



ASSOCIATION BETWEEN PERCEIVED STRESS, HEDONIC HUNGER, AND DIETARY INTAKE IN WOMEN WITH PCOS: A CROSS-SECTIONAL STUDY FROM MUMBAI

Home Science

Ms Mitika Patel*

M.Sc. in Specialized Dietetics (Diabetes and Cardiac Nutrition), Sir Vithaldas Thackersey College of Home Science (Empowered Autonomous), SNDT University, Juhu, Mumbai, India *Corresponding Author

Dr. Nisha Bellare

Associate Professor, Department of Nutrition and Dietetics, Sir Vithaldas Thackersey College of Home Science (Empowered Autonomous), SNDT University, Juhu, Mumbai, India

ABSTRACT

Background: Polycystic Ovary Syndrome (PCOS) is a multifaceted endocrine disorder affecting reproductive, metabolic, and psychological health in women of reproductive age. Given the rising prevalence and lifestyle influences, this study aimed to explore the association between hedonic hunger, perceived stress, and dietary intake among women diagnosed with PCOS. **Objectives:** To evaluate the relationship between hedonic hunger, perceived stress, and dietary intake across different BMI categories in women diagnosed with PCOS. **Methodology:** A cross-sectional study was conducted among 101 women aged 18–35 years in Mumbai who had been clinically diagnosed with PCOS. Data were collected through anthropometric measurements, structured questionnaires including the PSS-10, Power of Food Scale (PFS), 24-hour dietary recall, and a Food Frequency Questionnaire (FFQ) to assess habitual intake patterns. Participants were categorised into four BMI classes for comparative analysis. Statistical methods included chi-square tests and ANOVA to examine associations. **Results:** The mean age of participants was 25.75 ± 4.58 years. Higher BMI groups had a greater prevalence of comorbidities, menstrual irregularities, and higher intake of outside food and high-fat snacks. While perceived stress was moderate in most of the sample and showed no significant difference across BMI classes, individual PSS items showed variation. Hedonic hunger scores increased with rising BMI. Dietary analysis indicated suboptimal intake of energy, protein, and key micronutrients like iron, zinc, and omega-3 fatty acids across all groups. **Conclusion:** The study highlights that psychological factors such as stress and hedonic hunger may influence dietary behaviour and nutritional status in women with PCOS. These insights underscore the need for integrated dietary and behavioural interventions tailored to BMI and individual risk profiles to better manage PCOS symptoms and improve overall well-being.

KEYWORDS

Polycystic Ovary Syndrome (PCOS); Hedonic Hunger; Perceived Stress; Nutritional Status

INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is a complex endocrine and metabolic disorder that affects women of reproductive age, with a global prevalence estimated between 8% and 21% (Asghari et al., 2022). Characterized by chronic anovulation, hyperandrogenism, and polycystic ovarian morphology, PCOS manifests clinically through menstrual irregularities, hirsutism, acne, and infertility (Singh et al., 2023). Beyond reproductive dysfunction, PCOS is strongly associated with obesity, insulin resistance, metabolic syndrome, type 2 diabetes, and other eating disorders (Witchel et al., 2019; Teede et al., 2018).

In Mumbai, urban lifestyle—marked by sedentary behaviour, poor dietary habits, and high stress—has contributed significantly to the increasing prevalence of PCOS. Despite growing recognition of its metabolic and endocrine complications, the psychosocial and behavioural components of PCOS remain underexplored. Among these, hedonic hunger (the drive to eat for pleasure), perceived stress, and dietary intake patterns have emerged as crucial yet understudied factors influencing disease severity and quality of life in women with PCOS.

Appetite regulation is governed by two systems: the homeostatic system, which responds to energy needs, and the hedonic system, which is driven by the rewarding aspects of food. In PCOS, dysregulation in these pathways—especially hedonic hunger—may contribute to overconsumption of energy-dense, nutrient-poor foods, thus exacerbating obesity and insulin resistance (Ulker et al., 2021; Chmurzynska et al., 2021). Moreover, chronic stress has been shown to alter eating patterns, heighten cravings for sugary and fatty foods, and impair metabolic health (Goyal et al., 2024).

Thus, investigating the interplay between hedonic hunger, perceived stress, and dietary intake becomes crucial in understanding these behavioural dynamics of PCOS. These insights may contribute to the development of comprehensive, evidence-based interventions that integrate psychological support and lifestyle modifications alongside conventional clinical management.

METHODOLOGY

This cross-sectional study was conducted among 101 women aged 18–35 years, clinically diagnosed with PCOS based on the Rotterdam

criteria. Participants were residents of Mumbai, India. Purposive sampling was used for recruitment.

Inclusion Criteria:

- Women aged 18–35 years
- Diagnosed with PCOS according to the Rotterdam Criteria (any 2 of 3: oligo/anovulation, hyperandrogenism, polycystic ovaries)
- Residing in Mumbai

Exclusion Criteria:

- Pregnant or lactating women
- Those with other endocrine disorders (e.g., thyroid dysfunction, Cushing's syndrome) or major psychiatric illness

Ethical Considerations

Ethical approval was obtained from the Inter System Biomedica Ethics Committee (ISBEC). All participants provided written informed consent.

