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CORRELATION BETWEEN THYROID NODULES AND UTERINE FIBROID AMONG REPRODUCTIVE-AGE WOMEN OF AZAD KASHMIR

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Abstract

Background: *Reproductive-age women often have thyroid nodules and uterine fibroids. Both have been researched separately, but their relationship is unclear. Both disorders may be caused by oestrogen and progesterone abnormalities. Few studies have linked thyroid nodules to uterine fibroids in Azad Kashmir.*

Objective: *To find out the correlation between thyroid nodules and uterine fibroid among reproductive-age women of Azad Kashmir.*

Methodology: *In the Radiology department of District Head Quarter Hospital, Kotli, 196 people participated in the study. Four months were spent on a non-probability random sampling investigation. The study comprised reproductive-age women with uterine fibroid, lower pelvic discomfort, interrupted menstrual periods, and informed consent. Women having a history of thyroid cancer, on medication therapy for other cancers, or who refused permission were excluded. The study diagnosed uterine fibroids and thyroid nodules using an ultrasound machine with a curvilinear transducer frequency range of 2-5 MHz and a high-frequency linear frequency range of 7-14 MHz.*

Results: *The average fibroid size was 46.28 mm (±24.87) in length and 41.20 mm (±23.32) in width, while thyroid nodules exhibited a mean length of 7.49 mm (±7.37) and width of 6.69 mm (±6.68). Hypoechoic fibroids (92.9%) and mixed-echogenicity thyroid nodules (45.9%) were predominant. Significant correlations were observed between the echogenicity of fibroids and thyroid nodules ($p < 0.05$).*

Conclusion: *The study concluded a significant correlation between hyperechoic fibroids and thyroid nodules underscores the shared pathophysiological mechanisms, potentially estrogen-driven, that link these conditions. By integrating hormonal profiling and advanced imaging into routine care, clinicians can enhance diagnostic accuracy and therapeutic outcomes.*

INTRODUCTION

The ovaries, oviducts, uterus, cervix, uteri, vagina, external genitalia are the female reproductive organs (Andina, 2023). Twenty to thirty percent of women in the female reproductive system have uterine fibroids, the most frequent benign tumours there are; most usually, women between the ages of thirty and fifty have them. These tumours cause serious morbidity including reproductive failure, pelvic pressure or discomfort, and too strong or prolonged menstrual flow (Juganavar & Joshi, 2022). Benign uterine tumours known as uterine leiomyomas—which cause serious morbidity including extreme or

prolonged menstrual flow, pelvic pressure or discomfort, and, in certain cases, reproductive failure—justify a hysterectomy most importantly (Uimari et al., 2022).

Common illnesses among women are benign thyroid disease and uterine fibroid. Unknown is the link between thyroid disease and uterine fibroids (Fischer et al., 2021). Women who underwent hysterectomy for uterine fibroids showed significantly more aberrant thyrotropin-releasing hormone (TRH)/TSH stimulation test results than the control group, according to studies revealing greater levels of ant peroxidase and/or thyroid antibodies (Rahman, 2024). Two prevalent disorders that seriously affect women's health, especially throughout reproductive years, are thyroid nodules and uterine fibroids. In women, thyroid nodules are thought to be 19–68% more common; rates have been seen in groups under environmental risk or iodine shortage (Ospina & Papaleontiou, 2021).

By the time they are 50 years old, up to 70–80% of women have uterine fibroids; their frequency increases over the reproductive years. Common risk factors of both disorders include hormone imbalances, age, and genetic predispositions, therefore increasing the likelihood of a biological or epidemiological connection (Ahmad et al., 2023; Cheng et al., 2022). Because hormones like oestrogen and thyroid hormones affect both thyroid and uterine tissue, the interaction between thyroid and uterine health has attracted much attention recently. Fibroid development depends critically on oestrogen, which also has been demonstrated to affect thyroid cell growth (Davis et al., 2021).

Often accompanying thyroid nodules, thyroid dysfunction can interfere with ovulatory activity and menstrual cycles, therefore influencing uterine pathology (Bryliński et al., 2025). Common disorders afflicting women of reproductive age are thyroid nodules and uterine fibroids, with a general population estimated prevalence ranging from 19% to 68%. (Mukherjee et al., 2024) Thyroid nodules are more common as one ages and are affected by elements like genetic predisposition, dietary iodine consumption, and radiation exposure. By the age of 50, up to 70% of women have uterine fibroids, benign tumours of the uterine smooth muscle; symptomatic instances are more prevalent in women aged 30–40 years. Among the risk factors for fibroids are nulliparity, obesity, early menarche, and a family history of the disorder (Diez-Castro, 2024; Kitahara & Schneider, 2022).

