



“EFFECTIVENESS OF SELECTED HEALTH CARE STRATEGIES ON POLYCYSTIC OVARIAN SYNDROME AMONG WOMEN BETWEEN AGE GROUP OF 18 TO 40 YEARS –A RANDOMIZED CONTROL STUDY.”

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Abstract

Polycystic ovarian syndrome (PCOS) is a complex condition characterized by elevated androgen levels, menstrual irregularities, and/or small cysts on one or both ovaries. Women of reproductive age affected by PCOS. Although the cause of PCOS is unknown, it may be related to many factors which are working together.

Objectives:

1. To assess the level of PCOS before and after the selected health care strategies among women.
2. To assess the level of knowledge regarding PCOS before and after the selected health care strategies among women.
3. To assess the level of practice before and after the selected health care strategies among women.
4. To evaluate the effectiveness of selected health care strategies on PCOS among women.
5. To associate the pre-test score with selected demographic variables among women.

Design: A quantitative research approach and True experimental with randomize control design was adopted for the study.

Setting: Gynecology outpatient department (OPD) Rohilkhand Medical College and Hospital (RMCH), Bareilly.

Participants: 120 women with PCOS were selected for the study.

Sampling technique: Consecutive sampling technique was used to select the sample. Random allocation of women was done by using lottery method to control or experimental group.

Intervention: Data regarding the demographic variables were self-reported structured questionnaire. PCOS was assessed by using structured PCOS assessment checklist, Knowledge regarding PCOS was assessed by using structured knowledge questionnaire and Practice for women to reduce PCOS were assessed by using checklist. Intervention includes Selected Health Care Strategies for experimental group.

Results:

- In Experimental group, it was noted that PCOS assessment score reduced from moderate to mild level. Pre-test results appraised 57(95%), 2(3.3%) and 1(1.7%) had moderate, severe and mild and it reduced to mild 55(91.7%) and moderate 5(8.3%) PCOS assessment score in post-test respectively.
- In Control group, it was noted that PCOS assessment score was not noticeably reduced as in both Pre-test and post-test. Pre-test results appraised 59(98.3%) and 1(1.7%) had moderate and severe and in post-test 47(78.3%) had moderate and 13(21.7%) had severe PCOS assessment score respectively.
- In Experimental group, level of knowledge regarding PCOS increased. Pre-test results appraised 39(65%), 14(23.3%) and 7(11.7%) had moderate, low and high level of knowledge and it increased to moderate 55(91.7%), 12(20%) had and 2(3.3%) had low level of knowledge in post-test respectively.
- In Control group, level of knowledge regarding PCOS decreased. Pre-test results appraised 42(7%) had moderate and 18(30%) had low level of knowledge and it decreased to moderate 33(55%) and 27(45%) low level of knowledge in post-test respectively.
- In Experimental group, level of practice score regarding PCOS increased. Pre-test results appraised 36(60%) had moderate, 14(23.3%) had low and 10(16.7%) had normal practice score and it increased to moderate 45(75%) and 15(25%) normal practice score in post-test respectively.
- In Control group, level of practice score regarding PCOS decreased regarding PCOS. Pre-test results appraised 44(73.3%) had moderate, 11(18.3%) had low and 5(8.3%) had normal practice score and it decreased to moderate 39(65%), 16(26.7%) low and 5(8.3%) normal practice score in post-test respectively.

- In experimental group, the decreasing mean difference over a period of time between pre-test 6.23 and post-test 3.58 on PCOS assessment scores proved existing statistical high significant difference at $p < 0.001$.
- In control group, the increasing mean difference over a period of time between pre-test 6.35 and post-test 7.13 on PCOS assessment scores projected existing statistical high significant difference at $p < 0.001$.
- The comparison of experimental and control group on PCOS assessment scores between pre-test 6.23 and 6.35 had no statistical difference whereas post-test 3.58 and 7.13 respectively proved existing statistically significant difference at $p < 0.001$.
- The increasing mean differences over a period of time between pre-test 10.00 and post-test 12.63 on level of knowledge regarding PCOS projected a statistically high significant difference at $p < 0.001$ in experimental group.
- The decreasing mean differences over a period of time between pre-test 8.22 and post test 7.68 on level of knowledge regarding PCOS projected a statistically significant difference at $p < 0.05$ in control group.
- The comparison of experimental and control group on knowledge scores between pre-test 10.00 and 8.22 and post-test 12.63 and 7.68 respectively proved existing statistically significant difference at $p < 0.001$.
- The decreasing mean differences over a period of time between pre-test 4.33 and post-test 3.27 on level of practice regarding PCOS projected a statistically high significant difference at $p < 0.001$ in experimental group.
- The comparison of experimental and control group on level of practice between pre-test 4.33 and 4.18 had no statistical difference whereas post-test 3.27 and 4.43 respectively proved existing statistically significant difference at $p < 0.001$.
- There was no significant association between pre-test score regarding PCOS Condition with selected demographic variables among women with PCOS in experimental group and control group.
- There was no significant association between pre-test score regarding level of knowledge PCOS with demographic variables in experimental group and control group except for Family History of PCOS in experimental group.
- There was no significant association between pre-test score regarding levels of Practice with demographic variables in experimental group and control group except for occupation in experimental group and educational Qualification in control group.

Conclusion: It concluded this that women with PCOS had Moderate level of PCOS condition, moderate level of knowledge regarding PCOS and moderate level of practice to reduced PCOS before initiation of selected health care strategies. The selected health care strategies have reduced the ovarian condition significantly from moderate to majority of mild level, knowledge regarding PCOS improved significantly from moderate to majority of high and moderate level and practice improved to moderate to majority of normal and moderate level at the end of 6th month period, after selected health care strategies was given. The selected health care strategies were effective in reducing the PCOS condition, increasing the knowledge regarding PCOS and improving the practice of women with PCOS.

