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## Therapeutic effects of stinging nettle (*Urtica dioica*) in women with Hyperandrogenism

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### KEYWORDS

Hyperandrogenism,  
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### A B S T R A C T

Nowadays, the use of alternative medicine and complementary medicine more attention is to treat a variety of diseases and the use of herbal medicines for the treatment of various disorders of the body is considered by investigators and physicians in most clinical areas. The aim of this study was to evaluate the therapeutic effects of *Urtica Dioica* in women with Hyperandrogenism. In a randomized controlled clinical trial that performed in Endocrinology and Metabolism clinics of Emam Reza Hospital of Tabriz University of Medical Sciences on patients with Hyperandrogenism, the therapeutic effects of *Urtica Dioica* in women with Hyperandrogenism evaluated. Mean total testosterone level before treatment in case group was  $0.57 \pm 0.22$  and in after treatment was  $0.37 \pm 0.15$ . Mean free testosterone level before treatment in case group was  $2.43 \pm 2.19$  and in after treatment was  $1.56 \pm 1.18$ . Mean DHEA level before treatment in case group was  $150.48 \pm 63.44$  and in after treatment was  $134.06 \pm 56.96$ . Significant decrease was found in total testosterone level of case group at after treatment due to before treatment. Significant decrease was found in free testosterone level of case group at after treatment due to before treatment. Significant decrease was found in DHEA level of case group at after treatment due to before treatment. The improvement rate of acne in patients of control group was significantly higher than the case group ( $P < 0.001$ ). The improvement rate of menstrual status in patients of control group was significantly higher than the case group ( $P = 0.044$ ). The improvement rate of oily skin in patients of control group was significantly higher than the case group ( $P < 0.001$ ).

## Introduction

Today, use of herbs for treatment of diseases is increasing due to the wide range of side effects, drug resistance and high costs of chemical drugs (1). Nettle is an herbaceous

diclinous plant from the Urticaceae family. This plant is widely used in traditional and modern medicines for treatment purposes. It naturally grows in hot and tropical regions

of the world (1). This plant has been for so long classified into the group of key plants in European pharmacopoeia. The family of this plant includes 60 genera and more than 700 species. This plant is known as nettle in Iran and is found in the North, Northwest and Central parts of Iran (2). Its root and leaf, which contain active pharmacologic compounds influencing cytological and physiological processes in the body, are used for medical purposes (3). This plant had been used as a diuretic and as a means of treating Arthritis and rheumatic diseases in the past (4).

Different studies have discussed the antioxidant (5), anti-inflammatory (5), anti-diabetic and anti-traumatic (6), antiviral (1), anti-cancer (7), antimicrobial and antifungal (8), and anti-androgenic effects of this plant. The chemical compounds found in nettle include acetylcholine, histamine, 5-hydroxy-tryptamine, formic acid, and serotonin (9-10). In general, the distillate of the root of nettle contains water and compounds dissolved in alcohol such as fatty acids, sterols (b-sitosterol, campesterol), and flavonoids. In fact, nettle can be orally used as a diuretic and a blood glucose and uric acid lowering food. It can also be used to locally treat some skin and hair diseases such as eczema, inflammatory diseases, and even hair loss (11).

Among all of the effects addressed by different studies, this research focuses on the effects of this plant on restraining the aromatase enzyme and the 5-alpha reductase enzyme, which finally leads to a reduction in cellular metabolism and growth of prostate cells by affecting the active sodium-potassium pump. Nettle root restrains cellular proliferation in the BHI tissue. The lignans present in nettle root link to globulins linked to sex hormones (SHBG) and inhibit the connection and effect of

these hormones on membrane of the prostate gland (11).

Safari Nezhad et al. (12) studied the effects of nettle on 558 patients with BPH and stated that 81% of patients that had used nettle had experienced a considerable improvement of lower urinary tract symptoms (LUTS). Moreover, only 16% of patients in the control group demonstrated improvements and no significant difference was observed between the levels of serum testosterone and PSA in patients of the two groups. No side effect was also reported.

Zhang et al. (13) analyzed the role of nettle in the benign prostatic hyperplasia (BPH) developed artificially by consumption of prescribed testosterone. They stated that low dosages of nettle lead to a 23% reduction in the dry weight index of prostate while high dosages lead to a 33% decrease in the value of this index. So far, no research has been conducted on the effects of nettle on women Hyperandrogenism and most studies have addressed the effects of nettle on BPH and complications caused by prostate in humans and animals. Hence, this research was aimed at studying the effects of nettle on this disease. The objective of the present was, therefore, to examine the effects of nettle (*Urtica dioica*) on women Hyperandrogenism.

## **Materials and Methods**

In a clinical trial carried out with a control group and samples selected randomly from the Hyperandrogenism female patients visiting the Endocrinology and Metabolism Clinic of Imam Reza Hospital, which is associated with the Tabriz Medical Sciences University, the therapeutic effects of nettle (*Urtica dioica*) on women with Hyperandrogenism were examined. In this study, all of the 40 Hyperandrogenism female patients visiting the Endocrinology

and Metabolism Clinic of Imam Reza Hospital were included in the research through random sampling.