Data Collection Tools

Data were collected through an interviewer-administered questionnaire and standardized measurements, including:

1. **Sociodemographic Characteristics** – Age, marital status, education, occupation, medical history
2. **Anthropometric Measurements** – Height, weight, BMI (classified by Asian cut-offs), waist and hip circumference
3. **Psychological Scales:**
 - o Perceived Stress Scale (PSS-10) – Assesses stress over the past month; scores 0–40
 - o Power of Food Scale (PFS) – Assesses hedonic hunger; scores 21–105
4. **Dietary Assessment:**
 - o 24-Hour Dietary Recall – Captures detailed intake from the previous day
 - o Food Frequency Questionnaire (FFQ) – Evaluates long-term intake patterns of key food groups

Data Analysis

Data were analyzed using SPSS version 21. Descriptive statistics (mean, SD, frequency) described the sample. Pearson correlation tested associations between perceived stress, hedonic hunger, and nutrient intake. ANOVA and chi-square tests were used to compare findings across BMI categories. Significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

A total of 101 women aged 18–35 years diagnosed with PCOS participated in this study. The mean age of participants was 25.75 ± 4.58 years. Participants were classified into four BMI categories: Normal (18.5–22.9 kg/m²), Overweight (23–24.9 kg/m²), Pre-obese (25–29.9 kg/m²), and Obese (≥30 kg/m²), based on Asian BMI cut-offs.

Perceived Stress

Analysis of the PSS revealed that a majority of participants (67.3%) experienced moderate stress, while 29.7% exhibited high stress levels. There was no statistically significant difference in total PSS scores across BMI groups ($p > 0.05$). However, two individual items on the PSS scale — “felt nervous and stressed” and “felt that difficulties were piling up so high that you could not overcome them” — showed significant variation ($p = 0.01$ and $p = 0.04$, respectively). This indicates that specific stress-related experiences may be more prevalent in higher BMI groups, even if overall stress levels appear consistent.

These findings align with previous studies suggesting that women with PCOS experience elevated stress levels due to chronic symptoms, hormonal imbalances, and body image issues (Khafagy et al., 2020; Goyal et al., 2024). Chronic stress has also been linked to alterations in eating behaviour, including increased cravings for energy-dense foods, which may exacerbate PCOS symptoms (Stefanaki et al., 2024).

Hedonic Hunger

Hedonic hunger, assessed using the Power of Food Scale (PFS), showed no significant differences for most items across BMI classes. However, three items related to difficulty resisting palatable foods and deriving pleasure from eating were significantly higher in participants with higher BMI (Classes 3 and 4). This indicates that women with higher BMI exhibited stronger hedonic responses to food.

This trend suggests that as BMI increases, individuals are more susceptible to the influence of highly palatable foods even in the absence of physiological hunger, supporting evidence that hedonic hunger may override homeostatic controls in obesogenic environments, leading to increased caloric intake and further weight gain (Ulker et al., 2021; Karamizadeh et al., 2024).

Dietary Intake

Across all BMI classes, no statistically significant differences were found in the intake of macronutrients or micronutrients ($p > 0.05$). Mean energy and macronutrient intakes increased across BMI groups, but not significantly. Most nutrient intakes fell below 90% of ICMR-NIN 2020 RDA values, particularly for micronutrients like iron, potassium, and zinc, indicating suboptimal dietary quality across the cohort.

Table 1: Correlation of Hedonic Hunger and Perceived Stress with Macronutrients and Micronutrients Consumption Among the Study Participants

Nutrients	Hedonic Hunger		Perceived Stress	
	Pearson's Correlation (r)	p-value	Pearson's Correlation (r)	p-value
Energy	0.42	0.000**	0.182	0.068
Protein	0.211	0.034*	-0.018	0.859
Carbohydrates	0.36	0.000**	0.086	0.393
Fat	0.428	0.000**	-0.234	0.018*
Sodium	0.325	0.001**	0.25	0.012*
Potassium	0.3	0.002**	-0.041	0.685
Fibre	-0.107	0.288	-0.338	0.001**
Iron	0.211	0.034*	-0.095	0.345
Zinc	0.155	0.121	-0.108	0.283
Omega 3	-0.112	0.265	-0.266	0.007**

** $p < 0.001$, * $p < 0.005$

Correlation analysis revealed that hedonic hunger was significantly and positively associated with energy ($r = 0.420$, $p < 0.001$), fat ($r = 0.428$, $p < 0.001$), carbohydrates ($r = 0.360$, $p < 0.001$), protein ($r = 0.211$, $p = 0.034$), sodium, potassium, and iron. This suggests that individuals with higher hedonic hunger consumed more calorie-dense and palatable foods. No significant association was found with fibre or omega-3.

