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Original Research Article

Prevalence of Polycystic Ovary in Females with Infertility

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Abstract

Introduction: Polycystic ovary (PCO) features have become prevalent in the population due to increasing lifestyle and other genetical factors. There is a significant effect of polycystic ovaries and several consequences have been quite prevalent. It is said that around 10% of females in the reproductive age group have been suffering from Polycystic Ovary Syndrome (PCOS). One of the notable consequences of PCO features is infertility and there has been much discussion about the high prevalence of PCO features among infertility patients.

Aims and Objective: To find out the prevalence and significance of PCO features among the various infertility patient and also compared them to the patient without infertility.

Methods: This study is of retrospective design which has taken 88 patients with infertility and 32 healthy females of similar age groups, who had a history of successful pregnancy and labour. The baseline characteristics, hormonal profile, and pelvic ultrasound were all performed and they were classified into 3 groups based on their diagnosis or etiological factor of infertility. The control group also underwent all the laboratory tests, hormonal profiling and pelvic ultrasound. The analysis was performed between the groups and within each group among the patients of each group with polycystic features and without polycystic features.

Results: The study has shown that there is a significant difference between the number of patients in the PCO subgroup and the Normal subgroup of each group ($p<0.05$), the number of PCO subgroup of each group with that of the PCO subgroup of the control group ($p<0.05$) and PCO subgroup of each group and PCO subgroup of the control group ($p<0.05$).

Conclusion: The study has concluded that there is a significant number of patients with infertility who have Polycystic features as compared to the number of females with Polycystic features without infertility.

Keywords: PCOS, infertility, prevalence, anovulation

Introduction

According to Fattah *et al*., polycystic ovarian syndrome (PCOS) is a hormonal disorder which has mostly founded among females. In addition, PCOS disorder can affect the reproductive systems as well as race and ethnicity. Data has demonstrated that more than 3% to 10% of women are suffering from PCOS disorder [1]. Furthermore, it has been noticeable that PCOS syndrome is seen only in females and also it is usually depicted by an inconsistency of the sex steroids. It is figured that up to 14% of women and men in the West have fertility problems. To

determine precisely what causes fertility problems in a given clinical problem, both spouses must be evaluated, which is only done in special purpose clinics. Trends of factors that cause will depend on the couples who ask for a recommendation, the consultation policy, the patient's funds and areas of expertise, and the clinical definition used. Approximately 8% and 31% of couples with fertility problems who have been reviewed in developed nations have fertility problems that cannot be explained [2].

Polycystic ovary syndrome, or PCOS, is a really common issue with hormonal changes [3,4]. Approx 87% of women with oligomenorrhoea have PCO, and 92% of women with regular periods who do have hormonal imbalance have PCO. More than 50% of people, who have experienced fertility problems multiple times have PCO [4]. On ultrasound imaging, it has been discovered that 21–23% of healthy women have PCO. Although PCO is common in the general population, it seems to be a separate morphometric organization. PCO is linked to a variety of biochemical and clinical attributes. There is becoming more and more indication that PCO is a receiving process disorder [5].

This implies that a small number of key genes connect with environmental exposures to cause the condition. The intention of PCO in women, who already have regular fertility cycles is still not clear. The goal of this study would have been to find out how popular PCO is in women with fertility problems and to make comparisons of the endocrine profiles of women with and without PCO in infertility factions as well as with also without PCO in normal controls [6].

From January 1993 to December 1994, 577 men and women went to the Infertile couples Clinic at St. Mary's London Hospital to attempt to get pregnant [6,7]. There had been 289 couples, each of whom was put into one of 4 patients groups. Among the remaining 288 couples, prosecutions were not being done enough just to put people into any of the four psychiatric diagnoses (n = 249), or the form of their ovaries was just not clear (n = 9), either they had and over one reason for their fertility problems and could not be put in any of the 4 groups (n = 30) [8].

