Original Article :

Public Awareness and Knowledge of Thyroid Disorders in the Qassim Region, Saudi Arabia: A Cross-Sectional Study

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Abstract

Background and Aims:
Thyroid disorders are among the most common endocrine conditions; however, public awareness of these conditions remains insufficient in many regions. This study aimed to assess knowledge of hypothyroidism and hyperthyroidism among adults in the Qassim region of Saudi Arabia.

Methods:
This cross-sectional study was conducted between July and October 2024 among 401 adult residents in the Qassim region. Data were collected using an online self-administered questionnaire that assessed demographic information and knowledge of thyroid disorders. Knowledge levels were classified as good or poor based on a median score of 13 out of 17 points. Statistical analysis was performed using SPSS version 26, and chi-square test was used to examine associations ($P<0.05$).

Result:
Of the participants, 19% reported having thyroid disorders, with hypothyroidism being the most prevalent (59.3%). Knowledge of thyroid disorders was generally low, with only 44.1% of the participants demonstrating a good level of knowledge. Good knowledge was significantly higher among participants with thyroid disorders, those who consulted a doctor, and those who received drug treatment ($P<0.05$). Participants were aware of the common symptoms of hyperthyroidism, such as weight loss (78.3%) and insomnia (82.8%), and symptoms of hypothyroidism, including weight gain (87%) and fatigue (84.8%). However, critical gaps remain, particularly regarding the hereditary nature of thyroid disorders and the effects of iodine-rich diets.

Conclusion:
This study highlights the insufficient public knowledge about thyroid disorders in the Qassim region. Health awareness campaigns targeting high-risk groups and focusing on symptom recognition, lifestyle factors, and prevention strategies are essential for improving public understanding and fostering early diagnosis and management.

Keywords:
Thyroid disorders, hypothyroidism, hyperthyroidism, public awareness, Qassim, Saudi Arabia

Introduction:

Thyroid disorders are among the most prevalent endocrine conditions globally, with significant implications for public health owing to their potential impact on metabolism, growth, and overall wellbeing[1,2]. In Saudi Arabia, the prevalence of thyroid dysfunction is notably high, with reports estimating an overall prevalence of 49.76%, with subclinical hypothyroidism being the most common type[3]. However, variations in the prevalence of thyroid disorders have been observed across different age groups, sexes, and geographical regions within country[4]. Research across Saudi Arabia has consistently highlighted a gap in knowledge regarding thyroid disorders in the general population. For instance, a study in the Tabuk region revealed a limited understanding of thyroid disease manifestations and risk factors[5]. Similarly, Alghamdi et al.[6] emphasized that many Saudis are unaware of potential cardiac complications arising from hyperthyroidism, highlighting broader gaps in public awareness. Notably, insufficient knowledge is not confined to the public; Alharazi et al.[7] reported that even healthcare professionals exhibited gaps in their understanding of thyroid disorders, which could hinder effective patient care. Research on the public knowledge and awareness of thyroid diseases in the Qassim region remains limited. Alharbi et al. reported that a significant proportion of the population in Qassim recognized hormonal factors as the primary cause of short stature, suggesting some awareness of thyroid-related conditions[8]. Nevertheless, broader studies, such as those by Alhazmi et al.[9] and Abozaid et al.[10], highlighted a general lack of knowledge about thyroid diseases among Saudi populations, emphasizing the potential challenges this poses for early diagnosis and effective management. Similarly, Alyahya et al. found that, while a higher prevalence of thyroid disorders was associated with increased awareness of their manifestations and risk factors, knowledge gaps persisted across various demographic groups[11]. Certain factors, including a personal or family history of thyroid disease, have been shown to influence levels of knowledge and awareness. For instance, Alqahtani3 and Qutob et al.[12] observed correlations between awareness of thyroid disorders and variables such as age, sex, and education level, underlining the role of socio-demographic factors in shaping public understanding of these conditions. Despite the high prevalence of thyroid disorders in the Qassim region and other parts of Saudi Arabia, public knowledge of these conditions remains insufficient. This lack of awareness can hinder early detection, delay appropriate treatment, and

exacerbate the disease outcomes. These findings underscore the need for targeted educational initiatives to bridge knowledge gaps and to promote awareness of thyroid disorders. This study aimed to evaluate the public knowledge of hypothyroidism and hyperthyroidism among adults in the Qassim region of Saudi Arabia, providing insights that can inform future awareness campaigns and health interventions.

Material and Methods:

2.1 Study Design, Setting, and Time:

This cross-sectional descriptive study was conducted in the Qassim region of Saudi Arabia between July and October 2024.

2.2 Study Participants

The study included adults aged 18 years and above who were residents of the Qassim Region. Individuals below 18 years of age, unwilling to participate, and not residing in the Qassim region were excluded.

