

## Relationship between Sex Hormones and Hirsutism in Women

Aya Khudhair Khalaf (B.Sc.)<sup>1</sup> and Nazar Ahmed Naji (Ph.D)<sup>2</sup>

### Abstract

**Background:** Hirsutism is the presence or an excess of terminal hair growth in women in a male-like pattern dependent on the androgen hormones. It is a common disease that affects about (5-10%) of women. The causes of hirsutism are divided into three types: high androgen hormone such as polycystic ovary syndrome, which is the most common cause, and hyperprolactinaemia, non-androgen hormone, and idiopathic hirsutism.

**Objective:** To evaluate the relationship between hirsutism and sex hormones, prolactin, testosterone, luteinizing hormone and follicular stimulating hormone.

**Materials and Methods:** A cross-sectional study was conducted in outpatient clinic of Kalar general hospital, Al-Sulaimaniya governorate, Iraq, for the period from 15<sup>th</sup> February to 30<sup>th</sup> April 2015. Two groups were included, the first one consisted of (100) women with hirsutism, of them (75) Kurdish women and (25) Arabic women, their ages ranged from (15-45years), and the second group included (25) apparently healthy women as control group, a biochemical laboratory tests and ultrasound was conducted to determine the hormonal levels and to support the clinical diagnosis. Hormonal assay were done according to manufactural instruction for each kit. Statistical analysis was done by using the computer windows system (SPSS14).

**Results:** The mean age of women with hirsutism was 26 years, while the control group the mean age was 31years., although there was elevation of prolactin in (38%) of patients and of testosterone in (20%) of the control group, there was no significant difference noticed between both groups. The concentration of luteinizing hormone and follicular stimulating hormone were normal in both groups. These data indicated that there was no relationship between hirsutism and sex hormone in affected women, i.e. most of patients had idiopathic hirsutism, which was differed from western countries in which the most common cause of hirsutism was polycystic ovary syndrome.

**Conclusion:** It was concluded from the present study, that there was no relationship between the hirsutism and sex hormones in affected women.

**Key words:** Hirsutism, Prolactin, Testosterone, Luteinizing hormone, Follicular stimulating hormone.

**Corresponding Author:** ayakh\_1990@yahoo.com

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<sup>1</sup> Department of Chemistry - College of science - University of Tikrit - Iraq

### Introduction

The criteria for the definition of hirsutism used by physicians vary widely [1]. It is the presence or an excess of terminal hair growth in women in male like pattern [2, 3].

depending on the androgen hormone [4]. On the other hand is excessive terminal hair growth in sexual pattern [5]. It is a common disease that affects about (5-10%) of women during reproductive age [6]. Hirsutism



effected the hair found in the approved areas of the androgen hormone, which including the upper lips, cheeks, chin, the center of the chest, breast, lower abdomen and the back [7]. In severe cases, shoulder area; lower back, upper abdomen and upper arm [8]. Buttocks, front of the thighs and bottom of the legs [9]. And this means that there is an increasing secretion or hyper-secretion of male hormones by ovaries and or adrenal glands or external anabolic steroids or increased sensitivity of the hair follicles to normal androgen levels [10].

The causes of hirsutism are divided into three types: a. High androgen hormones, b. Non-androgen hormones and c. Idiopathic hirsutism (IH) [11].

The definition of the hormone is a chemical transmitter released from living cells (endocrine) and moving distance to the target tissue via the bloodstream, there are a very quick effect hormones (such as catecholamine hormones) and hormones work slowly such as sex hormones [12].

Prolactin hormone is produced by Lactotrophic cells in anterior pituitary gland [13], this hormone with a multiple polypeptide chain consists of 199 amino acids with three bridges sulfur and molecular weight of 23 kDa and the time of half-life of 20 minutes which is very similar to the growth hormone (GH), because it contains 23 amino acids similar to those found in the growth hormone [15,14]. There are three different forms with respect to size, namely: small prolactin, a dominant form with a molecular weight of approximately 22 kDa which is a one series of multi-peptide of 198 amino acid, and large prolactin approximately 48 kDa, and very large prolactin approximately 150 kDa [16]. And it is of low vital activity [17].

