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EVALUATION CHANGES OF GHERLIN AND LEPTIN ON POLYCYSTIC OVARY SYNDROME IN IRAQ

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ABSTRACT:

Women with polycystic ovarian syndrome experience symptoms during puberty, and one of the syndrome's traits is an increase in androgens, increased hirsutism, metabolic disorders and increased insulin resistance. Result: The results that we obtained in our current study, we noticed a higher luteinizing hormone in women with PCOS than the control group, as well as testosterone hormone in addition to blood insulin. The hormone gherlin showed a decrease in the group of women with PCOS compared to the control group, and leptin showed an increase in the group Women with PCOS than in the control group. There is a relationship between the hormones creatine and leptin with PCOS

Keywords: (PCOS) Polycystic ovary syndrome,(LH) luteinizing hormone,

INRODUCTION:

One of the most prevalent endocrine system conditions in women of menstrual and fertile age is polycystic ovarian syndrome (PCOS), and it can affect up to 18% of those who are childbearing age [1].

Due to elevated insulin levels and beta-cell insufficiency in the pancreas, polycystic ovary syndrome is frequently linked to the development of type 2 diabetes. Insulin resistance is also more prevalent in women with PCOS than in those with healthy body masses, and obesity has an impact on how much this syndrome's patients' elevated insulin levels and pancreatic weakness. significantly higher in women with polycystic ovaries than in those whose ovulation is regular and who do not have hyperandrogenism [2]

In women of reproductive age, obesity contributes to the development of polycystic ovarian syndrome, the most prevalent endocrine disorder that may result from a combination of hereditary and environmental factors. Where there is a connection between this syndrome and obesity [3]. The anterior pituitary gland secretes luteinizing hormone (LH), a hormone. It has a significant impact on reproduction. Its activities include ovulation in females and androgen synthesis in males. LH collaborates with follicle-stimulating hormone and other gonadotropic hormones (FSH) [4]

One of the hormones generated by the anterior pituitary gland is follicle-stimulating hormone. It is a glycoprotein hormone that also comprises luteinizing hormone (LH) and thyroid-stimulating hormone (TSH) (LH). Follicle-stimulating hormone (FSH) regulates and protects gamete

production in the female ovary, among other things. The ovary undergoes numerous processes, including ovulation, follicular development, and the female cycle [5]. Testosterone measurements are crucial for female diagnosis, including polycystic ovary syndrome and early puberty [6].

Women's blood testosterone levels vary depending on their nutritional intake, menstrual cycle timing, and stage of development [7]. Ghrelin lowers insulin levels, increases sugar, and activates growth hormone. Given that ghrelin has both endocrine and non-endocrine activities, this is its function in the situation of obesity. Glintborg discovered that PCOS patients had lower ghrelin levels. Nine obese women with PCOS participated in a study to examine how ghrelin affected their endocrine and metabolic processes. It was discovered that ghrelin had no effect on the amount of leptin in obese people or obese people with polycystic ovaries. By blocking luteinizing hormone, ghrelin levels that are too high may have an impact on reproductive processes [8]

Produced by fat cells, leptin inhibits neuroendocrine adjustments to shifting dietary conditions. According to animal research, leptin deficiency causes obesity and infertility. Studies on humans have shown that leptin plays a function in reproductive biology, and that leptin levels may fluctuate during the menstrual cycle in women. The importance of leptin is supported by significant premenopausal and sex-related changes in insulin sensitivity [9]. Aim of study is investigation of a relationship between gherlin and leptin with PCOS

MATERIAL AND METHODS:

Sample collection:

From February 2022 to May 2022, this study was carried out at the Obstetrics and Gynecology Hospital and Karbala University in the Karbala Governorate. All Participants gave their consent. The study involved two groups of obese women: the first group included 45 obese women with PCOS, while the second group included 30 obese women without PCOS. Samples were collected and tested in the labs of the Obstetrics and Gynecology Hospital, In addition to hormone and biochemical tests being evaluated in private laboratories. Each female was given a weight and height measurement in order to determine their body mass index (BMI) uses the following formula:

BMI equals weight (kg)/height (m2) (WHO)

Ages of the women chosen for this study ranged from 18 to 41, BMI30-more than 40 kg/m2.

Diagnosis of polycystic ovaries and chemical analyzes:

PCOS was diagnosed by using Rotterdam criteria (Lujan et al., 2010) no history of endometriosis, an ovarian cyst, or an endocrine disorder no pregnant at the time of assessment. Chronic Congenital adrenal hyperplasia was disregarded. For the purpose of confirming the diagnosis of PCOS, a pelvic ultrasound along with a physical and gynecological examination was done. There was no history of a chronic illness in all women selected for study.