2.3 Sample Size:

The sample size of 385 participants was calculated using an online sample size calculator (Raosoft, http://www.raosoft.com/samplesize.html). This calculation was based on a 5% margin of error, 95% confidence interval, and an estimated population of 1,488,285, according to the latest data from the General Authority for Statistics in Saudi Arabia. Participants were selected using a non-probability convenience sampling method.

2.4 Data Collection:

Data were collected using an online self-administered questionnaire distributed via Google Forms. The questionnaire was shared through various platforms, such as WhatsApp, X (formerly Twitter), and Instagram, after participants provided informed consent.

The questionnaire was adapted from Mirghani et al.[1], which was based on the work of Alhawiti et al.[13]. Modifications were made to exclude questions not directly relevant to the study objectives, such as questions on geographic region and the impact of sports on thyroid dysfunction. The final questionnaire consisted of 17 items. Each correct response was awarded a score of "1," while incorrect responses or "I don't know" answers were scored as "0," resulting in a maximum score of 17. A median knowledge score of 13 was used to classify participants' knowledge levels. Participants scoring above the median were categorized as having good knowledge, while those scoring below the median were considered to have poor knowledge.

2.5 Statistical Analysis

The data were analyzed using SPSS version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. The Chi-square test was

used to examine the associations between knowledge levels and participants' demographic and clinical characteristics. Statistical significance was set at $P < 0.05$.

2.6 Ethical Considerations:

This study was conducted in accordance with the ethical principles of the 1975 Declaration of Helsinki and its amendments. The study protocol was reviewed and approved by the Research Ethics Committee of the Qassim University, Saudi Arabia (approval number: 607/46/1078). Informed consent was obtained from all the participants prior to their inclusion in the study. Data confidentiality and anonymity were maintained throughout the research process.

Results:

4.1 Participant Demographics:

Of the 401 participants included in the study, 189 (47.1%) were aged between 26 and 50 years and the vast majority (98.5%, n = 395) were of Saudi nationality. Most participants were married (61.8%, n = 248) and held a bachelor's degree (69.3%, n = 278). Nearly half of the participants (47.6%, n = 191) were employed (Table 1).

Table 1: Demographic Characteristics of Participants (n = 401):

Variable	n (%)
Age (years)	
18-25	121 (30.2%)
26-50	189 (47.1%)
>50	91 (22.7%)
Nationality	
Saudi	395 (98.5%)
Non-Saudi	6 (1.5%)
Marital status	
Single	141 (35.2%)
Married	248 (61.8%)
Divorced / widow	12 (3%)
Educational level	
Illiterate	2 (0.5%)
Primary	2 (0.5%)
Middle	3 (0.7%)
Secondary	83 (20.7%)
Bachelor	278 (69.3%)
Postgraduate	33 (8.2%)
Occupation	
Student	80 (20%)
Unemployed	84 (20.9%)
Retired	46 (11.5%)
Employed	191 (47.6%)

4.2 Prevalence and Characteristics of Thyroid Diseases:

The prevalence of thyroid diseases among participants was 19% (n = 76), with hypothyroidism being the most common condition, affecting 59.3% (n = 45) of the diagnosed individuals. Among those with thyroid disorders, 34 (44.9%) were diagnosed after the age of 35. Most participants with thyroid conditions consulted a doctor (84.3%, n = 64) and 54 (71.1%) were undergoing drug therapy. Among participants without a thyroid diagnosis (n = 325), 59 (18.1%) suspected that they had a thyroid condition, with having a relative with thyroid disease being the most frequent-

ly cited reason (42.4%, n = 25) (Table 2).

Table 2. Prevalence and clinical characteristics of thyroid diseases and perceptions of having a thyroid disease among undiagnosed participants (n = 401):

Qs. No.	Variable	n (%)
1	**Do you suffer from thyroid disease?**	
	No	325 (81%)
	Yes	76 (19%)
2	**If yes, what is the disease? (n=76)**	
	Thyroid cancer	8 (10.5%)
	Hypothyroidism	45 (59.3%)
	Hyperthyroidism	23 (30.2%)
3	**At what age did this problem start? (n=76)**	
	1-12 years	5 (6.5%)
	12-20 years	11 (14.4%)
	20-35 years	26 (34.2%)
	>35 years	34 (44.9%)
4	**Have you consulted a doctor for treatment? (n=76)**	
	No	12 (15.7%)
	Yes	64 (84.3%)
5	**What type of treatment do you use for your condition? (n=76)**	
	Diet	22 (28.9%)
	Drug treatment	54 (71.1%)
6	**If you were not diagnosed with thyroid diseases, do you think you have thyroid disease? (n=325)**	
	No	266 (81.9%)
	Yes	59 (18.1%)
7	**If yes, what makes you think so? (n=59)**	
	I feel lazy	9 (15.2%)
	A relative is with these diseases	25 (42.4%)
	Symptoms appear	10 (17%)
	I noticed weight gain	10 (17%)
	I noticed weight loss recently	5 (8.4%)

4.3 Knowledge of Thyroid Function and Disorders:

The participants' knowledge of hypothyroidism and hyperthyroidism is summarized in Table 3.

