

Pattern of Thyroid Diseases in Arar City, Northern Saudi Arabia

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ABSTRACT

Background: Thyroid hormone acts as a vital factor of development and growth, and in adults plays a critical part in the regulation of the function and metabolism of virtually every organ system.

Study objective: The objective of this study was to identify the pattern of hypothyroidism and hyperthyroidism in Arar, Northern Saudi Arabia and some related socio-demographic determinants.

Methodology: A cross-sectional study was conducted in Arar, Northern Saudi Arabia. A multistage stratified random sampling technique was used. A pre-designed online questionnaire was distributed among the targeted population and filled by participants after a brief introduction or explanation of the idea of the research to the public. Sampled participants filled out the self-reported predesigned questionnaire to collect socioeconomic and thyroid diseases related data.

Results: The study included 160 participants. The total prevalence of thyroid diseases was 36(22.5%). Of the 36 reported cases of thyroid diseases, 11(30.5%) were reported as having hyperthyroidism and 25(69.5%) were having hypothyroidism. Of the 11 patients with hyperthyroidism 9 (81.8%) were males and 2(18.2%) were females. Of the 25 patients with hypothyroidism, 4(16.0%) were males and 21(84.0%) were females.

Conclusion: Hypothyroidism is the prevalent form of thyroid diseases in Arar, Northern Saudi Arabia, females: male ratio was about 1:5. Knowledge of various factors influencing thyroid dysfunction can help the public to guard against these prevalent diseases. More studies should be carried out in Arar city to stress on the individual thyroid disorder. The studies should be community based with clinical and laboratory diagnosis of cases.

Keywords: Hypothyroidism; Thyroid diseases; Hyperthyroidism; Arar, Northern Saudi Arabia.

INTRODUCTION

Thyroid diseases are, arguably, among the commonest endocrine disorders worldwide. There are four general types of thyroid diseases (hypothyroidism, hyperthyroidism, structural abnormalities and tumors). The symptoms of thyroid disease vary depending on the type ^[1].

Hypothyroidism results from reduced effects of thyroid hormone on tissues. Hypothyroidism is more common in women and has a total prevalence of 1% to 2% increasing with age ^[2].

Hyperthyroidism is the condition that occurs due to excessive production of thyroid hormone by the thyroid gland. The main hyperthyroid conditions are (Graves' disease, Toxic thyroid nodule, Thyroid storm, toxic nodular struma and Hashitoxicosis). In the United States hyperthyroidism affects about 1.2% of the population ^[3].

Structural abnormality is an abnormal enlargement of the thyroid gland (Goiter, Lingual thyroid and Thyroglossal duct cyst). Regarding thyroid tumors, the clinical presentation of thyroid cancer is usually as a solitary thyroid nodule or

increasing goiter size. Although thyroid nodules are common, thyroid cancers are rare ^[4].

Thyroid diseases are frequently misunderstood and are too often overlooked and misdiagnosed. Morbidity associated with thyroid diseases is well known with deleterious consequences in terms of both elevated serum cholesterol levels and increased risk of coronary artery disease and cardiovascular mortality ^[5].

A study conducted in Hail region in KSA reported that; 175 patients complaining of different thyroid disorders, (56%) of them were found to have hypothyroidism and (32.6%) had hyperthyroidism. Iodine deficiency was associated with hypothyroidism in females but it was common in males with hyperthyroidism. Total cases with goiter were 89 most of them were males (60.7%) palpable goiter was more common (75.5%) than visible type. Malignant thyroid was found mainly in males (75%) with papillary type of cancer (64.3%) and the common presenting manifestation was hyperthyroidism (53.6%) ^[6].

Another study in Northern Saudi Arabia found that (18.2%) were diagnosed as having hyperthyroidism and (81.8%) were diagnosed as having hypothyroidism. Of the 14 patients with hyperthyroidism (71.4%) were males and (28.6%) were females. Of the 63 patients with hypothyroidism, (6.3%) were males and (93.7%) were females [7].

The objective of this study was to identify the pattern of hypothyroidism and hyperthyroidism in Arar, Northern Saudi Arabia and some related socio-demographic determinants.

METHODS

Study design: A cross-sectional study was conducted in Arar, Northern Saudi Arabia.

A multistage stratified random sampling technique was used.

Participants: This study included 160 randomly selected participants (female and male population of Northern Saudi Arabia, KSA).

