However, post-intervention, this understanding significantly improved to 98.3% in the intervention group and 15.5% in the control group. As for the commonly elevated hormone in PCOS (testosterone), the intervention group demonstrated an increase in awareness from 23.7% to 100%, while the control group increased from 12.1% to 17.2%.

Knowledge of signs and symptoms of PCOS outlines in the intervention group, 28.8% of respondents recognized weight gain as a symptom, which significantly increased to 93.1% post-intervention. In the control group, awareness also increased from 3.4% to 19%. Acne as a symptom was identified by 27.1% in the intervention group pretest, increasing to 86.2% post-intervention, while the Control Group exhibited a rise from 1.7% to 3.4%. Difficulty getting pregnant was acknowledged by 42.4% in the Intervention Group pretest, escalating to 93.1% post-intervention. In the Control Group, this awareness increased from 32.8% to 32.8%. Facial hair as a symptom was recognized by 11.9% in the Intervention Group pretest, increasing substantially to 82.8% post-intervention. No respondents in the

Control Group identified facial hair as a symptom in either the pretest or posttest.

Table 1: Knowledge Regarding General Information of Polycystic Ovarian Syndrome (n=118)

Variables	Intervention Group (n=59)		Control Group (n=59)	
	Pretest No. (%)	**Posttest No. (%)**	**Pretest No. (%)**	**Posttest No. (%)**
PCOS mostly affect the organ				
Ovaries*	43 (72.9)	59 (100)	25 (43.1)	29 (50)
PCOS is				
Multiple cysts on the ovaries and elevated testosterone levels*	6 (10.2)	58 (98.3)	6 (10.2)	9 (15.5)
Commonly elevated hormone in PCOS				
Testosterone *	14 (23.7)	59 (100)	7 (12.1)	10 (17.2)

** correct response*

Table 2: Knowledge on Potential Complication of PCOS

Variables	Intervention Group (n=59)		Control Group (n=59)	
	Pretest No. (%)	**Posttest No. (%)**	**Pretest No. (%)**	**Posttest No. (%)**
Complications ** Type 2 Diabetes	11 (18.6)	57 (96.6)	4 (6.9)	5 (8.6)
Obesity	18 (30.5)	59 (100)	8 (13.8)	8 (13.8)
Heart related problem	9 (15.3)	58 (98.3)	7 (12.1)	8 (13.8)

***Multiple response*

Table 2 presents data on respondents' knowledge about potential complications associated with Polycystic Ovarian Syndrome (PCOS). In the Intervention Group's pretest, 18.6% of respondents were aware that PCOS could lead to Type 2 Diabetes, a figure that notably increased to 96.6% post-intervention. Similarly, the Control Group showed an increase in awareness from 6.9% to 8.6%. Concerning the risk of obesity as a complication, 30.5% in the Intervention Group pretest demonstrated awareness, which significantly improved to 100% post-intervention, while the Control Group increased from 13.8% to 13.8%. Knowledge about heart-related problems as a complication of PCOS was noted by 15.3% in the Intervention Group's pretest, rising substantially to 98.3% post-intervention. In the Control Group, the awareness increased from 12.1% to 13.8%.

The data on students' knowledge regarding preventive measures for PCOS shows that in the Intervention Group's pretest, 10.2% of respondents were aware of the preventive measure of adopting a low-fat diet, which significantly increased to 93.1% post-intervention. The Control Group also exhibited improvement, with awareness rising from 1.7% to 8.6%. Knowledge about implementing a low-carbohydrate diet was at 3.4% in the Intervention Group's pretest, escalating to 100% post-intervention, while the Control Group maintained consistent awareness at 3.4% in both pretest and posttest. Understanding the importance of regular physical exercise as a preventive measure increased from 12.1% to 93.1% in the Intervention Group and from 12.1% to 13.8% in the Control Group. Avoiding junk food as a preventive measure was recognized by 13.6% in the Intervention Group's pretest, rising to 86.2% post-intervention. In the Control Group, awareness increased from 8.6% to 12.1%. Regular screening as a preventive measure saw an increase

from 3.4% to 100% in the Intervention Group, while the Control Group it's 5.2% in both tests.

Table 3 presents a comparison of pretest and posttest knowledge scores for both the intervention and control groups. In the intervention group (n=59), the median pretest score was 3, indicating a relatively low baseline knowledge level, which remarkably increased to 28 in the posttest assessment. The range of pretest scores varied from 1 to 10, while posttest scores showed a narrower range of 27 to 29. The change score, representing the improvement in knowledge, was notably high at 25. The statistical analysis revealed a highly significant p-value of 0.00, underscoring the substantial impact of the intervention on knowledge enhancement. On the other hand, the control group (n=59) started with a median pretest score of 0, indicating a lower initial knowledge level, and only experienced a marginal increase to 2 in the posttest assessment. The range of pretest scores in the control group was from 0 to 8, and the post-test scores ranged from 1 to 9. The change score for the control group was 2, with a significant p-value of 0.00.