Keywords: PCOS, Polycystic Ovarian Syndrome, Health Care Strategies, Effectiveness, PCOS condition, Knowledge, Practice

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INTRODUCTION:

PCOS also known as Polycystic ovarian syndrome (Stein-Leventhal Syndrome), was first described in the year 1935 by Stein and Leventhal when women presented endocrine issues, such as amenorrhea, polycystic ovaries, and hirsutism. It is a common hormonal disorder commonly found in their reproductive age.(1)(2)(3) PCOS accounts for 75% of cases with anovulatory infertility.(4) PCOS affects 5-10% of women in their reproductive age group and remains the most mysterious reproductive disorders.(1)(5) PCOS is characterized by an elevation in serum luteinizing hormone (LH) level, causing hyperandrogenism and causing an altered ratio of LH and the follicle stimulating hormone (FSH).(6) According to the “European Society of Human Reproduction and Embryology” and the “American Society for Reproductive Medicine” criteria, also known as “Rotterdam Criteria” from 2003, the presence of any two of the following characteristics could usually be identified as patients affected by PCOS (after exclusion of other pathologies like hyperprolactinemia, Cushing Syndrome, hypothyroidism, virilising tumors, etc.) i.e. oligo-amenorrhea/ irregular anovulatory cycles (>35 days or <21 days), clinical (hirsutism, acne, male pattern alopecia) and/or biochemical hyperandrogenism (raised serum testosterone levels), polycystic ovary morphology (comprised of 12 or more follicles that range in size from 2 mm to 9 mm or increased ovarian volume, over 10cm³, on transvaginal ultrasound examination).(7)(8) Rotterdam criteria are accepted only for adult women.(9) Treatment of PCOS includes changes in lifestyle such as weight loss and exercise and pharmacological management. Before starting any medication, the risks and benefits of the medication should be discussed with the patient so that she can understand the roles of medications in the treatment of PCOS.(2) Management of PCOS involves addressing the risks and symptoms through healthy lifestyle interventions, education, and therapeutic interventions. (9) Over the past few years, India has observed a surge of approximately 30% cases of PCOS. According to the investigator, the main cause of the problem is attributed to changes in lifestyle and insufficient knowledge. To reduce its prevalence in the future, it is imperative to increase awareness among women regarding infertility.

MATERIALS & METHODS:

Research approach: A quantitative research approach was used to assess the effectiveness of selected health care strategies on PCOS among

women with PCOS between the age group of 18 to 40 years.

Research design: True experimental with randomize control design was used to assess the effectiveness of selected health care strategies among women with PCOS.

Research setting and participants: The setting of the current study was Gynaecology outpatient department (OPD) Rohilkhand Medical College and Hospital (RMCH), Bareilly. The sample comprises PCOS women in Gynaecology outpatient department (OPD) in Rohilkhand Medical College and Hospital (RMCH), Bareilly who fulfilled the inclusive criteria.

Sample size and sampling technique:

A consecutive sampling technique was used in the current study. PCOS women who met the inclusion criteria were enrolled until the required sample size was achieved. The sample size for the main study was estimated as 60 in both experimental and control groups. A total of 120 samples were distributed in 2 groups (60+60). Random allocation of women was done by using the lottery method and allocation concealment was done with the sealed envelope technique. The opaque envelopes were sequentially numbered and the randomly generated group allocation (control group and experimental group) was sealed inside the respective envelopes. After enrolling the women who met the inclusion criteria, the envelope was opened and the patients were allocated to the control or experimental group as per the group allocation in the envelope.

Data collection:

Data regarding the demographic variables of PCOS were collected from both the experimental and control group. Pre-test data were collected from both groups. PCOS was assessed by using a structured PCOS assessment checklist, Knowledge regarding PCOS was assessed by using a structured knowledge questionnaire, and Practice for women to reduce PCOS was assessed by using a checklist. Selected Health Care Strategies were given to experimental group as an intervention but withdrawn from control group. After the intervention, follow up were conducted every 1 month for the experimental group. The post-test was conducted by the researcher at the end of 6th month for both experimental and control group.

Data analysis:

The data was analysed by using Statistical Package for Social Sciences (SPSS) version 25.0 for windows. Appropriate descriptive and inferential statistics were used to analyse the data.

- **Paired ‘t’ test:** It was used to assess the effectiveness of Selected Health Care Strategies regarding polycystic ovarian syndrome among women with PCOS.
- **Independent ‘t’ test:** It was used to compare the mean values between experimental and control groups.
- **Chi-square test:** It is used to investigate the association between the pre-test PCOS assessment, knowledge regarding PCOS, and practice with the selected demographic variables of women with PCOS.

RESULTS:

Table no. 1 shows that in both the experimental group (51.7%) and the control group (58.3%), the majority of the women were between the ages of 24 to 30 years. In terms of weight, the majority of the women in the experimental group (61.7%) were overweight (BMI of 25.0 or more), while the majority of the women in control group (53.3%) were also overweight (BMI of 25.0 or more). A higher percentage of women were housewives (35%) in the experimental group whereas in Control group majority were also housewives (36.7%). Regarding the Monthly Income of Family, maximum of the women in experimental

group were having monthly income of below Rs. 10,000 (51.7%) whereas in control group maximum were also belongs to monthly income of below Rs. 10,000 (43.3%). Regarding marital status majority were married in both experimental group (73.3%) and control group (91.7%). In habitant, maximum was belonging to Rural area in both experimental group (70%) and control group (53.3%). Regarding Educational qualification maximum women in experimental group have Informal Education (35%) where as in control group maximum have completed 12th (30%) and Graduate (30%). In dietary habit maximum women in both experimental (73.3%) and control group (73.3%) were vegetarian. Regarding History of smoking maximum women in both experimental group (90%) and control group (91.7%) have no history of smoking. Regarding family history of PCOS most of the women in both experimental (75%) and control group (705) were having no family history of PCOS. Regarding family history of Diabetes maximum women in experimental group (80%) and control group (63.3%) were having no family history of Diabetes.

According to the study findings, most of the demographic variables for women with PCOS in both the experimental and control groups were not significant except for monthly family income, marital status, and family history of diabetes. This indicates that the participants in the two groups were homogeneous. Consequently, the data could be pooled for further analysis.

