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Impact of promoting healthy lifestyle interventions among adolescents, young adults with polycystic ovarian disease in resource limited settings

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ABSTRACT

Polycystic Ovarian Disease (PCOD) is a reproductive metabolic disorder caused by hormonal imbalances within women of fertile age. Mainstay for treating patients with PCOD includes pharmacological therapy and lifestyle modifications. Lifestyle modifications that play a key role in the management of PCOD are weight management, reduction in stress, physical activity, body mass index and dietary changes. There is sparse information regarding the impact of these interventional parameters among the PCOD women in the literature. This study aims to determine the impact of healthy lifestyle modifications in the management of PCOD among young adults and adolescents. It was a prospective interventional study conducted in the Gynaecology outpatient department in Government General Hospital, Kadapa over the time of 6 months from June 2019 to November 2019. Counseling on lifestyle changes and implementation of healthy lifestyle interventions were given to the study population by using the standard questionnaire forms and post counseling changes were collected after 90 days of visit to the clinic. The statistical significance was done by using the unpaired t-test and graph pad version 8.3.0. The total sample of 30 PCOD patients was compared to before patient counseling on lifestyle modifications and after follow-up. The total population was categorized into 2 groups as adolescents (10%) and young adults (27%). The current study showed that there is a significant association between dietary intervention ($p < 0.0113$) and physical activity scores ($p < 0.029$) among the PCOD patients. In PCOD patient's healthy lifestyle modifications like dietary interventions and Physical activity serves as an effective treatment strategy adjunct to pharmacological therapy and improved the patient reproductive health.

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INTRODUCTION

Polycystic ovarian disease (PCOD) a multiple system metabolic disorder because of hormonal imbalances (Harwood *et al.*, 2007). Its epidemiology ranges from 2-7.5% and 6.3% in Asian countries like India, China and Sri Lanka (Joshi *et al.*, 2014). In most of the health care settings the classification of PCOD patients is mainly based upon the rotterdam criteria that needs existing symptoms like a) Chronic or oligo anovulation b) Presence of excess male sex hormones c) Polycystic ovaries when diagnosed on ultrasound. Aetiological features associated with the PCOD remain unclear, but evidence

support genetic, environmental and lifestyle modifications are important contributors for development of PCOD (Naderpoor *et al.*, 2015). Treatment strategy for patients with PCOD is the combination of pharmacological therapy and lifestyle modifications. However, lifestyle modifications that play an important role as first line treatment options include stress reduction, dietary changes, exercise management and blood pressure (Humphreys and Costarelli, 2008). There are little shreds of evidence on the impact of lifestyle modifications like blood pressure, dietary intake, stress reduction and body mass index in PCOD patients. Many of the literature report a mutual association among healthy lifestyle and PCOD. Therefore, the key objectives of our study were to determine the impact of the lifestyle modifications like BP, dietary intake, and Physical activity in PCOD patients in tertiary care hospital settings.

MATERIALS AND METHODS

Study design

It is a prospective Interventional study.

Study period

Present work was carried out for a period of 6 months from June 2019 to November 2019.

Study site

The present study was conducted at Government General Hospital, at the out-patient department Kadapa.

Ethical approval

Institutional ethical committee approval was obtained Prior to initiation of the study and informed consent was taken from all the subjects included in the study.

Source of data

Entire required data was collected from the patients through medical case sheets and lab reports.

Sample size

During the study period of six months, the total sample size was 30 patients.

Inclusion criteria

Patients with age group 12-24 years (adolescents and young girls) diagnosed with PCOD were included in the study. All the adolescents and young adult patients receiving drug therapy for PCOD on a clinical basis were included in the study.

Exclusion criteria

Patients who did not give consent to participate in the study were excluded. Patients above the age of

25 years were excluded from the study. Patients who had been receiving the drug therapy for more than 3 years were excluded from the study due to chances of misleading the results and errors.

Methods of collection of data

All the patients were given counseling and data was collected by using the following:

1. Data on dietary intake was collected by using the self-designed diet questionnaire form
2. Data regarding physical activity was noted on the IPAQ (International Physical Activity Questionnaire) short form.
3. BP measurements were done during the baseline and follow-up after 90 days.

Statistical Analysis

All the data of recruited subjects were entered on a Microsoft Excel spreadsheet. In order to assess the statistical significance of interventional parameters like BP, diet and physical activity, we used the graph pad version 8.3.0 and a statistical significance of p-value ($p \leq 0.05$) was observed to be significant.