Conversely, perceived stress was negatively correlated with fibre ($r =$

-0.338 , $p = 0.001$), fat ($r = -0.234$, $p = 0.018$), and omega-3 intake ($r = -0.266$, $p = 0.007$), and positively correlated with sodium intake ($r = 0.250$, $p = 0.012$). These findings suggest that higher stress levels were linked with poorer dietary quality, particularly increased intake of energy-dense foods, and preference for high-fat, high-sugar foods in women with PCOS (Stefanaki et al., 2024) and lower consumption of protective nutrients like fibre and omega-3, and increased sodium intake. The FFQ findings revealed that high-fat snacks, fried foods, bakery items, and outside meals were more commonly consumed by the participants. Additionally, fruit and vegetable intake was comparatively lower. This dietary pattern, combined with elevated hedonic hunger and moderate-to-high stress, likely contributes to increased risk for metabolic complications.

Additionally, a significant positive correlation was found between hedonic hunger and perceived stress ($r = 0.475$, $p < 0.001$), indicating that higher stress levels were associated with increased pleasure-driven eating tendencies, consistent with literature suggesting stress-induced dysregulation of appetite and reward pathways (Tomiyama, 2018).

CONCLUSION

This study highlights the high prevalence of hedonic hunger and perceived stress among women with PCOS in Mumbai. While perceived stress was not significantly correlated with dietary intake, hedonic hunger was positively associated with energy and carbohydrate consumption. The observed link between perceived stress and hedonic hunger further emphasizes the role of emotional regulation in shaping dietary behaviours. These findings underscore the importance of integrating behavioural strategies into nutrition counselling to improve long-term management of PCOS.

REFERENCES

- Asghari, K. M., Nejadghaderi, S. A., Alizadeh, M., Sanaie, S., Sullman, M. J. M., Kolahi, A., Avery, J., & Safiri, S. (2022). Burden of polycystic ovary syndrome in the Middle East and North Africa region, 1990–2019. *Scientific Reports*, 12(1), Article 11006. <https://doi.org/10.1038/s41598-022-11006-0>
- Chmurzynska, A., Młodzik-Czyżewska, M. A., Radziejewska, A., & Wiebe, D. J. (2020). Hedonic hunger is associated with intake of certain high-fat food types and BMI in 20- to 40- year-old adults. *Journal of Nutrition*, 151(4), 820–825. <https://doi.org/10.1093/jn/nxaa434>
- Goyal, A., Doornra, R., Atkaan, N., Singh, S., & Bhatia, S. (2021). Is prolonged stress causes poly cystic ovarian syndrome? A survey from Delhi, National Capital Region. *Journal of Evolution of Medical and Dental Sciences*, 10(8), 505–510. <https://doi.org/10.14260/jemds/2021/110>
- Karamizadeh, M., Akbarzadeh, M., Gargari, B. P., Mahdavi, R., & Nikniaz, Z. (2024). Association between hedonic hunger and body mass index in adults: A systematic review and meta-analysis. *Appetite*, 199, 107395. <https://doi.org/10.1016/j.appet.2024.107395>
- Khafagy, G., Sayed, I. E., Abbas, S., & Soliman, S. (2020). Perceived stress scale among adolescents with polycystic ovary syndrome. *International Journal of Women's Health*, 12, 1253–1258. <https://doi.org/10.2147/IJWH.S279245>
- Singh, S., Pal, N., Shubham, S., Sarma, D. K., Verma, V., Marotta, F., & Kumar, M. (2023). Polycystic ovary syndrome: Etiology, current management, and future therapeutics. *Journal of Clinical Medicine*, 12(4), 1454. <https://doi.org/10.3390/jcm12041454>
- Stefanaki, K., Karagiannakis, D. S., Peppas, M., Vryonidou, A., Kalantaridou, S., Goulis, D. G., Psaltopoulou, T., & Paschou, S. A. (2024). Food cravings and obesity in women with polycystic ovary syndrome: Pathophysiological and therapeutic considerations. *Nutrients*, 16(7), 1049. <https://doi.org/10.3390/nu16071049>
- Teede, H. J., Hill, B., Loxton, D., & Joham, A. E. (2019). Increased prevalence of eating disorders, low self-esteem, and psychological distress in women with polycystic ovary syndrome: A community-based cohort study. *Fertility and Sterility*, 112(2), 353–361. <https://doi.org/10.1016/j.fertnstert.2019.03.027>
- Tomiyama, A. J. (2018). Stress and obesity. *Annual Review of Psychology*, 70(1), 703–718. <https://doi.org/10.1146/annurev-psych-010418-102936>
- Ulker, I., Ayyildiz, F., & Yildiran, H. (2020). Validation of the Turkish version of the power of food scale in adult population. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, 26(4), 1179–1186. <https://doi.org/10.1007/s40519-020-01019-x>
- Witchel, S. F., Oberfield, S. E., & Peña, A. S. (2019). Polycystic ovary syndrome: Pathophysiology, presentation, and treatment with emphasis on adolescent girls. *Journal of the Endocrine Society*, 3(8), 1545–1573. <https://doi.org/10.1210/je.2019-00078>