Original Article

Knowledge of Thyroid Disease Manifestations and Risk Factors Among population of the Tabuk City, Saudi Arabia

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ABSTRACT

Background: Thyroid disorders are common endocrine disorders. They are frequently under-diagnosed. In general, lack of knowledge and understanding of thyroid disorder effects can lead patients to go undiagnosed.

Objective: The objective of this research is estimation of the knowledge of thyroid disease manifestations and risk factors among population of the Tabuk city, Saudi Arabia.

Methods: Cross-sectional questionnaire-based study, was done in Tabuk, Saudi Arabia. A multi-stage clustering sampling technique was used to select the participants. The contact information was collected randomly from those who agree to participate and according to inclusion and exclusion criteria. Then the questionnaire was send to the participant.

Results: The study included 400 participants, of which 60% were females, and 40% were males. According to gender females had relevantly more knowledge than men in some aspects of knowledge, nevertheless, according to age, age group 35-50 years exhibited more significant knowledge especially in terminology and risk factors. According to education, university degree holders had more knowledge than high school degree holders, and for our surprise people with less degree had sometimes more knowledge than high school degree holders especially in terminology and risk factors. According to occupation, students exhibited more knowledge.

Conclusion: Participants exhibited an acceptable knowledge level of thyroid disease manifestations and risk factors compared to previously reported figures. Future awareness campaigns are recommended to increase the general public's understanding of the features of thyroid problems.

Keyword: Thyroid gland, Thyroid disorders, Hypothyroidism, Hyperthyroidism, Knowledge.

Introduction

Thyroid diseases are widespread endocrine disorders across the world. These illnesses are frequently not properly diagnosed. Patients may be untreated in general due to a lack of awareness and comprehension of thyroid problem effects [1]. A significant issue in clinical practise in recent years, inadequate thyroid Function has patients worried about their health. Iodine deficiency or autoimmune disorders can lead to thyroid disease. According to additional research, thyroid disease can be brought on by inherited factors, radiation therapy, certain medical procedures like thyroid surgery, or even inflammation [2].

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Thyroid gland enlargement and excessive or inadequate thyroid hormone secretion are also causes of thyroid disorders. Iodine shortage is thought to affect one-third of the world's population, and 1.6 billion individuals are at danger of developing thyroid diseases [3]. In addition, earlier research found that physical stress may contribute to thyroid gland malfunction. Fatigue, dry skin, weight increase or loss, changes in bowel habits and menstrual cycles, changes in hair growth and metabolism, myalgia, and changes in bowel movements were the most common signs and symptoms of an underactive thyroid gland [4, 5]. Many thyroid disease instances go untreated because the patient exhibits no symptoms or is unaware of them, according to the Saudi Arabian Ministry of Health (MOH). During their clinical examination, patients with thyroid problems may display a wide range of symptoms, including those affecting the body's endocrine, cardiovascular, central neurological, musculoskeletal, haematological, reproductive, gastrointestinal, and dermatological systems. Thyroid disease diagnosis and evaluation typically involve the use of thyroid function test panels [6]. The American Thyroid Association states that adults should begin thyroid screening using serum TSH at age 35 and then every five years after that [6, 7]. The objective of this research is to know the extent of information about thyroid disease in the Tabuk population by estimating knowledge of thyroid disease manifestations and risk factors among the population of Tabuk, Saudi Arabia.

Methods

A cross-sectional study was done among a random sample at Tabuk City, Saudi Arabia; the inclusion criteria were just any one from Tabuk City. Not from Tabuk was the only exclusion criteria. The questionnaire was electronic and self-administered. The purpose of the research was conveyed to them, and it was stated clearly that the information was used in a confidential manner. The following information was collected: age, gender, education level, occupation stats and knowledge of terminology, manifestations, and risk factors of thyroid diseases.

Inclusion Criteria: This study included adult population, above 18 years, living in Tabuk, Saudi Arabia, who agree to complete the survey.

Exclusion Criteria: We excluded those who have cognitive problems or are unable to respond to the questionnaire and those who refuse to participate in this study.

The questionnaire included 25 questions about the knowledge of: terminology (3), manifestations (15) and risk factors (7). (Table 1).

Recruitment was implemented by distributing the survey using social media platforms.

Data collection Tool: The study was conducted through an online self-administered questionnaire prepared in Arabic after reading and accepting the informed consent and distributed via an anonymous online survey instrument, which will target the Saudi population who live in Tabuk, Saudi Arabia.

Sample size and data analysis:

The minimum sample size for this study was adopted according to Swinscow, as follows:

$$n = \frac{Z^2 \times P \times Q}{D^2}$$

Where:

n: Calculated sample size

Z: The z-value for the selected level of confidence (1-α) = 1.96.