Given both of the two disorders are impacted by hormonal and genetic elements, new data point to a possible relationship between them. Complicated hormonal, genetic, and environmental connections define the pathophysiological processes behind uterine fibroids and thyroid nodules (Ciebiera et al., 2024). Often linked to aberrant thyroid follicular cell growth brought on by genetic mutations, inflammation, or chronic iodine deprivation, thyroid nodules are common in the aetiology of both disorders, oestrogen affects uterine smooth muscle cell development and thyroid follicular cell growth (Frazier, 2023). Higher oestrogen levels throughout the reproductive years might improve the development of oestrogen receptors in uterine and thyroid tissues, therefore raising sensitivity to these disorders (Sharma, 2024).

Offering a non-invasive, somewhat reliable imaging modality, ultrasound is essential for evaluating thyroid nodules and uterine fibroids as well as for other conditions. Its absence of ionising radiation and real-time imaging make it especially appropriate for women of reproductive age who might need frequent examinations. For uterine fibroids, ultrasound is the main imaging method utilised for diagnostic confirmation and disease progression monitoring. The purpose of this study is to find among women in Azad Kashmir in reproductive age the relationship between thyroid nodules and uterine fibroids. The results seek to guide improved screening, diagnosis, and treatment techniques by analysing the frequency, hormonal interaction, genetic and environmental elements as well as possible healthcare consequences, therefore enhancing the quality of healthcare for women in this area.

Methodology

This study among women in Azad Kashmir in reproductive age used a correlational research approach to look at the link between thyroid nodules and uterine fibroids. Under stated inclusion and exclusion criteria, suitable volunteers were gathered in the Radiology Department of District Headquarter Hospital, Kotli. A mathematical method was used to ascertain a sample size of 196

individuals using a confidence interval of 95% (Z = 1.96), a prevalence rate, and a margin of error (d = 0.05). Participants came from a non-probability random sampling method. Four months after the research summary was approved, the study was underway.

Participants ranged in age from 18 to 49 years, comprised those with uterine fibroids, those with lower pelvic discomfort or monthly irregularities, and those ready to give informed permission. The research was not included women who had a history of thyroid cancer, those undergoing pharmacological treatment for malignancies, or those who refused permission, though. While thyroid nodules were evaluated using a high-frequency linear transducer (7–14 MHz), the diagnostic process included the use of an ultrasonic machine fitted with a low-frequency curvilinear transducer (2–5 MHz) for spotting uterine fibroids. Patients were lying supine with neck extension to maximise thyroid gland view (Ahmad et al., 2023; Uimari et al., 2022; Zhu et al., 2022).

To guarantee appropriate sound wave transmission, a gel was sprayed; systematic scanning in both transverse and longitudinal planes was then used to evaluate nodule size, shape, echogenicity, borders, and interior composition (Fateri et al., 2023; F. Zhang et al., 2021). When needed, Doppler ultrasounds were also performed to assess vascularity, therefore offering further understanding of the kind of the nodules. This research conducted ethical standards set by Superior University, Lahore. Every participant signed written informed permission, and rigorous confidentiality was followed throughout data collecting and processing. Participants stayed anonymous; no personal identification was included into publications.

They were advised of the lack of hazards related to the study and were free to stop at any point without facing penalty. Data collecting consisted on gathering qualified patients having ultrasonic tests. Medical records and interviews helped to compile information that guarantees thorough recording of every case. SPSS 26 was used for data analysis, where for continuous variables descriptive statistics including mean and standard deviation were calculated. The chi-square test was used to find links between categorical data thereby enabling statistical evaluation of associations.

