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The Effects of Polycystic Ovarian Syndrome on Pregnant Women

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A B S T R A C T

Polycystic ovary syndrome (PCOS) may be a differentiated glandular disease that affects body systems and causes metabolic and reproductive complications or disorders in women of childbearing age. The study was designed to know the criteria and symptoms that appear on women in the city of Mosul as a result of having polycystic ovarian syndrome PCOS. Objective :The aim of the study is a determine the incidence of the disease and its complications in the city of Mosul. Method : The study was conducted on a hundred seventy women , 35 of them were in the control group, whereas 135 of them were the affected women of various ages, The study included a number of criteria (social situation, age at which the infection occurred, whether pregnancy occurred without treatment, how long did it take to become pregnant after infection, did polycystic disease lead to infertility, did polycystic disease lead to abortion, did infection lead to birth defects, Symptoms accompanying the injury), Result : The results showed that the highest rate of infection was among married women, while the results showed that the highest percentage of the age at which the infection occurred was between 18-36 , and the results showed that pregnancy did not occur without treatment, in some cases it took several years for pregnancy to occur as a result of the syndrome. The disease led to infertility and abortion, and the most prominent symptoms were menstrual disorders, hirsutism, obesity and other symptoms. Conclusion: The incidence of polycystic ovaries is higher among married women, and it also induces missgrage , infertility and menstrual disorders, while the study did not find a significant increase in the proportion of deformed fetuses.

1 Introduction

Polycystic ovary syndrome (PCOS) is a distinct glandular disorder that affects the body's systems and causes complications such as metabolic and reproductive disorders in women of childbearing age. Genes, environmental factors and nutrition play a major role in the pathogenesis of the syndrome (Tahir *et al*., 2017). It is one of the most common endocrine disorders among women (Kollmann *et al*., 2015). The syndrome was first described by Stein and Levntal in (1935), where they found that many women who had amenorrhea associated with the presence of small ovarian cysts on both sides of the ovary (Stein and Leventhal, 1935). PCOS includes complications, metabolic and epidemiological disorders associated with ovarian dysfunction, as well as reproductive disorders (Balen, 2007). PCOS phenotypes differ. Patients show a severe phenotype (hyperandrogenism, chronic anovulation, and polycystic ovaries) and this is the classic phenotype I, or patients show hyperandrogen secretion, chronic lack of ovulation and normal ovaries; and this is the second type II. There are differences between the two patterns where ovulation is

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relatively common in PCOS type II and endocrine and clinical disturbances are mild compared to classical type I (Kareem *et al*., 2017). The reason for conducting this study was the high percentage of women with polycystic ovary syndrome and the complications that accompany the disease.

2 Materials and Methods

The study was conducted on a hundred seventy women, 35 of them were the control group, whereas 135 of them were the affected women of various ages, The study included a number of criteria (social situation , age at which the infection occurred, whether pregnancy occurred without treatment, how long did it take to become pregnant after infection, did polycystic disease lead to infertility, did polycystic disease lead to abortion, did infection lead to birth defects, Symptoms accompanying the injury). After collecting the information and verifying that there are no errors, we conducted an association analysis of those data, and this statistical analysis of the information comes with the objective of extracting and decoding the results. Tables and columns for frequencies and percentages were created using the Statistical Package for Social Sciences (SPSS) v.20.

3 Results

The study was carried out in accordance with several criteria, yielding the following results, and in comparison to the control group, which displayed a "normal" pattern. According to the current study, married women had the highest rate of infection. Single women, on the other hand, had the lowest rate (Table 1 and Figure1).

