ORIGINAL ARTICLE

Awareness of thyroid disorders among the Saudi population

SAAD M. ALQAHTANI[1]
[1]*Department of Surgery, College of Medicine, Majmaah University, Al-Majmaah 11952, Saudi Arabia.*
Correspondence: Dr. Saad M. Alqahtani, Department of Surgery, College of Medicine, Majmaah University, Al-Majmaah 11952, Saudi Arabia. Telephone number: +966 504786646. Fax number: +966 16 4042500. Email: drsaadalhabib@hotmail.com

ABSTRACT

Background: Thyroid disorders are the commonest endocrine diseases. Sixty percent of people with thyroid disorders are unaware of their condition, and the prevention of thyroid diseases subject has not received much attention from medical professionals worldwide. This study aimed to assess the Saudi population's awareness about thyroid disorders in all regions of Saudi Arabia.

Methods: An online, cross-sectional, and survey-based study was carried out in December 2020 and included a random sample of 1560 Saudi men and women (≥20 years). The data was gathered through an online questionnaire. The questionnaire included sociodemographic data, presentations of various thyroid diseases, their risk factors, investigations, and management.

Results: A total of 1560 Saudi people were included in the survey. There were 819 women (52.5%) and 741 men (47.5%). Most of the participants aged between 31-40 years (n=489, 31.3%) and had a university level of education (n=987, 63.3%). The majority of respondents had moderate overall knowledge (n=647, 41.5%). There was a statistically significant correlation between the overall knowledge and the age, gender, and education level ($p<0.001$). On the other hand, most of the participants had poor knowledge about the risk factors for thyroid diseases. In addition, a statistically significant association was found between the knowledge of the risk factors and sociodemographic characteristics.

Conclusions: Most respondents had moderate overall knowledge and poor knowledge about the risk factors of thyroid diseases. We suggest intensive national campaigns and continuous community health education programs to gain favorable benefits and outcomes in terms of lowering the cost of treatment, catching-up early cancer cases, and providing a database for the family tendency of thyroid diseases.

Keywords: awareness, knowledge, Saudi population, thyroid disorders

BACKGROUND

The thyroid gland produces thyroid hormones that play key roles in oxygen consumption, myocardial contractility, stimulation of protein synthesis, and regulation of bone formation and resorption. They also influence the metabolism of carbohydrates, cholesterol, and phospholipids. In addition, they promote the growth and development of the fetal neurological system.[1]

Thyroid disorders are the commonest endocrine diseases universally.[2] Sixty percent of individuals with thyroid dysfunction are unaware of their condition worldwide.[2] Thyroid disorders exhibit variable presentations, including no symptomatology, small goiter, hypothyroidism, hyperthyroidism, and thyroid cancer.[3]

The vast majority of thyroid nodules are diagnosed by ultrasonography; however, the minority are detected clinically (5% and 1% in females and males, respectively).[4] The prevalence of incidental thyroid lesions ranges from 13.4% to 27.8% and it usually increases with age and exhibits gender predilection for females.[5]

Thyroid disorders are considered among the diseases that can be anticipated and avoided before they present clinically. Thus, prevention, early diagnosis, and prompt treatment are fundamental steps to reduce healthcare costs related to thyroid disorders.[6,7]

Age, female gender, pregnancy, coexisting morbidities (such as diabetes mellitus (DM) and obesity), lifestyle habits (such as smoking), and family history of thyroid dysfunctions are well-known factors associated with thyroid disorders.[8] In addition, iodine deficiency disorders (IDDs), some thyroid diseases, frequent exposure to radiation in childhood, family history of thyroid cancer, and goiter have been identified as risk factors for thyroid malignancy.[2]

Based on the Unified National Platform, the Kingdom of Saudi Arabia (KSA) has a land area of 2,150,000 km^2. The latest (2018) estimated Saudi population is 20.7 million individuals.[9]

In KSA, the prevalence of subclinical hypothyroidism is not clearly defined. However, it has been recorded that the prevalence at the primary healthcare level is 10%.[2] Other studies have estimated a prevalence of 13% to 35%, especially in women.[2] Furthermore, thyroid malignancy is the most common endocrine malignancy in KSA and accounts for 8.8% of all malignancies. Besides, it is the second most common malignancy in females after breast cancer.[10]

The subject of thyroid disease prevention has not received much attention from medical professionals worldwide.[6] Thus, this study aimed to assess the Saudi population's knowledge about thyroid disorders in all regions of the KSA.