Table 3. Knowledge of Hypothyroidism and Hyperthyroidism among Participants (n = 401):

Qs. No.	Variable	n (%)
1	**Is the thyroid gland considered an endocrine gland?**	
	No	37 (9.2%)
	Yes *	364 (90.8%)
2	**Who is the group most vulnerable to thyroid dysfunction (overactivity or deficiency)?**	
	Children	21 (5.2%)
	Males	15 (3.7%)
	Females *	286 (71.3%)
	Elderly	79 (19.7%)
3	**Thyroid functions include:**	
	Improve metabolism	55 (13.7%)
	Regulating heart rhythm	30 (7.5%)
	Growth and development of the fetus's nervous system	310 (77.3%)
	All of the above *	6 (1.5%)
4	**Foods that have a positive effect on thyroid function include:**	
	Foods rich in iodine (iodine) *	209 (52.1%)
	Protein-rich foods	115 (28.7%)
	None of the above	77 (19.2%)
5	**Does thyroid dysfunction (activity or deficiency) affect brain development?**	
	No	149 (37.2%)
	Yes *	252 (62.8%)
6	**Does thyroid dysfunction (activity or deficiency) affect the level of cholesterol in the blood?**	
	No	93 (23.2%)
	Yes *	308 (76.8%)
7	**Does thyroid dysfunction (activity or deficiency) lead to heart disease?**	
	No	111 (27.7%)
	Yes *	290 (72.3%)

8	**Is thyroid dysfunction (active or underactive) a hereditary ?disease**	
	No	(47.9%) 192
	* Yes	(52.1%) 209
9	**Is there a relationship between smoking and thyroid ?disorders**	
	No	(30.7%) 123
	* Yes	(69.3%) 278
10	**Is weight loss, despite a good appetite, a symptom of an ?overactive thyroid gland**	
	No	(21.7%) 87
	* Yes	(78.3%) 314
11	**Are insomnia and lack of sleep symptoms of thyroid ?activity**	
	No	(17.2%) 69
	* Yes	(82.8%) 332
12	**Is increased heart rate a ?symptom of thyroid activity**	
	No	(20.7%) 83
	* Yes	(79.3%) 318
13	**Is oligomenorrhea a symptom ?of thyroid activity**	
	No	(27.4%) 110
	* Yes	(72.6%) 291
14	**Is sudden weight gain a ?symptom of hypothyroidism**	
	No	(13%) 52
	* Yes	(87%) 349
15	**Are fatigue and drowsiness symptoms of hypothyroid-?ism**	
	No	(15.2%) 61
	* Yes	(84.8%) 340
16	**Are dry skin and hair symp-?toms of hypothyroidism**	
	No	(21.2%) 85
	* Yes	(78.8%) 316
17	**Is feeling cold in hot weather a symptom of hypothyroid-?ism**	
	No	(23.2%) 93
	* Yes	(76.8%) 308

* denotes the correct answer.

The majority (90.8%, n = 364) correctly identified the thyroid gland as an endocrine organ, and 286 (71.3%) believed that females were the most vulnerable to thyroid dysfunction. Additionally, 310 participants (77.3%) recognized the role of the thyroid gland in fetal nervous system development (Figure 1) and 209 (52.1%) acknowledged that iodine-rich foods had a positive effect on thyroid function.

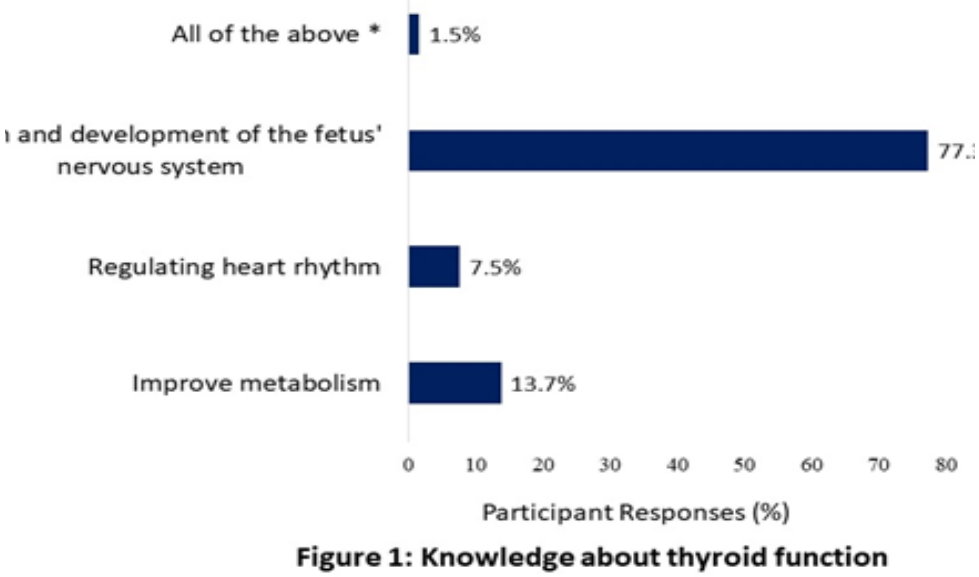


Figure 1 showing knowledge about thyroid function. The * indicates correct answer.