A total of 40 Hyperandrogenism patients were randomly divided into two equal groups. The first group received 300-600 mg of dried extract of nettle on a daily basis for three days while the second group received cyproterone compound and Spironolactone. The levels of total and free serum testosterone and DHEA were determined prior to the intervention. Afterwards, the patients were exposed to 4 months of standard treatment (control group) and intervention with dried extract of nettle root (experimental group). At the end of this period, the levels of total and free serum testosterone and DHEA of patients were measured once again.

In addition, the clinical symptoms of Hyperandrogenism such as acne, state of periodic cycles, and oily skin were examined before and after the treatments using questionnaires. Pregnant and lactating women as well as women with ovarian tumors and adrenal tumors were excluded from the research. Moral considerations: All of the measures were taken to diagnose, treat and follow up the disease and were carried out using ordinary methods. Hence, no additional expense was imposed on the patients. The treatment costs of patients under treatment with nettle and placebo were funded by the plan budget. Patients were assured that their participation was fully voluntary and secret and no patient information was going to be published. The personal information of all participants remained secret during the research. Written consent of the related parents was obtained too.

This study is registered under IRCT2013061013612N1 with the [www.irct.ir](http://www.irct.ir) website.

## **Result and Discussion**

In this study, 40 patients suffering from Hyperandrogenism were treated by nettle and routine treatment methods and the following results were obtained:

The average age of patients in the experimental group was  $24.10 \pm 5.08$  years and the average age of patients in the control group was  $25.60 \pm 5.91$  years ( $P=0.395$ ). Experimental findings obtained from patients under study before and after the treatment are shown in Table 1.

Results presented in Table 1 suggest that no significant difference was observed between the study parameters of the two groups. Patients in the experimental group demonstrated a significant decrease in total and free testosterone levels after the treatment ( $P=0.002$ ), but no significant change was observed in the post-treatment average level of DHEA in the intervention group ( $P=0.063$ ).

Patients in the control group demonstrated a significant decrease in the total and free testosterone and DHEA levels after the treatment ( $P=0.002$ ).

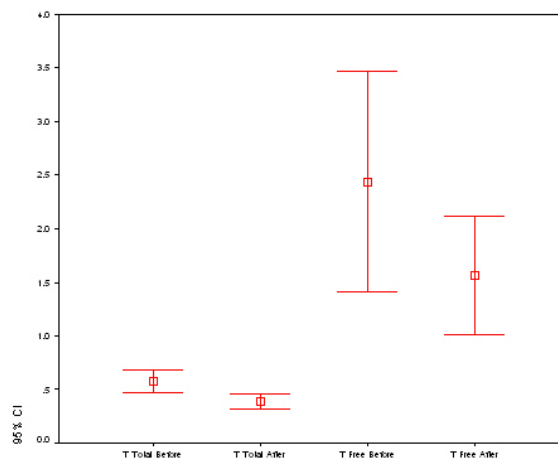
Clinical information obtained from the patients before and after the treatment is presented in Table 2. There was no significant difference between the clinical symptoms of patients in both groups before and after the treatment. Compared to the experimental group, patients in the control group demonstrated a higher level of improvement of acne ( $P<0.001$ ), menstrual cycle conditions ( $P=0.044$ ), and oily skin ( $P<0.001$ ) after the treatment. Testosterone levels distribution of patients of Case and Control group at before and after treatment was shown in Chart I and II.

**Table.1** Laboratory finding between two groups

	Group		P
	Case	Control	
Total Testosterone Before treatment	0.58 ± 0.22	0.58 ± 0.26	0.928
Total Testosterone after treatment	0.38 ± 0.15	0.44 ± 0.22	0.319
Free Testosterone Before treatment	2.44 ± 2.20	2.27 ± 1.82	0.798
Free Testosterone after treatment	1.57 ± 1.18	1.60 ± 1.25	0.927
DHEA Before treatment	150.49 ± 63.45	162.07 ± 107.93	0.681
DHEA after treatment	134.07 ± 56.97	117.79 ± 57.81	0.382

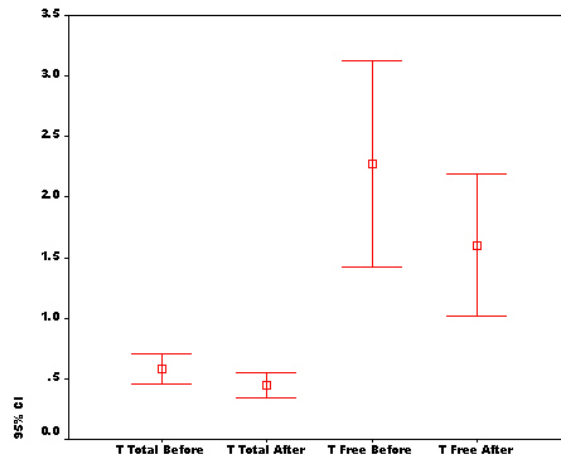
**Table.2** Clinical information obtained from the patients before and after the treatment