METHODS

Study design: The study is online, cross-sectional, and survey-based research. It was carried out in December 2020. A random sample of Saudi men and women (≥20 years) from all regions of the KSA was included with a stratified multistage cluster. Considering the prevalence of 30%,[11] the accepted error of 0.05, and design effect 2, the study sample size was estimated to be at least 646 individuals.

The questionnaire was designed based on literature review. Afterward, the questionnaire was reviewed and

validated by experts and pilot testing. The questionnaire included sociodemographic data, as well as questions about symptoms of different thyroid disorders, their risk factors, investigations, and management. There were 37 questions about the overall knowledge, which could be answered as 'yes', 'no', or 'I don't know'. The level of knowledge was scored based on the total number of correct answers, as follows: ≤13 correct answers corresponded to 'poor' knowledge; 14-26 correct answers corresponded to 'moderate' knowledge; and ≥27 correct answers corresponded to 'high' knowledge. On the other hand, there were 10 questions about the risk factors of thyroid diseases and thyroid cancer, which also could be answered as 'yes', 'no', or 'I don't know'. The level of knowledge was scored based on the total number of correct answers, as follows: ≤3 correct answers corresponded to 'poor' knowledge; 4-6 correct answers corresponded to 'moderate' knowledge; and ≥7 correct answers corresponded to 'high' knowledge.

Ethical approval: An ethical approval was taken from the Institutional Review Board (IRB) at the Majmaah University, Al-Majmaah, KSA (MUREC-Nov.1/COM -2O2O/7-2). Consent was obtained from all participants.

Statistical analysis: Data was analyzed using SPSS version 23 software. Descriptive statistics were used and comparison between qualitative variables was made by using the Pearson's chi-squared test. A p value <0.05 was considered statistically significant.

RESULTS

Sociodemographic results: Table 1 depicts the sociodemographic data of the questionnaire respondents. A total of 1560 Saudi people participated in the study. There were 819 women (52.5%) and 741 men (47.5%). In addition, the majority of the participants aged between 31-40 years (n=489, 31.3%) and had a university level of education (n=987, 63.3%). In terms of response rate, the eastern region represented the highest area (29.3%), followed by the southern region (27%). The other remaining regions were distributed equally (14% for each region). Nearly half of the study participants (n=787, 50.4%) had thyroid disorder or one of their family members. This latter variable was significantly associated with overall knowledge (p<0.001).

Overall knowledge: Table 2 displays the overall knowledge (correct answers) about thyroid diseases among the questionnaire participants. Figure 1 illustrates the overall knowledge of symptoms of various thyroid diseases as well as their risk factors, investigations, and management. The majority of participants had moderate knowledge (n=647, 41.5%). High and poor knowledge were observed in 473 (30.3%) and 440 (28.2%) of the surveyed subjects, respectively. There was a statistically significant correlation between the overall knowledge and age, gender, and education level (p<0.001). In contrast, no relationship was found between the overall knowledge and the region of KSA (p=0.462) (Table3).

Risk factors of thyroid diseases and thyroid cancer: The majority of participants had poor knowledge about the risk factors for thyroid diseases and thyroid cancer (n=620, 39.7%). High and moderate knowledge were seen in 389 (24.9%) and 551 (35.4%) of the surveyed subjects, respectively. There was a statistically significant association between the knowledge of the risk factors and the sociodemographic characteristics (Table 4).

