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Analysis Thyroid Stimulating Hormone in Polycystic Ovarian Syndrome with Rural and Urban Population of Udaipur

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Abstract

Background: Polycystic ovary syndrome (PCOS) is a condition in which the ovaries produce an abnormal amount of androgens, male sex hormones that are usually present in women in small amounts. The name polycystic ovary syndrome describes the numerous small cysts (fluid-filled sacs) that form in the ovaries. However, some women with this disorder do not have cysts, while some women without the disorder do develop cysts.

Ovulation occurs when a mature egg is released from an ovary. This happens so it can be fertilized by a male sperm. If the egg is not fertilized, it is sent out of the body during your period.

Methods: This paper target on analyzing the importance of TSH in polycystic ovarian syndrome of rural and urban people and their implications in the evolution of the disease by using standard procedure of selected biochemical parameters.

Results: The present study showed that the value of TSH were high in polycystic ovarian syndrome of rural patients compared to urban patients.

Conclusions: Our study also shows that Rural PCOS Patients have a high risk of critical condition and severity compare to urban PCOS Patients.

Keywords: PCOS,TSH

Introduction

The two endocrine conditions with the highest prevalence in the general population are thyroid problems and polycystic ovarian syndrome (PCOS). Despite the fact that hypothyroidism's etiopathogenesis and PCOS are fundamentally distinct from one another, and these two many similar characteristics. an expansion of ovarian volume and ovarian cystic alterations have been noted in main hypothyroidism. As opposed to that, it is getting more and more noticed that women are more likely than males to have thyroid issues compared to the general population, have PCOS.[1-4]

Stein and Leventhal first identified PCOS in 1935 in women with amenorrheic morphology and clinical signs of an elevation in androgen [5]. The cornerstone of PCOS definition over 50 years was the confluence of hyperandrogenism and anovulation [6]. The Rotterdam criteria for diagnosing PCOS was then developed in 2003, and it is characterized by the presence of any two of the three signs of oligo/anovulation, polycystic ovaries, and clinical and/or biochemical hyperandrogenism [7]. A crucial part of PCOS diagnosis across all the established criteria over time is the exclusion of other diseases that could be mistaken for the condition, such as

hyperprolactinemia and any endocrinological condition affecting the thyroid, pituitary, or adrenal gland [8].

One of the most prevalent endocrinopathies in women and the most prevalent thyroid condition in women of reproductive age is hypothyroidism [9]. The development and metabolism of the uterus and the ovaries are directly impacted by thyroid hormones, which are essential for female reproduction [10, 11]. As a result, in women with hypothyroidism, ovarian cysts, anovulation, and monthly irregularities are frequently present, as well as delayed puberty [12].

Insulin resistance, obesity, and dyslipidemia are examples of metabolic abnormalities that PCOS patients may display [13]. It has also been demonstrated that hypothyroidism decreases the generation and consumption of glucose, resulting in insulin resistance. Increased androstenedione to testosterone conversion, hyperlipidemia, decreased sex hormone-binding globulin (SHBG) levels, and weight gain and excess body mass can all be symptoms of thyroid hormone deficiency [14]. Additionally, hypothyroidism may impact the gonadal system, resulting in anovulatory cycles [15].

Patients with overt hypothyroidism are not considered to have PCOS due to the link between insulin residence and reproductive issue with both hypothyroidism and PCOS [16]. It is currently unknown whether PCOS affects the cut-off value of thyroid stimulating hormone (TSH) or whether women with PCOS are more likely to experience subclinical hypothyroidism (SCH), which is defined as TSH levels above the upper limit of the normal range accompanied by normal levels of free thyroxine [17].

A meta-analysis based on six research revealed that PCOS patients had a greater prevalence of SCH; however, because the bulk of the studies were clinical in nature, there may have been selection bias [18]. After adjusting for relevant confounders, only one study found that SCH does not raise the risk of PCOS in obese women of reproductive age [19]. The relationship between PCOS and subclinical hypothyroidism is still up for debate, and the small number of population-based studies has hampered our understanding of how PCOS and TSH cut-off levels interact.