The luteinizing hormone (LH) is also known lutrophin is a pituitary hormone cause ovulation and stimulate the corpus lutein of the ovary to secrete progesterone and

estrogen during the second half of the menstrual cycle [18]. It is a heterodimer glycoprotein and that each unilateral unit is glycoprotein molecule one alpha ( $\alpha$ ) and one beta ( $\beta$ ) and the secondary unit makes a full functional protein. The structure of the hormone is like that of other glycoprotein hormones such as (FSH) and (TSH) [19].

Follicle-stimulating hormone (FSH) is the pituitary hormone responsible for stimulating the vesicles cells around the egg and stimulates the development of the egg and the production of the female hormone (estrogen), and can be given as a medicine [18]. Is generally used in the treatment of infertility, mainly to increase the ovarian stimulation as part of the IVF process [20]. This hormone is asymmetric dimer molecule of glycoprotein includes two multiple units peptide, one alpha ( $\alpha$ ) and one beta ( $\beta$ ) which is similar to both corpus lutein stimulating hormone and thyroid stimulating hormone [21].

Testosterone (Te) is steroid hormone from group of male hormones, is a male sex hormone and original steroid [22]. This hormone is present in humans and other vertebrates, which is the widespread main male hormone and appears as accidental by-product of the functional either ovarian and adrenal secretion or metabolism of prohormones secreted by external tissue such as fat [2].

The hormone in males plays a key role in the development of male genitalia such as the testes, prostate and promoting secondary sexual characteristics such as increased muscle and bone mass [23] and prevent fragility [24] and the formation of the scrotum in the fetus, the sound inflation, and the growth of the beard and axillary hair [25]. The aim of the present study is to evaluate the relationship between sex hormones and hirsutism in women.

## Materials and Methods

A cross-sectional study was conducted in the outpatient clinic of Kalar General Hospital in the town of Kalar in Al-Sulaimaniya governorate, Iraq, for the period from 15<sup>th</sup> February to 30<sup>th</sup> April 2015.

Two groups were included in the study, the patients group, which consisted of (100) women with hirsutism, their ages ranged from (15-45years), where a diagnosis was made by a dermatologists in the clinic above, and looking for clinical signs associated with hirsutism (such as acne, infertility, obesity and increasing weight... et.), for the diagnosis of the cause, whether it is an idiopathic or because of hormonal disorders, family history of the disease. The second was the control group, which consisted of [25] women attending the outpatient clinic of Kalar general hospital, who were suffering from different skin diseases other than hirsutism, their ages ranged from (19-45years). After taking the consent of all women in both groups, a venous blood samples of (5ml) were taken from them, and taking (50 $\mu$ L) in plain tubes free of anticlotting substance, where blood samples left at room temperature for a period of (20 mins) and the serum was separated by using centrifuge at a speed of (3000circules) for (10 mins). The concentration of prolactin, testosterone, luteinizing hormone and follicle stimulating hormone was measured by using a minividas device.

## Statistical analysis

Was done by using the computer windows system (SPSS14).

## Results

The mean age of women with hirsutism was 26 years. While the control group the mean age was 31years.

As in (table-1) the study showed that the concentrations of the hormones in patients with hirsutism were, 38 patients (38%) had elevated prolactin, 11 patients (11%) elevated testosterone and all of them had normal luteinizing and follicular stimulating hormones, while in control group, 7 women (28%) had elevated prolactin, 5 women (20%) elevated testosterone and also all of them had normal luteinizing and follicular stimulating hormones, with a mean values as follows (PLR:19.4 $\pm$ 1, Te:0.82 $\pm$ 0.02, FSH:6.16 $\pm$ 0.47 and LH;6.028 $\pm$ 0.457) for the patients group and (PLR:16.21 $\pm$ 1.5, Te:0.569 $\pm$ 0.11, FSH: 8.89 $\pm$ 1.8 and LH:8 $\pm$ 3.05) for the control group (Table-2) and (Shape-1) . Although (38%) of patients had elevated prolactin and (11%) had elevated testosterone but these results did not record any significant statistical difference ( $P > 0.05$ ) when compared with control group, which indicated that most of the patients had idiopathic hirsutism (47%), (26%) polycystic ovary syndrome and (27%) had hyperprolactinaemia. The results revealed that the ages of patients ranged from (15-45years), with a mean age (26years), i.e. young adult and during reproductive period..