Regarding the effects of thyroid dysfunction, the participants were aware of its impact on brain development (62.8%, n = 252), blood cholesterol levels (76.8%, n = 308), and heart disease (72.3%, n = 290). While 209 participants (52.1%) considered thyroid dysfunction hereditary, 278 participants (69.3%) identified smoking as a risk factor for thyroid disorders.

4.4 Recognition of Symptoms:

The participants demonstrated a high level of awareness of the symptoms associated with thyroid disorders. For hyperthyroidism, common symptoms recognized included weight loss despite good appetite (78.3%, n = 314), insomnia (82.8%, n = 332), increased heart rate (79.3%, n = 318), and oligomenorrhea (72.6%, n = 291). Similarly, for hypothyroidism, symptoms such as sudden weight gain (87%), fatigue and drowsiness (84.8%, n = 340), dry skin and hair (78.8%, n = 316), and feeling cold in hot weather (76.8%, n = 308) were widely reported.

4.5 Knowledge Scores:

The mean knowledge score among the participants was 12.65 ± 2.82, with a median score of 13. Overall, 177 participants (44.1%) demonstrated good knowledge, whereas 224 (55.9%) were categorized as having poor knowledge (Figure 2).

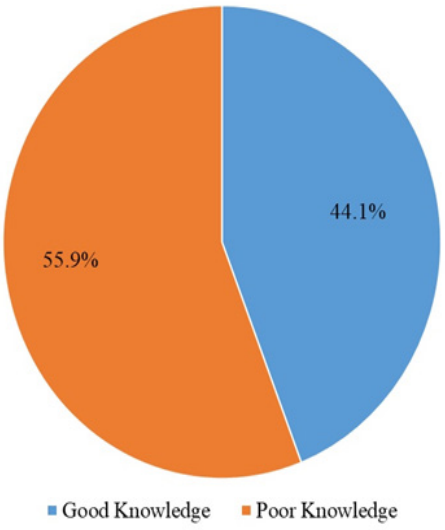


Figure 2: Levels of Knowledge of Thyroid

Figure 2 showing levels of knowledge of thyroid disorders.

4.6 Associations with Knowledge Levels:

As presented in Table 4, there were no significant associations between knowledge levels and demographic variables, such as age, marital status, or education level ($P > 0.05$).

Furthermore, participants diagnosed with thyroid diseases, particularly those with hypothyroidism, those diagnosed after the age of 35 years, those who consulted a doctor, and those receiving drug therapy, exhibited significantly higher knowledge levels ($P < 0.05$) (Table 4). Additionally, participants without a formal thyroid diagnosis, but who suspected that they had a thyroid condition, also demonstrated significantly higher knowledge levels ($P < 0.05$).

Table 4: Relationship between knowledge levels and participants' demographics, prevalence, clinical characteristics of thyroid diseases, and perceptions among undiagnosed participants (n = 401):

Variable	Knowledge level: Poor n (%)	Knowledge level: Good n (%)	(chi-square) χ^2	p-value
Sociodemographic Characteristics				
Age (years)				
18-25	68 (30.4%)	53 (29.9%)	4.55	0.102
26-50	97 (43.3%)	92 (52%)		
>50	59 (26.3%)	32 (18.1%)		
Nationality				
Saudi	220 (98.2%)	175 (98.9%)	0.28	0.591
Non-Saudi	4 (1.8%)	2 (1.1%)		
Marital status				
Single	77 (34.4%)	64 (36.2%)	2.88	0.236
Married	143 (63.8%)	105 (59.3%)		
Divorced / widow	4 (1.8%)	8 (4.5%)		
Educational level				
Illiterate	2 (0.9%)	0 (0.0%)		
Primary	2 (0.9%)	0 (0.0%)		
Middle	2 (0.9%)	1 (0.6%)	4.05	0.542
Secondary	47 (21%)	36 (20.3%)		
Bachelor	155 (69.2%)	123 (69.5%)		
Postgraduate	16 (7.1%)	17 (9.6%)		
Occupation				
Student	43 (19.2%)	37 (20.9%)		
Unemployed	48 (231.4%)	36 (20.3%)	0.36	0.948
Retired	27 (12.1%)	19 (10.7%)		
Employed	106 (47.3%)	85 (48%)		
Clinical Characteristics and Perceptions Related to Thyroid Diseases				
?Do you suffer from thyroid disease				
Yes	(13.8%) 31	(25.4%) 45	7.89	*0.005
(If yes, what is the disease? (n=76				
Thyroid cancer	(2.2%) 5	(1.7%) 3		
Hypothyroidism	(5.8%) 13	(18.1%) 32	15.06	*0.002
Hyperthyroidism	(5.8%) 13	(5.6%) 10		
(At what age did this problem start? (n=76				
1-12 years	4 (1.8%)	1 (0.6%)		
12-20 years	8 (3.6%)	3 (1.7%)	19.19	0.001*
20-35 years	10 (4.5%)	16 (9%)		
>35 years	9 (4%)	25 (14.1%)		

