

Nutritional Assessment of Selected Emerging Adult Women with Poly Cystic Ovarian Syndrome

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ABSTRACT

Introduction: Poly Cystic Ovarian Syndrome (PCOS) is one of the most common endocrine conditions, usually begins in adolescence and prominent in more than 75% of the adult population. **Aim:** The aim of the study was to assess the nutritional status of emerging adult women with PCOS. **Objectives:** The objectives of the study were to assess the nutritional status of the selected emerging adult women with PCOS using anthropometric, biochemical, and clinical parameters. **Methodology:** Prospective interventional design was adopted in the study to test the hypothesis framed and stated above. Emerging adult women between 18 and 23 years of age and who were free from other diseases were included for the study from SRHER (DU) and a working women hostel (Vaanavil Hostel) in Porur, Chennai. Anthropometric, biochemical, and clinical assessment were performed for 57 selected emerging adult women "at risk" for PCOS. **Results:** The mean height, weight, BMI, waist and hip circumference, and WHR of 57 "at risk" emerging adult women was found to be, 160.4 ± 6.7 cms, 60.7 ± 7.5 kg, 23.6 ± 2.9 , 95.9 ± 10.6 cm, 119.1 ± 13.0 cm, and 0.80 ± 0.05 , respectively. The mean biochemical parameters, namely, FBS, fasting insulin, total testosterone, total cholesterol, HDL, LDL, and TGL were 98.4 ± 19.7 (mgs/dl), 13.04 ± 6.4 (mcU/ml), 30.9 ± 13.6 (ng/dl), 170.2 ± 36.3 (mgs/dl), 47.7 ± 7.9 (mgs/dl), 115 ± 26.9 (mgs/dl), and 173.5 ± 43.2 (mgs/dl), respectively. It was observed that 25 (44%) had acne, 16 (33%) had hirsutism, 2 (4%) had dark discoloration of the skin, and 5 (9%) had both acne and hirsutism. **Conclusion:** The mean height was within the standard range; however, the body weight, BMI, waist and hip circumference, and WHR were higher. The mean biochemical parameters analyzed were within the normal range. Acne, hirsutism, and dark patches were observed.

Keywords: Emerging adult women, Hirsutism, PCOS, Waist circumference

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INTRODUCTION

Poly Cystic Ovarian Syndrome (PCOS) is one of the most common endocrine conditions, usually begins in adolescence and prominent in more than 75% of the adult population. The earliest clinical manifestation of PCOS is in the adolescent period.^[1] Many women with PCOS who are lean and who despite having a normal BMI may still be insulin resistant and display abdominal fat distribution.^[2] Even if the weight loss is moderate (<5%), the menstrual function may be restored. This clinical improvement shows that the effects of calorie restriction may be more important than weight loss by itself. The mechanisms by which weight loss may lead to improvement in PCOS are discussed elsewhere,^[3] but among them it is of interest to underline the impact of diet on hyperinsulinemia irrespective of weight loss.^[4] Increased cardiovascular risk has been postulated in patients with PCOS. Studies have found that obesity not only contributes to the development of PCOS, but arises also as a result.^[5]

Aim

The aim of the study was to assess the nutritional status of emerging adult women with PCOS.

Objectives

The objectives of the study were to assess the nutritional status of the selected emerging adult women with PCOS using anthropometric, biochemical, and clinical parameters.

METHODOLOGY

Research Design

Prospective interventional design was adopted in the study.

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Sampling Method

The sampling method used in this study was purposive and cluster random sampling. It is a non-probability sampling technique.

Informed Consent

An informed consent was obtained from all the subjects who took part in the study. Voluntary participation of the subjects was emphasized and a written consent was obtained from them after the verbal and written explanation of the methods and risks involved in this study.

Inclusion Criteria

Emerging adult women between 18 and 23 years of age and who were free from other diseases were included for the study.

Selection of Area

This study was carried out in Faculty of Nursing, Faculty of Allied Health Sciences and Faculty of Pharmacy in Sri Ramachandra Institute of Higher Education and Research (Deemed to be University) and a working women hostel (Vaavil Hostel) in Porur, Chennai.

Selection of Subjects

Out of three hundred emerging adult women in the age group of 18–23 years, 231 women were participated and 57 subjects were identified as “at risk” group. Sample size estimation was calculated based on the OpenEpi Version 2 and the risk group for PCOS was identified as per Rotterdam criteria.

Duration of the Study

This study was conducted for a period of 3 years, from 2013 to 2015.

Anthropometric Measurement

The height, weight, waist and hip circumference, and WHR were measured at the start of the study to identify subjects “at risk” for PCOS.