Table 1: The number of recurrences and the percentage of infection by social status

Marital status	Frequency	Percentage
Married	76	56.3%
single	59	43.8%

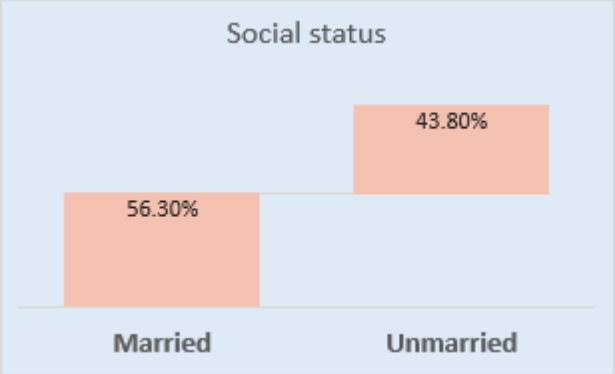


Figure 1: The number of recurrences and the percentage of infection by social status

While the largest rate of the age group in which the damage occurs was between 18 and 26, followed by a lower percentage between 26 and 34 (Table 2 and Figure 2).

Table (2) The frequency and percentages of infection by age.

Age	Frequency	percentage
18-25	50	%37
26-35	35	%29
36-45	28	%20.7
46 – 55	22	%16.3

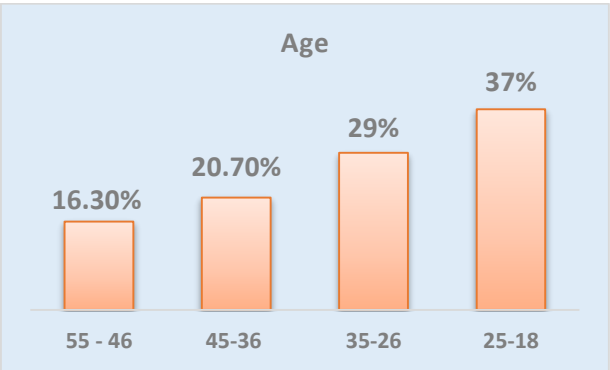


Figure 2: The percentage of infection by age

The study found that the women who did not get pregnant without treatment had the highest percentage of infection, while the women who did get pregnant without treatment had the lowest percentage (Table 3 and Figure 3).

Table 3: The frequencies and percentages of pregnancy with and without treatment

Pregnancy	Frequency	percentage
With treatment	77	% 57.1
Without treatment	58	% 43

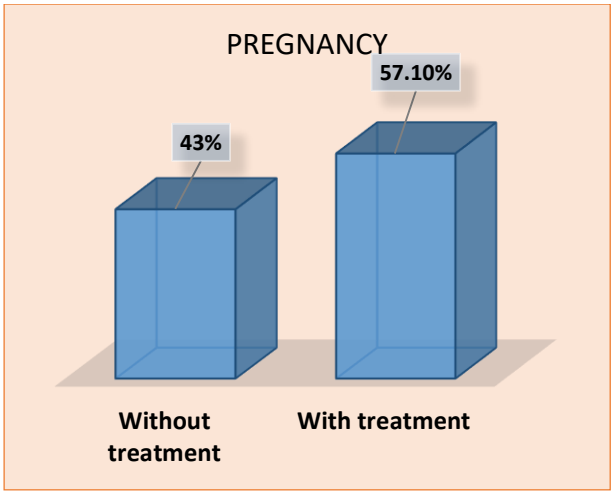


Figure 3: Depicts the percentage of pregnancies with and without treatment.

The study's findings also revealed that the occurrence of pregnancy after injury took between two and ten years, with the highest percentage in two years, the lowest percentage occurring in five years, followed by seven years and the lowest percentage ten years arising after ten years (Table 4 and Figure 4).

