International Journal of Radiology and Diagnostic Imaging

E-ISSN: 2664-4444
P-ISSN: 2664-4436
Impact Factor (RJIF): 5.68
www.radiologypaper.com
IJRDI 2025; 8(3): 141-145
Received: 11-06-2025
Accepted: 15-07-2025

Naglaa Mostafa Elsayed
Radiologic Sciences Department, KAU, Jeddah, Saudi Arabia1 and Radiology department, Cairo university, Cairo, Egypt

Njoud Aldusary
Radiologic Sciences Department, KAU, Jeddah, Saudi Arabia

Rawan Abdeen
Radiologic Sciences Department, KAU, Jeddah, Saudi Arabia

Corresponding Author:
Naglaa Mostafa Elsayed
Radiologic Sciences Department, KAU, Jeddah, Saudi Arabia1 and Radiology department, Cairo university, Cairo, Egypt

Incidental findings of the thyroid gland in males using ultrasonography

Naglaa Mostafa Elsayed, Njoud Aldusary and Rawan Abdeen

DOI: https://www.doi.org/10.33545/26644436.2025.v8.i3c.486

Abstract
Introduction: The widespread use of neck Ultrasonography has led to increased incidences of incidentally discovered thyroid lesions. Worldwide, females are more affected by thyroid diseases than males. clinical and imaging detection of thyroid lesions in males is also mandatory to early discover any suspicious or malignant lesions that may warrants surgical intervention.
Subjects and methods: Prospective study was performed at the Radiology Sciences department, faculty of applied medical sciences, KAU at 2012- 2023. Thyroid US was performed to 135 healthy males aging 12- 62 years old, not diabetic or hypertensive. Ethical approval and participants' consents were obtained.
Results: Thyroid lesions were detected in 40 participants including focal and diffuse thyroid lesions (28 and 12 cases respectively). All lesions show US benign criteria.
Aim of work is to study the incidence and character of thyroid lesions in healthy males using Ultrasonography

Keywords: Thyroid, ultrasound, incidental, males, nodules

Introduction

Thyroid diseases are the most common endocrine disorders worldwide, representing a major public health concern. Alarmingly, about 60% of individuals with a thyroid disorder are unaware of their condition [1]. One type of thyroid issue that often goes unnoticed is the incidental thyroid nodule, an asymptomatic lesion discovered unintentionally during imaging or surgery unrelated to the thyroid gland. Although most of these nodules are benign, their potential for malignancy makes them clinically significant [2]. Therefore, identifying and reporting even small thyroid nodules is crucial to prevent overlooking potential malignancies.

The prevalence of incidental thyroid nodules discovered through imaging varies significantly. High-resolution ultrasound is the most effective tool, detecting 20% to 67% of nonpalpable thyroid nodules, followed by computed tomography (CT) and magnetic resonance imaging (MRI), which detect 9% to 25% [2, 3]. Ultrasound is considered the gold standard for evaluating thyroid nodules, and duplex ultrasonography, combining Doppler ultrasound with B-mode imaging, is a commonly used non-invasive modality due to its ease and effectiveness [4].

Studies have found varying rates of incidental thyroid nodules during Doppler ultrasound, with a global prevalence affecting 4% to 7% of the population. These nodules are often discovered during palpation (4% to 8%) or ultrasound (10% to 41%) [4]. The incidental discovery of thyroid lesions during carotid ultrasound can occur in 10% to 40% of the general population [5, 6]. While most of these lesions are benign, the risk of malignancy ranges from 1.5% to 17% [6].

The incidental discovery of thyroid abnormalities during ultrasound scanning poses challenges to radiologists and clinicians, especially in terms of cost-effective assessment. Various studies have identified risk factors for thyroid disease, including gender, age, pregnancy, comorbidities, smoking, and family history [1]. Given the high prevalence of thyroid disease in Saudi Arabia, it is crucial to investigate the specific characteristics and occurrence of incidental thyroid gland findings, particularly in the male population, which has been underrepresented in research [7].

With the increasing use of advanced imaging modalities, the frequency of incidental

findings, including those in the thyroid, is on the rise. These findings often go unnoticed or unreported by radiologists or are disregarded by clinicians, contributing to significant health risks. Therefore, it is essential to evaluate these abnormalities further to determine whether they are benign or malignant, as this determines the necessity of additional diagnostic examinations. This study aims to fill the gap by examining the prevalence and characteristics of incidental thyroid findings in medically healthy males using ultrasound imaging and give recommendation to the outcome of these findings.