Have you consulted a doctor for treatment? (n=76)				
No	8 (3.6%)	4 (2.3%)	12.5	0.002*
Yes	23 (10.3%)	41 (23.2%)		
What type of treatment do you use for your condition? (n=76)				
Diet	10 (4.5%)	12 (6.8%)	0.27	0.596
Drug treatment	21 (9.4%)	33 (18.6%)		
If you were not diagnosed with thyroid diseases, do you think you have thyroid disease? (n=325)				
No	159 (71%)	107 (60.5%)	0.09	0.761
Yes	34 (15.2%)	25 (14.1%)		
If yes, what makes you think so? (n=59)				
I feel lazy	4 (1.8%)	5 (2.8%)		
A relative is with these diseases	16 (7.1%)	9 (5.1%)		
Symptoms appear	6 (2.7%)	4 (2.3%)	3.43	0.634
I noticed weight gain	4 (1.8%)	6 (3.4%)		
I noticed weight loss recently	4 (1.8%)	1 (0.6%)		

*** indicates statistically significant (p< 0.05)**

Discussion :

This study assessed knowledge of hypothyroidism and hyperthyroidism among adults in the Qassim region of Saudi Arabia. The findings revealed that 19% of participants reported thyroid disorders, with hypothyroidism being the most common (59.3%). These results align with those of Mirghani et al., who reported a similar prevalence of thyroid disorders (18.2%) and identified hypothyroidism as the predominant condition [1]. Similarly, Alqahtani et al. [3] found that subclinical hypothyroidism was the most frequent thyroid disorder in the Asir region of Saudi Arabia, followed by primary hypothyroidism, with a combined prevalence of 49.7%.

A notable proportion of participants with thyroid conditions (84.3%) sought medical consultation, underscoring the critical role of healthcare providers in managing thyroid disorders. However, a study conducted in Muscat highlighted a gap in patient education, with 76% of individuals with thyroid conditions reporting the absence of counseling or educational materials[14]. Effective communication between healthcare providers and patients is essential to improve patient knowledge and treatment adherence. Mabuza et al. demonstrated that adherence was enhanced when patients received clear, empathetic communication regarding their diagnosis and treatment[15]. This underscores the importance of recognizing nonverbal cues, practicing active listening, and fostering empathy during consultations[16].

The participants in this study had sufficient knowledge of certain aspects of the thyroid function. For example, 77.3% of respondents understood the role of the thyroid gland in fetal nervous system development, 71.3% identified females as the most susceptible group to thyroid dysfunction, and 90.8% recognized the thyroid as an endocrine organ. However, gaps in knowledge were evident: only 52.1% of the participants recognized thyroid dysfunction as a genetic condition, and a similar proportion acknowledged the beneficial effects of iodine-rich diets on thyroid health. These findings are consistent with those of Mohamed et al., who found that, while 76.4% of women identified the thyroid as a ductless organ, only 54.2% understood its role in brain development[17].

Similarly, Almuzaini et al. reported that 77.9% of participants recognized the thyroid as an endocrine gland, whereas 62.4% were aware of its influence on cholesterol levels. However, a significant proportion (42.1%) failed to identify thyroid dysfunction as a genetic condition[2]. In this study, the participants showed adequate awareness of the systemic implications of thyroid disorders, with 76.8% linking thyroid dysfunction to cholesterol levels, 72.3% associating it with heart disease, and 62.8% recognizing its impact on brain development.

Despite these encouraging levels of awareness, significant knowledge gaps remain, particularly concerning hereditary factors and lifestyle-related risks, such as smoking, which 69.3% of participants identified as contributing factors to thyroid dysfunction. These findings highlight the need for targeted educational initiatives to address this issue. Campaigns focusing on the hereditary nature of thyroid disorders, the role of iodine in thyroid health, and the prevention of lifestyle-related risks could significantly enhance public understanding and facilitate the early diagnosis and management of thyroid conditions.

Regarding knowledge of thyroid function, Mirghani et al. reported that 70.1% of participants understood the function of the thyroid gland, 66.4% recognized that women were more likely to develop thyroid disorders, and 49.5% identified a link between thyroid malfunction and heart disease[1]. Similarly, a study conducted in Riyadh involving 870 participants revealed that only 24.4% were aware of the thyroid gland's role in metabolism and bodily functions[18]. Another Saudi Arabian study found that 66.3% of participants understood the role of the thyroid gland in increasing metabolism, 44.2% believed it regulates heartbeats, and 36.1% linked it to the growth and development of the fe-

tal nervous system[19]. These findings underscore the variability in awareness of thyroid function across different populations.