Table (4): The percentage of the number of years during which pregnancy occurred after infection

Pregnancy years after infection	Number of Women	percentage
2	75	% 55.9
5	32	% 23.5
7	20	% 14.7
10	8	% 5.9

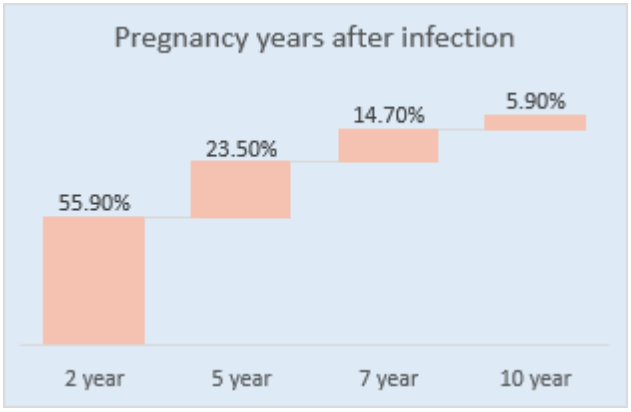


Figure 4: The number of years during which pregnancy occurred after infection

While the study discovered that 66 percent of cysts caused infertility, the incidence of infertility was 34 percent (Table 5 and Figure 5).

Table (5): shows the percentage of infertility

Infertility	number of women)	Percentage
Sterile	89	66%
Fertile	46	% 34

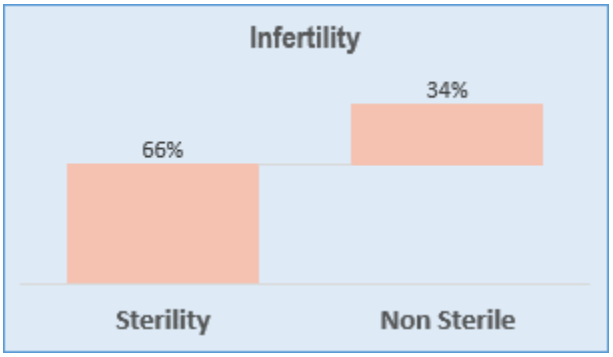
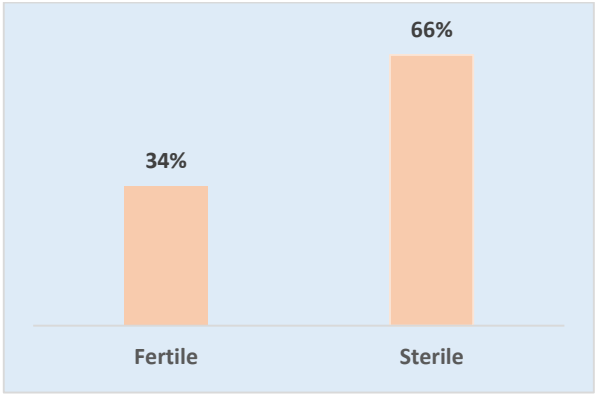


Figure 5: It shows the incidence of infertility



Furthermore, polycystic disease resulted in an miscarriage at a rate of (58%) while the percentage of women who did not have miscarriage as a result of polycystic disease was (42%) (Table 6 and Figure 6).

Table (6) The frequency and percentages of miscarriages

miscarriages	Number of women	Percentage
Miscarriage	78	%58
Normal Pregnancy	57	%42

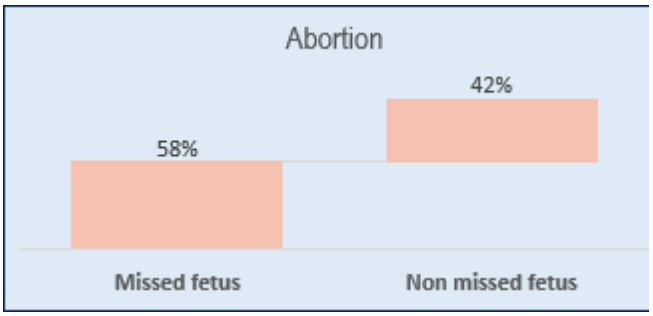


Figure 6: depicts the percentage of miscarriages.

In addition, the study found that the rate of birth defects was lower than the rate of normal births (Table 7 and Figure 7).

Table (7) shows the percentage of birth defects among the infants.