Materials And Methods

A study was conducted in Pacific Institute of Medical Sciences, Rajasthan, from March 2021 to December 2022 on Polycystic ovarian syndrome patient. The source population was all cases of Polycystic ovarian syndrome disease admitted at PIMS with a confirmed diagnosis of Polycystic ovarian syndrome disease reported by Radiology Department. In Inclusion Criteria Sample above 19-44 year of age., Patient who are willing to participate., Radiologically (ultrasonography) confirmed multiple small cysts in ovary, Biochemical parameters confirmed PCOS, Irregular Menses, hirsutism, acne and oligo menorrhea

Patients below 18 years and above 45 years of age was excluded. Other endocrinal disorders like diabetes mellitus, Patients those on drug treatment like antihypertensive, antiepileptic, lipid lowering agents, drug affecting glucose, Ex –smokers, ex-alcohol drinker Patient, Diabetes, acute or chronic kidney disease was in exclusion criteria.

The blood samples for analysis were taken at least after minimum of 12 hours of complete fasting. The subject were asked to have a light, fat free diet on the day prior to sampling. The venepuncture was done in the cubital fossa, About 5 ml blood was drawn using perfectly dry and sterile disposable syringes. The serum was separated within 2 hours of collection.

The sample were analyzed the same day or within 48 hours. The TSH was done using the fully automated analyser MAGLUMI

2000 PLUS.A total number of 100 patients admitted at Pacific Institute of Medical Sciences Udaipur, was form the subjects of the present study. Out of these 50 patients were suffering from polycystic ovarian syndrome from rural area, and 50 were from urban area with polycystic ovarian syndrome. Efforts will be made to match all anthropometric factors comparable to both the groups of patients.

Methodology: Symptoms (irregular periods, excessive pain during periods accompanied with heavy flow,), serum TSH were recorded by using Autoanalyzer MAGLUMI-2000 PLUS.

Statistical Analysis: For the quantitative analysis, we used the software SPSS software. In this meta-

Volume 6, Issue 5; September-October 2023; Page No 348-353

analysis, all p values reported were two-tailed with the statistical significance set at ⩽ 0.05

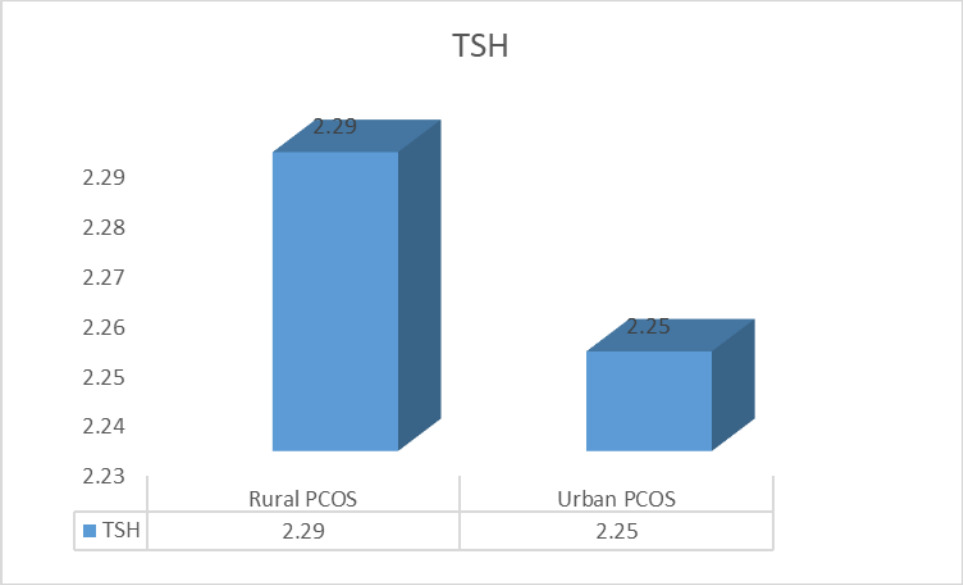
Result

Table 1. Comparison of Thyroid Stimulation Hormone between Rural PCOS Patients and Urban PCOS Patient

S. No	Test	Rural Pcos Patients		Urban Pcos Patients		P Value
		Mean	SD ±	Mean	SD ±	
1	TSH	2.29	0.92	2.25	0.28	= 0.76

The value of TSH in Rural PCOS Patients was insignificantly high (2.29 ± 0.92) compare to urban PCOS patients with P=0.76

Fig 1. Comparison of Thyroid Stimulation Hormone between Rural PCOS Patients and Urban PCOS Patients



Discussion

In our finding showed that the value of TSH in Rural PCOS Patients was insignificantly high (2.29 ± 0.92) compare to urban PCOS patients (2.25 ± 0.28) with P=0.76.