The participants in the current study demonstrated a strong awareness of the symptoms associated with thyroid disorders. Commonly recognized symptoms of hyperthyroidism included difficulty sleeping (82.8%), weight loss despite a healthy appetite (78.3%), elevated heart rate (79.3%), and oligomenorrhea (72.6%). Similarly, hypothyroidism symptoms were well recognized, with abrupt weight gain (87%), fatigue and tiredness (84.8%), dry skin and hair (78.8%), and feeling cold in hot weather (76.8%) being the most frequently reported symptoms. These results align with the findings of Alamri et al., who noted that 82.2% of participants associated weight gain without increased appetite with hypothyroidism, whereas 61.5% identified dry skin and hair loss as symptoms. For hyperthyroidism, 59.6% recognized excessive perspiration, 55.9% identified weight loss despite an increased appetite, and 57% associated the condition with an elevated heart rate, anxiety, and insomnia[19].

Similarly, Alqahtani et al. reported a high level of awareness of thyroid disorder symptoms, with most participants identifying weight gain (77.9%), depression and fatigue (74.9%), cold sensations (54.1%), and dry skin and hair loss (58.1%) as indicators of hypothyroidism. For hyperthyroidism, common symptoms included menstrual irregularities, anxiety, insomnia, palpitations, excessive sweating, and weight loss despite increased appetite[3]. Similarly, Alyahya et al. found robust awareness of thyroid-related symptoms in the Eastern Province of Saudi Arabia. Hypothyroidism was frequently associated with weight gain (68.9%), fatigue (81.7%), and cold sensations, whereas hyperthyroidism was linked to sensations of heat and weight loss, as recognized by 63% of participants[11].

The findings of this study indicate that 44.1% of participants demonstrated high knowledge of hypothyroidism and hyperthyroidism, while 55.9% exhibited low knowledge levels. These results are consistent with those of Alqahtani et al., who reported that 41.5% of the respondents had moderate knowledge of thyroid conditions[3]. Similarly, a cross-sectional survey of 1,560 Saudi males and females revealed comparable levels of knowledge[13]. However, the current study's findings surpass those of Alamri et al., where only 30.9% of participants exhibited strong knowledge, 50.8% had moderate knowledge, and 18.9% showed low knowledge[19].

In contrast, a study conducted in the

Eastern Province of Saudi Arabia found that 44.7% of participants had poor knowledge, 41.2% had average knowledge, and only 14.2% demonstrated high knowledge, with a mean knowledge score of 8.67[19]. Similarly, Alhawiti et al. reported that in Tabuk City, 52% of participants had a strong understanding of thyroid gland problems, whereas 45% exhibited insufficient knowledge[13]. Almuzaini et al. found slightly higher awareness levels, with 57.3% of the respondents demonstrating a high level of knowledge of thyroid disorders[2].

International comparisons have revealed substantial variability in knowledge levels. For instance, Mohamed et al. reported that 51.7% of Malaysian participants had excellent knowledge of thyroid disorders, which may be attributed to the predominance of women in the study sample, as they are more affected by these conditions[17]. Conversely, in Oman, Al Munji found that 95% of participants were unaware of thyroid issues prior to diagnosis[14]. Similarly, a study in India revealed widespread misconceptions and an insufficient understanding of thyroid disorders and related illnesses[20].

Participants in the current study demonstrated robust awareness of hyperthyroidism symptoms such as difficulty sleeping (82.8%), weight loss despite appetite (78.3%), elevated heart rate (79.3%), and oligomenorrhea (72.6%). These findings align with those of Almuzaini et al., who reported that 81% of respondents identified insomnia and 79.7% recognized weight loss as a symptom of hyperthyroidism[2]. However, Alhawiti et al. observed lower awareness levels in Tabuk City, where only half of the participants accurately identified their hyperthyroidism symptoms. Menstrual irregularities (50.7%) and sensitivity to hot temperatures (44.3%) were the least recognized symptoms[13].

Regarding hypothyroidism, participants in this study exhibited strong awareness of symptoms, including abrupt weight gain (87%), fatigue and drowsiness (84.8%), dry skin and hair (78.8%), and feeling cold in hot weather (76.8%). These results align with those of Alqahtani et al., who reported high awareness of weight gain (77.9%), fatigue (74.9%), and dry skin and hair loss (58.1%) as the key symptoms of hypothyroidism[3]. Similarly, Alyahya et al. found that participants in Eastern Province recognized weight gain (68.9%), fatigue (81.7%), and cold sensitivity as symptoms of hypothyroidism[11].