Birth Defects	Number of infants	Percentage
Normal	73	%54
Deformed	62	%46

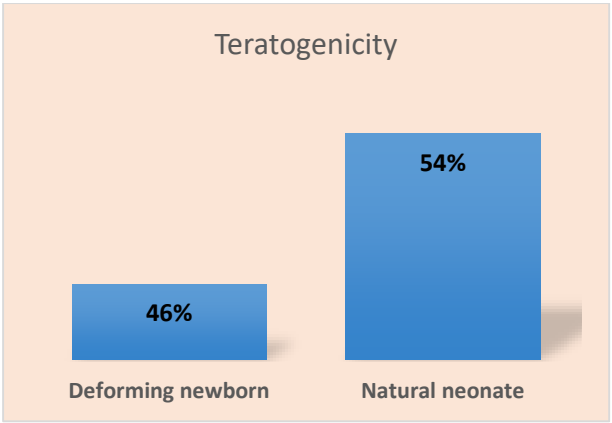


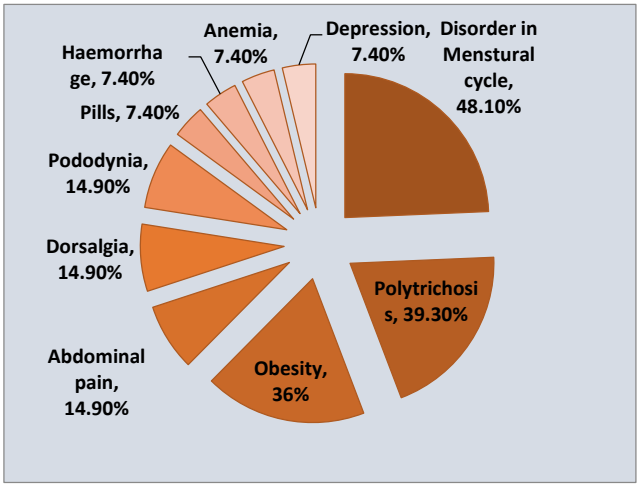
Figure 7: Percentages of normal and deformed newborn infants

Menstrual disorders, including irregular menstruation, its delay, length of duration, and interruption, were among the symptoms associated with polycystic syndrome in the patients, according to the study's findings (48.1 %) (Table 8).

Table (8) The percentages of symptoms among infected women

Symptoms	Number of Women	Percentage
Disorder in Menstrual cycle	65	%48.1
Polytrichosis	53	%39.3
Obesity	48	%36
Abdominal pain	20	%14.9
Dorsalis	20	%14.9
Pododynia	20	%14.9
Pills	10	%7.4
Hemorrhage	10	%7.4
Anemia	10	%7.4
Depression	10	%7.4

Chart (8) The percentage of symptoms



4 Discussion

Polycystic ovary syndrome (PCOS) is one of the most common diseases in women of all ages, and it is one of the causes of endocrine disorders, which leads to a delay in conception and a difference in hormones, as the natural ovulation process is disturbed due to a hormonal imbalance in the body. The results of our study showed that married women had the highest rate of infection and this is consistent with the findings of Teede *et al*., (2010);Zangana (2019), who suggested that the reason was the hormonal imbalance that affects them. PCOS is one of the most common reproductive, endocrine and metabolic disorders in women of reproductive age that has a variety of clinical and metabolic effects. Different researchers have shown that polycystic ovaries occur in women of childbearing age (Yousouf *et al*., 2012; McCartney *et al*., 2016; Hugar *et al*., 2018); while a study by Moran *et al*. (2011) indicated that between 4-18% of women of childbearing age suffer from the syndrome. March *et al*. (2010) study showed that the syndrome affects adolescent girls, and about 105 million women between the ages of 15-40 years have the syndrome around the world, and the hereditary steroid formation disorder plays a role in its occurrence. According to research findings, the most common causes of non-pregnancy are caused by the syndrome, which causes irregular or interrupted menstruation and, as a result, poor fertility, necessitating treatment to ensure pregnancy (Dumesic *et al*.,2015). According to Trikudanathan *et al*. (2015) study of PCOS, there is a fundamental disorder in the gonadotropin-stimulating hormone (GnRH), which leads to an increase in LH hormone secretion with a relative weakness in follicle-stimulating hormone secretion (FSH). Inadequate FSH secretion leads to insufficient follicle maturation and, as a result, difficulty obtaining pregnancy, which necessitates follow-up treatment to ensure its occurrence.