Results

Table 1 Descriptive Statistics of Age, Weight, US Fibroids Size, and US Thyroid Nodules Size

Statistic	Age	Weight (kg)	US Fibroids Size Length (Ahmad et al.)	US Fibroids Size Width (Ahmad et al.)	US Thyroid Nodules Size Length (Ahmad et al.)	US Thyroid Nodules Size Width (Ahmad et al.)
Mean	28.14	56.78	46.28	41.2	7.49	6.69
Std. Deviation	5.61	9.51	24.87	23.32	7.37	6.68
Minimum	18	36	12	9	0	0
Maximum	39	74	108	106	30	27

Table 2 Frequency Distribution of Clinical Symptoms, US Fibroids Shape, Location, and Echogenicity, and US Thyroid Nodules Shape, Location, and Echogenicity

Category	Frequency	Percent
Menstrual Bleeding	40	20.4
Lower pelvic pain	11	5.6
Heavy Menstrual bleeding	31	15.8
Pelvis pain and constipation	87	44.4
Lower abdominal pain	8	4.1
US Fibroids Shape - Round	162	82.7
US Fibroids Shape - Oval	28	14.3
US Fibroids Shape - Smooth	4	2

US Fibroids Shape - Irregular margins	2	1
US Fibroids Location - Ant. wall	50	25.5
US Fibroids Location - Post. wall	29	14.8
US Fibroids Location - Fondo Ant wall	112	57.1
US Fibroids Echogenicity - Hypoechoic	182	92.9
US Fibroids Echogenicity - Hyperechoic	6	3.1
US Fibroids Echogenicity - Isoechoic	8	4.1
US Thyroid Nodules Shape - Solid	7	3.6
US Thyroid Nodules Shape - Cystic	88	44.9
US Thyroid Nodules Shape - Solid/Cystic	90	45.9
US Thyroid Nodules Location - Right Lobes	51	26
US Thyroid Nodules Location - Left Lobes	51	26
US Thyroid Nodules Echogenicity - Hyperechoic	87	44.4
US Thyroid Nodules Echogenicity - Hypoechoic	5	2.6
US Thyroid Nodules Echogenicity - Isoechoic	8	4.1

Table 3 Cross Tabulation of US Fibroids Shape, Location, and Echogenicity with US Thyroid Nodules Shape, Location, and Echogenicity

US Fibroids Variable	US Thyroid Nodules Variable	Frequency	p-value
US Fibroids Shape - Round	Predominantly cystic	71	0.141
US Fibroids Shape - Oval	Predominantly cystic	14	0.141
US Fibroids Shape - Smooth	Solid	6	0.141
US Fibroids Shape - Irregular Margins	Solid	1	0.141
US Fibroids Location - Ant. wall	Right Lobes	10	0.139
US Fibroids Location - Post. wall	Left Lobes	15	0.139
US Fibroids Location - Fondo Ant wall	Absent	53	0.139
US Fibroids Location - Fundal region	Absent	1	0.139
US Fibroids Echogenicity - Hypoechoic	Nil	85	0.004
US Fibroids Echogenicity - Hyperechoic	Hyperechoic	79	0.004
US Fibroids Echogenicity - Isoechoic	Anechoic with internal foci	8	0.004

Table 4 Correlation Between US Fibroids Size, US Thyroid Nodules Size, Shape, Location, and Echogenicity

Variable 1	Variable 2	Pearson Correlation (r)	p-value
US Fibroids Size Length	US Fibroids Size Width	0.954	0
US Fibroids Size Width	US Thyroid Nodules Size Length	-0.279	0
US Thyroid Nodules Size Length	US Thyroid Nodules Size Width	0.962	0
US Thyroid Nodules Shape	US Thyroid Nodules Location	0.868	0
US Thyroid Nodules Location	US Thyroid Nodules Echogenicity	0.79	0
US Fibroids Shape	US Fibroids Location	-0.005	0.943
US Fibroids Location	US Fibroids Echogenicity	0.004	0.951
US Fibroids Echogenicity	US Thyroid Nodules Shape	-0.113	0.115
US Thyroid Nodules Shape	US Thyroid Nodules Location	0.725	0
US Thyroid Nodules Location	US Thyroid Nodules Echogenicity	0.79	0
US Thyroid Nodules Echogenicity	US Fibroids Echogenicity	-0.1	0.163

Discussion

The current study explored the correlation between thyroid nodules and uterine fibroids among reproductive-age women in Azad Kashmir, using ultrasonographic assessments and correlational analyses. The findings indicate a significant relationship between the two conditions, adding to the growing body of evidence supporting shared hormonal and pathophysiological mechanisms. This connection highlights the importance of understanding not just the individual burden of these conditions, but also their interplay, which could potentially alter diagnostic and therapeutic approaches in clinical practice. The observed demographic patterns, including the mean age of participants (28.14 years ±5.61), point to a younger cohort of women being affected, emphasizing the need for earlier screenings and intervention strategies.

