Journal of
Babol University of Medical Sciences
JBUMS
e-ISSN: 2251-7170 p-ISSN: 1561-4107

Prevalence of Symptoms of Polycystic Ovary Syndrome and Some Associated Factors in Medical Students

M. Ghazanfarpour (PhD)[1], Z. Dolatabadi (MSc)[2], Z. Bamorovat (BSc)[3], M. Mahmoodabadi (BSc)[3], J. Salari Nasab (BSc)[3], S. A. Basari (BSc)[3], A. Ahmadi (MD, PhD)[*1], A. Hosseinnataj (PhD)[4], Y. Jahani (PhD)[5], H. Tajadini (PhD)[6]

1.Nursing Research Center, Kerman University of Medical Sciences, Kerman, I.R.Iran.
2.Department of Midwifery, Faculty of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, I.R.Iran.
3.Student Research Committee, Kerman University of Medical Sciences, Kerman, I.R.Iran.
4.Department of Biostatistics, Faculty of Health, Mazandaran University of Medical Sciences, Sari, I.R.Iran.
5.Modeling in Health Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran, I.R.Iran.
6.Department of Traditional Medicine, Faculty of Traditional Medicine, Kerman University of Medical Sciences, Kerman, I.R.Iran.

Article Type

Short Communication

Received:
Apr 6th 2021
Revised:
Jun 1st 2021
Accepted:
Sep 21st 2021

ABSTRACT

Background and Objective: Polycystic ovary syndrome is the most common endocrine disorder in women of reproductive age. Therefore, in this study, the prevalence of hirsutism, overweight and menstrual disorders, which have a high comorbidity with this syndrome, and its relationship with age, marriage, and the use of related medications were investigated among students in the dormitory of Kerman University of Medical Sciences.

Methods: This cross-sectional study was conducted among students in the dormitory of Kerman University of Medical Sciences in 2019-2020. The prevalence of hirsutism, menstrual disorders, polycystic ovary syndrome (based on NIH criteria) and overweight were calculated. The polycystic ovary syndrome screening questionnaire was used for screening and its relationship with age, marriage and the use of related medications was measured.

Findings: 636 students with an average age of 21.99±3.61 participated in this study. 13.9% of students had a menstrual cycle of more than 35 days. 70.6% had a menstrual cycle of 25 to 34 days. In terms of the growth of thick dark hair, 17.1% experienced hair growth in more than two areas of the body, and most reports of hair growth were related to chin, chest, and abdomen with 31.4%, 29.9%, and 23.2%, respectively, and 45.3% of subjects did not report hirsutism. Moreover, 30.8% were overweight and 4.7% had galactorrhea. With a confidence interval of 95%, the prevalence of polycystic ovary syndrome was 10.6 (3.2-18.0). Age and the use of medications had a significant relationship with these symptoms.

Conclusion: The results of this study showed that the prevalence of polycystic ovary syndrome among students is not higher than the average of the society, and it occurs more in people over 22 years of age and people who take medications.

Keywords: *Polycystic Ovary Syndrome, Hirsutism, Menstrual Disorders, Overweight.*

Cite this article: Ghazanfarpour M, Dolatabadi Z, Bamorovat Z, Mahmoodabadi M, Salari Nasab J, Basari SA, et al. Prevalence of Symptoms of Polycystic Ovary Syndrome and Some Associated Factors in Medical Students. *Journal of Babol University of Medical Sciences*. 2022; 24(1): 215-23.