P: An estimated prevalence of having positive knowledge as 50% since there is no specific figure for that

Q: (1 – 0.50) = 50%, i.e., 0.50

D: The maximum acceptable error = 0.05.

So, the calculated minimum sample size was:

$$n = \frac{(1.96)^2 \times 0.50 \times 0.50}{(0.05)^2} = 384$$

Data management: The data was stored in SPSS with no attempts to identify the subjects because the questionnaire does not include any personal information such as the name, ID number or any kind of specific personal information that can specify the participant.

Ethical issues: The patient's secrecy and the confidentiality of their data are the priority. Nothing leads to ethical issues was used such as name of the participants. The ethical clearance was given by the ethical committee of the college of medicine at Tabuk University. Ethical Approval UT-272-117-2023.

Statistical analysis

Data was analyzed using SPSS (version 26). Testing the association was by Chi Square test. Qualitative variables represent as percentage and numbers (mean, Frequency…etc) and showing them in the figures. A 0.05 level of significance was used in all tests of this study.

Results

(Table 1) presents the knowledge of thyroid disease manifestations and risk factors among the population of Tabuk City, Saudi Arabia, in association with gender. The study included 400 participants, of which 60% were females, and 40% were males. In terms of knowledge of terminology, the majority of participants, regardless of gender, knew that the word

"thyroid" means "gland." There was no significant difference in knowledge of this term between females (86.7%) and males (89.3%) (p = 0.711).

Regarding the knowledge of hypothyroidism and its relation to thyroid hormones, females had a significantly higher knowledge percentage (94.0%) than males (84.5%) (p = 0.003). On the other hand, knowledge of hyperthyroidism and its relation to thyroid hormones was not significantly different between females (94.2%) and males (92.2%) (p = 0.422). With respect to knowledge manifestation, the majority of participants knew that sore throat (84.4%), neck pain (70.4%), hair fall (67.3%), constipation (69.3%), irregular menstrual cycles (46.0%), insomnia (78.4%), inability to withstand hot weather (64.6%), and feeling cold in hot weather (72.6%) do not directly prompt checking thyroid functions. However, the participants' knowledge regarding whether joint pain directs them to check thyroid functions was significantly different between females (16.3%) and males (8.7%) (p = 0.033). Similarly, the knowledge percentage of whether weight gain prompts checking thyroid functions was significantly higher in females (77.1%) than males (69.9%) (p = 0.083). There was no significant difference in knowledge percentages between females and males regarding depression (p = 0.323), voice change (p = 0.096), and skin problems (p = 0.511). (Table 2) presents the association between thyroid disease knowledge and age. The study found that the older participants had a better understanding of the terminology related to thyroid disease, as shown by the significantly higher percentage of participants in the age group above 50 years who correctly identified the word "thyroid" to mean "disease" (11.6%) compared to those in the 35-50 years age group (7.7%) and the 18-35 years age group (4.3%) (p = 0.003). On the other hand, knowledge of the term "hypothyroidism" meaning a decrease in thyroid hormones was better understood in the older age groups, with 95.6% of those in the 35-50 years age group and 86.0% of those in the above 50 years age group answering correctly, compared to only 90.6% of the 18-35 years age group (p = 0.051). In terms of knowledge of symptoms, the study found that the majority of participants did not believe that sore throat, neck pain, joints pain, hair fall, constipation, skin problems, and irregular menstrual cycles were related to thyroid function. Interestingly, there was a trend toward significance for weight gain being associated with thyroid dysfunction, with 75.5% of the 18-35 years age group, 79.0% of the 35-50 years age group, and 62.8% of the above 50 years age group believing that it was a symptom (p = 0.083). Similarly, depression was perceived as a symptom by 32.5% of the 18-35 years age group, 24.3% of the 35-50 years age group, and 34.9% of the above 50 age group (p = 0.129). The results presented in (Table 3) show the association between thyroid disease knowledge and education. In question 1 (Q1), when asked about the meaning of the word "thyroid," 7.5% of the high school group responded with "disease," compared to 22.2% of the less educated group and 5.5% of the university group, with no significant difference observed between the groups (p = 0.284). Most participants in all education groups responded with "gland." In Q2, 19.4% of the high school group, 0% of the less educated group, and 5.5% of the university group correctly answered that hypothyroidism means a decrease in thyroid hormones (p = 0.000). In Q3, most participants in all education groups knew that hyperthyroidism means an increase in thyroid hormones, with no significant difference between the groups (p = 0.318). (Table 4) shows the association between occupation and thyroid disease knowledge. For the first question, which assessed knowledge of the term "thyroid," the results showed that the percentage of correct answers ranged from 6.8% among housewives to 15.6% among retired individuals, but this difference was not statistically significant (p = 0.121). Similarly, for the second question, which assessed knowledge of hypothyroidism, the percentage of correct answers ranged from 6.8% among housewives to 12.5% among retired individuals, but the difference was not statistically significant (p = 0.356). Regarding knowledge of hyperthyroidism in question 3, the percentage of correct answers was high among all groups, ranging from 89.8% among housewives to 97.2% among unemployed individuals, and this difference was not statistically significant (p = 0.670). The majority of participants (ranging from 63.9% to 86.4% across groups) did not know that sore throat, neck pain, joints pain, hair fall, and depression are associated with thyroid disease, and these differences were not statistically significant (p > 0.05). However, a significant association was found between voice change and thyroid disease knowledge (p = 0.031), with higher percentages of correct answers among employed (25.9%) and retired individuals (31.3%) compared to housewives (37.3%) and students (41.0%).

