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ASSOCIATION OF UTERINE FIBROIDS AND HYPOTHYROIDISM AMONG WOMEN OF REPRODUCTIVE AGE

Original Research

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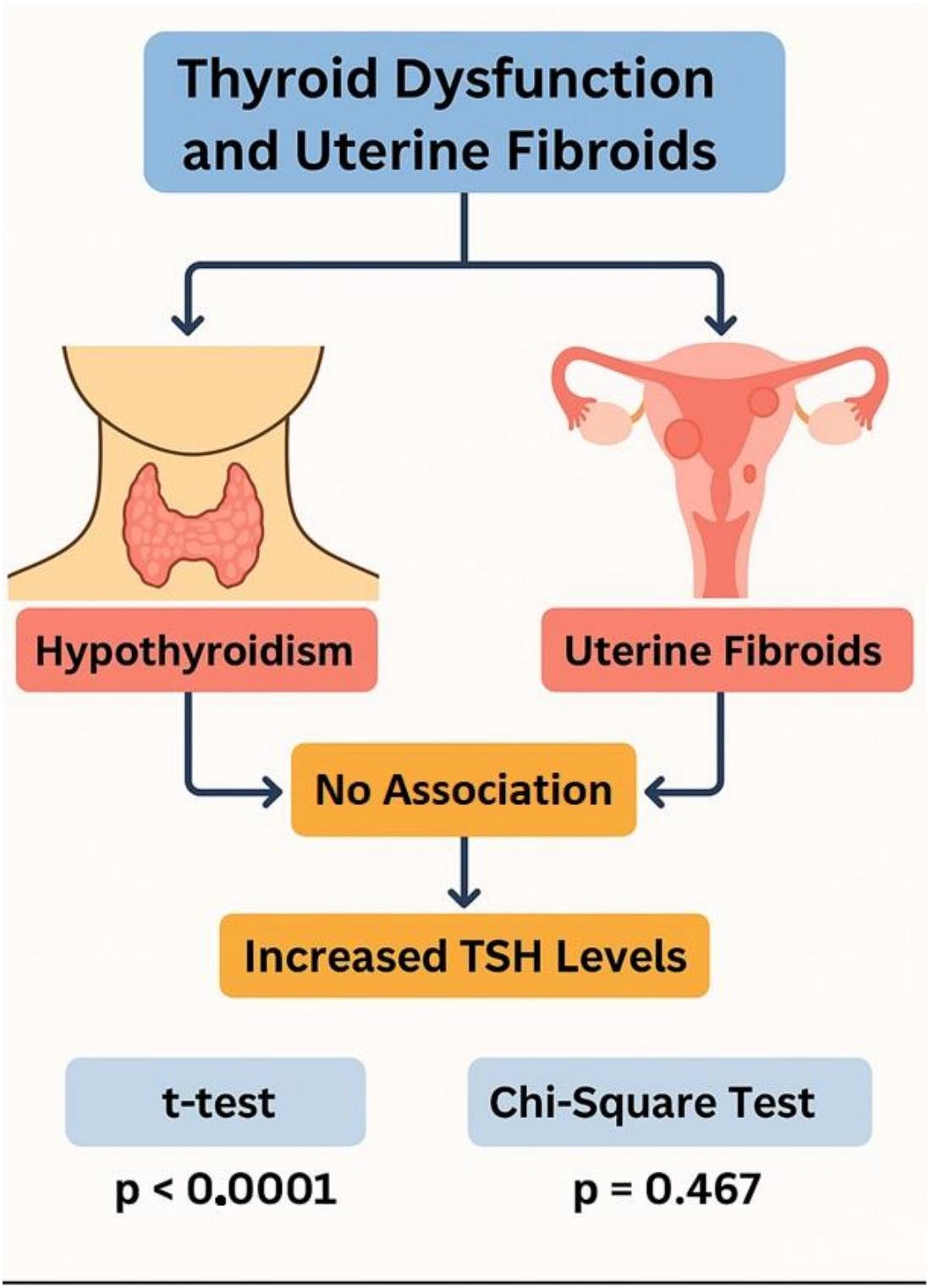
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ABSTRACT