Most couples were inspected out following the clinic's usual protocol. The female's menstruation was monitored. This involved a series of ultrasound examinations and timed metrics of hormone levels to look at the form of the ovarian follicles and ensure that ovulation had occurred. On day 8 of the process, treatment was done, as well as serum levels of luteinizing hormone (LH), follicle-stimulating hormone (FSH), and testosterone were evaluated [7,9].

A team of experts from ultrasonic companies looked at the form of ovarian follicles and used established criteria to identify PCO. The capacity of each controller to make the same prognosis with ultrasound had already been examined. Every 3–4 days, genetic tests were done again just to measure follicular growth and approximate when the follicular phase would happen [10]. Seven days after the ovulation, a serum progesterone result shows that ovulation had occurred. At this time, the portions of LH, FSH, and oestrogen in the blood were evaluated. In the next cycle, measurements were conducted again of mid-luteal plasma progestin, absorbs or transmits, and androgens [8-10].

Materials and Methods

Research design

A retrospective study was conducted on patients who came to the outpatient department of our hospital between June 2021 and August 2022. A detailed medical history of the couple was taken and examined and diagnosed. Of the total patients who are considered for this study

(120 females were included in the study), they were grouped into 4 groups, namely, unexplained infertility, anovulatory, tubal disease and control group. The first 3 groups were the patients who visited the hospital for infertility while the patients in the control groups were taken from the gynecological department, who had spontaneous pregnancies and had a live birth. The patients in the control groups were healthy females who were obstetrical patients of this hospital.

The grouping was based on the diagnosis of the patients and healthy females were assigned to the control group. The baseline characteristics were determined in these patients. The diagnostic results and the laboratory results were also assessed for analysis. The diagnosis of the PCO feature was done by using pelvic ultrasound and hormonal profiles on 2nd or 3rd day of the menstrual cycle.

Inclusion and exclusion criteria

The patients who came to the outpatient department of the infertility centre of the hospital and those who follow up on the study and gives consent for the study were included.

The study considered 120 females including patients with infertility and 32 females comprising the control group who are healthy and had spontaneous pregnancies and had at least one successful child. The couple, who do not follow up on the study or do not follow the protocol of the study were excluded. Those who did not give informed consent were also excluded. Patients with clinical features other than anovulation, tubal abnormalities, and unexplained infertility, were also excluded.

Sampling

The couple had a clinical protocol examination following the initial clinical appointment. The females received a cycle track, which comprised an ultrasound scan and hormone tests to determine the ovulation and assess the morphology of the ovaries. For determination of the patency of the tube, hysterosalpingography or laparoscopy was performed. The ovary was seen via transvaginal sonography or transabdominal sonography to see the cyst. Semen analysis was done for male partners.

Statistical Analysis

The study has used SPSS 25 and excel software for effective calculation and statistical analysis. The study used ANOVA for analysis between the groups and between the subgroups. The descriptive measurement was expressed as mean±standard deviation. The level of significance was considered to be $\alpha = 0.05$.

Ethical Approval

The study explained the whole procedure to each patient and obtained relevant consent from them. The Ethical Committee of the hospital has approved the study process.

Results

The study found out the baseline characteristics of the patients in each group including their age and Body Mass Index (BMI). Table 1 shows the detailed findings.

Table 1: The baseline characteristics of patients considered in this study

Parameters	Anovulation group	Unexplained infertility	Tubal abnormality	Control group
No. of patients	35	25	28	32
Age	24.3±2.3	28.4±3.5	27.5±2.9	28.5±1.9
BMI	26.1±1.2	25±1.5	27.3±1.4	24.2±1.2

The PCO features have been found more in patients with anovulation (85.7%), tubal abnormality (53.5%), unexplained infertility (48%), and the control group (28.1%). The study has shown that there is a significant difference between the number of patients in the PCO subgroup and the Normal subgroup of each group (p<0.05). Also, it is shown that there is a significant difference between the number of PCO subgroups of each group with that of the PCO subgroup of the control group (p<0.05). The hormonal profile revealed that LH and testosterone level on the 8th day is significantly different between the PCO subgroup and the Normal subgroup of each group. Again, the serum level of testosterone was found to be different significantly between the PCO subgroup of each group and the PCO subgroup of the control group (p<0.05).