Materials and Methods

Subjects

A total of 135 males participated in the study. We included a wide range of ages (12- 62 years). The inclusion criteria included normal BMI, no previous or current history of thyroid disease, thyroid operation, diabetes or hypertension.

Methods

This is a prospective study done at the radiological sciences department, faculty of applied medical sciences, KAU during 2022 - 2023. Ethical approval was obtained from the unit of biomedical ethics, research ethics committee (reference number 312-23). Verbal consent was received from all participants.

Neck ultrasound was performed by a radiologist and sonographer using Philips EPIQ 5 ultrasound machine and linear probe 12- 3 MHz. Findings including thyroid size, vascularity, echogenicity were reported. In case of focal lesions, number, size, location, vascularity and echogenicity were well studied and included in the report. Doppler was applied for all cases. Cervical lymphadenopathy was also reported.

Statistical Analysis

Patients' data were tabulated and processed using [SPSS (IBM Corp. Released 2023. IBM SPSS Statistics for Windows, Version 29.0.2.0 Armonk, NY: IBM Corp)].

Patients were categorized based on nature of the lesion(s) into focal and diffuse lesions groups. They were categorized once more according to site of lesion(s). Categorical variables were presented by frequency and percentage. They were compared using Chi-square test or Fischer's exact test when appropriate. Continuous variables were presented by mean and standard deviation (SD). They were compared by t-student test. In all tests, p value was considered significant if less than 0.05

Results

This study enrolled 135 clinically free males who underwent thyroid US examination. Their mean age was 24 ± 11 years old that ranged from 12-62 years. Forty patients (30%) had thyroid abnormalities in their US examinations. Focal lesions were noticed in 28 subjects (21%), while only 12 subjects had diffuse lesions (9%) (Figure 1).

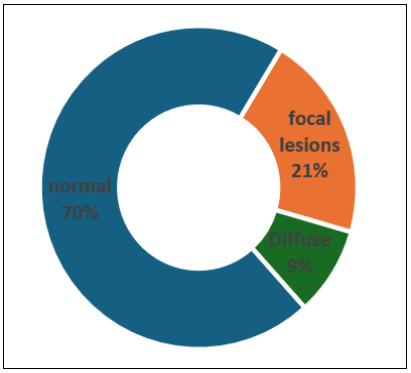

Fig 1: (Ultrasound findings of participants)

Figure 2 showed detailed categorization of diffuse and focal lesions, where thyroid colloid cysts were the commonest focal lesions (figure 3), while diffuse goiter was the commonest diffuse pathology.

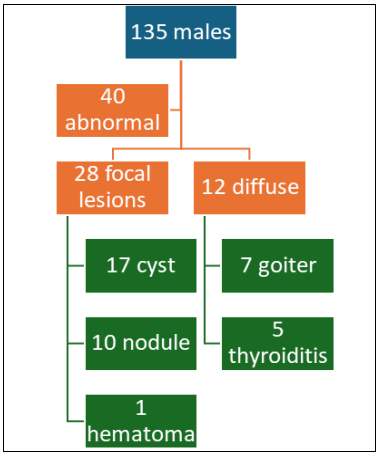

Fig 2: (Detailed Ultrasound findings of abnormal participants).

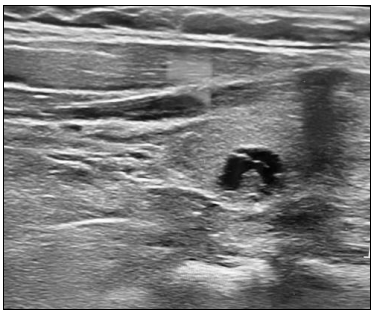

Fig 3: (Fifteen -years- old asymptomatic male. US shows colloid cyst of the right lobe)

On comparing age in the studied cases, there was no statistically significant difference between age of males with or without thyroid abnormalities and also with either focal or diffuse lesions.

Diffuse lesions were associated with significantly larger size of the gland ($P<0.01$), increased echogenicity ($P=0.04$) and more gland vascularity ($P=0.02$) than focal lesions as shown in table 1.

Table 1: US characteristics of the thyroid gland in relation to diffuse and focal pathologies.

			Focal	Diffuse	Total	P value
Gland size	Large	N	3	10	13	<0.01
		%	10.7%	83.3%	32.5%	
	Normal	N	25	2	27	
		%	89.3%	16.7%	67.5%	
Gland echogenicity	Increased	N	3	5	8	0.04
		%	10.7%	41.7%	20.0%	
	Normal	N	25	7	32	
		%	89.3%	58.3%	80.0%	
Gland vascularity	High	N	1	4	5	0.02
		%	3.6%	33.3%	12.5%	
	Normal	N	27	8	35	
		%	96.4%	66.7%	87.5%	

Details of the number and distribution of focal lesions are shown in table 2.

