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Cognitive Restraint, Uncontrolled and Emotional Eating in Women With and Without Polycystic Ovarian Syndrome

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Abstract

Background: An increasing number of women in the reproductive age are suffering from a hormonal disorder called Polycystic Ovarian Syndrome (PCOS). According to the World Health Organization (WHO 2023), PCOS affects an estimated 8 to 13 per cent of women of reproductive age worldwide. It is to be noted that nearly 70 per cent of this remains undiagnosed. PCOS is a complex condition characterized by increase in androgen levels, irregular menstrual cycle, and/or small cysts on one or both ovaries. In addition, psychological comorbidities are common in women with PCOS. Psychological factors may contribute to eating disorders and weight gain. There is a complex interrelationship between nutritional status and endocrine status. Research has shown that diet plays an important role in the regulation of metabolism of sex steroids and Luteinising Hormone (LH) secretions. **Objective:** To compare eating behaviour of women with and without PCOS. **Materials and Methods:** The study was conducted in selected areas of urban Bengaluru, Karnataka. The Three factor eating questionnaire (TFEQ), a revised 18 item tool developed by Karlsson Persson *et al* (2000) was used to assess the eating behaviour of the subjects. Women of age group 18-35 years suffering from PCOS (N=50) were compared with healthy women of the same age group (N=50). **Results:** The Body Mass Index (BMI) analysis shows that only 32 per cent of PCOS women had normal BMI compared to 48 per cent in case of Non-PCOS. It is observed that majority (68 per cent) of PCOS women have unhealthy Waist to Hip Ratio of >0.80. There was no difference in the dietary habits of the PCOS and Non-PCOS women. The eating behaviour analysed by three- factor eating indicated that emotional eating was highest in PCOS women, followed by uncontrolled eating and then cognitive eating. **Conclusion:** Binge eating, eating due to anxiety, depression and loneliness was more in women with PCOS as compared to control group.

Keywords: 18 item TFEQ; Eating disorder; Emotional eating; Uncontrolled eating; Cognitive eating

1 Introduction

Polycystic Ovarian Syndrome (PCOS) is an endocrine and metabolic disorder seen in women of reproductive age group. The disorder can be morphological with polycystic ovaries or predominantly biochemical with excess androgen ¹. Abnormally high androgen levels result in hirsutism, acne, androgenic alopecia and incidence of male

characteristics ². The biochemical changes associated with PCOS include insulin resistance, dyslipidemia, glucose intolerance ³. There is an unequivocal scientific evidence that PCOS can lead to an increased risk of medical complications such as type 2 diabetes, cardiovascular disorders and infertility ^{4, 5}. Excessive facial hair and overweight can contribute to negative body image. According to Dokras *et al.*, (2011) ⁶, Lee

et al., (2017) ⁷, PCOS increases risk of depression, anxiety and eating disorders.

The common symptoms of PCOS include heavy, long, intermittent and unpredictable or absence of menstrual bleeding, infertility, acne or oily skin, excessive body or facial hair, male-pattern baldness or hair thinning, weight gain, especially abdominal adiposity small cysts on one or both ovaries. The symptoms vary from person to person and change over time.

The etiology of this syndrome is yet to be understood although research indicates a strong genetic and environmental influence. Diet and lifestyle factors play an important role in the initiation and development of PCOS.

Research has shown that there is a complex interrelationship between nutrition and endocrine status. Regulation of metabolism of sex steroids and Luteinising Hormone (LH) is influenced by the diet of a person. Larsson, *et al.*, (2016) ⁸ in their study on eating behaviour of women suffering from PCOS, have observed that women with PCOS usually have a higher appetite, consume high- energy, high glycemic index foods, saturated fat, and lower amounts of fibre. They have low scores for PCOS-related quality of life. The study has also found that there was no difference between PCOS and control group with respect to overall energy intake and physical activity. Eating disorders such as abnormal food restriction, binge eating was found to be four times more among women suffering from PCOS when compared with Non-PCOS women. In their scoping review on prevalence and etiology of Polycystic Ovary Syndrome, Sophie *et al.*, 2024 ⁹, have suggested that eating disorders have a direct influence on the development and treatment of PCOD. Hence it is important to screen all women suffering from PCOS for eating disorders.