Specimens of venous blood 5 ml were extracted through venous puncture.

FSH, LH, and Free testosterone, gherlin, leptin and insulin tests were performed on the serum. Testosterone chemiluminescence immunoassay Kit, FSH chemiluminescence immunoassay Kit, LH chemiluminescence immunoassay Kit, ,Insulin chemiluminescence immunoassay Kit,

Human Ghrelin Enzyme Immunoassay kit, Human Leptin Enzyme Immunoassay kit, are used in analysis.

Statistical analysis:

SPSS version 27 was used to analyze the data, and 2010 Microsoft Office Excel. Number of factors where the mean, the student t-test was utilized. The standard deviation was used Chi square. The variations in values were at the level of statistical significance, regarded to be Significant at the level of (P0.05).

RESULTS:

The demographic information was displayed in a table (Table 1). The mean age of the PCOS-afflicted women was significantly different from that of the control group (p = 0.017). as well as body mass index did not record significant differences between the two groups, the group of women with polycystic ovaries and the control group (p = 0.709). We noticed in Table (1) that our study included women whose places of residence are city and rural, who obtained different certificates from primary and secondary school or higher. The statistical results of the primary, secondary, and university studies were (13.33), (33.33), and (53.33) for obese women with polycystic ovaries, as for the statistical evidence of the control group for primary, secondary and university studies, respectively (3.33), (33.33), (63.33) and the statistical results for women with PCOS in the city (77.77) and (76.66) for the control group and for women with PCOS in the countryside (22.22) and (23.33) for the control group.

Table (2) shows that there is a significant difference for luteinizing hormone when comparing its level in women with PCOS and the control group and that the significant probability of luteinizing hormone (0.000) while follicle stimulating hormone did not show a significant effect according to statistical evidence and that the significant probability of follicle stimulating hormone (0.141), testosterone A significant difference was shown between the two studied groups and that the significant probability (0.048). Insulin was higher in the group of women with polycystic ovaries than in the control group, and the mean for the women with polycystic ovaries (24.6±33.03) and the mean (10.43±6.08) for the control group (p= 0.009), while glucose did not show a significant difference between the study groups (p=0.0.094).

Gherlin showed a significant decrease in the group of women with PCOS and its level was (3.49±1.28) than in the control group where its level was (6.48±2.81), As for the leptin hormone, it showed a significant increase and its level was (6.58±2.83) for the group of women with PCOS and its level was (4.64±1.65) for the control group.

Table (1): The demographic characteristics included in the study in the healthy and sick groups

The value of the P	the group		Categories	Properties
	The patients No.=45	the control No=30		
0.017**	10(22.22)	4(13.33)	18-25	the age

	20(44.44)	**6(20)**	**26-33**	
	15(33.33)	**20(66.66)**	**34-41**	
0.709*	**0(0)**	**0(0)**	**normal weight 18.5-24.9**	**BMI**
	1(2.22)	**0(0)**	**overweight 25-29.9**	
	29(64.44)	**17(56.66)**	**obesity class 1 30-34.9**	
	11(24.44)	**9(30)**	**obesity class 2 35-39.9**	
	4(8.88)	**4(13.33)**	**obesity class3 more than 40**	
0.326	**6(13.33)**	**1(3.33)**	**Primary**	**Certificate**
	15(33.33)	**10(33.33)**	**Secondary**	
	24(53.33)	**19(63.33)**	**college**	
0.910	**10(22.22)**	**7(23.33)**	**rural**	**Living**
	35(77.77)	**23(76.66)**	**city**	

* There are no significant differences at the 5% probability level.
** There are significant differences at the 5% probability level.

Table (2): The level of some hormones in women with polycystic ovaries and in control

LH	FSH	Testosterone	the group
5.33±2.24	5.43±2.1	0.38±0.2	**the control**
9.84±3.01	6.48±3.007	0.93±1.77	**Polycystic ovaries patients**
0.000**	0.141*	0.048**	**The value of the P**

* There are no significant differences at the 5% probability level.
** There are significant differences at the 5% probability level.

Table (3): Insulin and glucose levels in women with polycystic ovaries and in control

glucose	Insulin	the group
155.13±35.4	10.43±6.08	**the control**
141.86±31.4	24.6±9.01	**Polycystic ovaries patients**
0.0.094*	0.009**	**The value of the P**

* There are no significant differences at the 5% probability level.
** There are significant differences at the 5% probability level.