Discussion

People have become more aware as the prevalence of metabolic diseases has been rising in recent years. In particular, obesity, thyroid disorders, and diabetes are becoming more common in Saudi Arabia as well as other nations [7, 8]. These conditions are strongly linked to a variety of comorbid conditions, which in turn increase death and disability rates around the world [7-9]. More than 190 million people worldwide have iodine deficient illnesses, according to the WHO.

Table 1: knowledge of thyroid disease in association with gender.

				Female	Male	p value
Knowledge terminology	**Q1**	**The word thyroid means:**	**Disease**	**6.3%**	**5.8%**	**0.711**
			Neck swelling	**7.0%**	**4.9%**	
			Gland	**86.7%**	**89.3%**	
	Q2	**Hypothyroidism means in relation to thyroid hormones**	**Increase**	**6.0%**	**15.5%**	**0.003**
			Decrease	**94.0%**	**84.5%**	
	Q3	**Hyperthyroidism means in relation to thyroid hormones**	**Increase**	**94.2%**	**92.2%**	**0.422**
			Decrease	**4.0%**	**6.8%**	
			Neck swelling	**1.8%**	**1.0%**	
Knowledge manifestation	**Q4**	**Does sore throat direct you to check thyroid functions?**	**No**	**84.4%**	**87.4%**	**0.281**
			Yes	**15.6%**	**12.6%**	
	Q5	**Does neck pain direct you to check thyroid functions?**	**No**	**70.4%**	**68.9%**	**0.433**
			Yes	**29.6%**	**31.1%**	
	Q6	**Does joints pain direct you to check thyroid functions?**	**No**	**83.7%**	**91.3%**	**0.033**
			Yes	**16.3%**	**8.7%**	
	Q7	**Does weight gain direct you to check thyroid functions?**	**No**	**22.9%**	**30.1%**	**0.083**
			Yes	**77.1%**	**69.9%**	
	Q8	**Does depression direct you to check thyroid functions?**	**No**	**70.9%**	**68.0%**	**0.323**
			Yes	**29.1%**	**32.0%**	
	Q9	**Does voice change direct you to check thyroid functions?**	**No**	**68.6%**	**61.2%**	**0.096**
			Yes	**31.4%**	**38.8%**	
	Q10	**Does hair fall direct you to check thyroid functions?**	**No**	**67.3%**	**64.1%**	**0.304**
			Yes	**32.7%**	**35.9%**	
	Q11	**Does infertility direct you to check thyroid functions?**	**No**	**83.7%**	**84.5%**	**0.490**
			Yes	**16.3%**	**15.5%**	
	Q12	**Does constipation direct you to check thyroid functions?**	**No**	**69.3%**	**73.8%**	**0.226**
			Yes	**30.7%**	**26.2%**	
	Q13	**Do skin problems direct you to check thyroid functions?**	**No**	**70.4%**	**70.9%**	**0.511**
			Yes	**29.6%**	**29.1%**	
	Q14	**Do irregular menstrual cycles direct you to check thyroid functions?**	**No**	**46.0%**	**50.5%**	**0.240**
			Yes	**54.0%**	**49.5%**	
	Q15	**Is insomnia a symptom of hyperthyroidism?**	**No**	**21.6%**	**23.3%**	**0.401**
			Yes	**78.4%**	**76.7%**	
	Q16	**Is inability to withstand hot weather a symptom of hyperthyroidism?**	**No**	**35.4%**	**35.9%**	**0.506**
			Yes	**64.6%**	**64.1%**	
	Q17	**Is feeling cold in hot weather a symptom of hypothyroidism?**	**No**	**27.4%**	**17.5%**	**0.024**
			Yes	**72.6%**	**82.5%**	
	Q18	**Is increased heart rate is a symptom of hyperthyroidism?**	**No**	**26.4%**	**27.2%**	**0.480**
			Yes	**73.6%**	**72.8%**	