Studies have also shown that PCOS is associated with overweight and obesity. Teede *et al.*, (2010) ¹⁰ in their study on PCOS and its impact on health have opined that insulin resistance is usually followed by intense carbohydrate cravings. This may promote overeating in women suffering from PCOS. Treatment for PCOS mainly focuses on altering lifestyle factors such as diet, sleep, physical activity and stress management. According to Stańczak *et al.*, (2024) ¹¹ diet should be considered as the treatment of first choice. Only if dietary intervention does not yield results, drug therapy should be considered.

Modern lifestyle has pushed many women towards unhealthy practices. Hence an increasing number of women in the reproductive age are suffering from Polycystic Ovarian Syndrome (PCOS). According to The World Health Organization (WHO, 2023), an estimated 8 to 13 per cent women of reproductive age suffer from PCOS all over the world. And 70 per cent of this remains undiagnosed. Studies have also shown that prevalence of PCOS is higher among urban women compared to rural women. Although eating disorders play an important role in etiology, prevention and treatment of PCOS, there are very few studies on eating behaviour of Indian women suffering from PCOS.

1.1 Objective

To compare dietary habits and eating behaviour of women with and without PCOS.

2 Materials and Methods

Selection of the subjects: Women in the age group 18-35 years (N=50) who have a medical history of PCOS for more than a year were included in the experimental study group. PCOS diagnosis was self-reported, and sample was selected by purposive sampling method. Women who were critically ill or suffering from any other endocrine or physical or mental illness were excluded from the study. Healthy women who were matched for age and socio-economic status formed control group (N=50). The subjects were selected by purposive random sampling in selected areas of urban Bangalore.

Anthropometric Assessment of the subjects: Anthropometric assessment was done using Body Mass Index (BMI) and Waist to Hip Ratio (WHR). Body mass index of the subjects was calculated by using the formula, Body mass index (kg/ m²) = weight (Kg)/ height (m)². Categorization of the subjects was done based on their BMI according to the WHO conventions appropriate for Asian population (2004).

Assessment of Eating Behaviour: Three-factor eating questionnaire is one of the most popular tools used for assessing eating behaviour. The 18 item revised Three-Factor Eating Questionnaire (TFEQ-R18) (Karlsson, Persson, *et al.*, (2000) ¹² was used for assessing eating behaviour. Although the original scale developed by Stunkard and Messick (1985) ¹³ was meant for obesity research, Blandine de Lauzon, *et al.*, (2004) ¹⁴ have shown that it can be applied for general population also. Anglé, *et al.*, (2009) ¹⁵ have shown that TFEQ R 18 is a psychometrically valid tool

for assessing eating behaviour among adolescents and young adult females of Finland.

The TFEQ R-18 (Karlsson, Persson, *et al.*, (2000) ¹² tool has three domains 1. Cognitive restraint (CR), 2. Uncontrolled eating (UE) and 3. Emotional eating (EE). 18 questions divided into 3 domains – cognitive restraint (CR), uncontrolled eating (UE) and emotional eating (EE). The cognitive restraint consists of 6 questions, uncontrolled eating consists of 9 questions and emotional eating consists of 3 questions. The sub themes of three factors include: Cognitive Restraint: (six items): the conscious restriction of food intake to control body weight or to promote weight loss), Uncontrolled Eating (nine items); the tendency to eat more than usual because of a loss of control over intake) and Emotional Eating (three items); overeating during dysphoric mood states). Responses to each of these items are given a score between 1 and 4. Before calculating domain scores item 1-17 were reverse coded as 1 to 4 and item 18 was recorded as follows: 1–2 scores as 1; 3–4 as 2; 5–6 as 3; 7–8 as 4. Domain scores were then calculated as a mean of all items within each domain and the domains with higher scores indicate higher CR, UE and EE. Mean Standard deviation and Chi-square test were used to statistically analyse the data

and interpret results. The interviewer personally administered the questionnaire after taking written informed consent from each participant.

3 Results and Discussion

The general information of the subjects is presented in [Table 1](#).

Majority of the subjects in PCOS and Non PCOS group belonged to age group of 21 to 30 years, most of them were graduates and postgraduates, and about half of them in both the groups were students. Majority were unmarried and belonged to nuclear families with a family size of 4 to 6 members. Nearly half of them had monthly family income ranging from Rs. 31000 to 50,000. Overall, there was no significant difference between the two groups with respect to their general information. So, the subjects were matched for their socio-economic profile.

