



Studies on the endocrine and metabolic correlates of polycystic ovary syndrome in district Rahim Yar Khan

Zaib-Un-Nisa¹, TJ Ursani², Shamsuddin Shaikh³, Jawaid A Khokhar^{4*}, Naheed Shah⁵

¹⁻⁵ Department of Zoology, University of Sindh, Jamshoro, Pakistan

Abstract

Polycystic ovary syndrome (PCOS) is a heterogeneous endocrine disorder that affects women during their child bearing years and leads to reproductive and metabolic complications. The clinical manifestations of PCOS are varied and characterized of functional hyperandrogenism (clinical and biochemical), menstrual irregularities, chronic anovulation, polycystic ovaries and increase infertility. In reproductive complications, the majority of PCOS subjects exhibit metabolic disturbances such as obesity, hyperinsulinemia increased risk of Type 2 diabetes mellitus (T2DM) and cardiovascular diseases. In this present study the observational record accumulated through the standard visits of OPD at Sheikh Zaid Hospital, Al-Saeed complex and Salman Medicare Rahim Yar Khan was accomplished to collect data from April 2017 to November 2017. Total 206 PCOS patients were examined. The maximum numbers of patients were from urban population (57%) and minimum from rural population (43%). Obesity, hirsutism and mood swing found much more in both urban as well as in rural population (28%), (23%), (16%) respectively. Whereas the ratios of other symptoms are fewer like anxiety (8%), panic attack (4%), depression (7%), difficulty Concentrating (3%), fatigue (3%), and chronic stress (6%), and sleep apnea (2%). (27%) subjects were suffering from diabetes, (19%) suffering from kidney stone, (13%) suffering from CVD and (41%) are controlled.

Keywords: endocrine, metabolic, polycystic ovary syndrome, obesity, insulin resistance, hyperandrogenism, Rahim Yar Khan

Introduction

Polycystic ovary syndrome is an ordinary endocrine disorder of women in their fertile age. Polycystic ovary syndrome was initially recognized in 1935 by two gynecologists; Dr. Irving Stein and Dr. Michael Leventhal. PCOS is a heterogenous disorder related to amenorrhoea, sterility, variable level of hirsutism and fatness within the presence of bilateral enlarged ovaries [1]. Polycystic ovary syndrome is characterised by the occurrence of expanded ovaries with several tiny cysts (2 – 8 mm in diameter) [2].

The sickness is demonstrated clinically by symptoms of androgenic hormone abundance together with hirsutism, baldness, fatness and cyclic disturbance with oligomenorrhoea or amenorrhoea [3]. Ovulatory process which has follicle in the ovaries that enlarge in response to acceptable ejaculation of follicle-stimulating hormone become predominant and ovulates, women get distracted who suffer from PCOS owing to androgenic hormone excess and over production of androgen [4]. The over formulation of androgens in ovaries is due to hyperinsulinemia and raising hormone levels are diagnostic crucial attribute of PCOS [5].

PCOS is thought of as a multi organ syndrome because it impacts on adrenal as well as sex hormones together with pituitary hormones along with corticotrophin (ACTH), gonadotropin and human growth hormone [6]. Patients with PCOS are in risk of type 2 DM as they suffer from hypoglycemic agent resistance alongside symptoms of abdominal fatness and accumulated secretion of interleukins, chemokines and adipokines (due to body's inflammatory state) [6]. The hallmark of this illness is characterized into following 3 divisions; clinical, endocrine and metabolic. The clinical traits are abnormal cycle, acne, hirsutism, alopecia anovulation, sterility and miscarriages.

The endocrine traits are accumulated levels of androgens, LH and prolactin. The level of Luteinizing hormone (LH) is higher and the level of follicle stimulating hormone (FSH) is normal or lower. Normally the ratio of LH: FSH is 1:1 and in PCOS women, the ratio of FSH: LH is 2:1 or 3:1. The metabolic angle of this disorder is hypoglycemic agent resistance, obesity, macromolecule abnormalities, associated degree of an accumulated risk of impaired glucose tolerance which may result in type 2 DM [7]. It has been established that 50% of the patients are fleshy girls and fatness contributes to the pathophysiology [8]. Moreover it has been indicated that PCOS leads to depression and anxiety [9]. The Polycystic Ovaries Syndrome is taken to be the most prevailing of all endocrine disorders that ladies face. The impact of modernization and technical analysis ruminates in our lifestyle also alters a lot of our daily life. Food ingestion is concentrated increasingly on sweets, junk food, and soft drinks. This unhealthy ingestion routine and default of exercise ends up in polycystic ovary syndrome up till now [10]. Polycystic ovarian syndrome is the combination of anovulation process and steroid excess and adjunct with hairiness, acne, and fat [11, 12]. Diagnosed by oligo ovulation process, hyperinsulinemia and hyperandrogenism [13]. High Luteinizing hormone and androgen level are the major causes of PCOS [14, 15].