RESULTS AND DISCUSSION

In present work total sample size was 57, out of them 7 patients were excluded as they are unwilling to give their consent form. Out of 50 patients, 5 patients were adolescents and the remaining 45 patients were young adults. Among 50 patients, 30 patients were willing to participate and the rest of 20 patients were excluded as they were not willing to continue their treatment in the present study site as shown in Figure 1. In this research study, entire 30 study participants were recruited and categorized into two groups based upon age-wise categorization i.e., Group I: adolescents (12-18 yrs) and Group II: young adults (19-24).

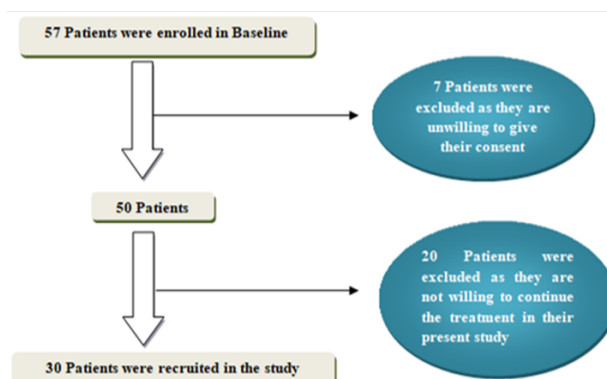


Figure 1: Recruitment of subjects for the study.

Table 1: Categorization of percentage of age groups among PCOD patients.

Demographic details of PCOD patients	Age categories	No. of patients (%)
Age groups	Adolescents (12-18 years)	3(10%)
	Young adults (19-24 years)	27(90%)

Table 2: Comparison of baseline and follow-up (90 days) average blood pressure in PCOD patients.

Parameter	Age distribution	Baseline		Follow up		P-value (systolic BP)	P-value (Diastolic BP)
		Average systolic BP±SD (mm of Hg)	Average diastolic BP±SD (mm of Hg)	Average systolic BP±SD (mm of Hg)	Average diastolic BP±SD (mm of Hg)		
Blood pressure	Adolescents	106.67 ± 15.27	80 ± 10	113.33 ± 11.54	80 ± 0	0.186	0.735
	Young adults	109.26 ± 12.38	83.33 ± 7.33	110.37 ± 10.18	81.85 ± 4.83		

Graphical representation of different groups based on age

The majority of the PCOD patients in our study were young adults 27 (90%) and adolescents were 3 (10%) as represented in Table 1.

Comparing the effect of Blood pressure on PCOD patients

This was done by measuring the systolic and diastolic BP levels of the patients. Among 30 patients average systolic BP of adolescents at baseline was 106.67 mm of Hg and after followup was 113.33 mm of Hg and average diastolic at baseline and followup was same 80 mm of Hg. Young adult's average systolic BP at baseline was 109.26 mm of Hg and after followup it was 110.37 mm of Hg, the diastolic average BP at baseline was 110.3 mm of Hg and after followup 81.85 mm of Hg. There was no significance in blood pressure of systolic p-value = 0.186 and diastolic BP p-value = 0.735 as shown in Table 2.

Effect of Diet in PCOD patients

We categorized the 30 patients into 3 categories based upon the self designed questionnaire of diet chat as shown below Table 3 and the final score was calculated by using formula.

$$\text{Final score} = \text{Initial score} \times 100/40$$

Among 30 patients the average DIET score of adolescents at baseline was 50.55±10.42 and followup was 77.35±13.90. The average DIET score of young adults at baseline was 55.08±11.0 and followup was 75.16±13.63. A statistically significant value (P<0.0113) was observed among the younger adults and adolescents with PCOD as shown in Table 4.

Effect of Physical activity in PCOD patients

We used the standard IPAQ questionnaire short form to categorize the patients into 3 groups as a) Vigorous b) Moderate and c) Low. The IPAQ adolescents baseline average MET-score was 830 ± 661.81 and followup average MET-score was 2382.53 ± 287.31, IPAQ score in young adults was at baseline was 967.69 ± 595.61 and follow-up average MET-score was 1960.10 ± 588.43. The physical activity (IPAQ MET-SCORE) has shown significance with a p-value 0.029 as shown in Table 5.