Figure 1. The classification of overall knowledge about thyroid diseases among the questionnaire respondents

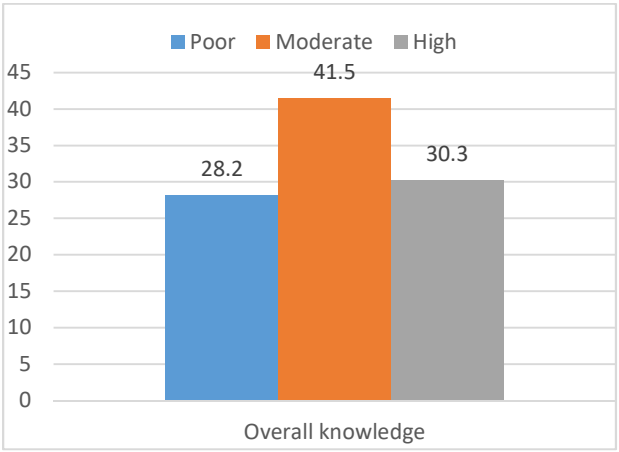

Table1. Sociodemographic characteristics of the questionnaire participants (n=1560)

Sociodemographic characteristic	Options	Number	Percent
Age	20 – 30	377	24.2
	31 – 40	489	31.3
	41 – 50	466	29.9
	50+	228	14.6
Gender	Male	741	47.5
	Female	819	52.5
Region	South	421	27.0
	East	457	29.3
	North	225	14.4
	West	225	14.4
	Central	232	14.9
Education Level	Primary	24	1.5
	Intermediate	36	2.3
	Secondary	366	23.5
	University	987	63.3
	Postgraduates	147	9.4

Table 2. The overall knowledge (correct answers) about thyroid diseases among the questionnaire participants (n=1560).

Knowledge	Number	Percent
Location of the thyroid gland		
At the anterior neck	1256	80.5
I don't know	304	19.5
Function of the thyroid gland		
Enhancing metabolism	1035	66.3
Regulation of heart beats	689	44.2
Growth and development of fetal neurological system	563	36.1
Symptoms of hypothyroidism		
Feeling cold	844	54.1
Constipation	563	36.1
Weight gain	1216	77.9
Dry skin and hair loss	906	58.1
Depression and fatigue	1169	74.9
Irregular menstrual periods	879	56.3
Abortion	455	29.2
Mental retardation and growth failure	445	28.5
Symptoms of hyperthyroidism		
Anxiety, insomnia, and tension	934	59.9
Palpitations	828	53.1
Sweating more than usual	819	52.5
Weight loss despite increased appetite	884	56.7
Hair loss	743	47.6
Changes in the menstrual cycle	695	44.6
Symptoms indicate thyroid diseases		
A lump in the front of the neck	958	61.4
Dysphagia and dyspnea	682	43.7
Change in the voice	651	41.7
Risk factors of thyroid diseases		
Iodine deficiency	870	55.8
Older age	459	29.4
Female gender	911	58.4
Obesity and diabetes mellitus	746	47.8
Smoking	434	27.8
Family history of thyroid disease	829	53.1
Pregnancy	290	18.6
Risk factors of thyroid cancer		
Frequent exposure to radiation in childhood	585	37.5
Family history of thyroid cancer	764	49.0
Goiter	886	56.8
Investigations of thyroid diseases		
Thyroid function test	1124	72.1
Neck ultrasound	830	53.2
Fine needle aspiration cytology	966	61.9
Treatment modalities of different thyroid diseases		
Medications	1183	75.8
Surgery	825	52.9
Radioiodine treatment	597	38.3

Table 3. Correlation between the overall knowledge and the sociodemographic characteristics (n=1560).

Sociodemographic characteristics	Knowledge				P-value
	Poor	Moderate	High	Total	
Age					
20-30	93 (24.7)	151 (40.1)	133 (35.3)	377 (100.0)	< 0.001*
31-40	120 (24.5)	206 (42.1)	163 (33.3)	489 (100.0)	
41-50	130 (27.9)	209 (44.8)	127 (27.3)	466 (100.0)	
More than 50	97 (42.5)	81 (35.5)	50 (21.9)	228 (100.0)	
Gender					
Male	314 (42.4)	273 (36.8)	154 (20.8)	741 (100.0)	< 0.001*
Female	126 (15.4)	374 (45.7)	319 (38.9)	819 (100.0)	
Region					
South	122 (29)	169 (40.1)	130 (30.9)	421 (100.0)	0.462
East	141 (30.9)	196 (42.9)	120 (26.3)	457 (100.0)	
North	58 (25.8)	89 (39.6)	78 (34.7)	225 (100.0)	
West	58 (25.8)	98 (43.6)	69 (30.7)	225 (100.0)	