Knowledge risk factors	**Q19**	**Do you think that smoking is a risk factor for thyroid diseases?**	**No**	**37.7%**	**27.2%**	**0.029**
			Yes	**62.3%**	**72.8%**	
	Q20	**Do you think that radiation exposure is a risk factor for thyroid diseases?**	**No**	**29.9%**	**27.2%**	**0.341**
			Yes	**70.1%**	**72.8%**	
	Q21	**Do you think that lack of iodine is a risk factor for thyroid diseases?**	**No**	**20.6%**	**22.3%**	**0.396**
			Yes	**79.4%**	**77.7%**	
	Q22	**Do you think that females are more susceptible for thyroid diseases?**	**No**	**56.8%**	**54.4%**	**0.370**
			Yes	**43.2%**	**45.6%**	
	Q23	**Do you think that pregnancy and postpartum period are risk factors for thyroid diseases?**	**No**	**12.3%**	**20.4%**	**0.029**
			Yes	**87.7%**	**79.6%**	
	Q24	**Do you think that amiodarone (pacerone, cordarone, advadarone or sedacoron) is risk factors for thyroid diseases?**	**No**	**49.2%**	**41.7%**	**0.106**
			Yes	**50.8%**	**58.3%**	
	Q25	**Do you think that lithium is risk factors for thyroid diseases?**	**No**	**44.2%**	**47.6%**	**0.309**
			Yes	**55.8%**	**52.4%**	

Table 2: knowledge of thyroid disease in association with age.

				Age (years)			**p value**
				18-35	**35-50**	**Above 50**	
Knowledge terminology	**Q1**	**The word thyroid means:**	**Disease**	**4.3%**	**7.7%**	**11.6%**	**0.003**
			Neck swelling	**10.1%**	**2.2%**	**2.3%**	
			Gland	**85.6%**	**90.1%**	**86.0%**	
	Q2	**Hypothyroidism means in relation to thyroid hormones**	**Increase**	**9.4%**	**4.4%**	**14.0%**	**0.051**
			Decrease	**90.6%**	**95.6%**	**86.0%**	
	Q3	**Hyperthyroidism means in relation to thyroid hormones**	**Increase**	**93.1%**	**95.0%**	**93.0%**	**0.715**
			Decrease	**5.1%**	**3.3%**	**7.0%**	
			Neck swelling	**1.8%**	**1.7%**	**0.0%**	
Knowledge manifestation	**Q4**	**Does sore throat direct you to check thyroid functions?**	**No**	**87.0%**	**82.3%**	**83.7%**	**0.377**
			Yes	**13.0%**	**17.7%**	**16.3%**	
	Q5	**Does neck pain direct you to check thyroid functions?**	**No**	**70.8%**	**68.0%**	**74.4%**	**0.658**
			Yes	**29.2%**	**32.0%**	**25.6%**	
	Q6	**Does joints pain direct you to check thyroid functions?**	**No**	**87.0%**	**81.8%**	**88.4%**	**0.252**
			Yes	**13.0%**	**18.2%**	**11.6%**	
	Q7	**Does weight gain direct you to check thyroid functions?**	**No**	**24.5%**	**21.0%**	**37.2%**	**0.083**
			Yes	**75.5%**	**79.0%**	**62.8%**	
	Q8	**Does depression direct you to check thyroid functions?**	**No**	**67.5%**	**75.7%**	**65.1%**	**0.129**
			Yes	**32.5%**	**24.3%**	**34.9%**	
	Q9	**Does voice change direct you to check thyroid functions?**	**No**	**64.6%**	**68.5%**	**76.7%**	**0.254**
			Yes	**35.4%**	**31.5%**	**23.3%**	
	Q10	**Does hair fall direct you to check thyroid functions?**	**No**	**65.7%**	**66.9%**	**72.1%**	**0.709**
			Yes	**34.3%**	**33.1%**	**27.9%**	
	Q11	**Does infertility direct you to check thyroid functions?**	**No**	**83.4%**	**84.0%**	**86.0%**	**0.906**
			Yes	**16.6%**	**16.0%**	**14.0%**	
	Q12	**Does constipation direct you to check thyroid functions?**	**No**	**69.7%**	**70.2%**	**74.4%**	**0.818**
			Yes	**30.3%**	**29.8%**	**25.6%**	
	Q13	**Do skin problems direct you to check thyroid functions?**	**No**	**69.7%**	**70.2%**	**76.7%**	**0.636**
			Yes	**30.3%**	**29.8%**	**23.3%**	
	Q14	**Do irregular menstrual cycles direct you to check thyroid functions?**	**No**	**43.3%**	**53.0%**	**44.2%**	**0.117**