Table 3: Diet Categorization Based on the Score

Diet	
Category	Score
Inappropriate	0-33
Quite Appropriate	34-66
Appropriate	67-100

Impact of healthy lifestyle interventions on menstrual condition

Among 30 patients the adolescent's menstrual condition who were with amenorrhea (3.33%) and oligomenorrhea (6.667%) are normalized at follow up (10%) when compared with baseline. The menstrual condition of young adults who are with amenorrhea (10%), oligomenorrhea (33.33%), Dysmenorrhoea (3.33) and irregular menses (3.33) at baseline. Most of them are identified normal menstrual status (73.33) and few are oligomenorrhea (16.66) at follow up as presented in Table 6. In the present study overall effect of lifestyle modifications had an improvement in menstrual or reproductive health of

Table 4: Comparison of percentage of baseline and follow-up (90days) diet score in PCOD patients

Intervention	Age groups	Baseline Average diet score ± SD	Follow-up Average diet score ± SD	p-value
Diet	Adolescents	50.55 ± 10.42	77.35 ± 13.90	0.0113
	Young adults	55.08 ± 11.0	75.16 ± 13.63	

Table 5: Comparing baseline with follow-up IPAQ scores.

Intervention	Age groups	Baseline Average IPAQ score ± SD	Follow-up Average IPAQ score ± SD	P-value
IPAQ	Adolescents	830 ± 661.81	2382.53 ± 287.31	0.029
	Young adults	967.69 ± 595.61	1960.10 ± 588.43	

Table 6: Categorization of PCOD subjects based on menstrual condition.

Parameter	Age group	Categorization based on menstrual condition	No of patients in baseline (%)	No of patients in follow-up (%)
Menstrual condition	Adolescents	Amenorrhea	1(3.33%)	0
		Oligomenorrhea	2(6.67%)	0
		Dysmenorrhea	0	0
		Irregular menses	0	0
		Regular	0	3(10%)
		Polyamennorhea	0	0
	Young adults	Amenorrhea	3(10)	0
		Oligomenorrhea	10(33.33%)	5(16.67%)
		Dysmenorrhea	1(3.33%)	0
		Irregular menses	1(3.33%)	0
		Regular	11(36.67%)	22(73.33%)
		Polyamennorhea	1(3.33%)	0

the PCOD patients. This is clearly explained by the follow-up results of menstrual conditions as represented in Table 6 where most of the menstrual irregularities in the PCOD females at baseline are normalized after the post counseling and implementation of the lifestyle modifications. This was similar to work done by Haqq *et al.* which concluded that diet and exercise interventions can improve the hormonal levels in PCOD patients (Haqq *et al.*, 2014) and also Hoeger study which concluded that weight reduction plays a significant role in reduction of PCOD (Hoeger, 2006).

Another study by Karimzadeh and Javedani also concluded that lifestyle modifications can improve that hormonal status that is exactly proved by our study (Karimzadeh and Javedani, 2010). In our study most of the patients having PCOD were observed in the age group of young adults (19-24 years) is 90%. This may be due to the high burden

of PCOD among young adults, especially in rural areas. Also a majority of the PCOS patients with lifestyle modifications has shown significant improvement in menstrual condition among adolescents and young adults of PCOD patients to regular in post-intervention, and clinically resemble to Elmenim and Emam, shown the effective results in 56.4% of studies population were having regular menstrual cycles after a year following of healthy life style compared to baseline (Balaji *et al.*, 2015).

This study inferred that there was a clear significance of intervention on IPAQ MET physical activity rate and dietary lifestyle which has shown to a greater extent on the menstrual condition from baseline to follow-up through the contribution of a clinical pharmacist, that is similar to Sedighi *et al.*, as suitable diet is a contributing factor for restoring hormonal imbalances to normal (Elmenim and Emam, 2016; Sedighi *et al.*, 2014). In many litera-

ture is a conflict on evidence regarding the role of androgen whether they can increase hypertension in the PCOD Patients. However, our study concluded that there is no significant relationship between the impacts of blood pressure on PCOD patients.

This contrasts with the findings of [Chen et al.](#) that concluded that there is a significant association among the androgen and blood pressure in PCOD patients ([Chen et al., 2007](#)). Nowadays, amending healthy lifestyle by dietary changes and increase in physical activity focus to maintain androgen hormone limits and set ovulation is considered as the first line therapy.

Limitations

This includes small sample size, duration of the study, and follow-up of the subjects.

CONCLUSIONS

Our study concluded that blood pressure does not show any impact on PCOD patients also lifestyle modifications like an increase in physical activity and intake of a balanced diet had improved menstrual conditions of PCOD patients. Regardless of pharmacological therapy, all the patients need to improve the physical activity and take an appropriate diet that is less in carbohydrates to maintain good reproductive health. Special care and education is needed among PCOD patients to reduce the long term complications. Onus is on the health care professionals to educate patients regarding lifestyle modifications and complications of PCOD to improve the health community status.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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