Central		61 (26.3)	95 (40.9)	76 (32.8)	232 (100.0)	
Education						
Primary		8 (33.3)	10 (41.7)	6 (25.0)	24 (100.0)	< 0.001*
Intermediate		14 (38.9)	15 (41.7)	7 (19.4)	36 (100.0)	
Secondary		134 (36.6)	148 (40.4)	84 (23.0)	366 (100.0)	
University		250 (25.3)	426 (43.2)	311 (31.5)	987 (100.0)	
Post- graduate		34 (23.1)	48 (32.7)	65 (44.2)	147 (100.0)	

Table 4. Correlation between the knowledge about the risk factors of thyroid diseases and the sociodemographic characteristics (n=1560).

Sociodemographic characteristics	Overall knowledge			Total	P-value
	Poor	Moderate	High		
Age					
20-30	139 (36.9)	138 (36.6)	100 (26.5)	377 (100.0)	0.01*
31-40	173 (35.4)	181 (37.0)	135 (27.6)	489 (100.0)	
41-50	196 (42.1)	156 (33.5)	114 (24.4)	466 (100.0)	
More than 50	112 (49.1)	76 (33.3)	40 (17.6)	228 (100.0)	
Gender					
Male	379 (51.1)	199 (26.9)	163 (22.0)	741 (100.0)	< 0.001*
Female	241 (29.4)	352 (43.0)	226 (27.6)	819 (100.0)	
Region					
South	165 (39.2)	130 (30.9)	126 (29.9)	421 (100.0)	0.007 *
East	190 (41.6)	181 (39.6)	86 (18.8)	457 (100.0)	
North	76 (33.8)	88 (39.1)	61 (27.1)	225 (100.0)	
West	97 (43.1)	73 (32.4)	55 (24.5)	225 (100.0)	
Central	92 (39.6)	79 (34.1)	61 (26.3)	232 (100.0)	
Education					
Primary	14 (58.4)	5 (20.8)	5 (20.8)	24 (100.0)	< 0.001*
Intermediate	21 (58.3)	10 (27.8)	5 (13.9)	36 (100.0)	
Secondary	181 (49.4)	124 (33.9)	61 (16.7)	366 (100.0)	
University	357 (36.2)	365 (37.0)	265 (26.8)	987 (100.0)	
Post- graduate	47 (32.0)	47 (32.0)	53 (36.0)	147 (100.0)	

DISCUSSION

Our findings showed that most of the participants had moderate overall knowledge (n=647, 41.5%). However, 473 (30.3%) and 440 (28.2%) individuals exhibited high and poor knowledge, respectively. In two different local studies, it was recorded that 57.3% and 52% of the participants had good knowledge of thyroid glands and their diseases. In comparison, poor knowledge was observed in 42.6% and 45%, respectively.[12,13] In the same studies, gender and level of education had no significant impact on the overall knowledge. This is in contrast to our results in which the correlation was statistically significant (p<0.001). In line with a previously published study,[13] our data also showed a significant correlation between age and overall knowledge (p<0.001). These findings endorse the importance of cultivating adequate knowledge of different thyroid disorders. For instance, hypothyroidism is one of the most common endocrine disorders and typically has no apparent symptoms. If this condition is left untreated, certain complications may occur, such as overt hypothyroidism, infertility (in both males and females), dyslipidemia, mood and cognition disturbances, and hypertension.[2,14] On the other hand, hyperthyroidism is a less common thyroid disorder. However, it has been shown that if thyrotoxicosis is left untreated or partially treated, some adverse sequelae may occur involving cardiac, musculoskeletal, and neurological aftermaths.[15]