Table 2: Criteria of focal lesions (n=28)

			Site of lesion(s)			Total
			Bilateral	Lt	Rt	
FL number		Count	3	0	0	3
		%	33.3%	0.0%	0.0%	10.7%
	multiple	Count	6	3	3	12
		%	66.7%	42.9%	25.0%	42.9%
	single	Count	0	4	9	13
		%	0.0%	57.1%	75.0%	46.4%
Total		Count	9	7	12	28
		%	100.0%	100.0%	100.0%	100.0%

FL = focal lesion

Multiple focal lesions were mostly in both lobes while single FL were mostly in the Rt lobe with a statistically significant P<0.01

Half cases (14) showed focal lesions less than 0.5 cm and in the other 14 cases, focal lesions ranged in size from 0.5-1 cm.

There was no significant association between size of the FL and their location within the gland (P=0.08).

Table 3 showed focal lesions echogenicity. All tiny, simple cysts were completely anechoic (10 cases), while colloid cysts and hematoma showed heterogeneous echogenicity (7 and one case respectively). Six cases were isoechoic and only 4 cases showed hyperechoic nodules. No Ultrasound signs of malignancy were detected in all examined nodules.

Table 3: Thyroid focal lesions echogenicity.

			Focal lesions
echogenicity	Isoechoic	Count	6
		%	21.4%
	anechoic	Count	10
		%	35.7%
	heterogenous	Count	8
		%	28.5%
	hyperechoic	Count	4
		%	14.3%
Total		Count	28
		%	100.0%

Applying Doppler for all cases showed that diffuse lesions were more vascular than focal lesions with P<0.01 as shown on table 4.

Table 4: Thyroid vascularity in relation to the type of lesions

			Diagnosis		Total
			Focal	Diffuse	
High vascularity		Count	7	9	16
		%	25.0%	75.0%	40.0%
	no	Count	16	0	16
		%	57.1%	0.0%	40.0%
	yes	Count	5	3	8
		%	17.9%	25.0%	20.0%
Total		Count	28	12	40
		%	100.0%	100.0%	100.0%

Cervical lymphadenopathy was detected in only 13 out of 40 cases with thyroid abnormalities. All enlarged lymph nodes showed clear hilum with no abnormal infiltration or vascularity.

Discussion

Epidemiological studies have shown that the most common endocrine abnormalities in Saudi Arabia are thyroid gland disorders. This also applied in the Middle East region [8, 9, 10]. Globally, general population faces the problem of thyroid nodule during their life in about 4-7% [11]. Extensive use of thyroid US has improved the detection of thyroid lesions up to 67% of population [12]. In Saudi Arabia rising frequency of thyroid cancer may be due to the

increased clinical and imaging screening, and not only an increase in the true occurrence of thyroid cancer [13, 14]. Also, incidental thyroid nodules are being detected with increasing rate [15].

Worldwide, the prevalence of thyroid diseases is much more common in females than in males as proved in many research. Regarding the relation of thyroid lesions and gender, the prevalence was significantly higher in females (30.2% in males and 44.4% in females) with the p<0.001 [16].

Our study included males only and showed that the prevalence of thyroid abnormalities among the study population is 30% which was consistent with previous research findings done at Saudi Arabia. In the current study, thyroid abnormalities include focal and diffuse enlargement of the gland (62.5% and 32.5% respectively) and all thyroid nodules show benign US criteria. These findings are in line with many previous research done at different countries. In a study done at Saudi Arabia, around 4.63% show malignant lesions, 92% show benign nodules. Most of them were colloid cyst (78%) [14]. This also corresponds with a study done in Pakistan where the largest number of cases showed benign lesions [17].

Thyroid lesions are classified clinically and by imaging into solitary nodule, multinodular, and diffuse goiter [18]. The forms of thyroid lesions detected in the current research are similar with the available world literature [12]. The commonest thyroid abnormalities in the current study are diffuse thyroid enlargement and solitary thyroid focal lesions (32.5% for both), while multiple focal nodules represent 30% of all abnormal cases.