Table 2: Clinical outcome and laboratory data of the patients in each group

Parameters	Anovulation group N = 35		Unexplained Infertility N = 25		Tubal abnormality N = 28		Control group N = 32		P1*	P2**
	Normal*** N= 5	PCO N = 30	Normal*** N = 13	PCO N = 12	Normal*** N = 13	PCO N =15	Normal*** N = 23	PCO N =9		
Percentage in the group (%)	14.3	85.7	52	48	46.5	53.5	71.9	28.1	p< 0.05	p< 0.05
Duration of infertility (years)	3.0±1.5	3.2±3.	3.1±1.8	3.4±2.5	3.5±2.2	2.9± 1.5	Not applied		Not applied	
LH on 8th day (IU/L)	4.1±2.5	9.7±1.	4.7±2.2	5.6±2.3	5.1±2.2	6.0± 3.3	4.9± 2.1	7.0± 1.5	p< 0.05	p> 0.05
FSH on 8th day (IU/L)	6.5±3.2	6.0±1.	5.6±1.2	5.9±1.5	6.2±1.1	6.8± 1.9	7.0± 3.2	6.5± 1.5	p> 0.05	p> 0.05
Testosterone (IU/L)	2.1±0.4	2.8±1.	2.1±0.5	2.6±0.9	2.1±0.8	2.6± 0.8	1.5± 0.7	1.9± 0.2	p< 0.05	p< 0.05

*Compared between the sub-group (Normal and PCO) in each group
**Compared between PCO subgroup of the control group and PCO group of each group
***Indicates absence of PCO features

Discussion

According to Vural *et al*., with the National institutes of health concept, 7.1% of women had PCOS, 11.7% with AES, and 14.6% the Reuteri. criteria in the group of people from Iran. Although people know, there is not an analysis in the Eastern Mediterranean Region that appears at just how common PCOS is and what its signs are in an arbitrary group of individuals. Among 2.2% or 26% of women are thought to have PCOS in various parts of the world [11,12]. In Southern China, 2.4% of 915 women who were selected by the option of a free physical check used to have PCOS, based on the Rott requirements. In Spain, 6.5% of 154 white needle exchange women had PCOS, based on the NIH requirements. In the United States, 6.6% of women, who had a pre-employment physical exam had PCOS, according to the NIH requirements. The concept was discovered to be 17.8% among many 978 women in South Australia who have been involved in a study that glanced at pregnancy rates in the past. PCOS had been found in 8.2% of the 157 women in Esfahan, Iran, who already had type 2 diabetes [13-15]. In addition, the data has presented a high rate of PCO in the population with tubal illness (50%) and unexplained infertility (53%), as well as in females with anovulatory infertility (83%), which is not unexpected. Furthermore, many people with PCO are