Table (4): levels of gherlin and leptin for women with PCOS and the control group

Leptin level (mean ± standard deviation)	Gherlin level (mean ± standard deviation)	the group
4.64±1.65	6.48±2.81	**the control**
6.58±2.83	3.49±1.28	**Polycystic ovaries patients**
0.001*	0.000*	**The value of the P**

* There are significant differences at the 5% probability level.

DISCUSSION:

Table (1) of the demographic characteristics included in the study in the healthy and patients groups showed that there were significant differences between the group of obese women with PCOS and the control group of obese women without PCOS in terms of age, and the age group was (18-25) for the affected women Polycystic ovaries showed a significant increase (22.22), as for the control group (13.33), and the age group was (26-33) for women with polycystic ovaries, there was also a significant increase (44.44) and for the control group (20), while the age group (34-41) for women with PCOS (33.33) and for the control group (66.66) and the significant probability (0.017), the number of women with PCOS increased at the age of 26-33 and started to decline after this age.

This is in agreement with Tabassum and his group (2021) who explained that the prevalence of PCOS in women in youth and increases before the age of 30, and that emotional and social and health status play a role in this and many other things, and that the most negative impact was in age and with age, emotional and health problems increase As well as work [10].

And it differs with the study of Al-Fatlawi (2018), which included ages from 25-35, and the reason may be due to the studied group in terms of the inclusion of age groups, and that our current study included ages up to 41 years [11].

We noticed in Table (1) that our study included women whose places of residence are city and rural, who obtained different certificates from primary and secondary school or higher. The statistical results of the primary, secondary, and university studies were (13.33), (33.33), and (53.33) for obese women with polycystic ovaries, as for the statistical evidence of the control group for primary, secondary and university studies, respectively (3.33), (33.33), (63.33) and the statistical results for women with PCOS in the city (77.77) and (76.66) for the control group and for women with PCOS in the countryside (22.22) and (23.33) for the control group.

This agrees with Balaji and his group (2015) in terms of the level of education. They did not notice a significant difference for the reason that the groups had a similar level of education even in the countryside who received university education, but there were significant differences for the urban and rural areas and this difference with our current study of the different nature of life between the two studies According to countries [12].

The reasons for this lie in the lack of differences in living between the countryside and the city at this time, and many rural women go to a lifestyle similar to the lives of women in cities, and there are no significant differences in living and habits as to whether the difference in the urban and rural environment has an impact on PCOS. According to Nader's study And his group (2019)

the results of which were 73% of women with PCOS from urban areas and with a low level of education compared to the countryside, and our current study was small differences between the level of education between the countryside and the city and between women with PCOS and the control group [13].

There are several causes of PCOS, which is a complex physiological syndrome that does not depend largely on the educational level, and this is what appeared to us according to the statistical results in our current study.

BMI also did not show significant differences as in Table (1), and the results of the statistical analysis of the group of obese women with PCOS for obesity category 1 were (30-34.9) (64.44) and for the control group (56.66). For obesity category 2 (35-39.9) (26.66) and for the control group (30), for obesity category 3 (more than 40), (8.88) and for the control group (13.33) and the significant probability (0.709).

Body mass index (BMI) was higher in women with polycystic ovaries and there was no significant difference in terms of statistical evidence between the weight groups studied in our current study, which included obese women with polycystic ovaries and the control group who had a body mass index <30 and divided into three Categories from (30-34.9), (35-39.9) and (more than 40). It is possible that the increase in weight and obesity is one of the eating habits followed and the lack of exercise in Iraq.

This agrees with Hasan and his group (2020), as they did not notice a significant difference between the two studied groups and there was no effect of BMI, and the studied groups were all of normal weight or similar in BMI [14]. There is no systematic, controlled study that determines the prevalence of obesity in women with polycystic ovaries. Most researchers have found 30%-50% of the prevalence of obesity in women with polycystic ovaries. There is evidence of visceral obesity in the abdomen even in women with polycystic ovaries of normal weight [15].

All samples were taken on the second and third day of the follicular stage for women in both groups, the group of women with polycystic ovaries and the control group, and there was no significant effect in terms of menstrual period.