Regarding diffuse thyroid lesions – including diffuse goiter and thyroiditis- in participants with abnormal thyroid gland, there is statistically significant results of gland enlargement, increased echogenicity and vascularity with p value (0.01, 0.04 and 0.02) respectively. For thyroid nodules, the number of cases with multiple and single nodules was 15 and 13 respectively. There is a statistically significance of the distribution of thyroid nodules among both lobes where multiple lesions were mostly in both lobes while single lesions were mostly in the right lobe with a p value < 0.01. No scientific justification of the distribution of nodules among both lobes.

Most focal lesions are tiny cysts and colloid cysts while solid lesions were less common. Although all of them show benign US characteristics, referral for surgical consultation was done for solid lesions and none of them proved to be malignant.

The size of incidentally discovered focal lesions ranged from less than 5 mm to 1 cm

Applying Doppler study, diffuse lesions show more vascularity than focal lesions with p value < 0.01this may be explained that diffuse lesions include thyroiditis with its known high vascularity.

Our study showed no correlation between the incidence of thyroid lesions and participant's age with insignificant p value. In the study of Muhammad I. Saeed *et al*, 2018, the most common age group affected is 30 – 39 years. In another study, the highest incidence of thyroid lesions was in the fourth decade of life, mainly between 41 - 50 years old (28.9%), followed by the age group of 31 - 40 years (23.1%), while the extremes of age below 10 and above 70 years were rarely involved [15].

In the current study, the most common age affected by theroid lesions is 26+/- 11 which is non-significant compared to other age groups. This may be due to the few numbers of participants in the extreme age groups in the current study.

While most previous studies showed a relation between some healthy and metabolic factors to the presence of thyroid lesions, our study population were all in good health condition. In the study of Jin Xu, 2024, a significant risk of thyroid lesions in men included increased body mass index, abnormal glucose and benign prostatic hyperplasia [16]. Also, in the study of Fan Zangh *et al*, 2021, thyroid nodules were associated with a higher prevalence of metabolic syndromes including central obesity, hypertriglyceridemia, abnormal blood pressure, and hyperglycemia. In addition, central obesity displayed gender differences, being a risk factor in males but not in females [19].

Our participants were selected with no previous or current history of diabetes, hypertension or prostatic abnormalities with normal range of BMI. So, further studies should be applied to detect other factors explaining the relation between thyroid lesions and healthy men.

Many centers have established US as the best imaging modality used to diagnose thyroid lesions and tumors at an early stage [15]. Widespread use of US and the improvement of machines and population health awareness all lead to increased diagnosis of thyroid lesions. Wise management with these findings is important to reduce the need for unnecessary biopsies. Only suspicious focal nodules should be referred to surgeons, while thyroiditis and diffuse goiter should be referred to lab studies for thyroid profile. Incidentally found tiny cysts should be ignored medically if the patient is clinically free.

Conclusion

Thyroid lesions are detected also in non-symptomatic males, although less frequent than females as mentioned in literature. Ultrasound screening is recommended specially in males at risk as the frequency of thyroid nodules is significant even in healthy, asymptomatic Saudi population.

We recommend routine physical examination and US for asymptomatic, healthy males to early detect and manage any abnormality. We also recommend that incidentally discovered tiny cysts should be ignored as long as the person is clinically free.

Conflict of interest

No conflict of interest related to the work.

Acknowledgement

Not available

Author's Contribution

Not available

Financial Support

Not available

References

1. Alqahtani SM. Awareness of thyroid disorders among the Saudi population. Original Article. 2021;15(3):1-22.
2. Khasawneh A, Takeshita Y, Hisatomi M, Kawazu T, Fujita M, Okada S, *et al*. Incidental findings in the thyroid gland on computed tomography images of the oral and maxillofacial region. Oncol Lett. 2020 Mar;19(3):2005-2010. doi: 10.3892/ol.2020.11298. PMID: 32194696; PMCID: PMC7038924.
3. Sharbidre KG, Lockhart ME, Tessler FN. Incidental thyroid nodules on imaging: relevance and management. Radiol Clin North Am. 2021;59(4):525-533. doi: 10.1016/j.rcl.2021.03.004.
4. Al Shayeb M, Varma SR, Kaseh A, El Ashekhi A, Kuduruthullah S, Khader I. Incidental thyroid nodules: an ultrasound screening of the neck region: prevalence and risk factors. Clin Pract. 2018;15(5):873-879. doi: 10.4172/clinical-practice.1000420.
5. Steele SR, Martin MJ, Mullenix PS, Azarow KS, Andersen CA. The significance of incidental thyroid abnormalities identified during carotid duplex ultrasonography. Arch Surg. 2005;140(10):981-985. doi: 10.1001/archsurg.140.10.981.
6. Yoon DY, Chang SK, Choi CS, Yun EJ, Seo YL, Nam ES, *et al*. The prevalence and significance of incidental thyroid nodules identified on computed tomography. J Comput Assist Tomogr. 2008 Sep-Oct;32(5):810-815. doi: 10.1097/RCT.0b013e318157fd38. PMID: 18830117.
7. Al-Shammari MA, Abdel Wahab MM, AlShamlan NA,