The current study found no significant associations between the participants' demographic characteristics and their level of knowledge regarding hypothyroidism and hyperthyroidism. However, higher knowl-

edge levels were observed among individuals with hypothyroidism, those diagnosed with thyroid disorders before the age of 35 years, individuals without thyroid disorders who suspected they might have one, and thyroid patients who had consulted a doctor for treatment. These findings contrast with those of Mirghani et al., who reported significant correlations between older age, higher education, and female sex with superior knowledge levels[1]. Similarly, Alamri et al. found that age and sex were significantly associated with thyroid knowledge[19]. Alqahtani et al. also identified statistically significant relationships between postgraduate education, younger age groups (20–30 years), and female gender with greater knowledge of thyroid disorders[3]. Consistent with these studies, Alyahya et al. noted that females and participants aged 20–35 years demonstrated significantly better knowledge than other demographic groups[11].

Interestingly, the higher knowledge levels observed among individuals with hypothyroidism or thyroid disorders in this study have not been extensively explored in previous Saudi research. However, a recent study in Jeddah by Alharazi et al. found a strong correlation between positive attitudes toward thyroid disorders and a history of diagnosis, underscoring the role of lived experiences in shaping the understanding and attitudes toward thyroid disease[7].

This study had several limitations that should be acknowledged. While the modified questionnaire was not formally re-validated, care was taken to retain the core structure and purpose of the original tool, focusing on knowledge and awareness of thyroid disorders. The use of a self-reported questionnaire introduces the potential for recall bias, as participants may not have accurately reported their knowledge or experiences. Additionally, the cross-sectional design limits the ability to establish causal relationships between the variables. The reliance on an online survey may have excluded individuals without Internet access or those less inclined to participate in digital research, potentially introducing sampling bias. Furthermore, the study was conducted in a single region, which limits the generalizability of the findings to the broader Saudi Arabian population.

Despite these limitations, this study highlights critical gaps in knowledge regarding hypothyroidism and hyperthyroidism among adults in the Qassim region. These findings emphasize the need for targeted public health initiatives to enhance awareness, particularly among less informed and high-risk groups. Address-

ing these knowledge gaps could facilitate early diagnosis and intervention, ultimately reducing the burden of thyroid disorders and improving patient outcome. Future research should adopt a multicenter approach involving a larger and more diverse sample to improve the generalizability of the findings. Longitudinal study designs are also recommended to establish causal relationships and evaluate the long-term effectiveness of educational interventions and awareness campaigns to improve public knowledge and health outcomes.

Conclusions:

This study revealed that only 44.1% of participants demonstrated good knowledge of thyroid illnesses, highlighting a low level of awareness among the population. Comprehensive national health awareness campaigns are urgently needed to address this gap, particularly focusing on high-risk and less-informed groups. Such initiatives have the potential to improve early detection and timely treatment, ultimately mitigating the adverse effects and burdens associated with thyroid disorders in Saudi Arabia.

Conflict of interest:

The authors declare no conflict of interest.

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References:

1. Mirghani H, Alquayr SM, Alanazi T, Alwakeel AA, Al Madshush AM, Alali HA, et al. Knowledge Assessment Regarding the Differences Between Hypothyroidism and Hyperthyroidism Among Saudi Arabia's Adult Population. Cureus [Internet]. 2023 Apr 19 [cited 2024 Dec 10]; Available from: https://www.cureus.com/articles/144843-knowledge-assessment-regarding-the-differences-between-hypothyroidism-and-hyperthyroidism-among-saudi-arabias-adult-population
2. Almuzaini A, Alshareef B, Alghamdi S, Munshy A, Aljarallah A, Salman S, et al. Assessment of knowledge and awareness regarding thyroid disorders among Saudi people. IJMDC. 2019;1070–6.
3. Alqahtani SAM. Prevalence and Characteristics of Thyroid Abnormalities and Its Association with Anemia in ASIR Region of Saudi Arabia: A Cross-Sectional Study. Clinics and Practice. 2021 Aug 6;11(3):494–504.
4. Syed W, Samarkandi OA, Alsadoun A,

Harbi MKA, Al-Rawi MBA. Evaluation of clinical knowledge and perceptions about the development of thyroid cancer—An observational study of healthcare undergraduates in Saudi Arabia. Front Public Health. 2022 Aug 15;10:912424.

5. Alshahrani RS, Mirghani H, Alharbi RT, Alenazi LM, Albalawi DL, Alomrani EMD, et al. Knowledge of Thyroid Disease Manifestation and Risk Factors Among the General Population in the Tabuk Region of Saudi Arabia. Cureus [Internet]. 2024 Mar 12 [cited 2024 Dec 13]; Available from: https://www.cureus.com/articles/216656-knowledge-of-thyroid-disease-manifestation-and-risk-factors-among-the-general-population-in-the-tabuk-region-of-saudi-arabia

6. Alghamdi K, Almaliki R, Almaliki K, Alzahrani W, Malyani R, Samaran Y, et al. Awareness and Knowledge of Saudi Community about Cardiac Complications Resulting from Hyperthyroidism. ijirms. 2021 Jul 20;6(07):424–9.