The mean age of participants was 28.14 years (±5.61), and the majority presented with pelvic pain and menstrual irregularities. These findings align with prior studies highlighting that uterine fibroids commonly affect women in their reproductive years (J. Zhang et al., 2021). Similarly, the mean weight of participants was 56.78 kg (±9.51), with a substantial number having a body mass index (BMI) consistent with the ranges associated with fibroid and thyroid nodule prevalence. This reflects the findings identified BMI as a risk factor for both conditions (Iizuka et al., 2022).

The ultrasonographic assessment revealed an average fibroid length of 46.28 mm (±24.87) and a width of 41.20 mm (±23.32). These measurements indicate moderate fibroid sizes that align with earlier studies (Liu et al., 2024; Ott et al., 2014). Most fibroids were hypoechoic (92.9%) and predominantly round (82.7%), with the majority located in the anterior and fundo-anterior walls (57.1%). These morphological characteristics are consistent with findings from (Iizuka et al., 2022)., which reported hypoechoic fibroids as the most prevalent type on ultrasound imaging.

Similarly, thyroid nodules showed a mean length of 7.49 mm (±7.37) and width of 6.69 mm (±6.68), with most nodules exhibiting mixed echogenicity (solid/cystic: 45.9%) and being located bilaterally in the thyroid lobes. This distribution concurs with (Chester et al., 2022; Santosh, 2023), who described thyroid nodules as primarily hyperechoic or mixed in echogenicity, with a significant prevalence in reproductive-age women.

A noteworthy finding was the statistically significant correlation ($p < 0.05$) between fibroid echogenicity and thyroid nodule echogenicity, with hyperechoic fibroids often associated with similar thyroid nodule echogenicity. This supports earlier hypotheses (Chester et al., 2022; Santosh, 2023) that estrogen plays a pivotal role in both thyroid and uterine tissue proliferation, suggesting a hormonal interplay that drives the co-occurrence of these conditions. The negative correlation between thyroid nodule size and fibroid size observed in this study may indicate differential growth mechanisms influenced by local hormonal environments, a hypothesis that warrants further investigation.

Ultrasonographic data revealed fibroid dimensions averaging 46.28 mm (length) and 41.20 mm (width), with 92.9% being hypoechoic and predominantly located in the anterior or fundo-anterior walls. Similarly, thyroid nodules were primarily mixed echogenicity (45.9%) with bilateral lobe distribution. These findings align with previous studies by (Chester et al., 2022), highlighting estrogen's role as a shared hormonal driver. However, the negative correlation observed between fibroid size and thyroid nodule size introduces a nuanced dimension to these interactions, suggesting localized hormonal or growth factor dynamics that merit further exploration.

Clinical Relevance

The findings of this study have critical implications for clinical practice. Uterine fibroids and thyroid nodules are both associated with significant morbidity, including menstrual disturbances, pelvic pain, and, in some cases, infertility. The observed correlation between these conditions underscores the need for integrated diagnostic and management approaches. For instance, women presenting with uterine fibroids, especially those with multiple or large fibroids, should be screened for thyroid nodules and vice versa. This integrated approach could facilitate early detection and comprehensive management, reducing the risk of complications associated with delayed diagnosis.

In the current study, 44.4% of participants reported pelvic pain with constipation, and 20.4%

experienced heavy menstrual bleeding. These symptoms significantly impact the quality of life and are exacerbated in women with coexisting thyroid dysfunction. Taylor et al. (2018) reported that hypothyroidism exacerbates fibroid-related symptoms, a finding corroborated by the high prevalence of symptomatic fibroids in this cohort.

For example, Ott et al. (2014) reported a significant association between hypothyroidism and uterine fibroids, with larger fibroid sizes observed in hypothyroid women. Similarly, Smith et al. (2019) found that thyroid dysfunction, particularly hypothyroidism, was associated with larger and more symptomatic fibroids. These findings parallel the current study's results, which showed that participants with thyroid nodules often had larger fibroids.

Moreover, the prevalence of fibroids in the fundo-anterior wall aligns with findings by Kumar et al. (2016), who emphasized the role of estrogen dominance in fibroid development. The observation that hyperechoic fibroids were more common in participants with thyroid nodules also supports the hypothesis of shared pathophysiological mechanisms involving estrogen and other growth factors, as suggested by Liu et al. (2017).

Conclusion

The study connections hyperechoic fibroids to thyroid nodules, emphasising multimodal therapy. Hormone profiling and imaging may help diagnose. Cross-sectional and ultrasound diagnostics have drawbacks. Studying temporal relationships requires larger populations and longitudinal approaches. People with both categories should be monitored.

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