Data collection: A pre-designed online questionnaire was distributed among the targeted population and filled by participants after a brief introduction or explanation of the idea of the research to the public. Sampled participants filled out the self-reported predesigned questionnaire to collect socioeconomic and thyroid diseases related data including:

- Socio-demographic characteristics of the participants including age, the sex, marital status, educational status, weight and height.
- If the patient has chronic disease, obesity, excessive sweating, continuous fatigue or muscle contractions.
- Questions about symptoms of thyroid dysfunction.
- The BMI was calculated (body weight in kg/height in m²), BMI ≤ 18.5 kg/m² was classified as underweight, 25–29.9 as overweight, and ≥ 30 as obese.

Statistical analysis

Data were compiled and analyzed using statistical package for the social sciences (SPSS, version 16) and results were analyzed with frequencies and Chi-squared test as appropriate. P-value was considered significant if <0.05 .

Ethical considerations

This study was reviewed and approved by the Research Ethics Committee of Faculty of Medicine, Northern Border University. Participants were informed that participation is completely voluntary

and data collectors introduced and explained the research to participants. No names were recorded on the questionnaires and all questionnaires were kept safe.

RESULTS

Table (1): shows the sociodemographic characters of the studied individuals. 85.6% of the studied population was females. About one third of them aged between 20-29 years, other third aged 30-39, 17.5% ≤ 20 and only 5% more than 50 years. About two thirds of the studied population were married and 37.5% single. Most of the studied population (73.3%) was highly educated (University or more), 20% secondary educated, only 3.1% primary and 45.6% had no job. The average family income/month (in SR) for one third of the studied population was 5000-10000 SR, 10000-20000 SR for 26.9% and less than 500 for 15.6%.

Only 3.8% of the studied population had diabetes mellitus, 12.5% osteoporosis, 11.2% anemia, 13.8% reported decreased iodine in the body and only 1.9% suffered from decreased heart rate. Regarding BMI; 35% were obese, 23.1% were overweight, 38.1% normal and only 3.8% underweight.

Table (2): illustrates the prevalence of reported thyroid diseases, hyperthyroidism and hypothyroidism among the studied population Arar, 2017. It is clear that, the prevalence of reported thyroid diseases was 22.5%; 6.9% of the studied population (30.5% from the 36 cases) suffered from hyperthyroidism and 15.6% from hypothyroidism (69.5% from the 36 cases).

Table (3): shows sociodemographic characters of the studied Hyperthyroidism cases. Most (54.5%) of the studied Hyperthyroidism cases aged between 30-40 years, 27.3% aged between 20-30 and 18.2% aged 20 years or less. Most (81.8%) of them were females, 54.5% were married, 45.5% were highly educated, 45.5% were employed and 36.4% had 500-5000 average family income/month, 27.3% had 5000-10000, the same percentage had less than 500 and only 9.1% had >15000 SR/month.

Table (4): illustrates the disease related characteristics of the studied Hyperthyroidism cases. 90.9% of the cases complained from hyperactivity, 100% loss of hair, 9.1% observed and palpate swelling in the front of the neck, 72.7% complained of continuous sensation of exhaustion, 100% complained of weight loss, 54.6% sleep 5-8 hours/day and only 18.2% had muscle cramps but none of them complained of palpitation and none of them had iodine deficiency. Regarding other

diseases; none of the cases had DM, 36.4% had osteoporosis, 27.3% suffered from anemia and none of them suffered from morbid obesity.

Table (5): shows sociodemographic characters of the studied Hypothyroidism cases. 28% of the studied Hypothyroidism cases aged between 30-39 years, 24% aged between 40-49 and 20% aged 20-29 years. 84% of them were females. 80% were married. 76% were highly educated, 52% were employed and 28% had 500-5000 average family income/month.

Table (6): discuss disease related characters of the studied Hypothyroidism cases. Regarding signs and symptoms; 32% reported muscle cramps, 75% hair loss, 4% palpitation, 8% observed swelling in front of the neck, 64% skin dryness, 16.0% sleep 10 hours/day and 32% had family history of thyroid disorders. Regarding chronic diseases; 12% had DM, 20% osteoporosis, 8% anemia, 100% had morbid obesity and 32% had other chronic diseases.