***Corresponding Author: A. Ahmadi (MD, PhD)**
Address: Department of Counselling in Midwifery, Razi Faculty of Nursing and Midwifery, Kerman University of Medical Sciences, Kerman, I.R.Iran.
Tel: +98 (34) 31325220. **E-mail:** a.ahmadi@kmu.ac.ir

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

Introduction

The menstrual cycle includes the activity and balance of hormones that are released from the hypothalamus, pituitary gland, and ovaries and affect the endometrium (1). In the normal pattern of the menstrual cycle, the typical menstrual cycle length is between 24 and 32 days, the length of the menstrual period is 3-7 days, and the amount of blood flow in this period is 80 ml (2). Menstrual disorders are one of the most common disorders in women of reproductive age. Different types of menstrual disorders include menstrual irregularities, hypermenorrhea, hypomenorrhea, polymenorrhea, oligomenorrhea, dysmenorrhea, amenorrhea, menorrhagia, and premenstrual syndrome (3). These disorders are responsible for 70% of women's visits (4). Menstrual disorders not only affect the physical and mental health of women, but also disrupt their work performance and marital relations and cause economic burden (5). On the other hand, these disorders increase the risk of osteoporosis, infertility, iron deficiency, fatigue and poor social performance (6).

In a meta-analysis and systematic review, the overall prevalence of dysmenorrhea was estimated to be 73.2%, oligomenorrhea and polymenorrhea 13.1%, hypermenorrhea 94.9%, hypomenorrhea 12.4%, menorrhagia 5.25%, metrorrhagia 19.24% and secondary amenorrhea 6.44% (7). In recent decades, the prevalence of these disorders has increased due to lifestyle changes, increased prevalence of obesity, low physical activity, unhealthy diet, and emotional stress (8). In overweight people, menstrual disorders are usually accompanied by irregular uterine bleeding and anovulatory cycles (9). There are several mechanisms known to influence adipose tissue on ovulation and the menstrual cycle (10).

Polycystic ovary syndrome is the most common internal gland disorder in women during the reproductive period (11). Although there is no single criterion for diagnosing this syndrome, it is diagnosed based on a combination of clinical, laboratory and ultrasound findings (12). Physicians use various criteria such as NIH (13), Rotterdam (14) and AEPCOS (15) to diagnose polycystic ovary syndrome. The global prevalence of polycystic ovary syndrome is estimated to be 2.2-22.5% (12). They estimated the prevalence of polycystic ovary syndrome in Iran to be 6.8% based on the NIH criteria, 19.5% based on the Rotterdam criteria, and 41.4% based on sonographic methods (16). In addition to increasing the risk of reproductive problems such as infertility, ovarian disorders, endometrial cancer, and early menopause, patients are at increased risk of depression, low self-confidence, anxiety, and a group of metabolic disorders, including insulin resistance, hypertension, and cardiovascular diseases (17-22).

Amenorrhea, oligomenorrhea, hirsutism, infertility and acne are among the symptoms of this syndrome (23, 24). Hirsutism is the most common clinical symptom of hyperandrogenism in polycystic ovary syndrome (25). In addition to affecting beauty, this disorder is associated with a decrease in self-confidence and an increase in the prevalence of anxiety disorders and depression (26). Increase in waist size has a significant relationship with polycystic ovary syndrome (27). In a review article, the prevalence of hirsutism was estimated to be 13%, acne 26%, androgenic alopecia 9%, menstrual disorders 28%, overweight 21%, obesity 19%, and infertility 8% (28).

Given that menstrual disorders may be manifestations of other diseases such as polycystic ovary syndrome, ovarian hyperandrogenism, and adrenal hyperplasia, which can lead to various pathological conditions such as infertility, recurrent miscarriage, and malignancy, early diagnosis and accurate evaluation seems necessary for women with various menstrual disorders to ensure their health. Therefore, the present study was conducted with the aim of investigating the prevalence of hirsutism, overweight and menstrual

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

disorders, which have a high comorbidity with this syndrome, and its relationship with age, marriage, and the use of related medications among students in the dormitory of Kerman University of Medical Sciences.

Methods

This cross-sectional study was conducted with the code of ethics IR.KMU.REC.1398.357 on students in the dormitory of Kerman University of Medical Sciences in 2019-2020. The sample size was estimated as 630 people based on estimation of a ratio in the community (28). All female dormitories affiliated to Kerman University of Medical Sciences were selected and after entering the dormitories, all the rooms were selected as samples and those who wanted to participate in the study were included in the study. Inclusion criteria included living in female dormitories of medical sciences universities, age of 15-45, willingness to participate in the study, completing a written consent form, at least two years after menarche and exit criteria (11) included lack of interest in continuing participation.

