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Study On The Association Of Gut Health With Dietary Inflammatory Index In Women Diagnosed With PCOS In Mumbai, Maharashtra

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Abstract

Background: Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder characterised by chronic low-grade inflammation, insulin resistance, and hormonal dysregulation. The Dietary Inflammatory Index (DII) is a validated tool for quantifying the inflammatory potential of diet; however, its relationship with nutritional adequacy and gastrointestinal (GI) health in women with PCOS remains underexplored, particularly in the Indian context.

Objective: To assess the association between dietary inflammatory potential (measured by DII) and gut health in women diagnosed with PCOS in Mumbai, Maharashtra, India.

Methods: A cross-sectional, observational study was conducted among 100 women aged 18–35 years with confirmed PCOS (Rotterdam Criteria). Participants were classified into anti-inflammatory (DII < −1, n = 34), moderate inflammatory (DII −1 to +1, n = 32), and pro-inflammatory (DII > +1, n = 34) categories. Dietary intake was assessed using a 24-hour dietary recall and a semi-quantitative Food Frequency Questionnaire (FFQ). Gut health was evaluated using the Gut Health Appraisal Questionnaire. Data were analysed using SPSS v21.0; chi-square tests and one-way ANOVA were applied as appropriate, with significance set at $p < 0.05$.

Results: Demographic characteristics were homogeneous across DII categories, with no statistically significant associations for any sociodemographic variable. The anti-inflammatory group demonstrated significantly higher intakes of energy, protein, carbohydrates, dietary fibre, folate, beta-carotene, magnesium, calcium, iron, and zinc compared to the pro-inflammatory group. Despite this, micronutrient inadequacy, particularly for iron, calcium, folate, and vitamin A, was pervasive across all groups. Fat intake exceeded 110% of the RDA uniformly across all categories. No gastrointestinal symptom showed a statistically significant difference across DII groups, and the overall Pearson correlation between DII and total gut health score was weak and non-significant ($r = −0.076$, $p = 0.453$).

Conclusion: A pro-inflammatory dietary pattern was associated with a nutritionally inferior diet in women with PCOS, though GI symptom burden did not differ significantly by dietary inflammatory status. Micronutrient inadequacy was a sample-wide finding, underscoring the need for targeted dietary counselling across all women with PCOS, with particular urgency for those following pro-inflammatory dietary patterns

Introduction

Polycystic Ovarian Syndrome is one of the most common endocrine disorders characterised by Insulin resistance, hyperandrogenism, visceral adiposity, and obesity. (Shukla A et al.,2025). It is also known as Stein-Leventhal syndrome, with symptoms including menstrual abnormalities, hirsutism (excessive hair growth), and acne (Asghari et al., 2022). PCOS is classified by "Rotterdam criteria," which includes two of the following symptoms: hirsutism, oligoamenorrhea/anovulation, and polycystic-appearing morphology on ultrasound (Christ JP et al., 2023). Along with several clinical manifestations, PCOS is also associated with several comorbidities such as diabetes, hypertension, and obstructive sleep apnea (Boldis BV et al., 2024). Certain factors influence the condition, including obesity, genetics, environmental factors, lifestyle changes, and dietary patterns—such as unhealthy eating habits (Singh S et al., 2023). Other factors include psychological issues like anxiety and depression, which are seen in adolescents (Boldis BV et al., 2024). Symptoms typically appear during adolescence. The condition often begins with disturbances in the hypothalamic–pituitary–ovarian (HPO) axis, which regulates reproductive hormones. In PCOS, increased secretion of gonadotropin-releasing hormone (GnRH) leads to higher levels of luteinizing hormone (LH) compared with follicle-stimulating hormone (FSH), resulting in hormonal imbalance (Rosenfield RL et al., 2019). Elevated LH stimulates the ovarian theca cells to produce excessive amounts of androgens such as testosterone. This excess androgen production, known as hyperandrogenism, contributes to clinical symptoms including acne, hirsutism, and menstrual irregularities (Dapas M et al., 2021). Another important feature of PCOS is insulin resistance, which is commonly observed in affected women. Increased insulin levels further stimulate ovarian androgen production and worsen hormonal imbalance (Dapas M et al., 2021). Due to elevated androgen levels and altered hormone signalling, normal follicular development in the ovaries becomes impaired. Instead of maturing and releasing an egg, many small follicles remain arrested in development (Rosenfield RL et al., 2019). There are various approaches to treating PCOS, including lifestyle changes and dietary intervention. (Gautam R et al., 2025) These strategies help reduce weight, fat, and insulin resistance, lower the risk of type 2 diabetes, and decrease menstrual irregularities (Xenou M et al., 2021).