AlOmar RS, Althunyan AK, Alghamdi LM, *et al*. Clinical, laboratory, and ultrasound-related diagnoses of thyroid disorders: using a family medicine center data to assess thyroiditis and thyroid nodules in the Eastern Province of Saudi Arabia. J Prim Care Community Health. 2022;13:21501319221095345. doi: 10.1177/21501319221095345. PMID: 35465762; PMCID: PMC9036321.
8. Al Shahrani AS, El-Metwally A, Al-Surimi K, Bin Salih S, Saleh Y, Al-Shehri A, *et al*. The epidemiology of thyroid diseases in the Arab world: a systematic review. J Public Health Epidemiol. 2016;8:17-26.
9. Qari FA. Pattern of thyroid malignancy at a University Hospital in Western Saudi aArabia. Saudi Med J. 2004;25(7):866-870.
10. Albasri A, Sawaf Z, Hussainy AS, Alhujaily A. Histopathological patterns of thyroid disease in Al-Madinah region of Saudi Arabia. Asian Pac J Cancer Prev. 2014;15(14):5565-5570.
11. Gharib H, Papini E, Paschke R, Duick DS, Valcavi R, Hegedüs L, *et al*. American Association of Clinical Endocrinologists, Associazione Medici Endocrinologi, and European Thyroid Association medical guidelines for clinical practice for the diagnosis and management of thyroid nodules: executive summary of recommendations. Endocr Pract. 2010 May-Jun;16(3):468-475. doi: 10.4158/EP.16.3.468. PMID: 20551008.
12. Ezzat S, Sarti DA, Cain DR, Braunstein GD. Thyroid incidentalomas: prevalence by palpation and ultrasonography. Arch Intern Med. 1994;154(16):1838-1840.
13. Lamfon HA. Thyroid disorders in Makkah, Saudi Arabia. Ozean J Appl Sci. 2008;1:55-58.
14. Hussain F, Iqbal S, Mehmood A, Bazarbashi S, El Hassan T, Chaudhri N. Incidence of thyroid cancer in the Kingdom of Saudi Arabia, 2000-2010. Hematol Oncol Stem Cell Ther. 2013;6(2):58-64.
15. Saeed M, Hassan A, Butt M, Baniyaseen K, Siddiqui M, Bogari N, *et al*. Pattern of thyroid lesions in Western Region of Saudi Arabia: a retrospective analysis and literature review. J Clin Med Res. 2017;10(12):3202-2027. Available from: https://www.jocmr.org/index.php/JOCMR/article/view/3202/2027.
16. Xu J, Lau P, Ma Y, Zhao N, Yu X, Zhu H, *et al*. Prevalence and associated factors of thyroid nodules among 52,003 Chinese 'healthy' individuals in Beijing: a retrospective cross-sectional study. Risk Manag Healthc Policy. 2024;17:181-189. doi: 10.2147/RMHP.S442062. PMID: 38250219; PMCID: PMC10800085.
17. Musani AM, Khan AF, Ashrafi KS, Jawaid I, Mugeri N, Malik S, *et al*. Spectrum of thyroid disease presenting in ENT department: evaluation by FNAC. Pak J Otolaryngol. 2010;26:74-75.
18. Nix P, Nicolaides A, Coatesworth AP. Thyroid cancer review 1: presentation and investigation of thyroid cancer. Int J Clin Pract. 2005;59(11):1340-1344.
19. Zhang F, Li Y, Yu X, Wang X, Lin Z, Song B, *et al*. The relationship and gender disparity between thyroid nodules and metabolic syndrome components based on a recent nationwide cross-sectional study and meta-analysis. Front Endocrinol (Lausanne). 2021 Sep 21;12:736972. doi: 10.3389/fendo.2021.736972. PMID: 34621243; PMCID: PMC8490942.

How to Cite This Article
Elsayed NM, Aldusary N, Abdeen R. Incidental findings of the thyroid gland in males using ultrasonography. International Journal of Radiology and Diagnostic Imaging. 2025; 8(3): 141-145