Open Access Library Journal
2024, Volume 11, e11685
ISSN Online: 2333-9721
ISSN Print: 2333-9705

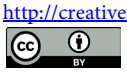
Causes of Thyroid Disease and Its Relationship to Dietary Habits and Its Prevalence in Al-Baha Region, KSA

Hala Mohamed Ali Wahba[1,2*], Dawla Ali Adam Ali[2]

[1]Home Economics Department, Faculty of Specific Education, Minufiya University, Shibin El Kom, Egypt
[2]Home Economics Department, Faculty of Sciences and Arts (Buljurshi), Al-Baha University, Al Baha, Saudi Arabia
Email: *hala.ali77@yahoo.com

How to cite this paper: Wahba, H.M.A. and Ali, D.A.A. (2024) Causes of Thyroid Disease and Its Relationship to Dietary Habits and Its Prevalence in Al-Baha Region, KSA. *Open Access Library Journal*, **11**: e11685.
https://doi.org/10.4236/oalib.1111685

Received: May 12, 2024
Accepted: June 27, 2024
Published: June 30, 2024



Abstract

The goal of this research is to examine the factors that contribute to the proliferation of thyroid disorders in the Al-Baha region and how these factors relate to age groups, sexes, food preferences, and behavioral patterns among individuals who have thyroid glands. This study included a total number of 200 cases of patients from King Fahd Hospital and (Prince Mashari Hospital in Baljurashi) from-02 January 2022 to 2023, Cases were classified into 70 hyperthyroidism (40 females and 30 males), 60 cases of hypothyroidism (40 females and 20 males) and 70 euthyroidism (50 females and 20 males. For data collection, a questionnaire schedule was given to cases to determine the causes of the disease and food habits. Results of this study showed that the prevalence of thyroid disease among people with hypothyroidism reached about 20% in females and 10% in males. While 35% of cases with hyperthyroidism were 20% females and 15% males. The disease was more prevalent among females by 65% and was highest prevalent in the age group from 30 to 50 years (increased by 32.1%). The study showed that iodine deficiency is common in mountainous areas as deficiency of iodine in food and water can lead to thyroid diseases. Low intake of fruits and vegetables, low eating of fish, use of birth control tablets, (75%) eating of chicken (containing hormones), drinking much canned juices (100)% and Lack of exposure to the sun may be causes of the disease. The study recommends increasing the dietary intake of fresh vegetables and fruits, eating marine fish and iodized salt and reducing the use of plastic bags.

Subject Areas

Nutrition

Keywords

Hyperthyroidism, Hypothyroidism, Thyroid Hormone, Prevalence Study

1. Introduction

Iodine is a vital micronutrient needed for the thyroid gland and for the thyroid-stimulating hormone or thyrotropin (TSH). Subcretinous mental abnormalities and endemic goiter. Many factors can influence the prevalence of hypothyroidism, hyperthyroidism including age, sex, and other geographical. Hypothyroidism is also associated with decreased metabolic rate [1]. Thyroxine and triiodothyronine (T4 and T3) are the thyroid hormones that are produced in excess in hyperthyroidism, which is a clinical condition marked by hyperfunction of the thyroid, gland and elevated levels of these hormones in the blood. Thyrotoxicosis is a term used to describe the harmful consequences on a person's body of having extremely high amounts of T3 and T4. In clinical settings, the terms "hyperthyroidism" and "thyrotoxicosis" are frequently used interchangeably to refer to the clinical state brought on by elevated thyroid hormone levels in the blood [1]. While hypothyroidism seems to have a steadier progression and hypothyroidism is more common in women and has a total prevalence of 1% to 2% increasing with age, hyperthyroidism has a path that is comparable to that of many inflammatory autoimmune illnesses with periods of flare-ups and remission. In hyperthyroidism, thyroid hormones are produced in excess, which speeds up all bodily functions and impairs absorption. As a result, the body uses up all of its nutrients more quickly. As a result, all nutrients in the diet should be increased [2].

Overt hyperthyroidism is characterized by a consistent decrease in bone mass; various investigations have shown, a 10% - 20% bone loss. One of the causes of excessive late 0 mortality in formerly hyperthyroid patients and a risk factor for hip fracture later in life is a history of overt hyperthyroidism. Subclinical hyperthyroidism does not have a notable hallmark of symptomatic bone damage. However, forearm bone density reduced in participants with multinodular goiter and mild (subclinical) hyperthyroidism while greater distal forearm bone density was observed in postmenopausal individuals with hyperthyroidism who were treated with methimazole compared to those who weren't. Additionally, there may be an increase in the risk of osteoporosis. fractures [3].