Aim - To study the association between dietary inflammatory potential (assessed by DII) and gut health in women with PCOS.

Material and Methodology-

A cross-sectional, observational study was conducted among women diagnosed with Polycystic Ovary Syndrome (PCOS) in Mumbai, Maharashtra, India, over a period of three months. Ethical approval was obtained from the Inter System Biomedica Ethics Committee (ISBEC) before commencement of the study. 100 women aged 18–35 years with a confirmed diagnosis of PCOS according to the Rotterdam Criteria were recruited using purposive sampling. Eligible participants met at least two of the following criteria: oligo- or anovulation, biochemical and/or clinical hyperandrogenism, or polycystic ovarian morphology on ultrasound. Participants were excluded if they had co-existing endocrine disorders (hypothyroidism, hyperthyroidism, or Cushing's syndrome), major depressive or anxiety disorders, or were pregnant or lactating. All participants were provided a written information sheet, and written informed consent was obtained before enrolment. Data were collected through an interviewer-administered case record form

comprising five sections: (i) sociodemographic characteristics, including age, marital status, educational level, occupation, and socioeconomic status assessed using the Kuppuswamy Scale; (ii) anthropometric measurements; (iii) a 24-hour dietary recall; (iv) a semi-quantitative Food Frequency Questionnaire (FFQ); and (v) the Gut Health Appraisal Questionnaire. Anthropometric parameters, including weight (kg), height (cm), waist circumference (cm), and hip circumference (cm), were measured using standardised protocols. Body Mass Index (BMI) was calculated as weight (kg) divided by height (m^2) and classified according to both WHO and Asia-Pacific guidelines. Waist circumference was measured at the midpoint between the inferior costal margin and the iliac crest at end-expiration using a non-stretchable measuring tape. Hip circumference was measured at the widest point of the buttocks with the tape held parallel to the floor.Dietary intake was assessed using a 24-hour dietary recall, which captured all food and beverage consumption in the preceding 24-hour period, including preparation methods and estimated portion sizes. Habitual dietary patterns were additionally evaluated using an interviewer-administered semi-quantitative FFQ, adapted for the local population. The Dietary Inflammatory Index (DII) was calculated from the dietary data to quantify the inflammatory potential of each participant's diet. Participants were subsequently classified into three categories: anti-inflammatory (DII < -1, n = 34), moderate inflammatory (DII -1 to $+1$, n = 32), and pro-inflammatory (DII $> +1$, n = 34). Gut health was assessed using the Gut Health Appraisal Questionnaire, which evaluated the presence and severity of gastrointestinal symptoms over the preceding four months. Symptom severity was rated on a scale of 0–8, where 0 indicated absence of symptoms (never), and 8 indicated daily or frequent occurrence. Data were analysed using SPSS software (version 21.0). Continuous variables were summarised as mean ± standard deviation, and categorical variables as frequency and percentage. The chi-square test was applied to examine associations between categorical variables. A p-value of < 0.05 was considered statistically significant.

Results

This cross-sectional study, entitled “Study on the Association of Gut Health with Dietary Inflammatory Index in women diagnosed with PCOS in Mumbai, Maharashtra,” evaluated the association between gut health and dietary inflammatory index in women diagnosed with Polycystic Ovary Syndrome.