Table (1): Sociodemographic characters of the studied individuals, Arar, 2017

Sex	Frequency (n=160)	Percent
Female	137	85.6
Male	23	14.4
Age groups		
≤20	28	17.5
20-	53	33.1
30-	54	33.8
40-	17	10.6
50+	8	5.0
Marital status		
Widow	3	1.9
Single	60	37.5
Married	97	60.6
Educational level		
Primary	5	3.1
Secondary	32	20.0
University +	118	73.8
Preparatory	5	3.1
Occupation		
Employed	80	50.0
Private	7	4.4
No work	73	45.6
Average family income/month (in SR)		
Less than 500	25	15.6
500 - 5000	34	21.2
5000 - 10000	54	33.8
10000 - 20000	43	26.9
More than 20000	4	2.5

Table (2): Prevalence of thyroid diseases, hyperthyroidism and hypothyroidism, Arar, 2017

	No.	%
Thyroid diseases	36	22.5
• Hyperthyroidism	11	6.9 (30.5% from the 36 cases)
• Hypothyroidism	25	15.6 (69.5% from the 36 cases)
Total	160	100.0

Table (3): Sociodemographic characters of the studied Hyperthyroidism cases, Arar, 2017

Variable	Frequency (n=11)	Percent
Age group (in years)		
≤ 20	2	18.2
20 – 30	3	27.3
30 – 40	6	54.5
Sex		
Female	9	81.8
Male	2	18.2
Marital status		
Single	5	45.5
Married	6	54.5
Educational level		
Primary	2	18.2
Secondary	4	36.4
University or more	5	45.5
Occupation		
Employed	5	45.5
No work	6	54.5
Average family income/month (in SR)		
Less than 500	3	27.3
500 - 5000	4	36.4
5000 - 10000	3	27.3
10000 - 20000	1	9.1

Table (4): Disease related characteristics of the studied Hyperthyroidism cases, Arar, 2017

Variable	Frequency (n=11)	Percent
Continues sense of hyperactivity		
Yes	10	90.9
No	1	9.1
Bright skin		
No	2	18.2
Yes	9	81.8
Loss of hair		
Yes	11	100.0
Observing swelling in front of the neck		
No	10	90.9
Yes	1	9.1
Palpable swelling in front of the neck		
No	10	90.9
Yes	1	9.1
Family history		
No	10	90.9
Yes	1	9.1
Osteoporosis		
No	7	63.6
Yes	4	36.4
DM		
No	11	100.0
Anemia		
No	8	72.7
Yes	3	27.3

Variable	Frequency (n=11)	Percent
Iodine deficiency		
No	11	100.0
Palpitation		
No	11	100.0
No. of sleeping hours/day		
5-8	6	54.6
9	3	27.3
10+	2	18.2
No. of meals/day		
2 meals	9	81.8
3 meals	2	18.2
Continues sense of exhaustion		
No	3	27.3
Yes	8	72.7
Loss of weight		
Yes	11	100.0
Excess seating		
Yes	10	90.9
No	1	9.1
BMI group		
Underweight	2	18.2
Normal	7	63.6
Obese	2	18.2
Morbid obesity		
No	11	100.0
Muscle cramps		
Sometimes	6	54.5
No	3	27.3
Yes	2	18.2

Table (5): Sociodemographic characters of the studied Hypothyroidism cases, Arar, 2017

Variant		Frequency (n= 25)	Percent
Age groups	≤ 20	2	8.0
	20-	5	20.0
	30-	7	28.0
	40-	6	24.0
	50+	5	20.0
Sex	Female	21	84.0
	Male	4	16.0
Marital status	Single	5	20.0
	Married	20	80.0
Educational level	Primary	2	8.0
	Secondary	3	12.0
	University	19	76.0
	Preparatory	1	4.0
Occupation	Employed	13	52.0
	Private	1	4.0
	Not working	11	44.0
Average family income/month (in SR)	Less than 500	2	8.0
	500 - 5000	7	28.0
	5000 - 10000	8	32.0
	10000 - 20000	8	32.0

Table (6): Disease related characters of the studied Hypothyroidism cases, Arar, 2017

Variables	Frequency (n= 25)	Percent
Other chronic diseases		
No	17	68.0
Yes	8	32.0
Obesity		
Yes	25	100.0
Underweight		
No	25	100.0
Muscle cramps		
Sometimes	7	28.0
No	10	40.0
Yes	8	32.0
Loss of hair		
No	6	24.0
Yes	19	76.0
Benign tumors elsewhere in the body		
No	23	92.0
Yes	2	8.0
Observing swelling in the front of the neck		
No	23	92.0
Yes	2	8.0
Palpable swelling in the front of the neck		
No	22	88.0
Yes	3	12.0
Family history of hypothyroidism		
No	17	68.0
Yes	8	32.0
DM		
No	22	88.0
Yes	3	12.0
Osteoporosis		
No	20	80.0
Yes	5	20.0
Anemia		
No	23	92.0
Yes	2	8.0
Iodine deficiency		
No	16	64.0
Yes	9	36.0
Palpitation		
No	24	96.0
Yes	1	4.0
Sleeping hours/day		
5-8	18	72.0
9	3	12.0
10	4	16.0
No. of meals/day		
2-3	21	84.0
4-5	4	16.0

DISCUSSION

There is a well-known geographical difference in thyroid diseases due to the different environmental variations in different geographic settings^[8].