Hyperthyroid patients typically experience a rise in body weight despite hyperphagia and excess thyroid hormone causes considerable insulin resistance. Contrary to hypothyroidism which is associated with weight gain and adequate insulin sensitivity [3]. Only .2% of pregnancies result in hyperthyroidism making it less prevalent than hypothyroidism. Some hyperthyroidism symptoms and indicators can be mistaken for typical pregnancy-related physiological changes. Preterm birth intrauterine growth restriction preeclampsia and heart failure are all more likely to occur in women who have severe maternal hyperthyroidism

[2]. The objectives of the current study are to identify the causes of thyroid disease its prevalence in the Al-Baha region and its relationship to dietary habits and malnutrition

2. Subjects and Methods

2.1. Subjects

In all, 200 patients from King Fahd Hospitals and (Prince Mashari Hospital in Baljurashi) in the Kingdom of Saudi Arabia during the year January 2022 to 2023 were included in this study (all patients who were hospitalized for endocrinology).

Three categories of cases were formed

1) An estimated 70 instances of hyperthyroidism (40 girls and 30 males) have been reported.

2) Sixty cases of hypothyroidism (40 girls and 20 males).

3) A total of 70 euthyrodism cases (50 females and 20 males).

Depending on the thyroid function. tests (TFT) results, cases were classified into euthyroid (normal T3, T4 and TSH), hypothyroid (TSH > 97) th percentile with T4 < 4.8 μg/dl), and hyperthyroid(TSH < .27 μIU/ml with T4 > 12.7 μg/dl). The hyperthyroid group consisted of 70 patients (40 women and 30 men, mean age 33.6 ± 9.9 and 44.5 ± 6.4 years). The hypothyroidism group consisted of 60 patients (40 women and 20 men, mean age (of 33.1 ± 10.7 and 31.7 ± 12.12 years) The normal. group consisted of 70 subjects, of which ((women and men, mean age (of 33.8 ± 8.2 and 43.1 ± 8.3 years).

2.2. Methods

2.2.1. Anthropometric Measurements

The weight and height were measured for each participant (volunteer). Weight was determined to the nearest 0.5 kilogram. The height was taken to the nearest centimeter. Since there are no local standards, for weight or height, for age considering Saudi people, the weight/height for age of each case was compared with that published in the [4].

2.2.2. Body Mass, Index (BMI)

Body mass index was used as an indication, of the body status. It was calculated by dividing weight in kilograms by height in meters squared (kg/m^2) according to the method reported by [5].

2.2.3. Analysis of Dietary Recall Data

All the subjects were interviewed by a dietician about their food intake 24 hours recall. For 7 days before and after the intervention food patterns and diet history were used. The energy and nutrient content of the 24-hour were computed through the food composition table of the National Institute [6].

2.2.4. The Questionnaire Included Some Sheets (Acts) as Follows

1) The first one was for health status.

2) The second one for food habits It included: Food likes and dislikes.

3) The third one is for the diseases and handicaps of participants.

A questionnaire schedule was given to cases to determine the causes.

The diagnosis of hyperthyroidism, hypothyroid and normal were based on signs symptoms and blood analyses.

2.2.5. Biochemical Analyses

Showed evidence of biochemical hyperthyroidism and hypothyroidism The following data were collected from the patients' files from (King Fahd Hospitals) and (Prince Mashari Hospital in Baljurashi) outpatients with ages from 30 - 45 years with a body mass index of >.25: <30 kg/M^2, and of 30 kg/M^2, history of thyroid disease or, FT4, FT3 and TSH levels.

3. Statistical Analysis

Statistical analysis: Statistical package spreadsheet software (SPSS) version 16 was used for statistical analysis. Mean±SD and analysis of variance (ANOVA) tests were used as appropriate. Qualitative data were expressed as percentages. For comparing the groups [7].

4. Results

The results of Table 1 and Figure 1 indicated that in subjects, with hypothyroidism about 20% of females while in males 10%. While 35% were infected with hyperthyroidism 20% of females were infected with hyperthyroidism and 15% of

Table 1. Number of cases and percentage of total cases in each group.

Diagnostic group	All		Females.		Males.	
	N = %	N =	N = %	N =	N = %	N =
Hypothyroidism	30	60	20	40	10	20
Hyperthyroidism	35	70	20	40	15	30
Euthyrodism	35	70	25	50	10	20
Total	100	200	65	130	35	70

Cases % parenthesis.

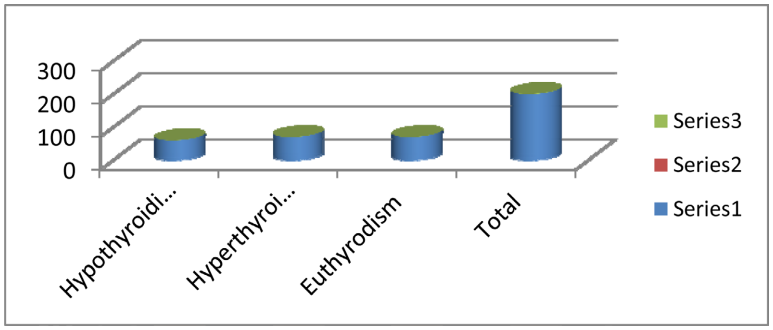


Figure 1. Number of cases and percentage of total cases in each group.

males. The disease was more Prevalence. among females by 65% and was the highest prevalence in the age group of 30 to 50 years increased by 32.1%.