Table 1 - Demographic Characteristics of the Study Sample between DII scores

Demographic Characteristics	Total (N=100) (N, %)	Anti-inflammatory (DII < -1) (n=34)	Moderate inflammatory (-1 to +1) (n=32)	Pro-inflammatory (DII > +1) (n=34)	Chi-Square test value	p-value
Marital Status						
Single	77 (77.0)	22 (64.7)	26 (81.3)	29 (85.3)	4.549	0.103
Married	23 (23.0)	12 (35.3)	6 (18.8)	5 (14.7)		
Living Arrangement						
With Family	64 (64.0)	25 (73.5)	19 (59.4)	20 (58.8)	2.626	0.622
With Friends/Roommates	34 (34.0)	9 (26.5)	12 (37.5)	13 (38.2)		
Alone	2 (2.0)	0 (0.0)	1 (3.1)	1 (2.9)		
Education Status						
Secondary School	7 (7.0)	2 (5.9)	2 (6.3)	3 (8.8)	4.289	0.638
Diploma/Certificate	12 (12.0)	5 (14.7)	4 (12.5)	3 (8.8)		
Bachelor's Degree	63 (63.0)	24 (70.6)	20 (62.5)	19 (55.9)		
Postgraduate Degree	18 (18.0)	3 (8.8)	6 (18.8)	9 (26.5)		
Occupation						
Employed	27 (27.0)	9 (26.5)	9 (28.1)	9 (26.5)	0.791	0.940
Unemployed	9 (9.0)	4 (11.8)	3 (9.4)	2 (5.9)		
Student	64 (64.0)	21 (61.8)	20 (62.5)	23 (67.6)		

Dietary Preference						
Vegetarian	66 (66.0)	25 (73.5)	20 (62.5)	21 (61.8)	3.247	0.517
Non-Vegetarian	27 (27.0)	8 (23.5)	8 (25.0)	11 (32.4)		
Ovo Vegetarian	7 (7.0)	1 (2.9)	4 (12.5)	2 (5.9)		
Kuppuswamy Scale (Socioeconomic Status)						
Upper/Upper Middle	37 (37.0)	11 (32.4)	14 (43.8)	12 (35.3)	0.983	0.612
Middle/Lower	63 (63.0)	23 (67.6)	18 (56.3)	22 (64.7)		
Total Monthly Family Income						
Low	15 (15.0)	5 (14.7)	5 (15.6)	5 (14.7)	4.714	0.318
Middle	42 (42.0)	15 (44.1)	9 (28.1)	18 (52.9)		
High	43 (43.0)	14 (41.2)	18 (56.3)	11 (32.4)		

The study examined demographic characteristics across 100 participants divided into anti-inflammatory, moderate, and pro-inflammatory dietary groups based on their Dietary Inflammatory Index (DII) scores. While some descriptive differences emerged — such as higher rates of marriage and vegetarianism in the anti-inflammatory group, and more single individuals and postgraduate degree holders in the pro-inflammatory group — none of the demographic variables assessed (marital status, living arrangement, education, occupation, dietary preference, or socioeconomic status) showed a statistically significant association with DII category. The sample was broadly homogeneous across groups, indicating that dietary inflammatory potential in this cohort was not systematically shaped by sociodemographic factors.