From the [Table 2](#), it can be observed that only 32 per cent of PCOS women had a normal BMI compared to 48 per cent in case of Non-PCOS group. So, there was a significant difference ($P > 0.05$) between the two groups with respect to their body mass index.

Table 1: General Information of the subjects

Age of Respondents	PCOS Women		Non – PCOS Women		χ^2 test
	No.	Percentage (%)	No.	Percentage (%)	
≤20 years	5	10	5	10	1.394 ^{NS}
21-30 years	40	80	43	86	
>30 years	5	10	2	4	
Education					
Undergraduate	5	10	5	10	0.71 ^{NS}
Graduate	25	50	21	42	
Post-graduate	20	40	24	48	
Uneducated	0	-	0	0	
Occupation					
Student	26	52	30	60	1.793 ^{NS}
Employed	13	26	14	28	
Home maker	11	22	6	12	

Table 2: Body Mass Index of the subjects

BMI classification	Cut offs	PCOS women		Non-PCOS women	
		No	Per cent tage (%)	No	Per cent tage (%)
Underweight	<18.50	0	0%	8	16%
Normal	18.50-22.99	16	32%	24	48%
Overweight	23-24.9	6	12%	7	14%
Pre obese	25-29.9	18	36%	9	18%
Obese	≥30	10	20%	2	4%

3.1. Waist Hip ratio

Fig. 1 gives waist-hip ratio (WHR) of the subjects. It was observed that majority (68 per cent) of PCOS women had unhealthy WHR of >0.80 and, majority of (64 per cent) Non PCOS subjects had healthy WHR of <0.80. There is a significant difference between PCOS and Non-PCOS women with respect to waist to hip ratio (P < 0.05).

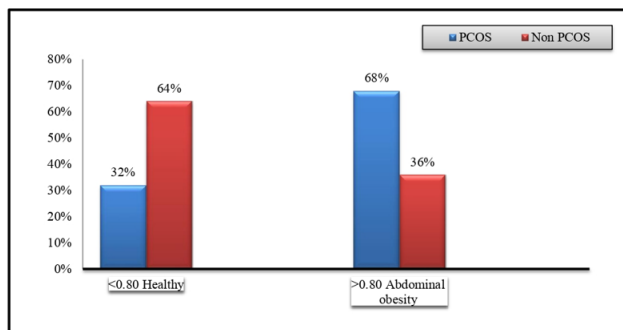


Fig. 1: Wait to Hip ratio of PCOS and Non-PCOS women

3.2 Food Habits of the subjects

More than 75 per cent of the subjects were non-vegetarians in both groups, consumed 3 meals per day. Sometimes they missed one of the meals and breakfast was the most missed meal of the day in both groups. Overall, there was no significant difference (P > 0.05) between the two groups with respect to dietary habits Table. 3.

Table 3: Food Habits of the subjects

Food Habits	PCOS Women		Non - PCOS Women		X ² test
	No.	Per cent tage (%)	No.	Per cent tage (%)	
Vegetarian	12	24	7	14	4.36 NS
Non-vegetarian	38	76	40	80	
Ova vegetarian	0		3	6	
No of meals consumed					
1	0	0	0	0	1.6 NS
2	3	6	6	12	
3	38	76	38	76	
4	9	18	6	12	
Skipping of meals					
Always	8	16	8	16	4.126 NS
Sometimes	23	46	24	48	
Rarely	13	26	17	34	

3.3 Three- factor Eating behaviour of the subjects

In the modern era obesity and associated health problems are on the rise and research has tried to understand the eating behaviour as an etiological factor. Studies have shown that disordered eating is common among adolescents and young females 16. The eating behaviour of the subjects with respect to three domains is presented in Table. 4 – Table. 6.

3.4 Cognitive restraint

In the present study with regards to cognitive eating, there is no significant difference between the PCOS and Non-PCOS group. The concept of restraint is the central idea in the study of eating behaviour. In a healthy individual, the physiological indicators such as hunger and satiety decide when to stop eating. The term restraint refers to restricting one’s food intake consciously and constantly instead of using physiological cues such as hunger and satiety. Restrained eating differs from dieting. In restrained eating a person consumes less than what he/she would like to consume. This need not be in accordance with their energy requirement. In case of dieting, a diet is carefully planned by a dietician, in accordance with the individual nutritional requirements and dietary goals.