Knowledge manifestation	Q15	Is insomnia a symptom of hyperthyroidism?	No	21.3%	24.3%	16.3%	0.481
			Yes	78.7%	75.7%	83.7%	
	Q16	Is inability to withstand hot weather a symptom of hyperthyroidism?	No	33.9%	39.2%	30.2%	0.384
			Yes	66.1%	60.8%	69.8%	
	Q17	Is feeling cold in hot weather a symptom of hypothyroidism?	No	23.1%	27.1%	32.6%	0.333
			Yes	76.9%	72.9%	67.4%	
	Q18	Is increased heart rate is a symptom of hyperthyroidism?	No	23.5%	29.8%	32.6%	0.207
			Yes	76.5%	70.2%	67.4%	
Knowledge risk factors	Q19	Do you think that smoking is a risk factor for thyroid diseases?	No	31.0%	42.5%	34.9%	0.042
			Yes	69.0%	57.5%	65.1%	
	Q20	Do you think that radiation exposure is a risk factor for thyroid diseases?	No	34.3%	24.3%	18.6%	0.019
			Yes	65.7%	75.7%	81.4%	
	Q21	Do you think that lack of iodine is a risk factor for thyroid diseases?	No	22.0%	21.0%	14.0%	0.481
			Yes	78.0%	79.0%	86.0%	
	Q22	Do you think that females are more susceptible for thyroid diseases?	No	48.4%	67.4%	60.5%	0.000
			Yes	51.6%	32.6%	39.5%	
	Q23	Do you think that pregnancy and postpartum period are risk factors for thyroid diseases?	No	17.0%	10.5%	9.3%	0.097
			Yes	83.0%	89.5%	90.7%	
	Q24	Do you think that amiodarone (pacerone, cordarone, advadarone or sedacoron) is risk factor for thyroid diseases?	No	42.2%	55.2%	51.2%	0.022
			Yes	57.8%	44.8%	48.8%	
	Q25	Do you think that lithium is risk factors for thyroid diseases	No	40.8%	48.6%	55.8%	0.083
			Yes	59.2%	51.4%	44.2%	

Table 3: knowledge of thyroid disease in association with education.

				High school	Less	University	p value
Knowledge terminology	Q1	The word thyroid means:	Disease	7.5%	22.2%	5.5%	0.284
			Neck swelling	6.5%	0.0%	6.8%	
			Gland	86.0%	77.8%	87.7%	
	Q2	Hypothyroidism means in relation to thyroid hormones	Increase	19.4%	0.0%	5.5%	0.000
			Decrease	80.6%	100.0%	94.5%	
	Q3	Hyperthyroidism means in relation to thyroid hormones	Increase	89.2%	100.0%	94.7%	0.318
			Decrease	7.5%	0.0%	4.0%	
			Neck swelling	3.2%	0.0%	1.3%	
Knowledge manifestation	Q4	Does sore throat direct you to check thyroid functions?	No	83.9%	66.7%	85.7%	0.269
			Yes	16.1%	33.3%	14.3%	
	Q5	Does neck pain direct you to check thyroid functions?	No	67.7%	77.8%	70.4%	0.771
			Yes	32.3%	22.2%	29.6%	
	Q6	Does joints pain direct you to check thyroid functions?	No	88.2%	66.7%	85.0%	0.210
			Yes	11.8%	33.3%	15.0%	
	Q7	Does weight gain direct you to check thyroid functions?	No	26.9%	11.1%	24.1%	0.549
			Yes	73.1%	88.9%	75.9%	