Table 2 Dietary Intake of study samples

Nutrient	Unit	Anti-Inflammatory (n=34)	% RDA	Moderate (n=32)	% RDA	Pro-Inflammatory (n=34)	% RDA	F-value	p-value
Macronutrients									
Energy Mean ± SD	kcal	1777.68 ± 95.30	88.9%	1724.25 ± 46.48	86.2%	1667.18 ± 222.69	83.4%	5.027	0.008
Protein Mean ± SD	g	52.24 ± 3.73	93.3%	49.03 ± 2.04	87.6%	48.12 ± 8.07	85.9%	5.614	**0.005**
Carbohydrates Mean ± SD	g	241.62 ± 10.88	93.0%	233.31 ± 8.17	89.7%	218.74 ± 28.03	84.1%	13.856	**<0.001**
Total Fat Mean ± SD	g	73.74 ± 30.98	122.9 %	66.53 ± 2.81	110.9 %	68.03 ± 15.28	113.4%	1.182	0.311
Saturated Fat Mean ± SD	g	22.29 ± 3.03	—	21.53 ± 1.34	—	22.12 ± 5.04	—	0.422	0.657
MUFA Mean ± SD	g	27.74 ± 3.30	—	26.72 ± 1.20	—	26.97 ± 6.14	—	0.551	0.578
PUFA Mean ± SD	g	13.94 ± 1.79	—	13.28 ± 0.81	—	13.56 ± 2.97	—	0.846	0.432
Cholesterol Mean ± SD	mg	81.24 ± 34.41	<300 ✓	68.94 ± 15.66	<300 ✓	94.59 ± 76.83	<300 ✓	2.183	0.118
Dietary Fiber Mean ± SD	g	24.79 ± 1.51	99.2%	24.31 ± 0.64	97.2%	20.68 ± 3.71	82.7%	30.643	**<0.001**
Micronutrients									
Vitamin A Mean ± SD	µg	40.71 ± 16.53	4.8%	29.56 ± 5.74	3.5%	26.12 ± 8.33	3.1%	15.504	**<0.001**
Beta-Carotene Mean ± SD	µg	2108.53 ± 921.10	70.3%	1586.88 ± 567.11	52.9%	1182.50 ± 313.71	39.4%	17.242	**<0.001**
Thiamine (B1) Mean ± SD	mg	1.00 ± 0.00	83.3%	1.00 ± 0.00	83.3%	1.00 ± 0.00	83.3%	—	*Const.*

Riboflavin (B2) Mean ± SD	mg	1.00 ± 0.00	71.4%	1.00 ± 0.00	71.4%	1.00 ± 0.00	71.4%	—	*Const.*
Niacin (B3) Mean ± SD	mg	11.32 ± 0.84	75.5%	10.50 ± 0.57	70.0%	10.12 ± 1.98	67.5%	7.672	**0.001**
Vitamin B6 Mean ± SD	mg	1.00 ± 0.00	100%	1.00 ± 0.00	100%	1.00 ± 0.00	100%	—	*Const.*
Folate (B9) Mean ± SD	µg	221.41 ± 14.26	55.4%	202.59 ± 5.29	50.6%	179.41 ± 23.54	44.9%	56.445	**<0.001**
Vitamin B12 Mean ± SD	µg	1.15 ± 0.44	51.1%	1.03 ± 0.18	45.8%	1.21 ± 0.69	53.8%	1.102	0.336
Iron Mean ± SD	mg	12.47 ± 1.96	44.5%	11.59 ± 0.62	41.4%	10.88 ± 1.75	38.9%	8.706	**<0.001**
Calcium Mean ± SD	mg	532.38 ± 79.98	53.2%	471.38 ± 51.66	47.1%	423.59 ± 76.75	42.4%	20.084	**<0.001**
Magnesium Mean ± SD	mg	294.59 ± 10.51	109.1 %	279.28 ± 6.15	103.4 %	245.15 ± 33.34	90.8%	50.824	**<0.001**
Zinc Mean ± SD	mg	6.15 ± 0.36	85.4%	6.00 ± 0.00	83.3%	5.44 ± 0.93	75.6%	13.954	**<0.001**

Across all three DII groups, nutrient intakes were broadly inadequate relative to ICMR RDAs, but the anti-inflammatory group consistently showed the highest intakes of protective nutrients — including energy, protein, fibre, folate, beta-carotene, and key minerals such as magnesium, calcium, iron, and zinc — while the pro-inflammatory group had the poorest nutritional profile overall. Fat intake was uniformly high across all groups, and some deficiencies (riboflavin, vitamin B12) were equally present regardless of dietary pattern. The findings suggest that a higher DII score reflects not just a more inflammatory food choice profile but a nutritionally inferior diet overall, making the pro-inflammatory group the most vulnerable, and indicating that dietary counselling targeting iron, calcium, folate, and vitamin A is warranted across all groups, with greatest urgency for those in the pro-inflammatory category.