Our results showed that 55.8% of respondents chose the correct answer that iodine deficiency is a risk factor for thyroid diseases. This is in contrast to a study by Alotaibi et al. in which the percentage was 20.5%.[16] In this respect, adequate knowledge about IDDs is essential as they are the most common cause of thyroid dysfunction and considered preventable diseases. The presentations of IDDs vary according to age. For example, fetuses may present with abortion, stillbirth, or congenital anomalies. Conversely, neonates may present with infant mortality, mental retardation, or cretinism. On the other side, children and adolescents may present with goiter, mental impairment, or delayed physical development. Lastly, adults may present with mental impairment, impaired work productivity, or toxic nodular goiter.[17] In 1997, a national IDD survey was conducted among school children (between 8-10 years). The authors estimated the prevalence of goiter to be 8% to 30%.[11] In addition, Abu-Eshy et al. found that in Aseer region, the overall prevalence of goiter was 24%.[18] In both studies, the high altitude was attributed as a risk factor and this may be ascribed to the iodine deficiency in the soils and the lack of iodine-containing foods, such as seafood.[11,18]

Our data showed that the majority (39.7%) of the survey respondents had poor knowledge of the risk factors for thyroid diseases and thyroid cancer and this is in agreement with previously published study.[16] Al-Geffari et al. concluded that thyroid dysfunction is more common in Saudi individuals who had type 2 DM. Therefore, the

authors have proposed regular screening for thyroid dysfunction among Saudi individuals with type 2 DM.[8] Indeed, sufficient knowledge of such risk factors can minimize the associated morbidity.

Primordial prevention aims to circumvent the occurrence of risk factors. An example of such approach involves adequate iodine intake in order to prevent the incidence of iodine deficiency, which is a key trigger for IDD, goiter, mental impairment, and hypothyroidism. On the other hand, primary prevention aims to reduce and control the effects of risk factors in order to prevent illness progression to an overt one. An example of such approach involves cessation of smoking and control of thyroid autoimmunity.[6] Conversely, secondary prevention is intended for early diagnosis and prompt treatment to avoid advanced disease progression. Screening for various forms of subclinical or inactive thyroid diseases—for example, congenital hypothyroidism, subclinical hypothyroidism, subclinical hyperthyroidism, thyroid malignancy, calcitonin and RET mutation, and thyroid screening in pregnancy—are a few examples of secondary prevention. Lastly, tertiary prevention helps to prevent future complications and disabilities through rehabilitation and proper medical treatment. Examples of such preventative approach include the prevention of iatrogenic disease (for example, thyroid hormone overdose) and ensuring adequate treatment of already identified thyroid disease (for example, during pregnancy).[7]

In clinical practice, different methods for thyroid disease screening are used. Detection of goiter (clinically and radiologically), estimation of urinary iodine excretion, and measurement of thyroid-stimulating hormone (TSH) in neonates are helpful measures in IDDs assessment.[11] Ultrasonography is a useful tool in detecting asymptomatic diffuse thyroid disease, and it is recommended for regular use in screening programs.[4,19] Although it is debatable, the measurement of TSH has also been deemed a useful screening method. This is an especially important measure in pregnant women to avoid miscarriage, preterm birth, or fetal death.[20]

Although there is no consensus on population screening, some societies have advocated guidelines for thyroid dysfunction screening in asymptomatic adults. For instance, it has been recommended that all adults older than 35 years should be screened every five years. In addition, routine TSH measurements have been recommended to be carried out regularly in elderly patients, particularly in women.[14] Moreover, the TSH level should be checked in patients with infertility, depression, as well as pregnant women and children with short stature. On the other hand, all newborns should be screened for congenital hypothyroidism, by measuring thyroxine (T4) with or without TSH.[2]

There are several strengths to our research. First, it represented all regions of KSA. Second, a reasonably large sample of 1560 participants was included. The current study is not without its limitations, such as the self-reported responses from the participants, which are subjected to under- or over-estimation.

CONCLUSIONS

Our results showed that most respondents had moderate overall knowledge and poor knowledge of the risk factors for thyroid diseases. It is worth paying attention to these different thyroid disorders and increasing the community's awareness of such risk factors. This can be achieved through intensive national campaigns and tracking and monitoring the people at risk of thyroid disorders (for example, diabetics, elderly, smokers, and pregnant women) at the primary healthcare center level.

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