7. Alharazi RM, Almarri LK, Ibrahim HM, Abdulshakour LS, Ahmad MA, Bashool RA. Awareness of Thyroid Diseases and Their Risk Factors Among the Residents of Jeddah, Saudi Arabia. Cureus [Internet]. 2024 Jun 10 [cited 2024 Dec 10]; Available from: https://www.cureus.com/articles/255815-awareness-of-thyroid-diseases-and-their-risk-factors-among-the-residents-of-jeddah-saudi-arabia

8. Alharbi MS, Alatni RI, Alhammad RA, Alotaibi MA, Alhatlani AH, Alshaya RH, et al. Knowledge and Awareness for the Early Detection and Intervention of Short Stature among Families in Qassim Region 2021–2022: A Cross-Sectional study. Open Access Maced J Med Sci. 2022 Sep 30;10(B):2355–60.

9. Alhazmi RA, Alobaid AM, Althunayyan SM, Syed W, Al-Rawi MBA. A cross-sectional assessment of knowledge, awareness of risk factors, and perceptions of thyroid disease (TD) among adults living in Saudi Arabia – A community-based study. Front Public Health. 2022 Nov 23;10:1041745.

10. Abozaid H, Albaqami RS, Aljuaid HM, Alotaibi EH, Althagafi AS, Alghamdi HA. Population awareness and knowledge of thyroid diseases signs, symptoms and risk factors in Taif Saudi Arabia. MS. 2022 Nov 14;26(129):1–11.

11. Alyahya A, AlNaim A, AlBahr AW,

Almansour F, Elshebiny A. Knowledge of Thyroid Disease Manifestations and Risk Factors Among Residents of the Eastern Province, Saudi Arabia. Cureus [Internet]. 2021 Jan 31 [cited 2024 Dec 10]; Available from: https://www.cureus.com/articles/51105-knowledge-of-thyroid-disease-manifestations-and-risk-factors-among-residents-of-the-eastern-province-saudi-arabia

12. Qutob RA, Alhusaini BA, Alzmamy SA, Alfozan OA, Alsaleh AA, Alhudayris FS, Alshuaibi LK, Almajed FA, Alghamdi AH, Alaryni A, Alammari YM, Al Harbi KM, AlHussaini KI, Alanazi AM, Hakami OA. Knowledge and Awareness About Risk Factors, Clinical Manifestations, and Prevention of Thyroid Disorders in the Era of COVID-19 and Their Association With Socioeconomic Status Among the General Population in Riyadh, Saudi Arabia. Cureus. 2023 Nov 16;15(11):e48878. doi: 10.7759/cureus.48878.

13. Alhawiti AM, Albalawi AS, Alghamdi AA, Albalawi AA. Assessment of Public Knowledge Regarding the Differences between Hyperthyroidism and Hypothyroidism. The Egyptian Journal of Hospital Medicine. 2018 Jan 1;70(9):1695–702.

14. Al Munji AS. An Evaluation of Thyroid Patients' Awareness and Knowledge Level in Diwan Health Complex, Muscat. IJISRT. 2021 Aug;6(8):359–438.

15. Mabuza LH, Omole OB, Govender I, Ndimande JV, Schoeman HS. Inpatients' awareness of admission reasons and management plans of their clinical conditions at a tertiary hospital in South Africa. BMC Health Serv Res. 2015 Dec;15(1):89.

16. Ranjan P. How can Doctors Improve their Communication Skills? JCDR [Internet]. 2015 [cited 2024 Dec 10]; Available from: http://jcdr.net/article_fulltext.asp?issn=0973-709x&year=2015&volume=9&issue=3&page=-JE01&issn=0973-709x&id=5712

17. Mohamed Mustafa Abdussalam Treki, Sakina Ruhi, Khaled Saleh, Piravetha Balasubramaniam, Aminu Ishaka, Jiyauddin Khan, et al. Knowledge and Awareness of Thyroid Disorder Among Women in Selangor 2019. PBJ. 2020 Mar 10;07–11.

18. Abdulrahman Ibrahim AM. Survey of Awareness of Thyroid Disorders

among the Riyadh Population, Central Region of Saudi Arabia. The Egyptian Journal of Hospital Medicine. 2018 Jul 1;72(2):4039–44.

19. Alamri A, Alqurashi R, Alyami N, Shehata M, Aljohani G, Althowab M, et al. A cross-sectional study among Saudi population's: Knowledge and awareness of thyroid disease. MS. 2023 Jan 4;27(131):1–9.

20. Rai S, Sirohi S, Khatri AK, Dixit SDS, Saroshe S. Assessment Of Knowledge and Awareness Regarding Thyroid Disorders Among Women of a Cosmopolitan City of Central India. National Journal of Community Medicine. 2016 Mar 31;7(03):219–22.