Table no. 1: The frequency and percentage distribution of demographic data among study participants. N= 120

Sl. No.	Demographic variables		Experimental group (60)		Control group (60)		Chi square (χ^2) value
			Frequency	Percentage	Frequency	Percentage	
			f	%	f	%	
1	Age	18 years to 23 years	13	21.7	13	21.7	$\chi^2 = 0.814$ d.f. = 3 p = 0.846 NS
		24 years to 30 years	31	51.7	35	58.3	
		31 years to 35 years	12	20.0	9	15.0	
		36 years to 40 years	4	6.7	3	5.0	
2	Weight	Under weight (BMI of 18.5 below)	6	10	4	6.7	$\chi^2 = 1.957$ d.f. = 2 p = 0.376 NS
		Normal weight (BMI of 18.5 to 24.9)	17	28.3	24	4	
		Over weight (BMI of 25.0 or more)	37	61.7	32	53.3	
3	Occupation	Student	14	23.3	7	11.7	$\chi^2 = 6.045$ d.f. = 4 p = 0.196 NS
		House wife	21	35	22	36.7	
		Private job	4	6.7	4	6.7	
		Government Job	5	8.3	13	21.7	
		Daily wager	16	26.7	14	23.3	
4	Monthly income of the family	Below Rs. 10,000	31	51.7	26	43.3	$\chi^2 = 8.211$ d.f. = 3 p = 0.042 S***
		Rs. 10,001 to Rs. 20,000	12	20	12	20	
		Rs. 20,001 to Rs. 30,000	8	13.3	2	3.3	
		Above Rs. 30,000	9	15	20	33.3	

5	Marital Status	Married	44	73.3	55	91.7	$\chi^2= 6.984$ d.f.= 1 p=0.008 S**
		Unmarried	16	26.7	5	8.3	
6	Habitant	Rural	42	70	32	53.3	$\chi^2= 5.040$ d.f.= 2 p=0.080 NS
		Urban	17	28.3	28	46.7	
		Urban Slum	1	1.7	00	00	
7	Educational Qualification	Informal Education	21	35	12	20	$\chi^2= 6.340$ d.f.= 3 p=0.096 NS
		10 th	13	21.7	12	20	
		12 th	8	13.3	18	30	
		Graduate and above	18	30	18	30	
8	Dietary Habit	Vegetarian	44	73.3	44	73.3	$\chi^2= 0.000$ d.f.= 2 p=1.000 NS
		Non-vegetarian	10	16.7	10	16.7	
		Eggetarian	6	10.0	6	10	
9	History of Smoking	Yes	6	10	5	8.3	$\chi^2= 0.100$ d.f.= 1 p=0.752 NS
		No	54	90	55	91.7	
10	Family History Of PCOS	Yes	15	25	18	30	$\chi^2= 0.376$ d.f.= 1 p=0.539 NS
		No	45	75	42	70	
11	Family History of Diabetes	Yes	12	20	22	36.7	$\chi^2= 4.104$ d.f.= 1 p=0.043 S*
		No	48	80	38	63.3	

**p < 0.01, *p < 0.05, NS- Not Significant, S- Significant

1. To assess the level of PCOS before and after the selected health care strategies among women: Table no. 2.1 shows the frequency and percentage distribution of pre-test and post-test levels of PCOS assessment scores between the experimental and control group and it depicts that in the pre-test majority of the women (95%) in the experimental

group had a moderate level of PCOS assessment score and (98.3%) in control group had a moderate level of PCOS assessment score. In the post-test, (91.7%) of women were mild PCOS conditions in the experimental group whereas (78.3%) in control group had moderate levels of PCOS assessment scores.

Table no. 2.1: Frequency and percentage distribution of pre-test and post-test level of PCOS assessment in experimental and control group N=120

PCOS assessment	Score	Experimental group (60)				Control group (60)			
		Pre-test		Post-test		Pre-test		Post-test	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Mild	0-4	01	1.7	55	91.7	00	00	00	00
Moderate	5-7	57	95	05	8.3	59	98.3	47	78.3
Severe	8-10	02	3.3	00	00	01	1.7	13	21.7

2. To assess the level of knowledge regarding PCOS before and after the selected health care strategies among women: Table no. 2.2 shows the frequency and percentage distribution of pre-test and post-test levels of knowledge scores regarding PCOS between the experimental and control group and it depicts that

in the pre-test majority of the women (65%) in the experimental group and (70%) in control group were having a moderate level of knowledge regarding PCOS. In the post-test, (76.7%) of the women were having moderate knowledge of PCOS in the experimental group whereas (55%) in control group were having moderate knowledge of PCOS.

Table no. 2.2: Percentage distribution and frequency of pre-test and post-test levels of PCOS knowledge in the experimental and control groups. N=120

Knowledge level	Score	Experimental group (60)				Control group (60)			
		Pre-test		Post-test		Pre-test		Post-test	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Low	0-7	14	23.3	02	3.3	18	30	27	45
Moderate	8-14	39	65	46	76.7	42	70	33	55

High	15-20	07	11.7	12	20	00	00	00	00
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3. To assess the level of practice regarding PCOS before and after the selected health care strategies among women:

Table no. 2.3 shows the frequency and percentage distribution of pre-test and post-test level of Practice scores regarding PCOS between the experimental and control group and it depicts that in the pre-test majority of the women (60%) in the

experimental group and (73.3%) in control group were having a moderate level of practice regarding PCOS. In the post-test, (75%) of women were having a moderate level of practice regarding PCOS in the Experimental Group whereas (65%) in control group were having a moderate level of practice regarding PCOS.

Table no. 2.3: Frequency and percentage distribution of pre-test and post-test level of practice scores in experimental and control groups.N=120

Practice level	Score	Experimental group (60)				Control group (60)			
		Pre-test		Post-test		Pre-test		Post-test	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Normal	0-2	10	16.7	15	25	5	8.3	05	8.3
Moderate	3-5	36	60	45	75	44	73.3	39	65
Low	6-8	14	23.3	00	00	11	18.3	16	26.7

4. To evaluate the effectiveness of selected health care strategies on PCOS among women:

Table no. 3.1 shows the comparison of the mean pre-test-post-test level of PCOS assessment scores between the experimental and control group & it depicts that in pre-test the mean and SD were 6.23 ± 0.810 in the experimental group whereas in control group mean and SD was 46.35 ± 0.547 . In post-test the mean and SD were 33.58 ± 0.809 in the experimental group whereas in control group mean and SD was 7.13 ± 0.536 .

significant at < 0.01 level whereas in control group was -11.585 and p value was 0.001 which was statistically significant at < 0.05 level.

