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1 **Abstract**

2 **Objective:** To compare dietary intake and lifestyle behaviour in women with polycystic ovarian  
3 syndrome (PCOS) and healthy women.

4 **Methods:** 160 healthy women (partner with male infertility) were recruited to a control group;  
5 168 women with PCOS (diagnosed on ultrasound) were recruited to a case study group for this  
6 cross-sectional comparative study. The case group was classified into three phenotypes based on  
7 presence or absence of menstrual disorder (M), hyperandrogenism (HA), and polycystic ovary  
8 according to sonography (PCO): HA+PCO (n=53), PCO+M (n=57) and M+HA+PCO (n=66).  
9 Dietary intake and lifestyle behaviour were measured using a food frequency questionnaire  
10 (FFQ) and a lifestyle questionnaire (LQ).

11 **Results:** The mean energy ( $P<0.001$ ) and fat intake ( $P<0.001$ ) were greater in PCOS groups  
12 compared with the control group. The average energy and fat intake were greater in  
13 HA+M+PCO group after age and BMI adjustment compared with other phenotypes ( $P<0.001$ ).  
14 In comparison with the control group, lifestyle scores were lower in the PCOS group in the fields  
15 of physical activity, weight and nutrition control after age and BMI adjustment ( $P<0.001$ ). The  
16 average score of lifestyle in the fields of physical activity, weight and nutrition control, and  
17 psychological health was lower in the phenotype HA+M+PCO compared with other phenotypes  
18 ( $P<0.001$ ).

19 **Conclusions:** Limited energy and fat intake is strongly recommended in Iranian women with  
20 PCOS especially in phenotype HA+M+PCO. Consultation on improvement of psychological  
21 health and the importance of weight and nutrition control, and appropriate physical activity in  
22 patients especially in HA+M+PCO is advocated.

23 **Keywords:** Lifestyle, polycystic ovarian syndrome, diet

24

## 25 **Introduction**

26 Polycystic ovarian syndrome (PCOS) is a common and complex endocrine disorder that affects  
27 women of reproductive age <sup>(1)</sup>. Three phenotypes are recognized based on the presence or  
28 absence of symptoms using the Rotterdam criteria: oligo-ovulation (irregular menses) with  
29 polycystic ovary in sonography (M+PCO), hyperandrogenism with polycystic ovary in  
30 sonography (HA+PCO) and hyperandrogenism with oligo-ovulation (irregular menses) and  
31 polycystic ovary (M+PCO+HA) <sup>(2, 3)</sup>. Although, PCOS can exist in the absence of obesity, 70  
32 percent of women with PCOS are obese <sup>(4)</sup>.

33

34 Obesity can intensify metabolic and fertility outcomes related to this syndrome. For this reason,  
35 the treatment of PCOS focuses mainly on weight loss if obesity is present because energy  
36 limitation is associated with improved metabolic status and energy intakes <sup>(5-7)</sup>. However, the  
37 relationship between diet and PCOS is not yet well understood and there is limited information  
38 available in this field. It is reported that total energy intake and intake of micronutrients is similar  
39 in PCOS and control groups (Carmina et al.<sup>8</sup>) and that consumption of certain foods with high  
40 glycaemic index is greater in women with PCOS (Douglas et al.<sup>9</sup>). Extensive long-term studies  
41 have identified a significant relationship between diet and the risk of hypertension, type 2  
42 diabetes mellitus (T2DM), and cardiovascular disease in a healthy population <sup>(10-14)</sup>. Most studies  
43 which assess the nutritional status of women with PCOS are flawed because they do not allow  
44 for the different clinical phenotypes in PCOS which result in significantly different clinical and  
45 metabolic parameters. Pikee et al. <sup>(15)</sup> have reported that women with the hyperandrogenism  
46 phenotype have a higher BMI and worse clinical and endocrine status (TG/HDL, LH/FSH,  
47 testosterone, LH) compared with other phenotypes. The only study which has investigated the

48 potential differences between phenotypes in PCOS and their dietary intake has reported that  
49 women with phenotype HA+M+PCO had more daily energy intake compared with healthy  
50 women <sup>(16)</sup>.