Knowledge manifestation	Q8	Does depression direct you to check thyroid functions?	No	71.0%	44.4%	70.7%	0.232
			Yes	29.0%	55.6%	29.3%	
	Q9	Does voice change direct you to check thyroid functions?	No	62.4%	77.8%	67.9%	0.465
			Yes	37.6%	22.2%	32.1%	
	Q10	Does hair fall direct you to check thyroid functions?	No	66.7%	100.0%	65.9%	0.100
			Yes	33.3%	0.0%	34.1%	
	Q11	Does infertility direct you to check thyroid functions?	No	86.0%	88.9%	83.2%	0.736
			Yes	14.0%	11.1%	16.8%	
	Q12	Does constipation direct you to check thyroid functions?	No	65.6%	77.8%	71.2%	0.503
			Yes	34.4%	22.2%	28.8%	
	Q13	Do skin problems direct you to check thyroid functions?	No	72.0%	100.0%	69.4%	0.129
			Yes	28.0%	0.0%	30.6%	
	Q14	Do irregular menstrual cycles direct you to check thyroid functions?	No	46.2%	55.6%	46.9%	0.866
			Yes	53.8%	44.4%	53.1%	
	Q15	Is insomnia a symptom of hyperthyroidism?	No	24.7%	44.4%	20.8%	0.184
			Yes	75.3%	55.6%	79.2%	
	Q16	Is inability to withstand hot weather a symptom of hyperthyroidism?	No	40.9%	0.0%	35.1%	0.046
			Yes	59.1%	100.0%	64.9%	
	Q17	Is feeling cold in hot weather a symptom of hypothyroidism?	No	30.1%	0.0%	24.8%	0.121
			Yes	69.9%	100.0%	75.2%	
	Q18	Is increased heart rate is a symptom of hyperthyroidism?	No	25.8%	22.2%	26.8%	0.938
			Yes	74.2%	77.8%	73.2%	
Knowledge risk factors	Q19	Do you think that smoking is a risk factor for thyroid diseases?	No	31.2%	44.4%	36.3%	0.550
			Yes	68.8%	55.6%	63.7%	
	Q20	Do you think that radiation exposure is a risk factor for thyroid diseases?	No	39.8%	55.6%	26.3%	0.008
			Yes	60.2%	44.4%	73.7%	
	Q21	Do you think that lack of iodine is a risk factor for thyroid diseases?	No	28.0%	33.3%	19.0%	0.107
			Yes	72.0%	66.7%	81.0%	
	Q22	Do you think that females are more susceptible for thyroid diseases?	No	60.2%	55.6%	55.4%	0.699
			Yes	39.8%	44.4%	44.6%	
	Q23	Do you think that pregnancy and postpartum period are risk factors for thyroid diseases?	No	19.4%	11.1%	12.8%	0.250
			Yes	80.6%	88.9%	87.2%	
	Q24	Do you think that amiodarone (pacerone, cordarone, advadarone or sedacoron) is risk factor for thyroid diseases?	No	51.6%	44.4%	46.9%	0.698
			Yes	48.4%	55.6%	53.1%	
	Q25	Do you think that lithium is risk factors for thyroid diseases?	No	35.5%	55.6%	46.9%	0.112
			Yes	64.5%	44.4%	53.1%	

Table 4: knowledge of thyroid disease in association with ccupation.