An Independent ‘t’-test was performed to compare the level of PCOS assessment scores in the experimental and control group. The obtained t value for pre-test was $t = -0.924$, $p = 0.357$ and post-test was $t = -28.348$, $p = 0.001$. It revealed that there was no significant difference between experimental and control groups in pre-test scores whereas there was a significant difference between experimental and control groups in post-test scores.

Paired t-test in the experimental group was 23.336 and p value was 0.001 which was statistically

Table no. 3.1: Comparison of mean of pre-test post-test PCOS assessment scores among women within and between experimental and control groups. N=120

Groups	PCOS assessment scores (Mean \pm SD)		t- value (p value)*
	Pre-test	Post-test	
Experimental group	6.23 ± 0.810	3.58 ± 0.809	$23.336 (0.001)$
Control group	6.35 ± 0.547	7.13 ± 0.536	$-11.585 (0.001)$
t- value (p value)#	$-0.924 (0.357)$	$-28.348 (0.001)$	

#Independent t- test *Paired t- test
 $T_{118} =$ at $p < 0.05$ level of significance

Table no. 3.2 shows the comparison of mean pre-test and post-test scores regarding knowledge of PCOS between the experimental and control group & it depicts that in pre-test the mean and SD was 10.00 ± 3.324 in the experimental group whereas in control group mean and SD was 8.22 ± 2.617 . In post-test the mean and SD were 12.63 ± 2.285 in

the experimental group whereas in control group mean and SD was 7.68 ± 2.581 . Paired t-test value in the experimental group was -9.794 and p value was 0.001 which was statistically significant at < 0.05 level whereas in control group was -2.533 and p value was 0.014 which was also statistically significant at < 0.05 level.

Independent ‘t’-test was performed to compare the level of PCOS assessment scores in the experimental and control group. The obtained t-value for the pre-test was $t = 3.265$, $p = 0.001$ and

post-test was $t = 11.124$, $p = 0.001$. The t-test revealed that there was a significant difference between the group's pre-test scores and post-test scores.

Table no. 3.2: Comparison of mean of pre-test post-test scores regarding knowledge of PCOS among women within and between experimental and control group. N=120

Groups	Knowledge scores (Mean \pm SD)		t- value (p value)*
	Pre-test	Post-test	
Experimental group	10.00 \pm 3.324	12.63 \pm 2.285	-9.794 (0.001)
Control group	8.22 \pm 2.617	7.68 \pm 2.581	2.533 (0.014)
t- value (p value) #	3.265 (0.001)	11.124 (0.001)	

#Independent t- test *Paired t- test
T₁₁₈= at p<0.05 level of significance

Table no. 3.3 shows the comparison of mean pre-test and post-test scores regarding practice between the experimental and control group & it depicts that in pre-test the mean and SD were 4.33 ± 1.664 in the experimental group whereas in control group mean and SD was 4.18 ± 1.172 . In post-test the mean and SD were 3.27 ± 1.233 in the experimental group whereas in control group mean and SD was 4.43 ± 1.466 .

Paired t-test value in the experimental group was 4.262 and p value was 0.001 which was statistically significant at < 0.05 level whereas in control group was - 1.137 and p value was 0.260 which was not statistically significant at < 0.05 level.

Independent ‘t’-test was performed to compare scores regarding practice in experimental and control group. The obtained t value for pre-test was $t = 0.571$, $p = 0.56$ and post-test was $t = - 4.718$, $p = 0.001$. The t-test revealed that there was no significant difference between the groups at pre-test scores whereas there was significant difference between both the groups at post-test scores.

Thus, it can be interpreted that the experimental group has a rapid improvement in PCOS condition, knowledge regarding PCOS and practice as compared to the control group. It showed that health care strategies were effective for PCOS women.

Table no. 3.3: Comparison of mean of pre-test post-test scores regarding practice among women within and between experimental and control groups. N=120

Groups	Practice scores (Mean \pm SD)		t- value (p value)*
	Pre-test	Post-test	
Experimental group	4.33 \pm 1.664	3.27 \pm 1.233	4.262 (0.001)
Control group	4.18 \pm 1.172	4.43 \pm 1.466	-1.137 (0.260)
t- value (p value) #	0.571 (0.569)	- 4.718 (0.001)	

#Independent t- test *Paired t- test
t₁₁₈= at p<0.05 level of significance

5. To associate the pre-test score with selected demographic variables among women with PCOS:

Table no. 4.1 shows the association between the pre-test PCOS assessment score with their selected demographic variables in experimental group. Yate’s correction test and Fisher’s exact test was performed to find the association. It shows that there was no significant association between age,

weight, occupation, Monthly Income of Family, Marital Status, Habitant, Educational Qualification, Dietary Habit, History of Smoking, Family History of PCOS, Family History of Diabetes at $p < 0.05$.

Thus, it can be interpreted that demographic variables did not have any influence on PCOS Condition among women in experimental group.

Table no. 4.1: Association between pre-test PCOS Assessment score with their selected demographic variables in experimental group. N=120