Patients with PCOS have difficulty getting pregnant due to chronic anovulation and an increase in androgen secretion. The failure of the ovulation process, which is the basic process of the menstrual cycle, is due to hormonal and physiological reasons, and it is one of the most serious problems that can lead to infertility and a disorder of the hypothalamic pituitary axis, which is one of the major factors that prevent women from becoming pregnant. In terms of reproduction, the hypothalamus is in charge of the pituitary gland's release of hormones (LH, FSH) that stimulate the ovaries to mature the ovum and initiate the ovulation process. Whether there is an abnormality or disorder in the hypothalamus and it fails to stimulate and control this process, the pituitary gland will be unable to produce (LH and (FSH) and the ovulation process will fail, and estimated (50%) of cases of anovulation occur when the ovaries are unable to produce a natural follicle to complete the maturation of the oocyte. , and the ovum is inappropriate for fertilization because the basis for activating the ovulation process is the hormone (LH), which helps to secrete digestive enzymes to the follicle wall, leading to its release from the ovary to the oviduct and, in the event of a decrease in hormonal concentration (LH and FSH), leads to inactivity in the function of the ovaries, which then leads to a failure in the function of the Hypothalamus (Speroff and Fritz *et al*.,2005). Our results agree with most studies that indicate that women with PCOS have infertility, as it is one of the symptoms and complications of infection. PCOS is one of the most common causes in the list of causes of infertility in women (Melmed *et al*., 2011). The reason may be that the syndrome causes high levels of the hormone prolactin, with the absence of anovulation, which directly and indirectly leads to infertility, as the large increase in levels of this hormone prevents the process of ovulation in women, and stops the menstrual cycle (Shibli-Rahhal Schlechte, 2011). An increase in the level of the hormone prolactin in the blood causes the so-called hyperprolactinemia, which is the presence of abnormal and high levels of the hormone Prolactin secreted by the pituitary gland (Melmed *et al*.,2011). Or, the reason may be the decreased secretion of follicle-stimulating hormone (FSH) in PCOS compared to that of normal women during the follicular phase early in the menstrual cycle, causing decreased growth at puberty and impaired ovarian function, leading to infertility and hypogonadism (Upton, 2016). In spontaneous abortion and its relationship to the syndrome, the study showed that it occurred in a percentage (58%). The increase in luteinizing hormone (LH) in some cases of ovarian cysts, as well as high insulin levels, is associated with many vital processes that may lead to recurrent miscarriages, including high rates of blood clotting, which affects the amount of blood flowing to the fetus from the uterus and thus leads to miscarriage. Oxidative stress is caused by an imbalance in the ratio of oxidants to antioxidants in the

organism and causes an increase in the production of free radicals, including reactive oxygen species (ROS), weakening the antioxidant system in the body, which can stimulate a variety of reproductive disorders, including spontaneous abortion. ROS also has a physiological impact on fertilization and oocyte maturation (Duhig *et al*., 2016). Oxidative stress is directly associated with insulin resistance and hyperandrogenism, which contribute to biochemical and endocrine changes in women with functional ovarian hyperandrogenism as a result of PCOS (Suresh and Vijayakumar, 2015). Our results showed that polycystic ovary disorders did not lead to birth defects in high rates. These results are in agreement with the study by Tam *et al*. (2019). Other studies indicate that cystic disease leads to metabolic disorders, and hyperinsulinemia leads to a decrease in the proportion of glucose in the follicular fluid, which affects the fetus, and this decrease occurs due to the disturbed transport of glucose and changing energy pathways Changes in the fatty acids in the follicular fluid also influence the quality of ovum and the development of the fetus (Niu *et al*., 2014). As a result, polycystic disease interferes with the gene expression of the follicles, thus disrupting the maturation of the ova, causing a "risk" for the development of embryos (Xiao *et al*.,2014).