Biochemical Assessment

The biochemical parameters, namely, blood sugar level (FBS and Fasting Insulin), total testosterone, and lipid profile (total cholesterol, LDL, TGL, and HDL) were estimated for 57 selected emerging adult women “at risk.” Estimation of FBS - Trinder using reagent Kit, Fasting insulin levels determined using reagent kits obtained from Medgenix-INS-ELISA total testosterone by ELISA test kit. The lipid levels were determined by automatic mechanism using the enzymatic method.

Clinical Assessment

The presence/absence of deficiency symptoms and symptoms specific to PCOS was identified by examining the respondents using standard photo graphs for severity of the acne identification.

Statistical Analysis

Percentage analysis was used for describing the demographic variables of the emerging adult women. $P < 0.05$ was considered to be statistically significant result.

RESULTS

Nutritional assessment is typically defined as “a comprehensive approach to determining nutritional status using medical, nutritional, and medication histories; physical examination, anthropometric measurements, and laboratory data.^[6] It is a process, which places emphasis on recognizing dietary and lifestyle factors that affect health, promoting optimal health and preventing nutrition-related disease.^[7] In the current study, the following assessment techniques, anthropometry [Table 1], biochemical [Table 2] and clinical assessment [Table 3] were adopted for 57 “at risk” emerging adult women.

Table 1: Comparison of anthropometric parameters of selected PCOS subjects with reference range

Parameters	Anthropometric measurements <i>n=57 (At risk group)</i>	Standard values	Variation <i>p</i> value
Height (cm)	160.4±6.7	161*	0.478 (NS)
Weight (kgs)	60.7±7.5	55*	0.000 (S)
BMI	23.6±2.9	21.2*	0.000 (S)
Waist circumference (Cm)	95.9±10.6	80**	0.000 (S)
Hip Circumference (Cm)	119.1±13.0	98.2***	0.000 (S)
WHR	0.80±0.05	0.85**	0.000 (S)

*[8], **[9], ***[10], NS: No significance, S: Significance. PCOS: Poly Cystic Ovarian Syndrome

Table 2: Comparison of biochemical parameters of selected PCOS subjects with reference range

Parameters	Mean Value <i>n=57 (At risk group)</i>	Normal values
FBS (mgs/dl)	98.4±19.7	70–110
Fasting Insulin (mcU/ml)	13.04±6.4	5.0–20.0
Total Testosterone (ng/dl)	30.9±13.6	8–48
Lipid Profile	170.2±36.3	14–240
Total cholesterol (mgs/dl)		
HDL (mgs/dl)	47.7±7.9	45–65
LDL (mgs/dl)	115±26.9	<130
TGL (mgs/dl)	173.5±43.2	<200

PCOS: Poly Cystic Ovarian Syndrome

Table 3: Clinical symptoms of selected study subjects

Parameters	Frequency	
	<i>n=57 (At risk group)</i>	Percentage (%)
Healthy skin	6	11
Adult acne	25	44
Mild acne	7	12
Moderate acne	15	26
Severe acne	3	5
Hirsutism	16	33
Dark or discolored patches	2	4
Acne and Hirsutism	5	9

Anthropometric Parameters

Anthropometry is widely used as a tool to estimate the nutritional status of populations and to monitor the growth and health of individuals.

Biochemical Parameters

It is evident that, the mean biochemical parameters, namely, FBS, fasting insulin, total testosterone, total cholesterol, HDL, LDL, and TGL of the selected 57 at risk emerging adult women were 98.4 ± 19.7(mgs/dl), 13.04 ± 6.4 (mcU/ml), 30.9 ± 13.6 (ng/dl), 170.2 ± 36.3 (mgs/dl), 7.7 ± 7.9(mgs/dl), 115 ± 26.9 (mgs/dl), and 173.5 ± 43.2 (mgs/dl), respectively. Mean values of all the parameters were found to be within range compared with the standard values.

Clinical Symptoms

Hyperandrogenism is generally manifested as hirsutism and acne. Although hirsutism and acne can be considered cosmetic in

nature, they cause significant social embarrassment and emotional distress.

DISCUSSION

PCOS is also associated with several features of metabolic syndrome, such as obesity, abdominal obesity,^[11] and insulin resistance.^[12] The results are in concurrent with those of Cascella *et al.*,^[13] Svendsen^[14] who have reported that women with PCOS tend to accumulate more upper body fat than women without the syndrome matched for weight and age. According to an Indian study carried out by Snehalatha *et al.*,^[15] the healthy BMI for an urban Indian is <23 kg/m², and cutoff values for waist circumference were 85 cm for men and 80 cm for women, and for WHR they were 0.89 for men and 0.81 for women. It may be appropriate to use waist circumference as an index for upper-body adiposity.