The objective of this study was to identify the pattern of hypothyroidism and hyperthyroidism in Arar, Northern Saudi Arabia and some related socio-demographic determinants.

A cross-sectional study was conducted in Arar, Northern Saudi Arabia. A multistage stratified random sampling technique was used.

A pre-designed online questionnaire was distributed among the targeted population and filled by participants after a brief introduction or explanation of the idea of the research to the public. Sampled participants filled out the self-reported predesigned questionnaire to collect socioeconomic and thyroid diseases related data.

As indicated in the findings of the current study, hypothyroidism is the most frequent thyroid disorder affecting people in Arar, Northern Saudi Arabia. Of the 160 participants, the prevalence of reported thyroid diseases was 22.5%; 6.9% of the studied population (30.5% from the 36 cases) suffered from hyperthyroidism and 15.6% from hypothyroidism (69.5% from the 36 cases). Our results are in accordance with a study conducted in Hail region in KSA reported that; the patients complaining of different thyroid disorders were 175. (56%) cases were found to have hypothyroidism and (32.6%) had hyperthyroidism^[6] and with another study in Northern Saudi Arabia which found that among the studied thyroid diseases cases, 18.2% were hyperthyroidism and 81.8% hypothyroidism^[7].

Strieder *et al.* reported less findings; from the total population, 3.6% were found to have hypothyroidism and 1.9% had hyperthyroidism^[9]. A study in Libya^[10] found that; the prevalence of thyroid dysfunction types was, overt hyperthyroidism 0.84%, subclinical hyperthyroidism 0.84%, overt hypothyroidism 1.12%, and subclinical hypothyroidism 6.18%. Another study showed that thyroid dysfunction was seen in one out of every eight young women in a South Indian population and overall prevalence of thyroid dysfunction among young females in their study was 12.5%.

They reported hypothyroidism and hyperthyroidism were 7.3% and 0.3% respectively^[12]. The study about Risk Factors for Thyroid Dysfunction among Type 2 Diabetic Patients in Saudi Arabia showed the prevalence of different types of thyroid dysfunction was 28.5%, of which

25.3% had hypothyroidism, where 15.3%, 9.5%, clinical, subclinical hypothyroidism, respectively while the prevalence of hyperthyroidism was 3.2%, of which subclinical cases accounted for 2.7% and overt hyperthyroidism accounted for 0.5%^[11].

The prevalence of different types of thyroid disease varied between the studies. In this study; 15.6% had hypothyroidism (84% females and 16% males). A study conducted in Libya **Ghawil *et al.***^[15] reported the prevalence of subclinical hypothyroidism as 2.3%. Prevalence of hypothyroidism was reported as 6.18% in Libya (Nouh *et al.*)^[10] and 47.34% in Saudi Arabia Makkah region by Lamfon *et al.*^[13].

A study in India reported overall prevalence of hypothyroidism 10.95%, a significantly higher ($P < 0.05$) proportion of females vs. males (15.86% vs 5.02%) and older vs. younger (13.11% vs 7.53%), adults were diagnosed with hypothyroidism^[14].

Regarding signs and symptoms of hypothyroidism; 32% reported muscle cramps, 52% excess sweating, 56% irritability, 75% hair loss, 4% palpitation, 8% observed swelling in front of the neck and 64% skin dryness. In the Colorado study, a questionnaire that included 17 thyroid symptoms revealed a clear correlation between the type of symptom (dry skin, poor memory, slow thinking, muscle weakness, fatigue, muscle cramp, cold intolerance, puffy eyes, constipation, and hoarseness), the number of symptoms, and elevated TSH^[16,17]. Another study reported a small increase in total symptoms was observed with progressive deterioration of thyroid function^[18].

Regarding signs and symptoms of hyperthyroidism; 90.9% of the cases complained of hyperactivity, 100% hair loss, 72.7% continuous sensation of exhaustion, 100% complained of weight loss and only 18.2% had muscle cramps but none of them complained of palpitation and none of them had iodine deficiency. A study in Hail region reported that most of the patients with hyperthyroidism were complaining of palpitation 87.7% and tremors 63.2%. About half of the case 49.1% had weight loss and 35.1% had sweating. Others had exophthalmos, goiter, exophthalmos and irritability.

Similarly, symptoms recorded by **Michelageli *et al.***^[18] palpitation, tremors and weight loss each were over 50%. Other symptoms recorded included excessive sweating 45%, heat intolerance 31% and nervousness 27%. On the hand, exophthalmos, tremors, and tachycardia ranked top on the list of clinical signs representing over 40% for each.