Women with PCOS usually have menstruation problems such as oligo menorrhea (fewer than nine menstrual cycles per year) or amenorrhea (not having a period), along with other menstrual problems such as heavy blood menstruation, usually less with a blockage in menstrual flow, and this is similar to our study. Al-Hadithy, (2010) found that 64 of 65 Iraqi women with PCOS suffer from irregular menstruation, the high levels of prolactin hormone caused by the syndrome prevents the woman from ovulating and leads to stopping the menstrual cycle (Shibli-Rahhal Schlechte ,2011). Another study indicated that polycystic ovaries lead to an increase in the hormone inhibin and luteinizing hormone, and that this imbalance in the concentrations of these hormones causes disturbances in the menstrual cycle and even stops the ovulation process (Zangana,2019). The current study also showed that one of the most prominent symptoms was hirsutism, and its percentage was (39.2%). Our results are in agreement with the results of Al-Dulaimi (2018) who indicated that women with polycystic ovaries develop hirsutism, Hirsutism was a second common criterion for PCOS patients, and our result is close to that obtained by Jacob and his group (Jacob *et al*.,2014), which was 34.6%, hirsutism may occur in PCOS due to increased production or activity of androgen hormone within the sebaceous glands (Fauser *et al*.,2014). Also, the high rate of hirsutism may be attributed to the increase in the concentration of testosterone secreted from the ovary as a result of the continuous stimulation by the luteinizing hormone, which is elevated in women with PCOS, and this was indicated by Mofid (2007). Or the increase in this percentage may be attributed to the increased production of androgens secreted by the adrenal gland (Setji, 2007). As for obesity, it reached 37%.

The current concept of the syndrome is that it is not just a gynecological condition, but rather a metabolic syndrome with associated disorders such as obesity and insulin resistance (Alemzadeh *et al*., 2010). In PCOS, it becomes difficult for the body to use the hormone insulin naturally, i.e. resistance to this hormone is formed, and as a result, the level of androgen increases in the bloodstream and leads to the concentration of fat in the upper part of the body or in the abdomen (Chaudhary and Qamar,2016). Traditionally, obesity plays an important role in the pathophysiology of PCOS, which dates back to the sixties and Wolfenthal years. But there is a puzzling fact that not all women with PCOS have obesity, although it is a common symptom in women with PCOS, but it is not part of the diagnostic criteria (Setji,2007), obesity when present in a woman with PCOS has a worsening of clinical manifestations including (anovulation, hyperandrogenism, insulin resistance) compared to women of normal weight (Hoeger, 2007).

The results also showed the occurrence of other disorders, including abdominal and foot pain, acne, where the excessive production of androgens in PCOS patients is known as a clinical and biochemical evidence of acne (Housman and Reynolds, 2014). Bleeding that may lead to anemia and psychological disorders, including depression, and our results agree with most studies which show that PCOS causes many physical and mental health disorders (Abd, Mai,2017).

5 Conclusions

In a study of pregnant women with PCOS in Mosul, researchers discovered a high incidence of PCOS in married women, a high rate of infertility and miscarriages in women with PCOS, a high rate of menstrual disorders in affected women, the rise of a number of symptoms, the most prominent of which are hirsutism and obesity in women, but no evidence of menstrual disorders. The percentage of malformed fetuses in affected women has increased significantly.

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Conflict of interest:

There was no conflict of interest among the authors in presenting this article for publication.

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