Sl. No.	Demographic variables		Pre-test PCOS Assessment Score (Experimental group)			Calculated value (χ^2)
			Mild	Moderate	Severe	
1	Age	18 years to 23 years	00	13	00	$\chi^2= 7.893$ d.f.= 6 p=0.241* NS
		24 years to 30 years	01	30	00	
		31 years to 35 years	00	10	02	
		36 years to 40 years	00	04	00	
2	Weight	Under weight (BMI of 18.5 below)	01	05	00	$\chi^2= 5.951$ d.f.= 4 p=0.217* NS
		Normal weight (BMI of 18.5 to 24.9)	00	17	00	
		Over weight (BMI of 25.0 or more)	00	35	02	
3	Occupation	Student	00	14	00	$\chi^2= 9.441$ d.f.= 8 p=0.273* NS
		House wife	00	20	01	
		Private job	00	03	01	
		Government Job	00	05	00	
4	Monthly income of the family	Daily wager	01	15	00	$\chi^2= 4.660$ d.f.= 6 p=0.678* NS
		Below Rs. 10,000	01	29	01	
		Rs. 10,001 to Rs. 20,000	00	12	00	
		Rs. 20,001 to Rs. 30,000	00	07	01	
5	Marital Status	Above Rs. 30,000	00	09	00	$\chi^2= 0.845$ d.f.= 2 p=1.000* NS
		Married	01	41	02	
6	Habitant	Unmarried	00	16	00	$\chi^2= 5.299$ d.f.= 4 p=0.665* NS
		Rural	01	40	01	
		Urban	00	16	01	
7	Educational Qualification	Urban Slum	00	01	00	$\chi^2= 3.860$ d.f.= 6 p=1.000* NS
		Informal Education	01	19	01	
		10 th	00	13	00	
		12 th	00	08	00	
8	Dietary Habit	Graduate and above	00	17	01	$\chi^2= 2.072$ d.f.= 4 p=1.000* NS
		Vegetarian	01	41	02	
		Non-vegetarian	00	10	00	
9	History of Smoking	Eggetarian	00	06	00	$\chi^2= 1.142$ d.f.= 2 p=1.000* NS
		Yes	00	06	00	
10	Family History Of PCOS	No	01	51	02	$\chi^2= 1.511$ d.f.= 2 p=0.585* NS
		Yes	00	14	01	
11	Family History of Diabetes	Yes	00	12	00	$\chi^2= 0.712$ d.f.= 2 p=1.000* NS
		No	01	45	02	

* Fisher’s exact test, # Yate’s correction test, **p < 0.01, *p < 0.05, NS- Not Significant, S- Significant

Table no. 4.2 shows the association between the pre-test PCOS assessment score with their selected demographic variables in control group. Yate’s correction test and Fisher’s exact test was performed to find the association. It shows that there was no significant association between age, weight, occupation, Monthly Income of Family,

Marital Status, Habitant, Educational Qualification, Dietary Habit, History of Smoking, Family History of PCOS, Family History of Diabetes at p<0.05.

Thus, it can be interpreted that demographic variables did not have any influence on PCOS Condition among women in control group.

Table no. 4.2: Association between Pre-test PCOS Assessment Score with their selected demographic variables in Control group. N=120

Sl. No.	Demographic variables		Pre-test PCOS Assessment Score (Control group)			Calculated value (χ^2)
			Mild	Moderate	Severe	
1	Age	18 years to 23 years	00	13	00	$\chi^2= 2.576$ d.f.= 3 p=1.000* NS
		24 years to 30 years	00	34	01	
		31 years to 35 years	00	09	00	
		36 years to 40 years	00	03	00	
2	Weight	Under weight (BMI of 18.5 below)	00	04	00	$\chi^2= 1.868$ d.f.= 2 p=1.000* NS
		Normal weight (BMI of 18.5 to 24.9)	00	24	00	
		Over weight (BMI of 25.0 or more)	00	31	01	
3	Occupation	Student	00	07	00	$\chi^2= 3.567$ d.f.= 4 p=1.000* NS
		House wife	00	21	01	
		Private job	00	04	00	
		Government Job	00	13	00	
		Daily wager	00	14	00	
4	Monthly income of the family	Below Rs. 10,000	00	25	01	$\chi^2= 3.155$ d.f.= 3 p=1.000* NS
		Rs. 10,001 to Rs. 20,000	00	12	00	
		Rs. 20,001 to Rs. 30,000	00	02	00	
		Above Rs. 30,000	00	20	00	
5	Marital Status	Married	00	54	01	$\chi^2= 0.0001$ d.f.= 1 p=1.000# NS
		Unmarried	00	05	00	
6	Habitant	Rural	00	31	01	$\chi^2= 0.0001$ d.f.= 1 p=1.000# NS
		Urban	00	28	00	
		Urban Slum	00	00	00	
7	Educational Qualification	Informal Education	00	11	01	$\chi^2= 3.382$ d.f.= 3 p=0.400* NS
		10 th	00	12	00	
		12 th	00	18	00	
		Graduate and above	00	18	00	
8	Dietary Habit	Vegetarian	00	43	01	$\chi^2= 1.383$ d.f.= 2 p=1.000* NS
		Non-vegetarian	00	10	00	
		Eggetarian	00	06	00	
9	History of Smoking	Yes	00	05	00	$\chi^2= 0.0001$ d.f.= 1 p=1.000# NS
		No	00	54	01	
10	Family History Of PCOS	Yes	00	18	00	$\chi^2= 0.0001$ d.f.= 1 p=1.000# NS
		No	00	41	01	
11	Family History of Diabetes	Yes	00	22	00	$\chi^2= 0.0001$ d.f.= 1 p=1.000# NS
		No	00	37	01	

* Fisher’s exact test, # Yate’s correction test, **p < 0.01, *p < 0.05, NS- Not Significant, S- Significant

Table no. 4.3 shows the association between pre-test levels of knowledge among women with their selected demographic variables in experimental group. Yate’s correction test and Fisher’s exact test was performed to find the association. It shows that there was no significant association between age, weight, occupation, Monthly Income of Family, Marital Status, Habitant, Educational Qualification, Dietary Habit, History of Smoking,

Family History of Diabetes at p<0.05, whereas there was significant association between Family History of PCOS (p=0.028).

Thus, it can be interpreted that demographic variables did not have any influence on the level of knowledge among women in experimental group except for Family History of PCOS.