**Table (1):** Distribution of patients and the control according to the hormonal values.

Hormones	No.	PLR		Te		LH		FSH	
		elevated	normal	elevated	normal	elevated	normal	elevated	normal
<b>Control group</b>	25	7 (28%)	18 (72%)	5 (20%)	20 (80%)	0	25 (100%)	0	25 (100%)
<b>Hirsutism group</b>	100	38 (28%)	62 (62%)	11 (11%)	89 (89%)	0	100 (100%)	0	100 (100%)

Table (2): concentration of hormones in women with hirsutism compared with the control group.

Hormones Group	Mean $\pm$ S.D			
	PLR ng/ml ns	Te ng/ml ns	FSH mIU/ml ns	LH mIU/ml ns
Control group, N = 25	16.21 $\pm$ 1.5	0.569 $\pm$ 0.11	8.89 $\pm$ 1.8	8.00 $\pm$ 3.05
Hirsutism group, N = 100	19.4 $\pm$ 1.00	0.82 $\pm$ 0.2	6.16 $\pm$ 0.47	6.028 $\pm$ 0.457
P – value	0.095	0.27	0.16	0.53

PLR=Prolactin, Te=Testosterone, LH=Luteinizing hormone, FSH=Follicular stimulating hormone, PCOS=Poly cystic ovary syndrome, IH= Idiopathic hirsutism

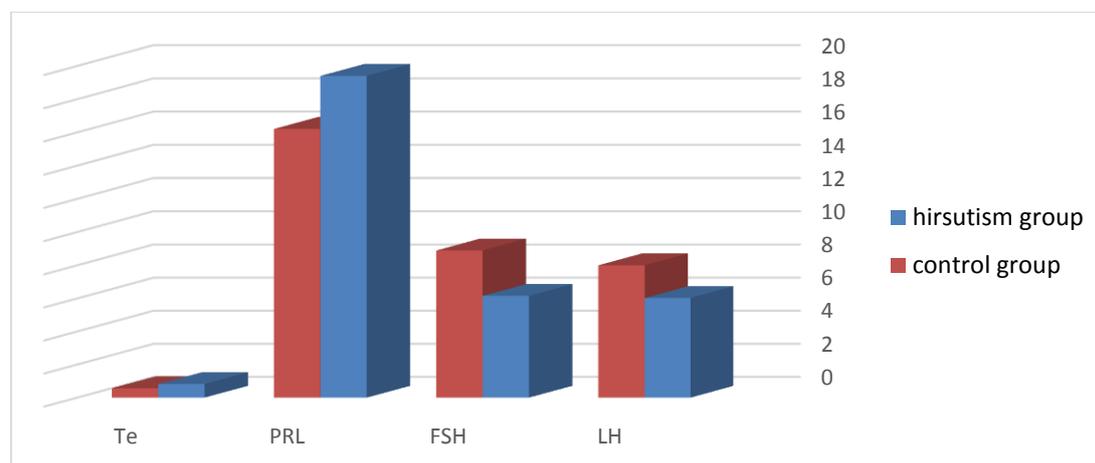


Figure (1): Hormone concentration in women with hirsutism compared with the control group

## Discussion

The present study demonstrated that, the prolactin and testosterone concentrations were elevated in (38% and 11%) of the patients respectively but the mean values of both hormones were normal (19.4 $\pm$ 1 and 0.82 $\pm$ 0.2) respectively which was disagreement with another study [26] where high concentration of both free and total testosterone observed, with a significant difference ( $P < 0.05$ ). this results agreement with other studies which shows that the cause of hirsutism was an increased the

concentration of male hormones in the blood, especially free testosterone [27, 28].

Another study revealed elevation of testosterone in women with hirsutism and PCOS, compared with women who had idiopathic hirsutism but without significant differences ( $P \leq 0.05$ ) [7]. Which was concordant with this study.

The concentration of luteinizing hormone (LH) and follicular stimulating hormone (FSH) were normal and this is consistent with the study [29].



Regarding the etiology of hirsutism the study revealed that the idiopathic hirsutism was the common cause, then hyperprolactinaemia and polycystic ovary syndrome, which was different from other studies over the world, in which the polycystic ovary syndrome was the common cause and the age of onset was the similar in this study and other studies [1].

In conclusion it was concluded from the current study, that there was no significant differences in the mean concentration of hormones (PRL, Te, LH, FSH) among the patients with hirsutism and the control group. which means the most common cause of hirsutism in Iraqi women was idiopathic

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