Material and Methods

The standard visits of OPD at Sheikh Zaid Hospital, Al-Saeed complex and Salman Medicare Rahim Yar Khan was accomplished to collect data from April 2017 to November 2017. Data was collected in the course of selfdeveloped Questionnaire in English edition. Throughout the visit, verbal consent was taken from the PCOS patients and predesigned feedback form concerning the PCOS is being

filled out by the inquiring person, questions to the medical OPD patients. Total 206 PCOS women were reviewed from above mentioned hospitals from April 2017 to November 2017. All 206 women were comprised for detailed medical history. Verbal consent was also taken from the entire patients of PCOS. Women with diverse age were also conformed to their sonographic reports and hormonal profile as well.

Results

The present study describes the analysis of the main variable surveyed in the survey questionnaire. The total number of polycystic ovary syndrome patients visited was 206 from Shaikh Zaid Medical College and hospital, Al-Saeed Complex and Salman Medicare from Rahim yar khan. The maximum number of the disorders of polycystic ovary syndrome was found at the age of 20 to 35 years. The maximum number of patients were from urban population 118 (57%) and minimum from rural population 88 (43%). The number of married women were 166 (81%) and unmarried were 40 (19%). Obesity, Hirsutisim and mood swing found much more in both urban as well as in rural population respectively i.e. (28%), (23%), (16%). Whereas the ratio of other symptoms were fewer like anxiety (8%), panic attack (4%), depression (7%), difficulty concentraning (3%), fatigue (3%), chronic stress (6%) and sleep apnea (2%). 56 patients (27%) were suffering from diabetes, 40 patients (19%) suffering from kidney stone and 26 patients (13%) suffering from CVD. The number of more active patients were 110 (53%) where as the number of less active patients were 96 (47%). The number of natural diet taking patients was 101 (49%) and the numbers of patient which emphasized on junk food were 105 (51%).

Table 1: Distribution of Urban and Rural PCOS Patients

Population	Frequency
Urban	118
Rural	88
Total	206

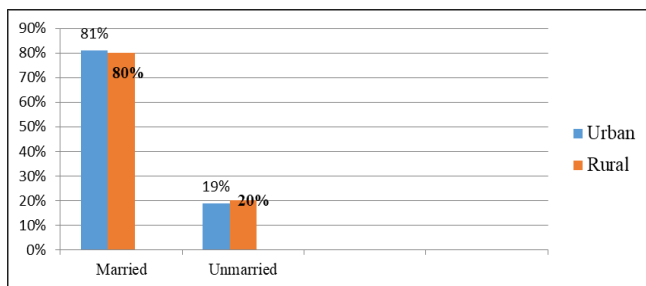


Fig 1: marital percentage of Urban and Rural PCOS patients.

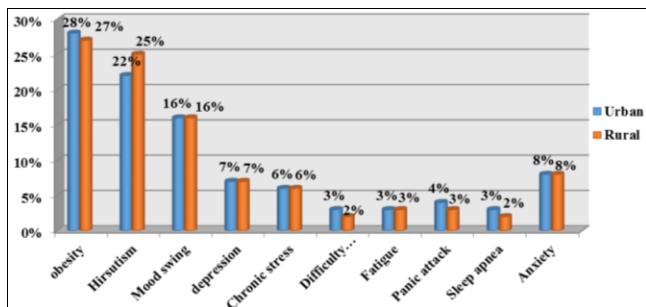


Fig 2: Percentage of symptoms of PCOS in Urban and Rural Patients

Table 2: Range of Hormones in Urban and Rural PCOS patients:

Hormones	Range in Urban	Range in Rural
Androgen ng/dl	200-500	150-350
Estrogen pg/ml	20-70	20-70
Progesterone ng/ml	10-14	9-14
LH mIU/ml	16-19	15-18
FSH mIU/ml	5-6	5-6
TSH mIU/ml	0.5-5.5	0.4-3.8

Table 3: Range of different variables in urban and rural PCOS patients

Variables	Range in Urban	Range in Rural
AGE (yr)	15-45	15-45
BMI (kg/m ²)	30-35	25-30
Fasting glucose (mg/dl)	90-160	70-130
Cholesterol (mg/dl)	160-250	150-200

Discussion

Polycystic ovarian syndrome (PCOS) manifests itself in a variety of ways with its roots in anovulation, insulin resistance and elevated testosterone levels, including hirsutisim, dysfunctional bleeding and infertility. It has been estimated that about 38% of these women are obese. Typically this weight is stored around the middle part of the body. This specific type of weight gain has been attributed to the increase in androgen levels and correlated insulin resistance. Once this central fat accumulates, multiple effects of obesity arise. In the reproductive age of women PCOS is most common endocrine disorder. Almost 7 to 10% of women population, especially adolescent girls was affected. PCOS is one of the most frequent reproductive endocrine diseases found in the women of fertile age, which is concerned by many aspects, but its actual pathophysiology is still undefined. PCOS women also have an increased risk of type 2 diabetes and CVD. Many remedies are accessible to ameliorate metabolic dysfunction in PCOS patients in which insulin sensitivity drugs and lifestyle modification are most adequate strategies. The metabolic conclusion of PCOS affects the woman’s health across the lifetime, along with fertile and post fertile years. According to WHO anovulatory infertility is caused by PCOS. Insensitivity to GnRH secretion from the ovaries leads to increased LH. Associative impairment in FSH secretion constitutes an increased LH/FSH ratio. LH excretion enhanced by excess insulin leads to increased androgen formation by the ovarian theca cells, as a consequence aromatize level reduced.