Another study showed that the value of TSH in Rural PCOS Patients was insignificantly high (3.0 ± 1.5) compare to urban PCOS patients (2.5 ± 1.5) with P=0.09. this was agreement with my study. [20]

The potential autoimmune pathophysiology of both disorders may potentially contribute to the link between PCOS and thyroid dysfunction. The primary cause of SCH is thought to be autoimmune thyroiditis [21]. Similar to how estrogen and progesterone may not be in balance, autoimmunity also contributes to the pathophysiology of PCOS. Progesterone and estrogen work together to stimulate the immune system [22]. Low progesterone levels are caused by anovulatory periods in people with PCOS. Additionally, it raises the estrogen to progesterone ratio, which may weaken immunity and promote autoimmune disease [23,24].

A meta-analysis of 13 clinical-based studies carried out by Mírian Romitti et al. [25] of a total of 1210 PCOS patients compared to the control group concluded that autoimmune thyroid disease is more frequent among women diagnosed with PCOS. Unfortunately, we did not measure autoimmune thyroid parameters such as anti-TPO antibodies, and

Volume 6, Issue 5; September-October 2023; Page No 348-353

a thyroid ultrasound was not performed on the study participants to compare the prevalence of autoimmune thyroiditis in the two groups. Thus, we could not investigate the cause of SCH from the perspective of autoimmunity. However, since Iran is an iodine-deficient area [26,27], it seems that the most common cause of thyroid dysfunction in Iran is iodine deficiency [28,29].

Our investigation has the advantage of being the first population-based study with significant statistical power to examine the prevalence of subclinical hypothyroidism in PCOS-positive women versus controls. The second strength of this study is the use of the quantile regression approach, which quantifies the relationship between explanatory variables and a conditional quantile of a dependent variable without assuming any particular conditional distribution. This method enables the understanding of relationships between variables other than the data mean, making it useful in understanding outcomes that are non-normally distributed and that have nonlinear relationships. [30]

In addition, our study participants were older than those in previous research, allowing us to examine TSH levels between the PCOS and control groups across the complete range of reproductive years. Additionally, all study participants had their PCOS diagnosed via an ultrasound. Thus, there was little chance of misclassifying PCOS patients with mild and subclinical characteristics. Finally, in our investigation, every laboratory measurement was performed using the same methodology in the same laboratory. The intra-assay variability in our results is therefore probably very small. There are, however, a few drawbacks that merit mentioning. In order to compare the prevalence of autoimmune thyroiditis in the two groups, we did not measure autoimmune thyroid factors such anti-TPO antibodies or perform a thyroid ultrasound on the research subjects. In order to test our hypothesis about the impact of vitamin D shortage on our findings, we did not evaluate the vitamin D levels of the study participants. The power of our data is insufficient to perform the subgroup analysis based on PCOS traits.

Conclusion

The present study done on the value of TSH in Rural PCOS Patients was insignificantly high (2.29 ± 0.92) compare to urban PCOS patients (2.25 ± 0.28) with P=0.76. and urban admitted in Pacific Institute of Medical Sciences, Udaipur. Total 100 patients were included for this study .50 was from rural patient and 50 was from urban with polycystic ovarian syndrome. 19-44 age group was taken for this study the study shows that the Mean and Standard deviation of the v TSH in Rural PCOS Patients was insignificantly high (2.29 ± 0.92) compare to urban PCOS patients (2.25 ± 0.28) with P=0.76.

Our study also shows that Rural PCOS Patients have a high risk of critical condition and severity compare to urban PCOS Patients.

Ethical Issues: Research project approved by the ethics committee of Pacific Institute of Medical Sciences, Umarda Udaipur- 313005, Rajasthan, INDIA**.**

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Volume 6, Issue 5; September-October 2023; Page No 348-353

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Volume 6, Issue 5; September-October 2023; Page No 348-353

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Volume 6, Issue 5; September-October 2023; Page No 348-353