51

52 Dietary habits are rooted in the culture of communities, and since the relationship between  
53 dietary habits and the prevalence of some cardiovascular disease and T2DM is proven, it seems  
54 logical and imperative to compare dietary intake between women with different phenotypes of  
55 PCOS in different cultures. To deliver appropriate nutritional interventions in the case of obesity  
56 or increased risk factors related to diet, PCOS cardiovascular status is required. The purpose of  
57 the present study was to compare dietary intake and lifestyle factors in women with three  
58 different phenotypes of PCOS with a control group of healthy women.

59

## 60 **Methods**

### 61 *Design and data collection*

62 The present study is a cross sectional study with a control and case group divided into three sub-  
63 groups. The study was conducted at an acute hospital in Hormozgan Province, Iran. Women  
64 were recruited through the infertility clinic at a provincial hospital. The case group included  
65 women with PCOS. The control group comprised healthy women who had been referred to this  
66 clinic because of male infertility.

67 A simple sampling method was used. The sample size was calculated using the following  
68 formula (Douglas et al.<sup>9</sup>) with CI 95% as at least 145 women in each group.

$$69 \quad N = \frac{\left( Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 (S_1^2 + S_2^2)}{\Delta^2}$$

70  $\mu_1$ : 61.5;  $\mu_2$ : 69.2; S1: 21.1; S2: 25.0.

71 The research team approached 362 women to explain the purpose of study; written consent was  
72 obtained from each participant who volunteered to participate and questionnaires were  
73 distributed and completed at the same clinic appointment. 34/362 women declined for unknown  
74 reasons. Inclusion criteria for all groups were: age 15-40 years, married, Iranian nationality, and  
75 absence of linguistic or cognitive problems, lack of underlying disease (diabetes, hypertension,  
76 diagnosed anaemia, or any other disease requiring a special diet). Additional inclusion criteria  
77 for the case group were women with PCOS based on two of the following three Rotterdam  
78 criteria: ultrasound scan of polycystic ovary (>12 follicles in both ovaries and ovarian volume  
79 >10 mm); clinical signs of hyperandrogenism: clinical score of hyperandrogenism >7 or obvious  
80 acne); menstrual cycles of greater than 35 days or amenorrhea (absence of menstruation for 199  
81 days). And absence of congenital adrenal hyperplasia, thyroid dysfunction, hyperprolactinemia.  
82 The selected participants in the case group were classified into three phenotypes: HA+PCO,  
83 M+PCO, HA+M+PCO.

84

#### 85 *Measures*

86 Menstrual history measured as the interval between two menses during the previous 12 months:  
87 <21 days, 21-34 days, 35-60 days, >199 days, variable.

88 BMI: calculated as an individual's weight in kilograms divided by height in metres<sup>2</sup>

89 Body hair: based on the Ferriman-Gallway hirsutism scoring scale which measures nine  
90 androgen sensitive areas in the body. Each area is rated from zero to 4 based on the degree of  
91 terminal hair growth. A score of 7 or more indicated hirsutism <sup>(17)</sup>.

92 Acne: a global acne grading system was used to measure acne. This scale includes six body areas  
93 of face, chest, and upper back based on the level of involvement, distribution, density, and  
94 pilosebaceous units. Each body area is rated from zero to four. The most severe lesion of each  
95 area determines the score of that area. The score of each area is multiplied by the factor score  
96 which is based on the involved area: forehead, left and right cheek, nose, chin, chest and upper  
97 back. The total acne score is obtained by multiplying the factor score by sum score of involved  
98 areas <sup>(18)</sup>.

99 Socio economic status: formal education of women was considered as an indicator of social  
100 status <sup>(19)</sup>.

101 Food frequency questionnaire: dietary intake was measured using a modified food frequency  
102 questionnaire (FFQ) based on Iranian dietary questionnaire which contains 168 items. The  
103 reliability and validity of the questionnaire are approved in Iran <sup>(20)</sup>. FFQ included a list of foods  
104 with a standard size of a food. Subjects were asked to report the frequency of consumption of  
105 each food during the past month on a daily, weekly or monthly basis. The amount of nutritional  
106 items consumed was converted to grams using household scales. This dietary information was  
107 analyzed using the software Nutrition4 which calculated the amount of energy, macronutrients  
108 (carbohydrates, lipid, and protein) and micronutrients (at least 30 micronutrients) including fat  
109 soluble vitamins, water soluble vitamins and minerals <sup>(20, 21)</sup>.