After entering the dormitory and providing explanations about polycystic ovary syndrome and its short-term and long-term symptoms and complications, a written consent was obtained from the students to participate in the study. Those who were willing to participate in the study were selected based on the inclusion criteria and filled the questionnaires. The questionnaire included personal information, polycystic ovary syndrome screening form and clinical hirsutism. The polycystic ovary syndrome screening form designed by Pedersen et al. in 2007 was created based on NIH criteria (29). This questionnaire consists of 4 questions and is intended to identify people who are likely to have polycystic ovary syndrome. Questions were about:

1) The average duration of the menstrual cycle between the ages of 16 and 40.
2) The growth of dark and thick hair on the upper lip, chin, chest and between the breasts, back, abdomen, upper arm, and upper thigh in reproductive years.
3) Being obese or overweight between the ages of 16 and 40.
4) Milky nipple discharge with or without stimulation or increased prolactin in hormonal tests.

If the calculated total score was greater than 2, the patient was considered to have polycystic ovary syndrome. The investigated variables included the use of contraceptive and hormonal drugs, definite diagnosis of the disease by the doctor in the past, symptoms of polycystic ovary syndrome, marital status, age and taking medications.

The data were analyzed using SPSS 20 and logistic regression test was used with stepwise method to investigate the factors affecting the status of polycystic ovary syndrome and $p<0.05$ was considered significant.

Results

There were 636 students in this study. The average age of subjects was 21.99±3.61 years, the youngest and oldest participants were 18 and 51 years old, and 26.9% of subjects were over 22 years old. Most participants were those who entered the university in 2018 and 2019 with percentages of 31.5 and 22.5. 10.5% of the students were married and the rest were single. The average weight of the students was 59.3±11.3 kg, the average height was 162.91±5.81 cm, the average waist circumference was 79.26±10.15 cm, and the average hip circumference was 96.40±13.77 cm. The average body mass index was 22.29±3.74

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

and 28.6% of subjects had a body mass index less than 20, 52.4% of subjects had a body mass index between 20 and 25, 15.4% of subjects had a body mass index from 25 to 30 and 3.6% had a body mass index above 30. Descriptive information of other variables was reported in Table 1.

Table 1. Prevalence of definitive diagnosis of diseases by doctors and prevalence of symptoms

Variable	Number(%)	95% CI
Use of contraceptive and hormonal drugs	99(15.8)	8.6-23.0
Definitive diagnosis of the disease by a doctor in the past		
PCOS	66(10.6)	3.2-18.0
Cushing syndrome	0(0)	0
Adrenal tumor	0(0)	0
Hyperprolactinemia	11(1.8)	0-9.7
Congenital adrenal hyperplasia	0(0)	0
Ovarian tumor	0(0)	0
Diabetes	4(0.6)	0-8.2
Hypothyroidism	21(3.4)	0-11.2
Hyperthyroidism	5(0.8)	0-8.6
Symptoms of PCOS		
The duration of the menstrual cycle more than 35 days	88(13.9)	6.7-21.1
The number of areas of the body with dark hair growth (3 or more)	108(17.1)	10.0-24.2
Overweight between the ages of 16 and 40	195(30.8)	24.3-37.3
Milk secretions between the ages of 16 and 40	30(4.7)	0-12.3

What was mentioned in the results of the definite diagnosis of the syndrome by the doctor was based on previous Rotterdam criteria, and in this study, it was based on the NIH and the polycystic ovary syndrome screening questionnaire (29). Finally, students who had a score of 2 or higher based on the above four symptoms were recognized as having polycystic ovary syndrome. Other symptoms and definitive diagnoses were reported in Table 1.