more than higher in the groups with tubal disease and unexplained infertility in the control groups approx. 28% [14,15]. Furthermore, PCO is a common issue among females with no explanation for infertility (44%). The lots of people with PCO in the control group is about the same as what has been documented in the prior 23, 22, and 21% [16]. Although many women are suffering from PCO as well as have faced tubal illnesses, and sperm dysfunction, and have not explained infertility, ovulate and have a normal process. However, this PCO female does ovulate. There have been some different aspects related to PCO that have provided their infertility, but it is not the primary reason. Most people with tubal disease do not have blocked tubes. Similarly, many people with sperm dysfunction do not have a huge number of sperm, as well as six of them (8% of the total), have no sperm during the separation examination [14,15]. As per findings, it can seem that people with PCO, sperm problems, and tubal disease are also likely to retain difficulty getting pregnant and moving to an infertility hospital. Similarly, PCO women in four diagnostic groups have higher testosterone levels than PCO females in the control group [16]. Furthermore, the comparison between the normal ovaries with polycystic ovary syndrome in women and among the infertile groups. It is a regular result all over diagnostic categories for PCOS females. Similarly, it has been indicated that patients who are suffering from PCO are not over-represented in each diagnostic sector. In addition, it has also been suggested that suffering from PCO seems to cause infertility in hospitals in the first step. Though this stage is also significantly higher in the group with no clarified infertility and also, they are still among the common range. Females who have experienced spontaneous menstrual cycles and distinguished levels of mid follicular LH have been connected to an important decline in fertility [13-17]. Couples, who are suffering from polycystic ovary syndrome (PCOS) and sperm dysfunction, are not uncovered to have more elevated testosterone grades or mid follicular luteinizing hormone (LH) levels than those with regular ovaries. However, changes in the requirements for diagnosing PCOS have a big effect on how popular it is. When all the conditions are used together, prevalence rates have been observed as low as 1.6% and as positive as 18% in comparable Caucasian populations when the Rotterdam criteria are used [18-20].

Conclusion

The study has concluded that there is a significant number of patients with infertility who have Polycystic features as compared to the number of females with PCO features without infertility. However, the prevalence of polycystic features is increasing with time due to several factors, but females with infertility have been shown to have more polycystic features among them. The study, therefore, has highlighted an important finding which has clinical significance in infertility management. Even the patients of infertility who have anovulation have shown to have a significant difference between the PCO subgroup and Normal subgroup, which infers that, patients in each group (Anovulation group, Unexplained Infertility and Tubal abnormality) have a significant difference in LH level and testosterone between patients of infertility with PCO features and patients of infertility without PCO features. The study has highlighted that LH level increases significantly in patients or females with PCO features, irrespective of their fertility status. Further studies should be conducted for more varied results. The findings of this current study hold significant clinical importance which can contribute to the diagnosis of Polycystic ovary.