				Employed	Housewife	Retired	Student	Unemployed	p value
Knowledge terminology	**Q1**	**The word thyroid means:**	**Disease**	**7.0%**	**6.8%**	**15.6%**	**2.9%**	**8.3%**	**0.121**
			Neck swelling	**5.5%**	**6.8%**	**3.1%**	**6.9%**	**13.9%**	
			Gland	**87.6%**	**86.4%**	**81.3%**	**90.2%**	**77.8%**	
	Q2	**Hypothyroidism means in relation to thyroid hormones**	**Increase**	**9.0%**	**6.8%**	**12.5%**	**8.1%**	**0.0%**	**0.356**
			Decrease	**91.0%**	**93.2%**	**87.5%**	**91.9%**	**100.0%**	
	Q3	**Hyperthyroidism means in relation to thyroid hormones**	**Increase**	**94.0%**	**89.8%**	**90.6%**	**94.8%**	**97.2%**	**0.670**
			Decrease	**5.0%**	**8.5%**	**6.3%**	**2.9%**	**2.8%**	
			Neck swelling	**1.0%**	**1.7%**	**3.1%**	**2.3%**	**0.0%**	
Knowledge manifestation	**Q4**	**Does sore throat direct you to check thyroid functions?**	**No**	**84.6%**	**86.4%**	**81.3%**	**85.5%**	**86.1%**	**0.968**
			Yes	**15.4%**	**13.6%**	**18.8%**	**14.5%**	**13.9%**	
	Q5	**Does neck pain direct you to check thyroid functions?**	**No**	**71.1%**	**67.8%**	**71.9%**	**70.5%**	**63.9%**	**0.913**
			Yes	**28.9%**	**32.2%**	**28.1%**	**29.5%**	**36.1%**	
	Q6	**Does joints pain direct you to check thyroid functions?**	**No**	**83.6%**	**79.7%**	**84.4%**	**89.6%**	**83.3%**	**0.328**
			Yes	**16.4%**	**20.3%**	**15.6%**	**10.4%**	**16.7%**	
	Q7	**Does weight gain direct you to check thyroid functions?**	**No**	**23.9%**	**11.9%**	**37.5%**	**27.2%**	**22.2%**	**0.065**
			Yes	**76.1%**	**88.1%**	**62.5%**	**72.8%**	**77.8%**	
	Q8	**Does depression direct you to check thyroid functions?**	**No**	**73.1%**	**72.9%**	**78.1%**	**65.9%**	**63.9%**	**0.378**
			Yes	**26.9%**	**27.1%**	**21.9%**	**34.1%**	**36.1%**	
	Q9	**Does voice change direct you to check thyroid functions?**	**No**	**74.1%**	**62.7%**	**68.8%**	**59.0%**	**72.2%**	**0.031**
			Yes	**25.9%**	**37.3%**	**31.3%**	**41.0%**	**27.8%**	
	Q10	**Does hair fall direct you to check thyroid functions?**	**No**	**68.2%**	**64.4%**	**71.9%**	**63.0%**	**75.0%**	**0.575**
			Yes	**31.8%**	**35.6%**	**28.1%**	**37.0%**	**25.0%**	
	Q11	**Does infertility direct you to check thyroid functions?**	**No**	**79.1%**	**84.7%**	**87.5%**	**86.7%**	**91.7%**	**0.174**
			Yes	**20.9%**	**15.3%**	**12.5%**	**13.3%**	**8.3%**	
	Q12	**Does constipation direct you to check thyroid functions?**	**No**	**74.1%**	**69.5%**	**68.8%**	**63.6%**	**83.3%**	**0.087**
			Yes	**25.9%**	**30.5%**	**31.3%**	**36.4%**	**16.7%**	
	Q13	**Do skin problems direct you to check thyroid functions?**	**No**	**72.1%**	**71.2%**	**68.8%**	**65.9%**	**83.3%**	**0.295**
			Yes	**27.9%**	**28.8%**	**31.3%**	**34.1%**	**16.7%**	
	Q14	**Do irregular menstrual cycles direct you to check thyroid functions?**	**No**	**47.3%**	**49.2%**	**50.0%**	**43.9%**	**52.8%**	**0.850**
			Yes	**52.7%**	**50.8%**	**50.0%**	**56.1%**	**47.2%**	
	Q15	**Is insomnia a symptom of hyperthyroidism?**	**No**	**24.9%**	**28.8%**	**12.5%**	**16.2%**	**30.6%**	**0.056**
			Yes	**75.1%**	**71.2%**	**87.5%**	**83.8%**	**69.4%**	
	Q16	**Is inability to withstand hot weather a symptom of hyperthyroidism?**	**No**	**37.8%**	**35.6%**	**37.5%**	**30.1%**	**47.2%**	**0.295**
			Yes	**62.2%**	**64.4%**	**62.5%**	**69.9%**	**52.8%**	
	Q17	**Is feeling cold in hot weather a symptom of hypothyroidism?**	**No**	**26.4%**	**37.3%**	**40.6%**	**15.0%**	**36.1%**	**0.000**
			Yes	**73.6%**	**62.7%**	**59.4%**	**85.0%**	**63.9%**	
	Q18	**Is increased heart rate is a symptom of hyperthyroidism?**	**No**	**33.8%**	**33.9%**	**31.3%**	**12.1%**	**38.9%**	**0.000**
			Yes	**66.2%**	**66.1%**	**68.8%**	**87.9%**	**61.1%**	

Knowledge risk factors	**Q19**	**Do you think that smoking is a risk factor for thyroid diseases?**	**No**	**38.3%**	**39.0%**	**34.4%**	**31.8%**	**33.3%**	**0.711**
			Yes	**61.7%**	**61.0%**	**65.6%**	**68.2%**	**66.7%**	
	Q20	**Do you think that radiation exposure is a risk factor for thyroid diseases?**	**No**	**26.9%**	**42.4%**	**21.9%**	**29.5%**	**27.8%**	**0.176**
			Yes	**73.1%**	**57.6%**	**78.1%**	**70.5%**	**72.2%**	
	Q21	**Do you think that lack of iodine is a risk factor for thyroid diseases?**	**No**	**20.4%**	**32.2%**	**15.6%**	**18.5%**	**22.2%**	**0.218**
			Yes	**79.6%**	**67.8%**	**84.4%**	**81.5%**	**77.8%**	
	Q22	**Do you think that females are more suspicious for thyroid diseases?**	**No**	**64.2%**	**67.8%**	**62.5%**	**39.9%**	**66.7%**	**0.000**
			Yes	**35.8%**	**32.2%**	**37.5%**	**60.1%**	**33.3%**	
	Q23	**Do you think that pregnancy and postpartum period are risk factors for thyroid diseases?**	**No**	**12.4%**	**8.5%**	**6.3%**	**18.5%**	**16.7%**	**0.157**
			Yes	**87.6%**	**91.5%**	**93.8%**	**81.5%**	**83.3%**	
	Q24	**Do you think that amiodarone (pacerone, cordarone, advadarone or sedacoron) is risk factor for thyroid diseases?**	**No**	**53.2%**	**62.7%**	**50.0%**	**37.0%**	**41.7%**	**0.003**
			Yes	**46.8%**	**37.3%**	**50.0%**	**63.0%**	**58.3%**	
	Q25	**Do you think that lithium is risk factors for thyroid diseases?**	**No**	**49.8%**	**54.2%**	**50.0%**	**33.5%**	**52.8%**	**0.006**
			Yes	**50.2%**	**45.8%**	**50.0%**	**66.5%**	**47.2%**	