Students older than 22 and those taking medication had a higher chance of having polycystic ovary syndrome. The chances of having menstrual disorders were higher in people who took medication. Furthermore, students aged above 22 or taking medication had a higher possibility of suffering from hirsutism (Table 2).

Table 2. Identification of factors affecting the prevalence of the disorder using logistic regression

Variable	Syndrome		Menstrual disorders		Dark hair growth		Overweight	
	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Marital status								
married	0.83 (0.36-1.90)	0.659	0.73 (0.30-1.66)	0.455	0.71 (0.34-1.48)	0.362	1.62 (0.94-2.78)	0.085
Age								
>22	1.94 (1.13-3.31)	0.016	1.02 (0.60-1.75)	0.935	1.82 (1.15-2.87)	0.010	1.18 (0.79-1.75)	0.415
Taking medication								
Yes	3.42 (1.95-5.99)	0.001	4.28 (2.55-7.16)	0.001	1.79 (1.06-3.03)	0.030	1.48 (0.93-2.34)	0.096

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

Discussion

In this study, the prevalence of polycystic ovary syndrome was 10.6% and the prevalence of hirsutism was 17.1%. 15.4% of the research units were overweight and 3.6% were obese. The findings of the present study showed that the prevalence of hirsutism in students living in the dormitories of Kerman University of Medical Sciences is 17.1%. The prevalence of hirsutism in adolescents in Yazd was reported to be 10.8% (30). One of the reasons for the lower prevalence of hirsutism in this study compared to the present study is the lower average age, as hirsutism is less evident during adolescence (31). In students of Semnan University of Medical Sciences, the prevalence of hirsutism was 36.1% (32), in students of Tehran University of Medical Sciences 22.8% (33) and in Ahvaz 15.4% (34). Among the reasons for the difference between the results of these studies compared to the present study, one can mention different scoring scales, different races and ethnicities. In addition, as hirsutism develops over a longer period of time in the presence of increased androgens, this disorder seems to be more prevalent in older ages.

In the present study, 10.6% of the students were diagnosed with polycystic ovary syndrome by a doctor, while in other studies, the prevalence was 30% (35), 11.3% (36) and 48.3% (37). It seems that the prevalence of this disorder is increasing due to changes in lifestyle, nutrition, inactivity and obesity (38). The difference in the prevalence of polycystic ovary syndrome is due to the study population and the use of different criteria for diagnosis. In addition, ultrasound examination to diagnose this syndrome may provide false positive reports (39).

The results of this study showed that the waist circumference has a significant relationship with the state of having polycystic ovary syndrome, and for every one-centimeter increase in waist circumference, the chance of having polycystic ovary syndrome increases by 7%. Polycystic ovary syndrome and homocysteine levels increase with increasing waist size (40). Obesity and increased abdominal fat affect the clinical and biochemical manifestations of polycystic ovary syndrome in different ways (41).

Obese women with polycystic ovary syndrome suffer not only from intrinsic insulin resistance, but also from obesity, hypertension, and other metabolic disorders (42, 43). Diabetes in patients with polycystic ovary syndrome is closely related to abdominal obesity and hyperandrogenism (44). Diabetes may lead to increased hirsutism by reducing SHBG levels and increasing free testosterone (45).

In the present study, the average body mass index of the research samples was 22.29. 15.4% of the research units were overweight and 3.6% were obese. In previous studies, the prevalence of overweight and obesity in students was estimated at 17.3% and 3.6% (46). In another study, the prevalence of overweight and obesity was 15% and 2%, respectively (47). The different prevalence of overweight and obesity in different studies could be due to differences in sample size and dietary patterns. Studies have shown that obesity and overweight are the most important public health issues in the whole country.

The results of this study showed that the prevalence of polycystic ovary syndrome is not high among students, and it occurs more in people over 22 years old and people taking medicine. Therefore, knowledge of these factors plays a significant role in planning for screening. In order to clarify other risk factors, it is necessary to conduct a study with a larger sample size.