CONCLUSION AND RECOMMENDATIONS

Thyroid dysfunction is common. Most people found to have thyroid dysfunction in surveys have subclinical thyroid dysfunction, in particular subclinical hypothyroidism. When asked, some of these people with subclinical thyroid dysfunction have symptoms that are compatible with, though not specific for, thyroid dysfunction or have another indication for testing for thyroid dysfunction. Some people have biochemical or physiological abnormalities.

Limitation of the Study

This study depends on self-administered online questionnaire, so we found the already diagnosed cases. To represent thyroid diseases as a whole, the study should be community based study with clinical and laboratory diagnoses of cases.

REFERENCES

- Hall JE, Guyton AC (2011):** Guyton and Hall textbook of medical physiology. Philadelphia, PA, Saunders Elsevier. <http://www.clinicalkey.com/dura/browse/>
- Canaris GJ, Manowitz NR, Mayor G, Ridgway EC (2000):** The Colorado thyroid disease prevalence study. *Arch Intern Med.*, 160: 526–534.
- Bahn Chair R, Burch H, Cooper D et al. (2011):** Hyperthyroidism and other causes of thyrotoxicosis: management guidelines of the American Thyroid Association and American Association of Clinical Endocrinologists. *Thyroid*, 21 (6): 593–646.
- Perros P (2007):** British Thyroid Association and Royal College of Physicians Guidelines for the management of thyroid cancer, Report of the Thyroid Cancer Guidelines Update Group., London Royal College of Physicians. Available at: http://www.british-thyroid-association.org/news/Docs/Thyroid_cancer_guidelines_2007.pdf.
- Cappola AR, Fried LP, Arnold AM et al. (2006):** Thyroid status, cardiovascular risk, and mortality in older adults. *JAMA*. 295:1033–1041
- Safia Moussa, Amal Alshammari, Gada Alshammari et al. (2016):** Pattern of Thyroid Disease in Hail Region, Saudi Arabia. *International Journal of Science and Research*. 5 (2): 276 – 282.
- Anwar O. Alrasheedi (2016):** Patterns of thyroid disorders in northern Saudi Arabia. *Journal of Diabetes & Metabolism*. DOI: 10.4172/2155-6156.C1.061.
- Knudsen N, Bulow I, Jorgensen T et al. (2000):** Comparative study of thyroid function and types of thyroid dysfunction in two areas in Denmark with slightly different iodine status. *Eur J Endocrinol.*, 143: 485-491.
- Strieder TG, Prummel MF, Tijssen JG et al. (2003):** Risk factors for and prevalence of thyroid disorders in a cross-sectional study among healthy female relatives of patients with autoimmune thyroid disease. *Clinical Endocrinology*, 59: 396–401.
- Nouh AM, Eshnafl, Basher MA (2008):** Prevalence of thyroid dysfunction and its effect on serum lipid profiles in a Murzok, Libya Population. *Thyroid Sci.*, 3(10):1-6.
- Gaffer Ali AA, Altahir SA (2016):** Prevalence of Thyroids Dysfunction among Saudi Adult Males and Females from (June– September 2016). *J Endocrinol Diab.*, 3(4): 1-3.
- Velayutham K, Selvan S, Unnikrishnan A (2015):** Prevalence of thyroid dysfunction among young females in a South Indian population. *Indian J Endocrinol Metab.*, 19: 781-784.
- Lamfon HA (2008):** Thyroid Disorders In Makkah, Saudi Arabia. *Ozean J Applied Sci.*, 1: 55-58.
- Unnikrishnan AG, Kalra S, Sahay RK et al. (2013):** Prevalence of hypothyroidism in adults: An epidemiological study in eight cities of India. *Indian Journal of Endocrinology and Metabolism*, 17(4):647-652.
- Ghawil M, Tonutti E, Abusrewil S et al. (2011):** Autoimmune thyroid disease in Libyan children and young adults with type 1 diabetes mellitus. *Eur. J. Pediatr.*, 170(8):983-987.
- Canaris GJ, Manowitz NR, Mayor G et al. (2000):** The Colorado thyroid disease prevalence study. *Arch Intern Med.*, 160:526–534.
- Canaris GJ, Steiner JF, Ridgway EC (1997):** Do traditional symptoms of hypothyroidism correlate with biochemical disease? *J Gen Intern Med.*, 12:544–550.
- Michelageli VP, Pawape G, Sinha A et al. (2000):** Clinical features and pathogenesis of thyrotoxicosis in adult Melanesians in Papua New Guinea. *Clin Endocrinol (Oxf)*, 2: 261-6.