Table no. 4.3: Association between levels of Knowledge among women with their selected demographic variables in experimental group. N=120

Sl. No.	Demographic variables		Pre-test Knowledge Assessment Score (Experimental group)			Calculated value (χ^2)
			Mild	Moderate	Severe	
1	Age	18 years to 23 years	03	09	01	$\chi^2 = 2.977$ d.f.= 6 p=0.853* NS
		24 years to 30 years	09	18	04	
		31 years to 35 years	02	09	01	
		36 years to 40 years	00	03	01	
2	Weight	Under weight (BMI of 18.5 below)	01	04	01	$\chi^2 = 4.221$ d.f.= 4 0.351* NS
		Normal weight (BMI of 18.5 to 24.9)	6	08	03	
		Over weight (BMI of 25.0 or more)	07	27	03	
3	Occupation	Student	04	08	02	$\chi^2 = 9.080$ d.f.= 8 p= 0.262* NS
		House wife	04	17	00	
		Private job	01	02	01	
		Government Job	02	03	00	
		Daily wager	03	09	04	
4	Monthly income of the family	Below Rs. 10,000	09	20	02	$\chi^2 = 10.649$ d.f.= 6 p=0.057* NS
		Rs. 10,001 to Rs. 20,000	01	06	05	
		Rs. 20,001 to Rs. 30,000	01	07	00	
		Above Rs. 30,000	03	06	00	
5	Marital Status	Married	09	30	05	$\chi^2 = 1.076$ d.f.= 2 p=0.680* NS
		Unmarried	05	09	02	
6	Habitant	Rural	09	27	06	$\chi^2 = 2.227$ d.f.= 4 p=0.801* NS
		Urban	05	11	01	
		Urban Slum	00	01	00	
7	Educational Qualification	Informal Education	05	15	01	$\chi^2 = 4.266$ d.f.= 6 p=0.657* NS
		10 th	02	08	03	
		12 th	01	06	01	
		Graduate and above	06	10	02	
8	Dietary Habit	Vegetarian	09	28	07	$\chi^2 = 3.230$ d.f.=4 p=0.521* NS
		Non-vegetarian	04	06	00	
		Eggetarian	01	05	00	
9	History of Smoking	Yes	03	03	00	$\chi^2 = 2.409$ d.f.= 2 p=1.000* NS
		No	11	36	07	
10	Family History Of PCOS	Yes	07	08	00	$\chi^2 = 6.576$ d.f.= 2 p=0.028 * S*
		No	07	31	07	
11	Family History of Diabetes	Yes	02	10	00	$\chi^2 = 2.207$ d.f.= 2 p=0.309* NS
		No	12	29	07	

* Fisher's exact test, # Yate's correction test, **p < 0.01, *p < 0.05, NS- Not Significant, S- Significant

Table no. 4.4 shows the association between levels of knowledge among women with their selected demographic variables in control group. Yate's correction test and Fisher's exact test was performed to find the association. It shows that there was no significant association between age, weight, occupation, Monthly Income of Family, Marital Status, Habitant, Educational

Qualification, Dietary Habit, History of Smoking, Family History of PCOS, Family History of Diabetes at p<0.05.

Thus, it can be interpreted that demographic variables did not have any influence on the level of knowledge among women in control group.

Table no. 4.4: Association between levels of Knowledge among women with their selected demographic variables in control group. N=120

Sl. No.	Demographic variables		Pre-test Knowledge Assessment Score (Control group)			Calculated value (χ^2)
			Mild	Moderate	Severe	
1	Age	18 years to 23 years	02	11	00	$\chi^2= 1.911$ d.f.= 3 p=0.642* NS
		24 years to 30 years	12	23	00	
		31 years to 35 years	03	06	00	
		36 years to 40 years	01	02	00	
2	Weight	Under weight (BMI of 18.5 below)	02	02	00	$\chi^2= 3.836$ d.f.= 2 p=0.118* NS
		Normal weight (BMI of 18.5 to 24.9)	04	20	00	
		Over weight (BMI of 25.0 or more)	12	20	00	
3	Occupation	Student	00	07	00	$\chi^2= 4.732$ d.f.= 3 p=0.305 * NS
		House wife	06	16	00	
		Private job	02	02	00	
		Government Job	05	08	00	
		Daily wager	05	09	00	
4	Monthly income of the family	Below Rs. 10,000	09	17	00	$\chi^2= 0.925$ d.f.= 3 p=0.968 * NS
		Rs. 10,001 to Rs. 20,000	03	09	00	
		Rs. 20,001 to Rs. 30,000	00	02	00	
		Above Rs. 30,000	06	14	00	
5	Marital Status	Married	18	37	00	$\chi^2= 1.039$ d.f.= 1 p=0.308 # NS
		Unmarried	00	05	00	
6	Habitant	Rural	07	25	00	$\chi^2= 2.156$ d.f.= 1 p=0.642* NS
		Urban	11	17	00	
		Urban Slum	00	00	00	
7	Educational Qualification	Informal Education	03	09	00	$\chi^2= 0.468$ d.f.= 3 p=0.981 * NS
		10 th	04	08	00	
		12 th	06	12	00	
		Graduate and above	05	13	00	
8	Dietary Habit	Vegetarian	12	32	00	$\chi^2= 0.929$ d.f.= 2 p=0.726 * NS
		Non-vegetarian	04	06	00	
		Eggetarian	02	04	00	
9	History of Smoking	Yes	02	03	00	$\chi^2= 0.0001$ d.f.= 1 p=1.000# NS
		No	16	39	00	
10	Family History Of PCOS	Yes	08	10	00	$\chi^2= 2.555$ d.f.= 1 p=0.110# NS
		No	10	32	00	
11	Family History of Diabetes	Yes	08	14	00	$\chi^2= 0.670$ d.f.= 1 p=0.413# NS
		No	10	28	00	

* Fisher’s exact test, # Yate’s correction test, **p < 0.01, *p < 0.05, NS- Not Significant, S- Significant

Table no. 4.5 shows the relationships between women's pre-test level of practise score and their selected demographic variables in Experimental group. Yate’s correction test and Fisher’s exact test was performed to find the association. It shows that there was no significant association between age, weight, Monthly Income of Family, Marital Status, Habitant, Educational Qualification, Dietary Habit, History of Smoking, Family History of PCOS,

Family History of Diabetes at p<0.05, whereas there was significant association between occupation (p=0.029) and pre-test level of Practice score among women.

Thus, it can be interpreted that demographic variables did not have any influence on level of practice among women in experimental group except for occupation.