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

Acknowledgment

We would like to express our gratitude to the Vice Chancellor of Research and Technology of Kerman University of Medical Sciences for the financial support of this study and to all the students who helped us in its implementation.

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

References

1.Burkman RT. Berek and Novak's gynecology. JAMA. 2007;297(14):1601-4.
2.Luesley DM, Kilby MD. Obstetrics & Gynaecology: An evidence-based text for MRCOG, 3rd ed. CRC Press; 2016. p. 539-43.
3.Farhan I, Akhtar M, Abid R. Prevalence of Menstrual Disorders in Woman of Reproductive Age Group. Pakistan J Med Health Sci. 2020;14(1):194-6.
4.Serrano Berrones MÁ. Alteraciones menstruales en pacientes adolescentes del Hospital Regional Lic. Adolfo López Mateos. Rev Esp Med Quir. 2014; 19(3):294-9.
5.Schoep ME, Nieboer TE, van der Zanden M, Braat DD, Nap AW. The impact of menstrual symptoms on everyday life: a survey among 42,879 women. Am J Obstet Gynecol. 2019;220(6):569.e1-569.e7.
6.Rad M, Torkmannejad Sabzevary M, Mohebbi Dehnavi Z. Association between menstrual disorders and obesity-related anthropometric indices in female high school students: A cross-sectional study. Int J School Health. 2018;5(2):e65716.
7.Omani Samani R, Almasi Hashiani A, Razavi M, Vesali S, Rezaeinejad M, Maroufizadeh S, et al. The prevalence of menstrual disorders in Iran: A systematic review and meta-analysis. Int J Reprod Biomed. 2018;16(11):665-78.
8.Falahat F, Tavakkoli M, Mokaberinejad R, Ayati S, Feyzabadi Z. Natural treatments of oligomenorrhea based on persian medicine. Iran J Obstet Gynecol Infertil. 2018;21(Supple):55-66. [In Persian]
9.Berek JS. Berek & Novak's gynecology, 16th ed. Lippincott Williams & Wilkins; 2019. p. 342.
10.Montero P, Bernis C, Fernandez V, Castro S. Influence of body mass index and slimming habits on menstrual pain and cycle irregularity. J Biosoc Sci. 1996;28(3):315-23.
11.Nayak PK, Mitra S, Sahoo J, Mahapatra E, Agrawal S, Lone Z. Relationship of subclinical hypothyroidism and obesity in polycystic ovarian syndrome patients. J Family Med Prim Care. 2020;9(1):147-50.
12.Ganie MA, Rashid A, Sahu D, Nisar S, Wani IA, Khan J. Prevalence of polycystic ovary syndrome (PCOS) among reproductive age women from Kashmir valley: A cross-sectional study. Int J Gynaecol Obstet. 2020;149(2):231-6.
13.Zawadzski JK, Dunaif A. Diagnostic criteria for polycystic ovary syndrome: towards a rational approach. In: Dunaif A, Givens JR, Haseltine F, editors. Polycystic Ovary Syndrome. Boston, USA: Blackwell Scientific; 1992. p. 377-84.
14.Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. Fertil Steril. 2004;81(1):19-25.
15.Azziz R, Carmina E, Dewailly D, Diamanti-Kandarakis E, Escobar-Morreale HF, Futterweit W, et al. Positions statement: criteria for defining polycystic ovary syndrome as a predominantly hyperandrogenic syndrome: an Androgen Excess Society guideline. J Clin Endocrinol Metab. 2006;91(11):4237-45.
16.Sayehmiri F, Kiani F, Sayehmiri K, Maleki F, Ahmadi M, Shohani M. Prevalence of polycystic ovary syndrome in Iranian women: a systematic review and meta-analysis. Iran J Obstet Gynecol Infertil. 2014;17(115):11-21. [In Persian]
17.Cena H, Chiovato L, Nappi RE. Obesity, polycystic ovary syndrome, and infertility: A new avenue for GLP-1 receptor agonists. J Clin Endocrinol Metab. 2020;105(8):e2695-e709.
18.Meczekalski B, Pérez-Roncero GR, López-Baena MT, Chedraui P, Pérez-López FR. The polycystic ovary syndrome and gynecological cancer risk. Gynecol Endocrinol. 2020;36(4):289-93.
19.Ramezani Tehrani F, Amiri M, Behboudi-Gandevani S, Bidhendi-Yarandi R, Carmina E. Cardiovascular events among reproductive and menopausal age women with polycystic ovary syndrome: a systematic review and meta-analysis. Gynecol Endocrinol. 2020;36(1):12-23.