References

1. Fattah A., Hadavi F., Bahrami F., Khoshkholgh R., Ahmadi A., Mahmoodabadi M., Salari Nasab J.,

Bamorovat Z., Basri S.A.R., Hosseinnataj A. and Ghazanfarpour M. 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):13957-13969.
2. Desai N.A., Tiwari R.Y. and Patel S.S. Prevalence of polycystic ovary syndrome and its associated risk factors among adolescent and young girls in Ahmedabad region. Indian Journal of Pharmacy Practice, 2018;11(3).
3. Mayrhofer D., Hager M., Walch K., Ghobrial S., Rogenhofer N., Marculescu R., Seemann R. and Ott J. The prevalence and impact of polycystic ovary syndrome in recurrent miscarriage: a retrospective cohort study and meta-analysis. Journal of clinical medicine, 2020;9(9):2700.
4. Behnoud N., Farzaneh F. and Ershadi S. The effect of clomiphene citrate versus letrozole on pregnancy rate in women with polycystic ovary syndrome: A randomized clinical trial. Crescent Journal of Medical and Biological Sciences, 2019; 6(3): 335-340.
5. Gupta M., Singh D., Toppo M., Priya A., Sethia S. and Gupta P. A cross sectional study of polycystic ovarian syndrome among young women in Bhopal, Central India. Int J Community Med Public Health, 2018;5(1):95-100.
6. Murali C. and Venkatesan S. Infertility Comics and Graphic Medicine. Routledge. 2021.
7. Krishna A., Fernandes D., Athiyamaan M.S., Shankar S., Rao S. and Hasib A.G. Assessment of variations in serum testosterone, follicle stimulating hormone, and luteinizing hormone levels in patients receiving radiotherapy for rectal cancer. Middle East Journal of Cancer, 2022; 13(2): 337-342.
8. Jordans M.J., Luitel N.P., Garman E., Kohrt B.A., Rathod S.D., Shrestha P., Komproe I.H., Lund C. and Patel V. Effectiveness of psychological treatments for depression and alcohol use disorder delivered by community-based counsellors: two pragmatic randomised controlled trials within primary healthcare in Nepal. The British Journal of Psychiatry, 2019; 215(2): 485-493.
9. Alikhani M., Amjadi F., Mirzaei M., Wu Y., Shekari F., Ashrafi M., Mehdizadeh M., McKay M., Taleahmad S., Aghajanpour S. and Gupta V. Proteome analysis of endometrial tissue from patients with PCOS reveals proteins predicted to impact the disease. Molecular Biology Reports, 2020;47(11):8763-8774.
10. Chaudhari, A.P., Mazumdar, K. and Mehta, P.D., 2018. Anxiety, depression, and quality of life in women with polycystic ovarian syndrome. Indian journal of psychological medicine, 2018; 40(3): 239-246.
11. Vural F., Vural B., Kardaş E., Coşkun A.D.E. and Yildirim İ. The Diagnostic Performance of Antimullerian Hormone for Polycystic Ovarian Syndrome and Polycystic Ovarian Morphology. 2022.
12. Alfanob Z.O., Ahmed M.H., Ahmed M., Badi S. and Elkheir H.K. Knowledge, Prevalence and Practice of Polycystic Ovary Syndrome among Sudanese women in Khartoum State, Sudan: The need for health education. Sudan Journal of Medical Sciences, 2022;17(2): 204-217.
13. Starrach T., Santl A. and Seifert-Klauss V.R. Perimenopausal bone loss is associated with ovulatory activity—Results of the pekno study (perimenopausal bone density and ovulation). Diagnostics, 2022; 12(2): 305.
14. Nowicka-Bauer K., Lepczynski A., Ozgo M., Kamieniczna M., Fraczek M., Stanski L., Olszewska M., Malcher

A., Skrzypczak W. and Kurpisz M.K. Sperm mitochondrial dysfunction and oxidative stress as possible reasons for isolated asthenozoospermia. Journal of Physiology and Pharmacology, 2018; 69(3).
15. Lu X., Liu Y., Cao X., Zhang D., Zhang T., Liu M., Shi H., Liu S. and Dong X. Effect of Advanced Paternal Age on Reproductive Outcomes in IVF Cycles of Nonmale Factor Infertility: A Retrospective Cohort Study. 2021.
16. Barrea L., Arnone A., Annunziata G., Muscogiuri G., Laudisio D., Salzano C., Pugliese G., Colao A. and Savastano S. Adherence to the mediterranean diet, dietary patterns and body composition in women with polycystic ovary syndrome (PCOS). Nutrients, 2019;11(10):2278.
17. Ciebiera M., Esfandyari S., Siblini H., Prince L., Elkafas H., Wojtyła C., Al-Hendy A. and Ali M. Nutrition in gynecological diseases: Current perspectives. Nutrients, 2021; 13(4): 1178.
18. Kashani L. Effect of local endometrial injury in Follicular vs. luteal phase on implantation and pregnancy outcomes of Frozen Embryo Transfer Cycles in women with repeated in vitro fertilization failure. A randomized clinical trial. 2022.
19. Wolf W.M., Wattick R.A., Kinkade O.N. and Olfert M.D. The current description and future need for multidisciplinary PCOS clinics. Journal of Clinical Medicine, 2018; 7(11):395.
20. Okwelogu I.S., Agbakoba N.R., Ikechebelu J.I. and Anukam K.C. Self-help treatment methods and aetiology of infertility among couples seeking in-vitro fertilization in a private fertility clinic, awka, nigeria. Afrimedic journal, 2022; 8(1): 17-24.