110  
111 Lifestyle questionnaire (LSQ) which comprises 70 items in 10 subscales including physical  
112 health (8 items), sports and fitness (7 items), weight management and nutrition (7 items), disease  
113 prevention (7 items), mental health (7 items), spiritual health (6 items), social health (7 items),  
114 avoidance of drugs, alcohol and opiates (6 items), accident prevention (8 items) and

115 environmental health (7 items). All items are graded on a four-point Likert scale scoring in range  
116 from 0 (=never) to 3 (=always). The higher the score, the better the lifestyle. Lali et al. <sup>(22)</sup> have  
117 confirmed the validity and reliability of this questionnaire for Iranian society.

118

### 119 *Ethical consideration*

120 The ethics committee of Hormozgan University of Medical Science approved the present study.  
121 After explaining the purpose of the study and securing the confidentiality of information, all  
122 subjects gave written consent.

123

### 124 *Statistical analysis*

125 The Mean  $\pm$  SD and n (%) were used for quantitative and qualitative variables respectively. T  
126 test and ANOVA test were used for intergroup comparison of PCOS patients for quantitative  
127 variables and comparison of PCOS phenotypes respectively. BMI and age were adjusted by co-  
128 variance analysis. Data were analyzed using Statistical Package for the Social Sciences 21.0  
129 (SPSS Inc., Chicago, IL, USA). Significance level of  $P < 0.05$  was accepted.

130

## 131 **Results**

### 132 *Study population*

133 Table 1 shows the clinical and demographic information of all participants. There was no  
134 significant difference between the control and case study groups in terms of demographic and  
135 clinical characteristics except for menstrual cycle interval, hirsutism and acne scores ( $P > 0.05$ ).  
136 There were no significant differences between three PCOS phenotype groups in terms of  
137 demographic and clinical characteristics.

138

139 *Dietary intake*

140 Table 2 shows the comparison of women with PCOS and the women in the control group based  
141 on their dietary intake. Energy and fat intake were greater in the PCOS group after adjustment  
142 for BMI and age compared with control group ( $P<0.01$ ). Table 3 shows dietary intake in the  
143 different phenotypes of PCOS. Energy intake and fat intake were significantly higher in  
144 phenotype HA+M+PCO compared with phenotypes HA+PCO and M+PCO. This statistical  
145 difference remained after adjustment for age. Other micro/macro nutrient intake was similar  
146 across phenotype groups.

147

148 *Lifestyle*

149 Table 4 shows the comparison of PCOS and control groups based on the domains of lifestyle.  
150 Scores of physical activity, nutrition and weight control in the PCOS group were significantly  
151 lower than in the control group after BMI and age adjustment, indicating a poorer lifestyle in  
152 women in the PCOS group in the mentioned domains above.

153

154 Table 5 shows the lifestyle scores across the different PCOS phenotype groups of women. Scores  
155 of physical activity, nutrition and weight control and psychological health were significantly  
156 lower in HA+M+PCO phenotype after BMI and age adjustment compared with other phenotypes  
157 ( $P<0.001$ ) indicating a poorer lifestyle of HA+M+PCO phenotype.