Table no. 4.5: Association between levels of Practice among women with their selected demographic variables in experimental group. N=120

Sl. No.	Demographic variables		Pre-test Practice Assessment Score (Experimental group)			Calculated value (χ^2)
			Mild	Moderate	Severe	
1	Age	18 years to 23 years	02	09	02	$\chi^2= 3.337$ d.f.= 6 p=0.795 * NS
		24 years to 30 years	04	18	09	
		31 years to 35 years	03	06	03	
		36 years to 40 years	01	03	00	
2	Weight	Under weight (BMI of 18.5 below)	00	05	01	$\chi^2= 3.117$ d.f.= 4 p=0.551* NS
		Normal weight (BMI of 18.5 to 24.9)	03	08	06	
		Over weight (BMI of 25.0 or more)	07	23	07	
3	Occupation	Student	01	10	03	$\chi^2=14.873$ d.f.= 8 p=0.029* S*
		House wife	03	15	03	
		Private job	00	02	02	
		Government Job	04	00	01	
		Daily wager	02	09	05	
4	Monthly income of the family	Below Rs. 10,000	03	20	08	$\chi^2= 9.752$ d.f.= 6 p=0.096* NS
		Rs. 10,001 to Rs. 20,000	01	06	05	
		Rs. 20,001 to Rs. 30,000	02	06	00	
		Above Rs. 30,000	04	04	01	
5	Marital Status	Married	08	25	11	$\chi^2= 0.600$ d.f.= 2 p=0.774* NS
		Unmarried	02	11	03	
6	Habitant	Rural	06	28	08	$\chi^2= 4.595$ d.f.= 4 p=0.319 * NS
		Urban	04	07	06	
		Urban Slum	00	01	00	
7	Educational Qualification	Informal Education	03	13	05	$\chi^2= 7.379$ d.f.= 6 p=0.266* NS
		10 th	00	11	02	
		12 th	03	03	02	
		Graduate and above	04	09	05	
8	Dietary Habit	Vegetarian	07	27	10	$\chi^2= 1.095$ d.f.= 4 p=0.950 NS
		Non-vegetarian	02	05	03	
		Eggetarian	01	04	01	
9	History of Smoking	Yes	02	02	02	$\chi^2= 2.640$ d.f.= 2 p=0.223 * NS
		No	08	34	12	
10	Family History Of PCOS	Yes	05	08	02	$\chi^2= 3.920$ d.f.= 2 p=0.124* NS
		No	05	28	12	
11	Family History of Diabetes	Yes	02	10	00	$\chi^2= 5.172$ d.f.= 2 p=0.079 * NS
		No	08	26	14	

* Fisher’s exact test, # Yate’s correction test, **p < 0.01, *p < 0.05, NS- Not Significant, S- Significant

Table no. 4.6 shows the association between levels of practice among women with their selected demographic variables in control group. Yate’s correction test and Fisher’s exact test was performed to find the association. It shows that there was no significant association between age, weight, Monthly Income of Family, Marital Status, Habitant, Dietary Habit, History of Smoking, Family History of PCOS, Family History of

Diabetes at p<0.05, whereas there was significant association between Educational Qualification (p=0.004).

Thus, it can be interpreted that demographic variables did not have any influence on level of practice among women in control group except for Educational Qualification.

Table no. 4.6: Association between levels of Practice among women with their selected demographic variables in Control group. N=120

Sl. No.	Demographic variables		Pre-test Practice Assessment Score (Control group)			Calculated value (χ^2)
			Mild	Moderate	Severe	
1	Age	18 years to 23 years	02	08	03	$\chi^2= 3.322$ d.f.= 6 p=0.0784* NS
		24 years to 30 years	03	26	06	
		31 years to 35 years	00	08	01	
		36 years to 40 years	00	02	01	
2	Weight	Under weight (BMI of 18.5 below)	00	03	01	$\chi^2= 1.952$ d.f.= 4 p=0.727* NS
		Normal weight (BMI of 18.5 to 24.9)	03	18	03	
		Over weight (BMI of 25.0 or more)	02	23	07	
3	Occupation	Student	00	04	03	$\chi^2= 6.871$ d.f.=8 p=0.494* NS
		House wife	03	17	02	
		Private job	00	03	01	
		Government Job	00	11	02	
		Daily wager	02	09	03	
4	Monthly income of the family	Below Rs. 10,000	04	16	06	$\chi^2= 4.663$ d.f.= 6 p=0.575* NS
		Rs. 10,001 to Rs. 20,000	00	11	01	
		Rs. 20,001 to Rs. 30,000	00	02	00	
		Above Rs. 30,000	01	15	04	
5	Marital Status	Married	05	40	10	$\chi^2= 0.364$ d.f.= 2 p=1.000* NS
		Unmarried	00	04	01	
6	Habitant	Rural	04	23	05	$\chi^2=1.619$ d.f.= 2 p=0.513* NS
		Urban	01	21	06	
		Urban Slum	00	00	00	
7	Educational Qualification	Informal Education	04	08	00	$\chi^2= 15.414$ d.f.= 2 p=0.004* S**
		10 th	01	06	05	
		12 th	00	16	02	
		Graduate and above	00	14	04	
8	Dietary Habit	Vegetarian	04	32	08	$\chi^2= 1.736$ d.f.= 4 p=0.907* NS
		Non-vegetarian	00	08	02	
		Eggetarian	01	04	01	
9	History of Smoking	Yes	01	04	00	$\chi^2= 1.941$ d.f.= 2 p=0.261* NS
		No	04	40	11	
10	Family History Of PCOS	Yes	02	14	02	$\chi^2= 1.115$ d.f.= 2 p=0.637* NS
		No	03	30	09	
11	Family History of Diabetes	Yes	01	19	02	$\chi^2= 2.744$ d.f.= 2 p=0.285* NS
		No	04	25	09	

* Fisher's exact test, # Yate's correction test, **p < 0.01, *p < 0.05, NS- Not Significant, S- Significant

DISCUSSION:

The study results were analysed and discussed in detail in relation to the objectives as follows- **The first objective was to assess the level of PCOS before and after the selected health care strategies among women:**

The frequency and percentage distribution of pre-test and post-test levels of PCOS assessment scores between the experimental and control group depicts that in pre-test majority of the women (95%) in the experimental group had a moderate level of PCOS assessment score and (98.3%) in

control group had a moderate level of PCOS assessment score. In post-test, (91.7%) of women were mild PCOS conditions in the experimental group whereas (78.3%) in control group had a moderate level of PCOS assessment score.