Table 4: Comparison of PCOS and Non-PCOS subjects with respect to cognitive restraint (TFEQ-R18) (Karlsson, Persson, *et al.*, (2000))

Domain I Cognitive restraint	Total score		t test
	PCOS	Non PCOS	
Deliberately taking small helpings as a means of controlling weight	136	127	0.23 NS
Hold back at meals to avoid weight gain	126	132	
Do not eat some foods as they make them fat	132	94	
Frequency of avoiding "stocking up" on tempting foods	124	128	
Likelihood of consciously eating less than they want to eat	121	110	
Self score given on a scale of 1 to 8, where 1 means no restraint in eating and 8 means total restraint	128	127	

NS: Not significant difference

Table 5: Comparison of PCOS and Non-PCOS subjects with respect to Uncontrolled eating (TFEQ-R18) (Karlsson, Persson, *et al.*, (2000))

Uncontrolled eating	Total score		t test
	PCOS	Non PCOS	
Very difficult to keep from eating when triggered by the smell of a delicious food, even after just completing the meal	148	113	
Sometimes after starting eating, just can't seem to stop	144	99	
Being with someone who is eating often makes one hungry enough to eat also.	148	100	
After seeing a real delicacy, one often gets so hungry that one has to eat right away	146	116	2.63063E-08*
One gets so hungry that one's stomach often seems like a bottomless pit.	142	99	
One is always hungry, so it is hard to stop eating before one finishes the food on plate.	135	87	
One is always hungry enough to eat at any time.	140	101	
Frequency of hunger feeling	123	94	
Habit of eating binges though not hungry	149	101	

*Significant

Table 6: Comparison of PCOS and Non-PCOS subjects with respect to Emotional Eating (TFEQ-R18) (Karlsson, Persson, *et al.*, (2000))

Emotional Eating	Total score		t value
	PCOS	Non PCOS	
Finding oneself eating whenever one feels anxious	163	96	
One often overeats, when he/she feels blue	146	91	0.005*
Consoling oneself by eating when felt lonely	130	87	

*Significant

3.5 Uncontrolled eating

The term uncontrolled eating refers to the tendency to overeat, with a feeling of being out of control. In the present study, there is a significant difference between the two groups and PCOS group had higher score compared Non-PCOS in all parameters of uncontrolled eating. High testosterone levels may be responsible for bulimic behaviour by influencing food cravings and impulse control (Stefanaki Katerina, *et al.*, (2024) ¹⁷. Food cravings are often reported by women with PCOS ¹⁸. A pilot study ¹⁹ has shown that women with PCOS had significantly higher food cravings than women without PCOS.

Binge eating is often associated with difficulties in managing weight ²⁰, (Lydecker, *et al.*, 2018) and unsuccessful attempts in losing weight ²¹ (Moroshko, *et al.*, 2011). Binge eating is also associated with impaired physical health and quality of life ²² Another study ²³ has also reported binge eating behaviours and food cravings in women with PCOS.

3.6 Emotional eating

Tendency to eat in response to emotions is termed as emotional eating. The results of this study show that there is a statistically significant difference between PCOS and Non-PCOS women with respect to emotional eating. From Table. 4 – Table. 6, it can be inferred that emotional eating is highest in PCOS women, followed by uncontrolled eating and cognitive eating. In Non-PCOS women the highest score is for cognitive restraint then uncontrolled eating, and the least is for emotional eating. It can be observed that women suffering from PCOS tend to eat more in response to anxiety and loneliness than healthy women.

The results are in agreement with study by Emilia Pesonen *et al.*, (2024) ²⁴ in which they observed that

compared with women without PCOS, women with PCOS exhibited higher scores for emotional and uncontrolled eating but no difference in cognitive restraint. Studies 7, 25 have shown, that high rates of psychological disorders such as anxiety and depression are common in women with PCOS. These psychological conditions directly affect the eating behaviours and vice versa.

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4 Conclusion

From the study, it can be inferred that emotional eating is highest in PCOS women, followed by uncontrolled eating and then cognitive eating. Binge eating and eating due to anxiety, depression, to cope up with loneliness are more common in women with PCOS. Identification of early signs and symptoms for eating disorders is necessary to diagnose and effectively manage PCOS.

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