158

159 **Discussion**

160 The results of the present study showed that after BMI and age adjustment, energy, fat, saturated  
161 fatty acids and polyunsaturated fatty acids intake were significantly greater in the PCOS group  
162 compared with the control group. Given that quality of the diet increases by fibre and  
163 micronutrients intake, and decreases by saturated fat intake <sup>(23)</sup>, the quality of diet may be lower  
164 in the PCOS group compared with the control group. Our findings suggest that the quality of diet  
165 is positively affected by polyunsaturated fatty acids intake. Previous studies show that quality of  
166 diet is a dietary intake measure which is associated with unfavourable metabolic outcomes and  
167 increased risk of chronic disease mortalities <sup>(24, 25)</sup>. Wild et al. <sup>(26)</sup> reported increased fat intake  
168 and decreased fibre intake in women with PCOS compared with a control group. Moran et al. <sup>(27)</sup>  
169 showed women with PCOS had a better diet quality as indicated by a higher diet quality score  
170 and higher energy, fibre, folate, iron, calcium, magnesium, niacin, phosphorus, potassium,  
171 sodium, vitamin E and zinc intake and lower percentage energy from saturated fat intake,  
172 glycaemic index and retinol intake than women without PCOS. It should be noted that in this  
173 study, diagnosis of PCOS was self-reported and dietary intake was measured using a dietary  
174 questionnaire for epidemiological studies. These questionnaires measure 80 types of nutrients  
175 consumed during the past 12 months which differs from the present study as the FFQ is an  
176 appropriate tool for measurement of diet components in a certain period. However, data accuracy  
177 may be limited due to the ability of the responders to remember their intake. Moreover, women  
178 with PCOS reported higher carbohydrate (229 vs. 61 g), protein (78 vs. 66.3 g), fat (85 vs. 61.1  
179 g), saturated fat (26 vs. 22.5 g) intake compared with reference population <sup>(28)</sup>. A high energy  
180 diet has been reported in Iranian <sup>(29)</sup> and Brazilian <sup>(16)</sup> women with PCOS. Using three 24-hour  
181 dietary recall questionnaires, Ahmadi et al. <sup>(29)</sup> reported that daily energy intake (about 300 kcal)  
182 was higher in women with PCOS. These women also had more total and saturated fat intake

183 compared with control group <sup>(29)</sup>. A 24 hours dietary diary has similar limitations to the FFQ as it  
184 also depends on an individual respondent's memory. However, it is an appropriate method which  
185 can present accurate information when it is used by a trained interviewer in a standard approach.  
186 Furthermore, the results of the present study show for the first time that the energy and saturated  
187 fat intake were greater in HA+M+PCO phenotype after age and BMI adjustment compared with  
188 other phenotypes. To date, this is the only study to compare dietary intake PCOS phenotypes  
189 with healthy women. The results of Graff et al. <sup>(16)</sup> using a 121 items FFQ showed that energy  
190 intake was greater in classic phenotype of PCOS (HA+M+PCO) compared with the control  
191 group; however, this statistical difference did not exist after age and BMI adjustment. It should  
192 be noted that Graff et al considered only two phenotypes of HA+PCO+M (n=39) and ovulatory  
193 PCOS (n=22). In the present study, classification of PCOS phenotype was based on the  
194 Rotterdam criteria.

195

196 It has been shown that HA+M+PCO phenotype has three times higher levels of androgen which  
197 in turns increases the prevalence of glucose tolerance disorder and insulin resistance more than  
198 other phenotypes <sup>(16)</sup>. Testosterone stimulates appetite and an increased level of androgen in  
199 women is associated with appetite control disorder <sup>(30)</sup>. Moreover, hyperandrogenism is essential  
200 in determining the risk of cardiovascular disease in PCOS phenotypes <sup>(31)</sup>. Current clinical  
201 evidence suggests that testosterone increases abdominal fat accumulation <sup>(32-34)</sup>. Increased  
202 abdominal adiposity is associated with increased Leptin hormone and Leptin resistance which  
203 may be associated with increased energy intake <sup>(35)</sup>. High fat intake (total and saturated fat) in the  
204 present study is a concern for patients with PCOS specially HA+PCO+M phenotype; because  
205 fatty acid intake affects the glucose metabolism by making changes in insulin signaling and cell

206 membrane function. In addition, high saturation fat diet is associated with decrease insulin  
207 resistance <sup>(36)</sup>.

208  
209 However, a high level of physical activity improves the glucose metabolism and sensitivity to  
210 insulin, and reduced abdominal obesity <sup>(22)</sup>; the risk of which is higher in phenotypes  
211 HA+PCO+M. Our results showed for the first time that phenotype HA+M+PCO has less  
212 physical activity compared with two other phenotypes. Wright et al. <sup>(37)</sup> have reported no  
213 significant difference in self-reported physical activity between American PCOS and non PCOS  
214 patients. This finding is similar to the study of Ahmadi et al. <sup>(29)</sup>, Álvarez-Blasco et al. <sup>(38)</sup> in  
215 which there was no significant difference in physical activity between PCOS and non PCOS  
216 patients in Iran and Spain. However, it should be noted that similar tools are not used in these  
217 studies to measure physical activity. Wright et al. <sup>(37)</sup> have used Paffenburg physical activity  
218 questionnaire that is validated in male and female samples. Álvarez-Blasco et al. <sup>(38)</sup> and Ahmadi  
219 et al. <sup>(29)</sup> have used interview questionnaires which their validity is uncertain. In the present  
220 study, we have used the Iranian version of the lifestyle questionnaire where the validity and  
221 reliability are approved <sup>(30)</sup>.