The results shown in Table (2) show an increase in luteinizing hormone in women with PCOS and a significant difference according to the statistical results and that its level in women with PCOS is (9.84±3.01) and its level in the control group is (5.33±2.24) and that the significant probability (0) This is in agreement with the results of Jadav (2020) [16]. And this rise in the level of LH leads to a defect in the process of ovulation or the absence of ovulation in the follicular cycle, as the LH stimulates ovulation and then stimulates the corpus luteum to form steroid hormones. But a high level of it suppresses the effectiveness of aromatase and inhibits the growth of oocytes [17].

The level of follicle stimulating hormone (FSH) did not show a significant difference in women with PCOS, and the level of follicle stimulating hormone in women with PCOS was (6.48±3.007) and (5.43±2.1) for the control group with a probability level of (0.141). This agrees with what was obtained by Hussein and his group (2014) and Al-Deresawi (2012), and it does not agree with Van Der Meer and his group (1998). [18] [19] They explained that the increase in the number of

follicles in the ovary is either related to the time period for the secretion of follicle-stimulating hormone and produces small accumulated follicles, or an increase in the level of follicle-stimulating hormone.

Testosterone hormone showed a significant difference and it was high in women with PCOS, and its level in the group of women with PCOS was (0.93±1.77) and its level in the control group was (0.38±0.2) and the significant probability was (0.048) and this is consistent with the study of McCartney & Marshall (2016). And this increase in the level of the hormone may be due to the increase in blood insulin, which increases androgens, as well as the imbalance that occurs in ovarian cells [20].

Table (3) shows the levels of insulin and sugar in the two groups of obese women with PCOS and obese women without PCOS. The statistical results showed that there were significant differences in the level of insulin between the two groups, as the level of insulin was (24.6±9.01) for the group of women with PCOS, ovaries and (10.43 ± 6.08) for the control group, while sugar did not show a significant difference according to the statistical results (141.86 ± 31.4) for the group of women with polycystic ovaries and (155.13 ± 35.4) for the control group. This agrees with Pagotto and his group (2002), where their study was on obese women with polycystic ovaries and others of the same weight and age, and they did not notice a difference in the level of sugar and it was normal in all of them [21]. One of the traits of PCOS is insulin resistance and hyperinsulinemia. In the case of a healthy pancreas, insulin is generated with a poor biological effect, and there is hyperinsulinemia in the blood. This state is known as insulin resistance. The blood sugar level can still be normal despite this. Intolerant to glucose affects 40% of women with polycystic ovaries, and type 2 diabetes strikes 10–20% of them between the ages of 55 and 65. Without the emergence of glucose tolerance, insulin resistance may continue to stay dormant and only manifest in certain circumstances, such as gestational diabetes [22].

Gherlin hormone showed a significant decrease according to the statistical results between the group of obese women with polycystic ovaries and the control group, and the level of gherlin for the group of obese women with polycystic ovaries was (3.49±1.28), and the level of gherlin for the control group was (6.48 ± 2.81) and the significant probability (0), according to the table (4) This is in agreement with Pagotto and his group (2002) where their results were a decrease in the level of gherlin in obese women with PCOS compared with the control group.

The hormone gherlin is thought to contribute to PCOS through its detrimental impact on the hypothalamic, pituitary, and ovary axis and is likely to control androgen release from the ovaries. Research in Europe has demonstrated that he played a part in PCOS, but other studies have not. The situation changes according on the study's location and other factors, and genetic and environmental studies must be considered to understand the connection between these associations [23].

The leptin hormone showed a significant increase, and according to the statistical results, and as in Table (4), the level of leptin in obese women with polycystic ovaries was (6.58±2.83) and the level of leptin in the control group was (4.64±1.65) and the significant probability was (0.001). These results are consistent with Baldani and his group (2019), and not with Dayer and his group

(2013). They did not observe an effect of leptin protein in both groups statistically and there is no significant difference in follicular fluid leptin with BMI [24] [25].

Adipocytes secrete a protein called leptin. It plays a part in metabolism, increasing during times of satisfaction and decreasing during times of starvation. In addition to its function as a kind of energy storage, it also aids in reproduction. It decreases hunger while increasing energy consumption at normal blood levels. The axis between the hypothalamus, pituitary, and ovary is stimulated by it. While in the case of obesity, the rise in leptin hormone inhibits the development of follicles, suppresses the rise in IGF-Leptin in interstitial cells activated by LH, and has the capacity to inadvertently obstruct ovulation and egg maturation. Leptin levels may fluctuate and even rise in PCOS when compared to controls. Leptin and luteinizing hormone pulse synchronization occurs frequently during the normal menstrual cycle, however it is disrupted in polycystic ovaries [26].

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