The mean height, weight, BMI, waist and hip circumference, and WHR of 57 "at risk" emerging adult women were found to be, 160.4 ± 6.7 cm, 60.7 ± 7.5 kg, 23.6 ± 2.9, 95.9 ± 10.6 cm, 119.1 ± 13.0 cm, and 0.80 ± 0.05, respectively. Although the mean height was found to be similar to the standard value, body weight, BMI, waist circumference, hip circumference, and WHR were found to be higher compared with the standard values.

The mean FBS level of the selected 57 emerging adult women belonging to "at risk" was 98.4 ± 19.7 mg/dl. This was well within the normal range of 70–110 mg/dl. The FBS value of one subject was 140 mg/dl. For four subjects, it ranged between 110 – 140 mgs/dl and for 14 subjects it ranged between 100 and 110 mgs/dl. It was less than 100 mgs/dl in the rest of the emerging adult women studied. Fasting insulin was found to be higher (20–25 mcU/ml) for two of the selected emerging adult women "at risk," while in 12 of them it ranged between 15 and 19 mcU/ml and in the remaining 43, it was found to be <15 mcU/ml. The total testosterone was higher in one of the selected emerging adult women "at risk" (above 75 ng/dl), while it was within the range of 48–53 ng/dl in three and it ranged between 40 and 47 ng/dl in 15 of the selected at risk emerging adult women. In the remaining 38, it was found to be <39 ng/dl. The total cholesterol level was found to be very high (287 mgs/dl) in one the selected at risk emerging adult women. It ranged between 200 and 239 mgs/dl in 11 of the selected emerging adult women "at risk," and in the remaining 45 the cholesterol was below 199 mgs/dl. The HDL level was above 65 mgs/dl in four of the selected emerging adult women "at risk" and in 10, it was <45 mgs/dl, while in the remaining 43, it was within the normal range. The LDL level was above 150 mgs/dl in one of the selected emerging adult woman "at risk." It was above 140 mgs/dl in four of the selected emerging adult women "at risk" and in ten subjects it ranged between 130 and 140 mgs/dl. In the remaining 42, it was below 130 mgs/dl. The TGL level was above 250 mgs/dl in one of the selected at risk emerging adult women. It ranged between 200 and 250 mgs/dl in the 11 of the selected emerging adult women "at risk," while in the remaining 42, it was below 199 mgs/dl. Elevated fasting serum insulin and reduced insulin sensitivity are other features which have been well documented in both lean and obese women with polycystic ovaries.^[16] Elevated serum testosterone concentrations have been frequently associated with polycystic ovaries.^[17] The results are concurrent with those of Ramzi *et al.*,^[18] who have reported that, there is a strong positive correlation between duration of illness and BMI with FBS, uric acid, total cholesterol, TG LDL, and VLDL. Furthermore, Mg and HDL were negatively correlated with BMI

and duration of PCOS. The abnormal levels observed in some of the selected emerging adult women studied may increase the risk of the development of metabolic disorders later in life.

It was observed that, only 11% of the 57 selected emerging adult women "at risk" were found to have healthy skin, 25 (44%) had acne, 16 (33%) had hirsutism, 2 (4%) had dark discoloration of the skin, and 5 (9%) had both acne and hirsutism. These results are similar to a study conducted by Azziz *et al.*,^[19] where they have reported that acne affects 15–25% of PCOS patients although it is unclear whether the prevalence of acne is significantly increased in these patients over that observed in the general population.^[20] Androgenic alopecia is a recognized sign of PCOS,^[21] although the prevalence of this abnormality in PCOS is unclear. Hirsutism is a valuable and necessary diagnostic criterion for PCOS even in the absence of proven hyperandrogenemia.^[22] High testosterone levels in both non-hirsute and hirsute women can contribute to hirsutism.^[23]

CONCLUSION

These findings demonstrate that polycystic ovaries as detected by Rotterdam criteria are extremely common in the age group of 18–25 years, but that they are not necessarily associated with other symptomatology. This study also emphasizes that many of these young women with polycystic ovaries may progress to develop symptoms later in life.

The mean height was within the standard range; however, the body weight, BMI, waist and hip circumference and WHR were higher. PCOS is frequently associated with obesity and overweight and obesity which may lead to long-term complications such as cardiovascular risk and diabetes. The mean biochemical parameters analyzed were within the normal range. Acne, hirsutism, and dark patches which affect the self-esteem of the selected emerging adult women studied were observed. This study confirms that, nutrition assessment is essential and before starting medicine, diet, and exercise should be advised to all women with PCOS.

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