222  
223 A strength of the present study is that the diagnosis of PCOS phenotypes for allocation to case  
224 study groups was done by an expert physician in the infertility clinic and patients were classified  
225 to the clinical phenotypes based on the Rotterdam criteria. Moreover, a validated FFQ was used  
226 for diet evaluation which is a standard tool for measurement of long term dietary habits in cross  
227 sectional and cohort studies. Lifestyle questionnaire was used to evaluate participants' lifestyle.  
228 Nevertheless, there are some limitations in the present study. Patients were selected from the

229 only referral infertility clinic of Hormozgan province which limits generalization of the study  
230 results. Furthermore, the association between metabolic and hormonal features of the study  
231 population and dietary intake was not included in this study; future studies should consider  
232 different phenotypes of PCOS. In addition, since diet analysis was limited to the nutrition  
233 database, glycaemic load could not be measured in this study. In the current study, we assess  
234 physical activity by a lifestyle questionnaire that was designed by Likert scale. We did not assess  
235 physical activity using metabolic equivalents (METS). This should be considered in the  
236 interpretation of our findings.

237

### 238 **Conclusions**

239 Reduced energy and fat intake is strongly recommended to Iranian women with PCOS especially  
240 with the HA+M+PCO phenotype. It is critical to closely examine the metabolic and endocrine  
241 status of women with menstrual disorder and hyperandrogenism because the treatment strategies  
242 for energy deficit-related menstrual disturbances differ from that of disturbances attributable to  
243 hyperandrogenaemia. Further investigation is necessary to explore whether different endocrine  
244 etiologies underlay menstrual disorder and hyperandrogenism in different phenotypes of PCOS.  
245 Consultation on improvement of psychological health and the importance of nutrition and weight  
246 control, and appropriate physical activity in these patients especially HA+M+PCO phenotype is  
247 necessary. Future studies on the evaluation of the risk of metabolic side effects, dietary intake  
248 and lifestyle in PCOS phenotypes are recommended.

249

250 **Disclosure statement**

251 The authors report no conflicts of interest.

252

253 **Transparency declaration**

254 The lead author affirms that this manuscript is an honest, accurate, and transparent account of the  
255 study being reported. **The reporting of this work is compliant with the STROBE checklist.** The

256 lead author affirms that no important aspects of the study have been omitted and that any  
257 discrepancies from the study.

258

259

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**Table 1.** Demographic and clinical characterizes of participants

Variable**	Phenotype of PCOS			Control	P value§
	H+PCO (n= 53)	H+PCO+M (n= 66)	M+PCO (n= 57)		
Variable					
Age *	29.30±6.25	28.41±3.49	29.03±9.31	29.85±6.40	0.43
Education *	12.69±3.05	11.63±4.11	11.04±4.92	10.82±4.31	0.62
Weight *	79.43 ±13.1	76.31±15.41	78.35±10	75.3 ±20.8	0.52
BMI*	39.80±6.53	38.43±7.11	35.42±2.34	33.32±2.96	0.87
Acne score*	6.93±1.38	6.58±2.30	6.83±1.10	3.62±0.90	<0.001
Hirsutism score*	11.30±0.84	11.03±0.31	11.17±0.01	9.40±0.18	<0.001
Average menstrual cycle **					
<21	2 (3.77)	5 (7.57)	4 (7.01)	13 (8.1)	
21-35	22 (41.50)	28 (42.42)	30 (52.63)	76 (47.5)	
35-60	15 (28.30)	18 (27.27)	9 (15.78)	8 (5)	<0.001
>199 days	6 (11.32)	8 (12.12)	9 (15.78)	18 (11.3)	
Variable	8 (15.09)	7 (10.60)	5 (8.77)	44 (27.5)	