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

20.Kirmizi DA, Baser E, Onat T, Caltekin MD, Yalvac ES, Kara M, et al. Sexual function and depression in polycystic ovary syndrome: Is it associated with inflammation and neuromodulators?. Neuropeptides. 2020;84:102099.
21.Alkoudsi KT, Basheti IA. Prevalence of anxiety and depression among women with Polycystic Ovary Syndrome living in war versus non-war zone countries: A randomized controlled trial assessing a pharmacist intervention. Res Social Adm Pharm. 2020;16(5):689-98.
22.Pani A, Gironi I, Di Vieste G, Mion E, Bertuzzi F, Pintaudi B. From prediabetes to type 2 diabetes mellitus in women with polycystic ovary syndrome: lifestyle and pharmacological management. Int J Endocrinol. 2020;2020:6276187.
23.Mehrabadi S, Jahanian Sadatmahalleh S, Kazemnejad A, Moini A. Association of acne, hirsutism, androgen, anxiety, and depression on cognitive performance in polycystic ovary syndrome: A cross-sectional study. Int J Reprod Biomed. 2020;18(12):1049-58.
24.Chaudhari AP, Mazumdar K, Mehta PD. Anxiety, depression, and quality of life in women with polycystic ovarian syndrome. Indian J Psychol Med. 2018;40(3):239-46.
25.Barrionuevo P, Nabhan M, Altayar O, Wang Z, Erwin PJ, Asi N, et al. Treatment options for hirsutism: a systematic review and network meta-analysis. J Clin Endocrinol Metab. 2018;103(4):1258-64.
26.Manvita RM, Pratap KV, Madhavi Padma T, Kalyan VS, Srikanth P. Experiences of Students Living with Hirsutism. Int J Res Engineer Sci Manage. 2019;2(10):321-3.
27.Fattah A, Hadavi F, Bahrami F, Khoshkholgh R, Ahmadi A, Mahmoodabadi M, et al. Prevalence of Polycystic Ovary Syndrome among Girls' Students of Kerman University of Medical Sciences and a Meta-Analysis of the Prevalence of PCOS among Iranian Adolescent Girls. International Journal of Pediatrics. 2021;9(7):13957-69.
28.Jalilian A, Kiani F, Sayehmiri F, Sayehmiri K, Khodaee Z, Akbari M. Prevalence of polycystic ovary syndrome and its associated complications in Iranian women: A meta-analysis. Iran J Reprod Med. 2015;13(10):591-604.
29.Pedersen SD, Brar S, Faris P, Corenblum B. Polycystic ovary syndrome: validated questionnaire for use in diagnosis. Can Fam Physician. 2007;53(6):1041-7.
30.Nourbala MT, Kefaei P. The prevalence of hirsutism in adolescent girls in Yazd, Central Iran. Iran Red Crescent Med J. 2010;12(2):111-7.
31.Azziz R. PCOS: a diagnostic challenge. Reprod Biomed Online. 2004;8(6):644-8.
32.Taheri R, Ziari A, Mirmohammadkhani M, Talebi Kiasari F, Sadeghi Ivrigh E. Prevalence of hirsutism and its related factors in dormitory students of Semnan University of Medical Sciences. J Dermatol Cosmet. 2016;7(1):24-30. [In Persian]
33.Akhyani M, Danesh Pazhooh M, Barzegari M, Ghandi N, Ghiasi M, Chenari Z, et al. Frequency of hirsutism in medical students in Tehran. Iran J Dermatol. 2006;9(3):242-9. [In Persian]
34.Nouhjah S, Mearefi J, Farajinezhad M, Alvanzadeh M, Haghighizadeh MH, Fathi Z. Prevalence of hirsutism and related factors in the female students of Ahvaz Jundishapur University of Medical Sciences. Jundishapur J Health Sci. 2010;2(3):15-25. [In Persian]
35.Hashemipour M, Faghihimani S, Zolfaghary B, Hovsepian S, Ahmadi F, Haghighi S. Prevalence of polycystic ovary syndrome in girls aged 14-18 years in Isfahan, Iran. Horm Res. 2004;62(6):278-82.
36.Asgharnia M, Mirblook F, Soltani MA. The prevalence of polycystic ovary syndrome (PCOS) in high school students in Rasht in 2009 according to NIH criteria. Int J Fertil Steril. 2011;4(4):156-9.
37.Zandi S, Farajzadeh S, Safari H. Prevalence of polycystic ovary syndrome in women with acne: hormone profiles and clinical findings. J Pakistan Assoc Dermatol. 2010;20(4):194-8.