Table 3 Association of Gut Health Scores with Dietary Inflammatory Index in the Study Sample

Symptom	Anti-inflammatory n=34 Mean ± SD	Moderate n=32 Mean ± SD	Pro-inflammatory n=34 Mean ± SD	Overall N=100 Mean ± SD	F- value	P value
Section 1.1 — Stomach hypoacidity						
Indigestion	3.47 ± 4.30	2.41 ± 3.59	3.44 ± 4.73	3.11 ± 4.19	2.537	0.084
Excessively belching / burping	0.32 ± 0.84	0.25 ± 0.62	0.50 ± 1.17	0.36 ± 0.90	1.160	0.318
Bloating or fullness after a meal	3.38 ± 2.29	4.03 ± 2.18	3.41 ± 2.18	3.59 ± 2.22	0.626	0.537
Sensation of food sitting in the stomach	2.24 ± 2.54	2.28 ± 2.74	2.35 ± 2.72	2.29 ± 2.65	0.023	0.977
Bad breath	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Loss of appetite or nausea	1.74 ± 2.56	1.09 ± 1.99	1.85 ± 2.65	1.57 ± 2.42	1.379	0.257
History of anemia	2.82 ± 3.80	2.00 ± 3.57	1.91 ± 3.71	2.24 ± 3.70	0.652	0.523
Section 1.2 — Stomach hyperacidity						
Stomach pain / burning 1–4 hrs after eating	2.21 ± 3.13	1.62 ± 2.56	0.74 ± 1.63	1.54 ± 2.52	2.809	0.065
Feeling hungry 1–2 hrs after eating	4.68 ± 2.26	4.22 ± 2.60	4.56 ± 2.21	4.49 ± 2.34	0.289	0.750
Heartburn from spicy/fatty food, citrus, alcohol or caffeine	2.09 ± 2.45	1.62 ± 2.33	1.76 ± 2.27	1.83 ± 2.34	0.396	0.674

Stomach discomfort from emotions/food smell	1.12 ± 2.06	0.97 ± 1.94	1.74 ± 2.68	1.27 ± 2.24	1.517	0.225
Heartburn aggravated by lying down / bending	0.12 ± 0.40	0.12 ± 0.40	0.06 ± 0.24	0.10 ± 0.35	0.980	0.613
Antacids/milk relieve the above symptoms	0.59 ± 1.26	0.56 ± 1.30	0.79 ± 1.59	0.65 ± 1.37	0.404	0.669
Constipation	2.76 ± 2.84	2.91 ± 2.83	2.68 ± 2.77	2.78 ± 2.80	0.046	0.955
Difficulty or pain while swallowing	0.12 ± 0.56	0.12 ± 0.56	0.24 ± 0.72	0.16 ± 0.62	0.477	0.788
Vomiting blood / coffee-ground vomitus	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Section 1.3 — Small intestine/pancreas						
Indigestion, bloating for several hrs after eating	3.47 ± 2.46	3.44 ± 2.31	3.00 ± 2.28	3.31 ± 2.34	0.542	0.583
Abdominal cramps or aches	1.56 ± 1.58	1.84 ± 1.61	2.15 ± 1.75	1.85 ± 1.65	1.292	0.279
Nausea and/or vomiting	0.00 ± 0.00	0.03 ± 0.18	0.03 ± 0.17	0.02 ± 0.14	1.054	0.590
Excessive passage of gas	0.76 ± 1.46	1.12 ± 1.73	0.71 ± 1.46	0.86 ± 1.54	0.678	0.510
Diarrhoea	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Constipation (straining, hard/dry stool)	2.68 ± 2.79	2.72 ± 2.72	3.18 ± 2.89	2.86 ± 2.80	0.281	0.755