		Group		P
		Case	Control	
Acne before treatment	Yes	16	20	0.106
	No	4	0	
Menstrual cycle conditions before treatment	Regular	5	1	0.182
	Irregular	15	19	
Oily skin before treatment	Yes	16	20	0.106
	No	4	0	
Acne After treatment	Improved	5	18	<0.001
	Not Changed	15	2	
Menstrual cycle conditions after treatment	Improved	13	19	0.044
	Not Changed	7	1	
Oily skin after treatment	Improved	4	20	<0.001
	Not Changed	16	0	



**Chart.I** Testosterone levels distribution of patients of Case group at before and after treatment

**Chart.II** Testosterone levels distribution of patients of Control group at before and after treatment



Today, alternative medicine and supplementary medicine are used more than before for treatment of different kinds of diseases and researchers and physicians majoring in clinical field pay more attention to the usefulness of herbs for treatment of various physical disorders (14).

Moreover, due to the public interest in traditional medicine, the usage and properties of herbs such as nettle are considered more than before. According to the report published by the World Health Organization, 80% of world population use herbal treatment (15).

Nettle (*Urtica dioica*) contains different chemicals such as caffeic malic acid, polysaccharides, lectins, scopoletin, agglutinin, serotonin, and K, C and B vitamins (16-17). Hyperandrogenism is among the most common endocrine disorders that develop in fertility ages. It is also one of the most common causes of infertility caused by lack ovulation. Moreover, Hyperandrogenism accounts for 73% of outbreaks of hirsutism.

An increase in secretion of androgen is among the fixed symptoms of this syndrome. It also causes a sort of resistance

to insulin as a result of changes made to the two genes producing cytochrome P450. Seemingly, folliculogenesis (acne and hirsutism), alopecia, and menstrual cycle disorder are seen in 38.4%, 70.3% and 66.2% of patients, respectively.

So far, various treatment methods have been proposed for Hyperandrogenism and PCOS. Some of the most common treatment methods include weight reduction, inhibition of androgens of ovaries using progesterone, oral contraceptive pills (OCP), GnRH agonists, anti-androgens, ovulation stimuli, and drugs used for treatment of diabetes (Metformin and Glitazones).

The response of patients differs depending on clinical symptoms and natural differences. In this study, in order to treat patients with women Hyperandrogenism, the standard treatment method as well as treatment with nettle was used. Comparison of the results of these two methods indicated that no significant change was observed in the post-treatment levels of total testosterone in patients of the experimental group that received nettle ( $P=0.002$ ).

In addition, a significant decrease was observed in the post-treatment level of free

testosterone in patients of the experimental group ( $P=0.044$ ). However, no significant difference was observed in the average level of DHEA after the treatment of the intervention group ( $P=0.063$ ). This finding indicates that this compound is useful for the treatment of women Hyperandrogenism. However, compared to the standard treatment administered for patients in the control group, it can be said that nettle was less effective than the treatment standard.

In a study by Hryb et al., which was performed in St. Luke's/Roosevelt hospital (New York), the contribution of nettle to the treatment of patients with BPH was studied. These researchers stated that the use of nettle for the treatment of BPH patients leads to a decrease in the effects of androgens on the body because nettle affects SHBG receptors (18). Natural endocrine conditions are necessary for successful breeding. None of the endocrine systems in vertebrates is more complex than the breeding system.

Although the genetic gender of a human is defined by the chromosomal combination of the fertilized egg, the path through which gonadal are differentiated to create ovaries or testicles depends on the hormones secreted by the gonadal. Hence, gonadic sex controls phenotypic sex. Even the growth of the brain for male and female types depends on gonadic steroid hormones (19). Schottner et al. (1997) studied the links between some types of ligands of the extract of nettle root and prostate.

They reported that 3- and 4-vanillyl tetrahydrofuran or SHBG has high affinity and thus it prevents its connection to its receptor on the membrane of prostate gland (20). In the study by Safarinejad et al. it was stated that nettle is useful for the treatment of BPH because it affects the receptor of sex

hormones (12). In a study by Schottner et al. on the effects of nettle it was reported that nettle has an anti-androgen effect as it blocks SHBG (20). In this study, nettle was used to treat women suffering from Hyperandrogenism. Results revealed that this plant can affect sex hormones and androgens. Therefore, it can reduce the effects or levels of these hormones in the body and contribute to the control and improvement of patients' symptoms.

### **Conclusion**

A significant reduction was observed in the post-treatment levels of total and free testosterone in patients of the control and experimental groups. No significant difference was seen in the post-treatment and pre-treatment average levels of DHEA in the intervention group while a significant decrease was seen in the DHEA levels of patients in the control group. The post-treatment level of improvement of acne, menstrual cycle and oily skin conditions was significantly higher in the control group compared to the experimental group.

### **Suggestions**

According to the results and evidence on the acceptable contribution of nettle to the improvement of conditions of women with Hyperandrogenism, it is recommended to use nettle for these patients.

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