A similar study was conducted by **Patten Rhiannon (2021)** which revealed that exercise like HIIT is effective and helps in improvements of health conditions like aerobic capacity, hormonal profiles, insulin sensitivity, and anxiety in PCOS women. (10)

The second objective was to assess the level knowledge regarding PCOS before and after the selected health care strategies among women:

The distribution of frequency and percentage of the pre-test and post-test levels of knowledge scores regarding PCOS between the experimental and control group depicts that, in pre-test, majority of the women (65%) in experimental group and (70%) in control group were having a moderate level of knowledge regarding PCOS. In post-test, (76.7%) of the women were having moderate knowledge of PCOS in experimental group whereas (55%) in control group were having moderate knowledge regarding PCOS.

A study conducted by **Souheil Farah Al et al. (2022)** among Lebanese women to assess knowledge and perceptions regarding PCOS. This study supported the present study as 43.6% of the women had good knowledge regarding PCOS and a significant percentage of women have inadequate knowledge regarding PCOS. (11)

The third objective was to assess the level of practice before and after the selected health care strategies among women:

The distribution of frequency and percentage of the pre-test and post-test levels of practice scores for PCOS between the experimental and control groups showed that the majority of women in the experimental group (60%) and control group (73.3%) had a moderate level of practice regarding PCOS in the pre-test. The post-test results revealed that in the Experimental Group, 75% of women had a moderate level of practice regarding PCOS, while in control group, 65% had a moderate level of practice regarding PCOS.

In a narrative review conducted by **Blackshaw Lucinda C.D. et al. (2019)** revealed that there is limited existing evidence regarding lifestyle management and needs further study on the knowledge and practice regarding PCOS among healthcare providers. (12)

The fourth objective was to evaluate the effectiveness of selected health care strategies on PCOS among women:

Comparison of mean of pre-test post-test PCOS assessment scores among women within and between experimental and control group-

In experimental group, the decreasing mean difference over the period of time between pre-test 6.23 and post-test 3.58 on PCOS assessment scores proved existing statistical high significant difference at $p < 0.001$.

Kim Chan-Hee et al (2022) conducted a study which support the present study where it was noted

that the group that underwent lifestyle modifications displayed significant improvement in reproductive function compared to the control group. (13)

In control group, the increasing mean difference over the period of time between pre-test 6.35 and post-test 7.13 on PCOS assessment scores projected existing statistical high significant difference at $p < 0.001$.

The comparison of experimental and control group on PCOS assessment scores between pre-test 6.23 and 6.35 had no statistical difference whereas post-test 3.58 and 7.13 respectively on PCOS assessment scores proved existing statistically significant difference at $p < 0.001$.

Comparison of mean of pre-test post-test scores regarding knowledge on PCOS among women within and between experimental and control group-

The increasing mean differences over a period of time between pre-test 10.00 and post-test 12.63 on level of knowledge regarding PCOS projected a statistically high significant difference at $p < 0.001$ in experimental group.

The decreasing mean differences over a period of time between pre-test 8.22 and post test 7.68 on level of knowledge regarding PCOS projected a statistically significant difference at $p < 0.05$ in control group.

The comparison of experimental and control group on knowledge scores between pre-test 10.00 and 8.22 and post-test 12.63 and 7.68 respectively proved existing statistically significant difference at $p < 0.001$.

Comparison of mean of pre-test post-test scores regarding practice among women within and between experimental and control group-

The decreasing mean differences over a period of time between pre-test 4.33 and post-test 3.27 on level of practice regarding PCOS projected a statistically high significant difference in experimental group with a value of $p < 0.001$.

The mean and SD of pre-test and post-test of on level of practice regarding PCOS did not show any significant difference in control group.

The comparison of experimental and control group on level of practice between pre-test 4.33 and 4.18 had no statistical difference whereas post-test 3.27 and 4.43 respectively proved existing statistically significant difference at $p < 0.001$.

A randomized controlled trial study conducted by **Sareh Dashti et al (2022)** on female staff of the University Putra Malaysia who were diagnosed

with PCOS shows that there were no significant changes in attitude and practice of nutrition, eating attitude as well as knowledge, attitude and practice of physical activity between experimental and control group. (14)

The fifth objective was to associate the pre-test score with selected demographic variables among women with PCOS:

There was no association between Pre-test PCOS Assessment score with their selected demographic variables among women with PCOS in experimental group and control group.

In experimental group, Family History of PCOS and pre-test knowledge score among women with PCOS demonstrated significant association at $p < 0.05$ level. A study conducted by **Bhaswatee Kalita et al (2022)** supported the present study. Pre-test knowledge of PCOS among students was positively correlated with several demographic characteristics, including educational field, place of residence, father's profession, PCOS family history, and prior knowledge about PCOS, including Previous information source at 0.05 significant level. ($p < 0.05$). (15). There was no association between levels of knowledge with their selected demographic variables among women with PCOS in control group. This result was consistent with **Elina Abraham et.al. (2022)** study and findings shows that there were no association between demographic variables with knowledge score. (16)

There was significant association between occupation and pre-test levels of Practice score among women with PCOS at $p < 0.05$ level in experimental group.

A study was conducted by **Cutillas-Tolín Ana et al. (2021)** where there were no significant association between dietary indices and total anovulatory or ovulatory PCOS were found. (17)

RECOMMENDATION:

Future research is needed to determine-

- The replication of this study may also be conducted to couple with other alternatives treatment measures.
- An authenticated survey to be conducted in India to obtain accurate statistics on PCOS since there is a lack of reliable national data representing the prevalence of PCOS.
- Large scale prevalence study on PCOS can be done in national level and worldwide.
- A triangulation of qualitative and quantitative measures might be utilised to decide the effectiveness of selected health care strategies on PCOS.

CONCLUSION:

In conclusion, this study indicated that women with PCOS had a moderate level of PCOS symptoms, moderate knowledge about PCOS, and a moderate level of self-care practices before implementing the chosen healthcare strategies. However, after six months of implementing these strategies, there was a noticeable decrease in the severity of PCOS symptoms from moderate to mostly mild, a significant improvement in knowledge from moderate to mostly high/moderate, and a significant improvement in self-care practices from moderate to mostly normal/moderate. Therefore, the chosen healthcare strategies were effective in reducing the severity of PCOS symptoms, enhancing knowledge about PCOS, and improving self-care practices in women with PCOS.

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DECLARATION OF INTERESTS:

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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