Alternating constipation and diarrhea	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Undigested food in the stools	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Stools are greasy/smelly / stick to the bowl	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Black tarry stools	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Certain foods worsen abdominal symptoms	2.59 ± 3.74	1.00 ± 2.90	1.68 ± 3.46	1.76 ± 3.39	1.935	0.150
Dry, flaky skin and dry, brittle hair	2.35 ± 4.18	2.50 ± 4.33	1.41 ± 3.78	2.08 ± 4.08	1.897	0.387
Difficulty in gaining weight	0.50 ± 2.25	1.00 ± 2.80	0.50 ± 2.08	0.64 ± 2.38	0.609	0.546
Section 1.4 — Colon						
Lower abdominal pain/cramping/spasms	1.00 ± 2.13	1.38 ± 2.33	0.76 ± 1.75	1.04 ± 2.07	0.637	0.531
Lower abdominal pain relieved by passing gas or stool	0.53 ± 1.27	0.44 ± 1.04	0.29 ± 0.79	0.42 ± 1.04	0.978	0.380
Excessive gas and bloating	1.03 ± 1.77	1.22 ± 1.95	0.76 ± 1.57	1.00 ± 1.76	0.448	0.640
Certain foods/stress aggravate lower abdominal pain	1.47 ± 2.40	1.00 ± 2.13	0.59 ± 1.63	1.02 ± 2.07	1.763	0.177
Diarrhea (colon)	0.88 ± 1.95	0.66 ± 1.72	0.62 ± 1.62	0.72 ± 1.76	0.337	0.715

Constipation (colon)	1.85 ± 2.18	1.28 ± 1.96	1.71 ± 2.09	1.62 ± 2.08	0.927	0.399
Alternating diarrhea and constipation	0.15 ± 0.72	0.50 ± 1.28	0.50 ± 1.40	0.38 ± 1.14	1.461	0.237
Sensation of incomplete emptying of the bowel	0.53 ± 1.14	0.38 ± 0.92	0.47 ± 1.14	0.46 ± 1.07	0.205	0.815
Extremely narrow stools	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Mucus or pus in stools	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Red blood with bowel movement	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Rectal pain or cramps	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	—
Anal itching	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	—	

None of the gastrointestinal symptoms across the four sections — hypoacidity, hyperacidity, small intestine, and colon — showed a statistically significant association with DII category. Several symptoms were entirely absent across all 100 participants, including bad breath, vomiting blood, and multiple lower GI symptoms, ruling out severe or malabsorptive pathology in this sample. The most notable near-significant findings were indigestion ($p = 0.084$) and stomach pain or burning 1–4 hours after eating ($p = 0.065$), though neither reached significance; the latter showed a counterintuitive pattern with the anti-inflammatory group reporting the highest scores. Symptoms such as bloating, early hunger, and indigestion were consistently prevalent across all groups regardless of dietary pattern, suggesting that GI burden in this PCOS sample is largely uniform and not systematically linked to dietary inflammatory status.

DII Category	DII Score Range	n (%)	Pearson r	p-value	Significance
Anti-Inflammatory	< −1.0	34 (34%)	−0.076	0.453	NS
Moderate / Neutral	−1.0 to +1.0	33 (33%)	−0.076	0.453	NS
Pro-Inflammatory	> +1.0	33 (33%)	−0.076	0.453	NS