Variable manifestations of thyroid problems include minor goiter, hypothyroidism, hyperthyroidism, and thyroid cancer [6, 10, 11]. In the world, 60% of people with thyroid dysfunction are unaware of their ailment [10]. Knowledge of the manifestations: according to gender, 29.6% of females and 31.1% of males, according to age, 29.2% aged 18-35 y, 32% aged 35-50 y and 25.6% aged over 50 y, according to education, 32.3% with high school degree, 22.2% with less degree and 29.6% with university degree. Inconsistent with another survey done amongst women in Punjab showed that 61% of the participants said that neck pain and sore throat were symptoms for thyroid diseases [12], A study held among general population in the Northern Region of India which showed that 54% of the participants said that a sign of thyroid diseases can be a neck swelling (lump) [13]. An important manifestation is weight gain, according to gender, 77.1% of females and 69.9% of males, according to education 73.1% with high school degree, 88.9% with lesser degree and 75.9% with university degree, according to occupation 76.1% of employed, 88.1% of housewives, 62.5% of retired, 72.8% of students and 77.8% of unemployed said that weight gain directs them to check thyroid functions. A study held among the Saudi population revealed that 77.9% of participants said that weight gain is a symptom of hypothyroidism [14]. Another study held in KSA, Riyadh 2019 showed that 54.9% of the participants said that feeling cold and gaining weight are from symptom of hypothyroidism [15]. Another study held Among Saudi populations showed that 82.2% of the respondents said that gaining weight without change in appetite is a symptom of hypothyroidism [16]. Another study held among general population of Himachal Pradesh showed that 69.25% of participants said that rapid increase in weight is also a symptom of hypothyroidism [17]. Another parameter for hypothyroidism is feeling cold in hot weather, according to gender 72.6% of females and 82.5% of males. A survey held in Taif, Saudi Arabia revealed that 57.3% of respondents identified feeling cold as a symptom for lazy thyroid [18]. Knowledge of risk factors, according to gender 62.3% of females and 72.8% of males, according to age 69% aged 18-35 Y, 57.5% aged 35-50 Y and 65.1% aged over 50 Y, according to education 68.8% with high school degree, 55.6% with less degree and 63.7% with university degree, and according to occupation 61.7% of employed, 61% of housewives, 65.6% of retired, 68.2% of students and 66.7% of unemployed think that smoking is from the known risk factors for thyroid diseases, inconsistent with the findings of a study held in Eastern Province, KSA which revealed that only 40.5% of participants think of smoking as a risk factor for thyroid diseases [1]. According to gender ,knowledge of risk factors, 43.2% were females and 45.6% were males, according to age 51.6% aged 18-35 Y, , 32.6% aged 35-50 Y, and 39.5% aged over 50 Y,, according to education 39.8% with high school degree, 44.4% with less degree and 44.6% with university degree, and according to occupation 35.8% of employed, 32.2% of housewives, 37.5% of retired,

60.1% of students and 33.3% of unemployed think that females are more suspicious for thyroid diseases, similarly a study among adults living in KSA revealed that 33.6% of respondents said that females are most affected by thyroid dysfunction [19]. In our study ,knowing that pregnancy and postpartum period as a risk factor: according to gender 87.7% were females and 79.6% were males, according to age 83% aged 18-35 Y, 89.5% aged 35-50 Y, and 90.7% aged over 50 Y,, according to education 80.6% with high school degree, 88.9% with less degree and 87.2% with university degree, and according to occupation 87.6% of employed, 91.5% of housewives, 93.8% of retired, 81.5% of students and 83.3% of unemployed think that pregnancy and postpartum period are from the risk factors for thyroid diseases. Another study among general population in the Northern Region of India showed that 53.75% of participants had a correct response regarding the same exact fact about pregnancy and postpartum as risk factors [13].

Conclusion

In conclusion, participants exhibited an acceptable knowledge level of thyroid disease manifestations and risk factors compared to previously reported figures worldwide. {Rising public and carer awareness of thyroid disorders lead to early detection and control of the disease. Health authorities should organise more effective health education activities}.

Conflict of Interest

None

Funding

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