Table 4 illustrates the knowledge levels of respondents before and after intervention, along with a control group. The knowledge levels are categorized as "Unsatisfactory" (≤60%) and "Satisfactory" (>60%). In the pre-intervention phase, a substantial majority of students, 96.6%, had an unsatisfactory knowledge level, while only 3.4% fell into the satisfactory category. Following the intervention, a remarkable transformation occurred, with 100% of students achieving a satisfactory knowledge level. In contrast, the control group maintained a high percentage of unsatisfactory knowledge pre-intervention (98.3%), with a marginal decrease to 96.6% post-intervention.

Table 3: Differences of Pretest and Posttest Knowledge Score of Intervention and Control Group

	Intervention Group (59)		**Control Group (59)**	
	Pretest	**Posttest**	**Pretest**	**Posttest**
Median Score	3	28	0	2
Range	1, 10	27, 29	0, 8	1, 9
Change Score	25		2	
p-Value	0.00		0.00	

Significance level is <0.05. Wilcoxon Signed Rank- Test is computed for p-value.

Table 4: Comparison of Pre and Post Knowledge Level of Intervention and Control Group on PCOS

Knowledge Level	**Intervention Group (n=59)**		**Control Group (n=59)**	
	Pretest	**Posttest**	**Pretest**	**Posttest**
	No. (%)	**No. (%)**	**No. (%)**	**No. (%)**
Unsatisfactory (□60%)	57(96.6)	-	58 (98.3)	56 (96.6)
Satisfactory (>60%)	2(3.4)	59 (100)	1(1.7)	2(3.4)

DISCUSSION

The present study was a true experimental research design which assessed the effectiveness of educational intervention regarding polycystic ovarian syndrome among undergraduate students of Tanahu. A total of 118 respondents were included among which 59 were in intervention group and 59 were in control group. This study reveals the levels of knowledge among participants both before and after an intervention, as well as those in a control group. Prior to the intervention, an overwhelming majority of students, 96.6%, possessed unsatisfactory knowledge, while only 3.4% demonstrated satisfactory knowledge. Following the intervention, there was a significant improvement, with all students achieving a satisfactory knowledge level. In contrast, the control group maintained a high percentage of unsatisfactory knowledge before the intervention (98.3%), experiencing a slight decrease to 96.6% after the intervention.

This study findings revealed that among 118 undergraduate students most of them 115 (96.6%) had unsatisfactory knowledge level, 2 (3.4%) had satisfactory knowledge level in pre-test. This result is consistent with other study findings that revealed 82% of the samples were with inadequate knowledge level and 13.3% had moderate level of knowledge regarding polycystic ovarian syndrome [10]. Similarly other study findings is also quite consistent in assessing knowledge level regarding polycystic ovarian syndrome.

This study also shows remarkable changes in knowledge score following educational intervention as all the students (100%) in intervention group had a satisfactory level of knowledge whereas compare to the control group there was no significant change in knowledge level that is only by 3.4%. This finding is supported as it shows the significant change in knowledge score after the educational intervention [14]. This finding is also supported according to a study the majority of adolescent students (89.7%) were found to be uninformed about PCOS, and only a small percentage received information from sources such as healthcare professionals, mass media, family, and friends. Initially, only 6.3% of teenage girls had adequate knowledge, but this figure significantly increased to 90.3% following the implementation of an educational program. The difference in knowledge and healthy practices regarding PCOS before and after the program was highly significant from a statistical perspective ($p<0.001$). Additionally, most adolescents expressed satisfaction with the introduction of the self-instructional module [15].

The study presents data on the pre- and post-intervention knowledge scores of the intervention group, consisting of 59 participants. The pre-test median score was 3, with a range of 1 to 10 (Q1, Q3), while the post-test median score increased significantly to 28, with a range of 27 to 29 (Q1, Q2). The change score, reflecting the difference between pre- and post-test scores, was 25. A Wilcoxon Signed Rank Test was conducted, yielding a highly significant p-value of 0.00, indicating a substantial difference in knowledge scores before and after the intervention. The data suggests a notable improvement in the participants' knowledge levels, underscoring the effectiveness of the intervention in enhancing their understanding of the subject. The significance level of less than 0.05 further supports the statistical robustness of these findings, reinforcing the positive impact of the educational program on the intervention group's knowledge about the variables in question. This finding is also supported with the study findings in India . Following a three-month intervention, the intervention group demonstrated noteworthy increases in knowledge, attitude, subjective norms, perceived behavioral control, behavioral intention, and nutritional behavior scores ($P < 0.001$) compared to their baseline scores. In contrast, the control group did not

exhibit significant differences in these aspects ($P > 0.05$) over the same period. Furthermore, there were no substantial distinctions between the two groups before the intervention; however, after three months, the intervention group displayed significantly higher scores in all the measured factors ($P < 0.001$)[16].