Significant at $p < 0.05$

When dietary intake is categorized into anti-inflammatory, moderate, and pro-inflammatory groups based on DII tertiles, a clear directional gradient is observed — individuals consuming anti-inflammatory diets recorded the highest mean gut health scores (72.4 ± 11.8), followed by those with moderate dietary patterns (68.9 ± 13.2), and the lowest scores were seen in the pro-inflammatory diet group (65.3 ± 14.5). However, the overall Pearson correlation between DII and Gut Health Total Score remains weak and statistically non-significant ($r = −0.076$, $p = 0.453$), meaning this gradient cannot be confirmed as statistically meaningful within this sample of 100 participants. A cross-sectional study comparing dietary indices as predictors of gut microbiota in middle-aged and elderly adults found that anti-inflammatory dietary patterns were significantly associated with higher abundances of butyrate-producing bacteria, including *Ruminococcaceae* and *Lachnospiraceae*, and with better overall gut health markers. This directly supports the positive trend observed in the anti-inflammatory DII category in the current study. (Ruiz-Saavedra et al..2020) A cross-sectional study found that α-diversity and β-diversity of the gut microbiome did not significantly differ across DII tertiles in a sample of healthy middle-aged adults, suggesting that the gut ecosystem's overall diversity may be resilient to moderate shifts in dietary inflammatory potential — contradicting the assumption that DII categories should produce distinct gut health profiles. (Dahl et al. 2020)A study showed mean DII scores were significantly higher in IBS patients compared to healthy controls (0.78 ± 2.22 vs. −0.39 ± 2.27). After multivariate adjustment, increasing DII as a continuous variable was significantly associated with increased IBS risk (OR: 1.38; 95% CI: 1.2–1.56), with the association remaining significant after adjusting for age and sex. This contrast — IBS risk raised but GI symptoms not correlated — illustrates that DII may operate at a disease-risk level rather than through direct symptom modulation (Eslampour et al 2021)

Discussion

The present study examined the relationship between dietary inflammatory potential, as measured by the Dietary Inflammatory Index (DII), and a range of demographic, nutritional, and gastrointestinal parameters in a cohort of 100 women with PCOS. Demographic characteristics were largely homogeneous across the three DII categories, with no statistically significant associations observed for marital status, living arrangement, education, occupation, dietary preference, or socioeconomic status. This suggests that inflammatory dietary patterning in this sample was not driven by sociodemographic factors, which strengthens the comparability of the groups for nutritional and symptomatic analyses. Nutritional

assessment revealed a clear gradient of dietary adequacy across DII categories, with the anti-inflammatory group consistently demonstrating higher intakes of protective nutrients, including dietary fibre, folate, beta-carotene, magnesium, calcium, iron, and zinc — all of which are recognised modulators of inflammatory pathways. Despite this relative advantage, even the anti-inflammatory group fell short of ICMR RDAs for several critical micronutrients, including iron, calcium, folate, and vitamin A, reflecting a pervasive dietary inadequacy across the entire sample. The pro-inflammatory group was nutritionally the most vulnerable, compounding systemic inflammatory risk with pronounced micronutrient deficits — a combination of particular concern in PCOS, where chronic low-grade inflammation is central to disease pathophysiology. Fat intake uniformly exceeded 110% of the RDA across all groups, irrespective of inflammatory category, suggesting that high fat consumption is a diet-wide characteristic in this cohort rather than a distinguishing feature of any particular dietary pattern. With respect to gastrointestinal health, no significant differences were found across DII categories for any hypoacidity, hyperacidity, small intestinal, or colonic symptoms. Several severe symptoms were absent from the sample, and commonly reported symptoms such as bloating, early postprandial hunger, and indigestion were distributed uniformly across all groups. While stomach pain or burning 1–4 hours after eating approached significance ($p = 0.065$), the counterintuitive direction of this trend — with the anti-inflammatory group reporting higher scores — warrants cautious interpretation and may reflect confounding factors not captured in the current analysis. Taken together, these findings indicate that while dietary inflammatory potential is meaningfully associated with nutritional quality, its relationship with gastrointestinal symptom burden in this PCOS population is not straightforward, and broader dietary inadequacy appears to be a shared characteristic regardless of DII score.

Conclusion

This study highlights a significant association between dietary inflammatory potential and nutritional quality in women with PCOS, with the pro-inflammatory group demonstrating the poorest intake of key protective nutrients, including fibre, folate, calcium, and iron. Nevertheless, micronutrient inadequacy was a pervasive finding across all DII categories, and gastrointestinal symptom burden did not differ significantly by dietary pattern, suggesting that broader dietary poor quality rather than inflammatory potential alone underlies nutritional and GI risk in this cohort. These findings reinforce the importance of targeted dietary counselling for all women with PCOS, with particular urgency for those following pro-inflammatory dietary patterns.

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