Uterine fibroids are among the most common benign tumors in women of reproductive age, often associated with hormonal imbalances. Hypothyroidism, another hormone-related disorder, has been reported to influence gynecological health, including menstrual irregularities and infertility. Since both conditions are hormonally driven, the possibility of an interrelation between thyroid dysfunction, particularly elevated thyroid-stimulating hormone (TSH) levels and fibroid development warrants investigation to inform clinical assessment and management strategies. The aim was to assess the relationship between hypothyroidism and uterine fibroids in women of reproductive age. This cross-sectional study included 138 women aged 18–50 years. Participants were categorized into two groups based on ultrasound-confirmed presence or absence of uterine fibroids. The mean size of uterus with fibroid and without fibroid was 148±64 and 112±35 mm respectively among affected individuals. Blood samples were analyzed for TSH levels using automated analyzers. Hypothyroidism was determined using a clinical cutoff of TSH > 4.5 mIU/L. Statistical analysis was performed using chi-square and independent t-tests, with significance set at $p < 0.05$. Statistically significant association was not found in hypothyroidism and uterine fibroids ($\chi^2 = 0.53$, $p = 0.467$). However, the mean TSH level in women with fibroids was significantly higher (5.33±1.47 mIU/L) than in those without fibroids (3.09±1.12 mIU/L), with a t-value of 6.21 and $p < 0.0001$. Estimated frequency of elevated TSH (above 4.5 mIU/L) was 71.0% in the fibroid group and 10.5% in the non-fibroid group. This study concluded that hypothyroidism was not statistically associated with fibroid occurrence, however, elevated TSH levels in fibroid patients suggests a potential hormonal link.

Keywords: Hypothyroidism, Thyroid-Stimulating Hormone, Uterine Fibroids, Reproductive age.

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Graphical Abstract

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INTRODUCTION

Uterine fibroids, or leiomyomas, are benign monoclonal tumors originating from uterine smooth muscle and fibroblast cells, representing the most common gynecological tumors in women of reproductive age. These fibroids are associated with symptoms such as abnormal uterine bleeding, pelvic pain, urinary issues, and reproductive complications.[1,2] Their global prevalence and incidence have shown a steady increase, with fibrosis and extracellular matrix (ECM) accumulation as hallmark features. Estrogen and progesterone are key hormonal drivers of fibroid growth.[3] Diagnostic methods primarily include ultrasonography and MRI, while treatment is based on individual symptoms, size, location, and fertility considerations.[4,5] Hypothyroidism, a condition of low thyroid hormone levels, commonly results from autoimmune thyroiditis, iodine deficiency, or thyroid interventions and is particularly relevant to reproductive health.[6,7] It presents with nonspecific symptoms such as fatigue, menstrual irregularities, and weight gain, and is diagnosed by elevated TSH and low T4 levels.[8,9] Although hypothyroidism and fibroids independently affect women's health, chronic thyroid dysfunction may elevate estrogen levels by reducing hepatic clearance, potentially promoting fibroid growth. This study aims to explore the potential association between uterine fibroids and hypothyroidism, addressing a critical gap in the understanding of endocrine and gynecological interplay.

MATERIALS AND METHODS

This cross-sectional study was conducted over a period of four months at General Hospital and Central Hospital in Lahore, Ethical clearance was obtained from the Institutional Review Board (IRB), and informed written consent was secured. Participants included women between 18 and 50 years of age with confirmed diagnosis of uterine fibroids. Women were excluded if they were currently pregnant or had a known history of autoimmune thyroid disease or thyroid cancer.[10] Venous blood samples were collected, centrifuged to isolate serum components and analyzed for thyroid-stimulating hormone (TSH), triiodothyronine (T3), and thyroxine (T4) using a standardized automated analyzer. Statistical analysis was performed using IBM SPSS Statistics version 23. Descriptive statistics, including means, standard deviations, and frequency distributions, were employed to summarize patient demographics and clinical characteristics. Chi-square test was used to assess associations between categorical variables, while independent t-tests compared continuous variables across groups. A p-value less than 0.05 was considered statistically significant.

RESULTS

Statistical Analysis:

A total of 138 women were enrolled in this study, comprising of 62 women diagnosed with uterine fibroids and 76 without fibroids. They were analysed through various statistical tests, including descriptive statistics, mean age, frequency distribution, and gender distribution to assess trends and relationships in the dataset.

Table 1: Descriptive Statistics for TSH Levels in Women With and Without Uterine Fibroids

Group	Sample Size (n)	TSH (Mean)	SD
Patients with uterine Fibroids	62	**5.33**	1.47
Patients without uterine Fibroids	76	**3.09**	1.12

Descriptive analysis revealed that the mean thyroid-stimulating hormone (TSH) level in women with fibroids and without fibroid was 5.33 mIU/L ± SD = 1.47 and 3.09 mIU/L ± SD = 1.12 as mentioned in Table 1.