It is thought that PCOS is a gradual multiglandular endocrinopathy in which the proportion of hypothalamic pituitary adrenal ovarian axis is disrupted, inconsequence the cyclic reproductive mechanism let’s down. PCOS demonstrate various metabolic irregularities including hyperandrogenism, hyperinsulinemia, dyslipidemia and obesity. This is due to the changes in the pituitary sensitivity to (GnRH) stimulation. The mechanism of how androgen excess leads to the ovulatory dysfunction and formation of multiple cysts in the ovary. It has been advised that testosterone agitate the regulation of GnRH secretion. This disruption in the GnRH leads to deformity in follicle outgrowth. This progression leading to the anovulation or be scanty leading to the oligo ovulation. These follicles form a cystic construction leading to the PCOS and infertility.

Conclusion

It is concluded in this study that PCOS is a major health concern for affected women, their families and general society. Hyperandrogenism and hyperinsulinemia, both implicated in the mechanisms of PCOS. PCOS is more prevalent in urban population as compared to rural population and is significantly associated with oligomenorrhea and amenorrhea. Maximum number of patients are married as compared to unmarried. The ratio of obesity, hirsutism and mood swing is higher both in urban and rural population while depression, panic attack, chronic stress, difficulty concentrating, sleep apnea, fatigue and anxiety is lower. Maximum patients suffering from diabetes, moderately suffering from kidney stone and least suffering from CVD. The necessary lifestyle adjustments and therapeutic medical regimen are well supported as means to reduce the risks associated with the PCOS.

References

1. Azziz R, Adashi EY, Stein and Leventhal. 80 Years On, American Journal of Obstetrics & Gynecology. 2015; 214:247. e1. doi: 10.1016/j.ajog.2015.12.013
2. Erickson GF, Yen SC. The polycystic ovary syndrome, In Adashi, EY and Leung PCK. (eds) The Ovary. Raven Press Ltd, New York, 2001, 561-579.
3. Shannon M, Wang Y. Polycystic ovary syndrome: a common but often unrecognized condition. Journal of Midwifery & Women's Health. 2012; 57(3):221-230.
4. Baskind NE, Balen AH. Hypothalamic pituitary, ovarian and adrenal contributions to polycystic ovary syndrome. Best Practice & Research Clinical Obstetrics & Gynaecology. 2016; 37:80-97.
5. Castelobranco C, Steinvarcel F, Osorio A, Ros C, Balasch J. Atherogenic metabolic profile in PCOS patients, Role of obesity and hyperandrogenism. Gynecological Endocrinology the Official Journal of the International Society of Gynecological Endocrinology. 2010; 26:736.
6. Glintborg D, Andersen M. An update on pathogenesis, inflammation, and metabolism in hirsutism and polycystic ovary syndrome, Gynecological Endocrinology. 2010; 26(4):4281296.
7. Tasoula, Tsilchorozidou, Overton C, Conway GS. The pathophysiology of polycystic ovary syndrome, Issue Clinical Endocrinology. 2004; 60(1):1-17.
8. Cai X, Liu C, Mou S. Impact of the FTO gene variation on fat oxidation and its potential influence on body weight in women with polycystic ovary syndrome, PLoS ONE. 2014; 9(1):86972.
9. Pastore LM, Patrie JT, Morris WL, Dalal P, Bray MJ. Depression symptoms and body dissatisfaction association among polycystic ovary syndrome women, J psychosomatic research. 2011; 71(4):131,
10. Rahman S, Parvez AK, Sabur A, Ali S. Study of the Effect of Food Habit, Lifestyle and Daily Trip on Physical and Mental Status of Subjects at Islamic University in Kushtia, Bangladesh, Open Journal of Statistics. 2012; 2(02):219.
11. Moore AM, Campbell RE. The neuroendocrine genesis of polycystic ovary syndrome, a role for arcuate nucleus GABA neurons. Journal of Steroid Biochemistry & Molecular Biology. 2016; 160:106-117.
12. Azziz R, Adashi EY, Stein, Leventhal. 80 Years On, American Journal of Obstetrics & Gynecology, 2015, 214- 247.
13. Dewailly D. Diagnostic criteria for PCOS, need for a rethink, Best Practice & Research Clinical Obstetrics & Gynaecology. 2016; 3:1-7.
14. Group ESPCW. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome (PCOS), Human Reproduction. 2004; 19:19-25.
15. 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, Fertility & Sterility. 2009; 91:456-88.