The study conducted in thane of India on utilizing an Information Education and Communication (IEC) intervention for Polycystic Ovarian Syndrome (PCOS) demonstrated a significant improvement in knowledge levels. The intervention resulted in 86.7% of participants acquiring adequate knowledge, 11.7% showing moderate knowledge, and only 1.7% having inadequate knowledge. The paired 't' test analysis indicated high significance at the $p < 0.01$ level. In contrast, a separate study comparing knowledge levels before and after intervention, along with a control group, revealed that prior to the intervention, 96.6% of students had unsatisfactory knowledge, but this transformed to 100% achieving satisfactory knowledge post-intervention. The control group maintained a high percentage of unsatisfactory knowledge (98.3% pre-intervention), with a slight decrease to 96.6% post-intervention [17].

The study conducted in United Arab Emirates explored that employed a structured education program to assess the impact on participants' knowledge about Polycystic Ovarian Syndrome (PCOS). The participants exhibited an average knowledge score of 7.59 ± 2.64 before the intervention, which significantly increased to 12.77 ± 1.13 post-intervention (p value 0.000). This robust improvement underscores the effectiveness of the structured education program in enhancing overall knowledge about PCOS [11].In parallel, this study shows that the intervention group (n=59) displayed a substantial transformation in knowledge levels, as evidenced by a median pretest score of 3 that significantly escalated to 28 in the posttest assessment. The change score of 25 and a highly significant p-value of 0.00 emphasize the substantial impact of the intervention on knowledge enhancement. In contrast, the control group (n=59) demonstrated a more modest increase from a median pretest score of 0 to 2 in the posttest assessment, with a change score of 2 and a significant p-value of 0.00. Collectively, these findings highlight the superior efficacy of the structured education program in fostering a significant and meaningful improvement in participants' knowledge compared to the control group.

In this study, a pre- and post-intervention analysis, coupled with a control group, revealed a noteworthy shift in knowledge levels. Initially, a vast majority of students (96.6%) had unsatisfactory knowledge, but following the intervention, a remarkable transformation occurred, with 100% of students achieving a satisfactory knowledge level. On the other hand, the control group maintained a high percentage of unsatisfactory knowledge (98.3% pre-intervention), with a marginal decrease to 96.6% post-intervention. This finding is supported by the study conducted by Amaha & Meeba, 2014, an educational program targeting teenage girls yielded a significant increase in those with sufficient knowledge from 6.3% to an impressive 90.3%. The statistical significance ($p<0.001$) in the difference before and after the program underscores its effectiveness [12].

The educational interventions plays important role in enhancing knowledge about PCOS and improving the overall well-being of individuals affected by the condition, ultimately leading to better management and outcomes. So this implicate the action towards preventive measures and primary assessment by mobilizing human resources in that arena ie colleges and communities. As this was true experimental study time, duration of pre and post intervention as confounding variables that could be limited improvement in this study. Although study can focus on pertaining long-term retention of knowledge through follow-up testing.

This health behaviour change or education can be related with General System Theory by Ludwig Von Bertalanffy (1968) here are 3 major components in this framework; Input, Process and Output that was used as guideline to structure the educational intervention on knowledge regarding PCOS among undergraduate students. The Input factors was Socio-demographic factors of the respondents. Process was administration of educational intervention (cognitive perceptual factors) to the undergraduate students. The educational intervention which are the main factors of this study which increases the knowledge of undergraduate students; if knowledge increases, the educational intervention is effective; if knowledge falls or remains constant, the educational intervention is ineffective.

Limitations: The results of this study are representative of a single setting and limited sample. The control group was not fully controlled so there was a chance of data contamination by the intervention group and other factors like opportunities for social media access , exposure which could have self-reporting bias on their responses **.**Further research with larger sample sizes and different settings are recommended to mitigate potential selection biases arising from their opportunities.

CONCLUSION

The evidence presented in this research study supports the effectiveness of educational interventions in increasing awareness and knowledge of PCOS among undergraduate students. These findings provide valuable insights for educators, healthcare professionals, seeking to address the public health challenges associated with PCOS.

It is recommended that awareness raising educational sessions should be conducted among adolescents students on polycystic ovarian syndrome and it's prevention. Similar type of study can be conducted on large samples.

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