Table 2: Comparison of TSH Levels in Women With and Without Uterine Fibroids

Group	Sample Size (n)	Mean TSH (mIU/L)	Standard Deviation (SD)	t-Value	p-Value

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Patients with uterine Fibroids	62	**5.33**	1.47		
Patients without uterine Fibroids	76	**3.09**	1.12	**6.21**	**<0.0001**

Chi-square value of 0.53 with 1 degree of freedom and a two-sided asymptotic significance (p-value) of 0.467, indicating no statistically significant association between the two conditions as mentioned in Table 2.

Table 3: Association of Uterine Fibroids and Hypothyroidism in patients

	Value	df	P Value
x^2	0.53	1	0.467

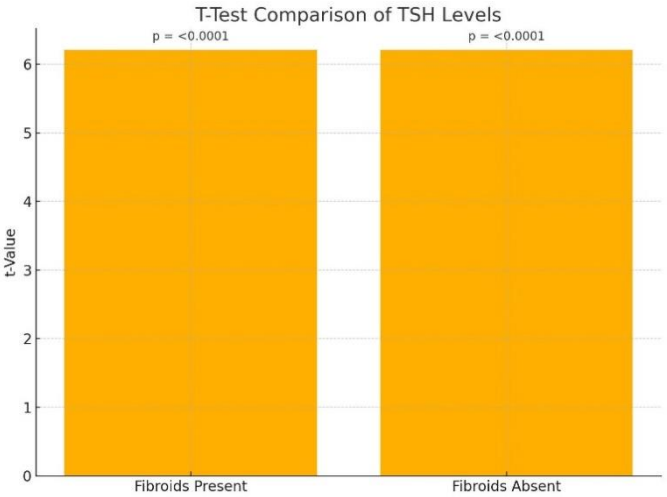


Figure 1 T-test Comparison of TSH Levels

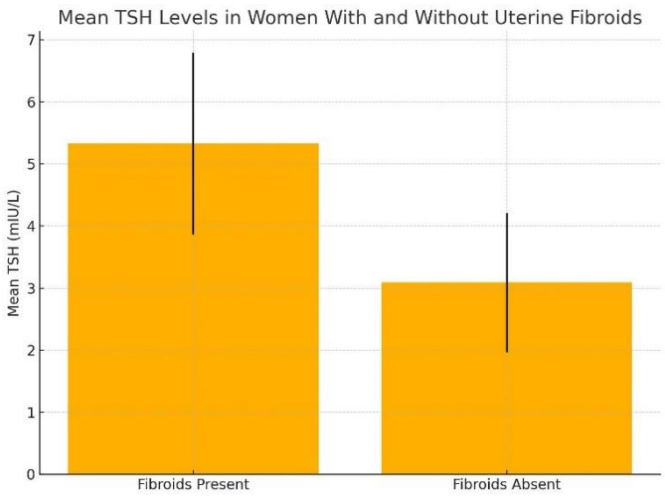


Figure 2 Mean TSH Levels in women with and without Uterine Fibroids

DISCUSSION

The study investigates the endocrine influence on uterine fibroids, highlighting a significantly higher mean TSH level in women with fibroids compared to those without, with a highly significant statistical difference ($t = 6.21$, $p < 0.0001$). This supports the hypothesis that even subclinical thyroid dysfunction may contribute to fibroid development by promoting an estrogen-dominant state.[11] While no categorical association was found between clinically diagnosed hypothyroidism and fibroids, elevated TSH in undiagnosed cases suggests the role of subtle thyroid imbalances.[12] The study's strength lies in integrating hormonal and gynecological data using standardized lab tests, though limitations include a small sample size, lack of a full thyroid profile, and unaccounted confounding factors like age, BMI, and reproductive history. The findings underscore the need for further research with larger, more diverse populations and full thyroid evaluations to explore subclinical hypothyroidism as a potential modifiable risk factor in fibroid pathogenesis.

CONCLUSION

This study concluded that while a direct association between hypothyroidism and uterine fibroids was not statistically established, the significantly elevated TSH levels observed in women with fibroids suggest a possible hormonal interplay that may influence fibroid pathophysiology. These findings underscore the relevance of assessing thyroid function, even in the absence of overt thyroid disease, during the clinical evaluation of women presenting with fibroids. Recognizing subtle endocrine imbalances could offer new perspectives in understanding fibroid development and guide more comprehensive, individualized approaches to diagnosis and management.

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AUTHOR CONTRIBUTION

Author	Contribution
Amani Fatima	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Hifsa Mobeen*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Shahryar Ahmad	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Asma Fatima	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Abdullah Meraj	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Muhammad Tayyab	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Nosheen Jafar	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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