§ between PCOS and control group

\*ANOVA test

\*\*Kruskal wallis test

£ P<0.05 between H+PCO and H+PCO+M phenotype

€ P<0.05 between H+PCO and M+PCO phenotype

¥ P<0.05 between H+PCO+M and M+PCO phenotype

**Table 2.** Comparison of PCOS patients and control group based on the dietary intake

Variable **	PCOS (n= 168)	Control (n= 160)	P value *	P value adjusted for BMI and age
Energy (Kcal/day)	2500.2±78.7	2202.8±49.6	<0.001	<0.001
Protein (g/day)	76.09±10.79	74.25±9.36	0.41	0.82
Fat (g/day)	89.06±12.42	65.38±11.75	<0.001	<0.001
Saturated fatty acids (g/day)	35.97±9.24	21.16±5.56	<0.001	<0.001
Polyunsaturated fatty acids (g/day)	27.21±2.48	15.81±2.48	<0.001	<0.001
Linoleic acid (g/day)	33.10±8.91	24.22±9.40	0.21	0.32
EPA (g/day)	0.03±0.002	0.01±0.001	0.45	0.31
Sodium (mg/day)	2223.05± 31.08	1353.93±10.21	0.06	0.09
Iron (mg/day)	24.13±2.27	26.23±6.37	0.43	0.25
Magnesium (mg/day)	395.98±43.09	332.83±26.28	0.51	0.40
Zinc (mg/day)	9.68±3.75	7.75±2.55	0.59	0.41
Manganese (mg/day)	8.64±3.11	9.26±4.91	0.98	0.43
Fluoride (µg/day)	4129.04±60.51	3163.40±23.50	0.61	0.52
Iodine (µg/day)	0.28±0.31	0.02±0.01	0.45	0.31
Vitamin A(µg/day)	2701.59±79.35	1347.72±13.10	0.39	0.15
Vitamin E (mg/day)	3.98±0.67	3.11±0.85	0.92	0.81
Thiamin B1 (mg/day)	2.34±0.57	1.72±0.22	0.35	0.41
Niacin B3 (mg/day)	23.89±5.78	17.84±3.97	0.63	0.51
Folate (µg/day)	410.81±14.33	302.89±51.24	0.51	0.31
Carbohydrate (g/day)	380.26±54.02	622.02±10.13	0.60	0.31
Potassium (mg/day)	5292.19±80.37	4034.62±36.03	0.43	0.22
Calcium (mg/day)	1234.81±12.91	861.700±16.69	0.81	0.12
Phosphorus (mg/day)	1800.16±10.80	1075.22±79.80	0.53	0.72

\*T test, \*\*Mean±SD

**Table 3.** Dietary intake in different phenotypes of PCOS

Variable**	Phenotype of PCOS			P value*	P value adjusted for BMI and age
	H+PCO (n= 53)	H+PCO+M (n= 66)	M+PCO (n= 57)		
Energy (Kcal/ day)	2454.2±82.4	2600.8±51.09	2346.80± 4.08	<0.001£€¥	<0.001
Protein (g/day)	85.56 ±81.12	91.69±82.38	65.96±68.30	0.41	0.63
Fat (g/day)	119.27±55.46	89.81±45.38	77.56±49.59	<0.001£€¥	<0.001
Saturated fatty acids (g/day)	29.80±31.67	45.06±10.31	21.75±15.79	<0.001£€¥	<0.001
Polyunsaturated fatty acids (g/day)	41.54±12.97	25.34±13.13	25.11±15.25	<0.001£€¥	<0.001
Linoleic acid (g/day)	39.40±12.46	45.90±16.17	23.59±14.59	0.52	0.35
EPA (g/day)	0.01±0.01	0.05±0.01	0.007±0.01	0.09	0.06
Sodium (mg/day)	1993.41±15.71	2523±38.12	2907.27±34.58	0.31	0.58
Iron (mg/day)	21.94±17.26	28.46±34.87	21.27±24.82	0.38	0.41
Magnesium (mg/day)	431.99±51.47	450.84±64.62	362.05±37.70	0.83	0.96
Zinc (mg/day)	9.74±7.66	12.79±2.96	9.080±.76	0.61	0.82
Manganese (mg/day)	7.74±4.03	10.69±0.12	7.17±.20	0.21	0.35
Fluoride (µg/day)	6454.85±47.21	5030.95±39.90	7064.76±84.99	0.63	0.41
Iodine (µg/day)	0.2±.01	0.38±0.12	.08±.01	0.52	0.51
Vitamin A (µg/day)	1962.76± 16.38	3512.09±12.02	2473.02±52.84	0.35	0.41
Vitamin E (mg/day)	4.30±0.36	4.19±0.66	3.44±0.42	0.31	0.51
Thiamin B1 (mg/day)	2.35±0.40	2.78±0.70	1.82±0.34	0.83	0.62
Niacin B3 (mg/day)	21.09±0.18	30.58±0.91	18.95±0.16	0.34	0.91
Folate (µg/day)	557±74.20	591.36±64.42	377.16±25.36	0.48	0.72
Carbohydrate (g/day)	433.41±57.31	435.06±63.39	345.17±39.45	0.64	0.51
Potassium (mg/day)	5353.94±53.53	6128.09±10.01	4292.63±34.42	0.76	0.43
Calcium (mg/day)	1386.78±18.24	1238.75±11.09	1089.47±79.86	0.62	0.95
Phosphorus (mg/day)	1824.75±16.02	1238.75±11.09	1089.46±79.86	0.52	0.81