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]

38.Azargoon A, Mirmohammadkhani M, Borjian S. The prevalence of polycystic ovarian syndrome, metabolic abnormalities and its association with obesity in adolescents: a cross sectional study in an urban population in Iran. Acta Med Iran. 2020;58(8):388-93.
39.Azziz R, Carmina E, Dewailly D, Diamanti-Kandarakis E, Escobar-Morreale HF, Futterweit W, et al. The Androgen Excess and PCOS Society criteria for the polycystic ovary syndrome: the complete task force report .Fertil Steril. 2009;91(2):456-88.
40.Maleedhu P, Vijayabhaskar M, Sharma SS, Kodumuri PK, Devi VD. Status of homocysteine in polycystic ovary syndrome (PCOS). J Clin Diagn Res. 2014;8(2):31-3.
41.Brennan KM, Kroener LL, Chazenbalk GD, Dumesic DA. Polycystic ovary syndrome: impact of lipotoxicity on metabolic and reproductive health. Obstet Gynecol Surv. 2019;74(4):223-31.
42.Shi Y, Cui Y, Sun X, Ma G, Ma Z, Gao Q, et al. Hypertension in women with polycystic ovary syndrome: prevalence and associated cardiovascular risk factors. Eur J Obstet Gynecol Reprod Biol. 2014;173:66-70.
43.Hashemian Z, Afsharian P. Role of Oxidative Stress in Polycystic Ovary Syndrome. J Shahid Sadoughi Univ Med Sci. 2020;28(5):2635-47. [In Persian]
44.Hudecova M, Holte J, Olovsson M, Larsson A, Berne C, Poromaa IS. Diabetes and impaired glucose tolerance in patients with polycystic ovary syndrome—a long term follow-up. Hum Reprod. 2011;26(6):1462-8.
45.Allahbadia GN, Merchant R. Polycystic ovary syndrome and impact on health. Middle East Fertil Soc J. 2011;16(1):19-37.
46.Zar A, Karan Khosravi P, Ahmadi MA. Prevalence of obesity and overweight among female students of Shiraz University of Medical Sciences and its association with physical fitness factors. Salāmat-i ijtimāī (Community Health). 2017;4(2):79-89. [In Persian]
47.Mohammadi M, Mahmoodi Darvishani S, Mirzaei M, Bahrololoomi Z, Sheikhi A, Bidbozorg H, et al. The Prevalence of Overweight and Obesity among dental students of Medical Sciences of Yazd in 2014. J Rafsanjan Univ Med Sci. 2015;14(3):189-98. [In Persian]

[DOR: 20.1001.1.15614107.1401.24.1.27.3]
[DOI: 10.22088/jbums.24.1.215]