\*ANOVA, \*\*Mean±SD

£ P&lt;0.05 between H+PCO and H+PCO+M phenotype

€ P&lt;0.05 between H+PCO and M+PCO phenotype

¥ P&lt;0.05 between H+PCO+M and M+PCO phenotype

**Table 4.** Comparison of PCOS and control groups based on the domains of lifestyle

Variable **	PCOS (n= 168)	Control (n= 160)	P value *	P value adjusted for BMI and age
Physical health	16.32±3.62	16.66±3.01	0.38	0.62
Exercise and fitness	12.05±3.52	15.42±4.82	<0.001	0.04
Weight control and nutrition	12.49±4.02	16.54±3.98	<0.001	0.03
Illness prevention	15.82±3.38	16.23±4.49	0.45	0.59
Psychological health	12.90±4.22	16.34±3.36	<0.001	0.01
Spiritual health	17.62±3.45	18.02±4.28	0.69	0.71
Social health	17.56±4.62	17.38±5.01	0.53	0.73
Drug and alcohol avoidance	16.31±3.42	15.95±3.41	0.42	0.59
Accident prevention	17.43±3.42	17.56±3.51	0.36	0.48
Environmental health	17.36±2.49	17.42±4.32	0.74	0.80

\*T test, \*\*Mean±SD

**Table 5.** The scores of lifestyles in different phenotypes of PCOS

Variable	Phenotype of PCOS			P value*	P value adjusted for BMI and age
	H+PCO (n= 53)	H+PCO+M (n= 66)	M+PCO (n= 57)		
Physical health	16.02±3.44	16.56±3.53	16.45±3.08	0.65	0.55
Exercise and fitness	12.34±3.34	11.02±2.34	13.40±3.29	<0.001£€¥	<0.001
Weight control and nutrition	11.93±2.43	10.42±2.35	13.39±3.86	<0.001£€¥	<0.001
Illness prevention	15.04±3.22	14.93±4.24	15.42±4.42	0.45	0.31
Psychological health	12.42±1.32	10.56±2.94	13.20±3.82	<0.001£€¥	<0.001
Spiritual health	17.53±7.34	16.92±6.42	17.83±5.01	0.33	0.25
Social health	17.32±6.45	17.24±3.56	17.45±5.92	0.45	0.35
Drug and alcohol avoidance	16.42±5.62	16.02±4.41	16.93±4.32	0.56	0.42
Accident prevention	17.05±3.56	16.92±2.39	17.21±4.35	0.71	0.65
Environmental health	17.32±4.23	17.25±1.95	17.28±4.62	0.93	0.83

\*ANOVA, \*\*Mean±SD

£ P<0.05 between H+PCO and H+PCO+M phenotype

€ P<0.05 between H+PCO and M+PCO phenotype

¥ P<0.05 between H+PCO+M and M+PCO phenotype