Table 2 demonstrates that the hypothyroidism groups had a significant ($p < 0.05$) increase in weight gain BMI, when compared with the Euthyrodism and hyperthyroidism groups. while hyperthyroid patients showed a significant decrease in weight and a decrease in BMI without changes in % of body fat. The data in Table 3 revealed that the hyperthyroidism groups had significantly ($p < 0.05$) decreased serum TSH levels and elevated serum levels of FT4 and/or FT3; while the hypothyroid group showed elevated serum TSH concentrations with low levels of T4 and T3 concentrations.

Table 2. Mean ± SD of age and anthropometric indices for hypothyroidism, Hyperthyroidism patients, and Euthyrodism groups.

Diagnostic group	hypothyroidism		hyperthyroidism		Euthyrodism	
	Males. Mean. ± S D	Females. Mean ± SD	Males. Mean. ± SD	Females. Mean. ± SD	Males. Mean. ± SD	Females. Mean ± SD
Age (years)	31.7 ± 12.12	33.1 ± 10.39*	44.5 ± 6.4	33.6 ± 9.9	43.1 ± 8.3	33.8 ± 8.3
Weight (kg)	75.9 ± 10.32**	69.8 ± 7.21	64.4 ± 10.7	54.1 ± 4.62	65.3 ± 7.2	54.5 ± 6.4
Height (cm)	164.2 ± 5.1	159.2 ± 2.4	161.1 ± 6.91*	159.5 ± 5.9*	167.7 ± 6.2**	157.1 ± 5.52
BMI (kg/cm^2)	23.3 ± 2.9*	21.8 ± 2.4	19.3 ± 2.4	16.9 ± 1.3	17.64 ± 1.58*	17.31 ± 1.7

*P < 0.05, **P < 0.01, NS: Not significant, BMI: Body mass index.

Table 3. Mean ± SD biochemical characteristics for hypothyroidism, Hyperthyroidism patients, and Euthyrodism according to the analysis of the thyroid gland.

Diagnostic group	Hypothyroidism		Hyperthyroidism		Euthyrodism	
	Males Mean ± D	Females Mean ± SD	Males Mean ± SD	Females Mean ± SD	Males Mean ± SD	Females Mean ± SD
Glucose (mg/dl)	119.1 ± 9.03	105.5 ± 13.4	141 ± 12.5*	140 ± 15.6*	101 ± 12.35*	101.3 ± 11.98*
Ca (mg/dl)	9.4 ± .83*	8.2 ± 1.37	13.5 ± 1.48*	11.6 ± 1.8*	8.8 ± 1.62	8.15 ± 1.2*
Hb (mg/dL)	15.1 ± .81	12.3 ± 1.5	15.9 ± .78	13.9 ± .77	15.4 ± .96**	13.5 ± 1.35*
Urea (mg/dL)	26.3 ± 4.3	22.8 ± 4.96**	46.5 ± 5.2*	33.3 ± 10.5*	29.2 ± 7.72	23.9 ± 7.63
Uric acid (mg/dL)	4.5 ± .22	4.4 ± .88	7.4 ± 1.03*	7.61 ± .8*	3.67 ± .71	3.6 ± .25*

*P < .05, **P < .01, NS: Not significant.

Hyperthyroidism groups resulted in a significant ($p < .05$) increase in serum levels of glucose, calcium, urea and uric acid when compared with the Euthyrodism and hypothyroidism groups as recorded in Table 4.

Data in Table 5 showed that the hypothyroidism groups recorded significant ($p < .05$) increases in serum levels of cholesterol, triglycerides, LDL and VLDL when compared with the Euthyrodism group. There were no significant changes in hyperthyroidism groups.

The data in Table 6, showed the mean and standard deviation of the macronutrient intakes for each group. Compared to the Euthyrodism group, the

hyperthyroidism group consumed more total protein, lipids, carbohydrates, and fiber. When compared to the Euthyrodism group, the hypothyroidism group did not show any differences in macronutrient intake.

Table 4. Mean ± SD Serum analysis features for patients with hypothyroidism, hyperthyroidism, according to thyroid volume hormone.

Diagnostic group	Hypothyroidism		Hyperthyroidism		Euthyrodism	
	Males. Mean. ± D	Females. Mean. ± SD	Males. Mean. ± SD	Females. Mean. ± SD	Males. Mean ± SD	Females. Mean ± SD
T3 (pmol/l)	3.83 ± .42	2.93 ± .62*	6.9 ± .737*	5.4 ± .53*	4.82 ± .44	4.33 ± .63
T4 (pmol/l)	8.89 ± .41**	7.77 ± 1.02	19.1 ± .54*	17.9 ± 1.07	13.97 ± 1.16*	12.99 ± 1.67*
TSH (ulu/ml)	9.08 ± 1.90*	8.85 ± 2.24*	3.37 ± .718	2.8 ± .98	3.61 ± .789	3.15 ± .655
Cortisol (ug/dl)	15.76 ± 2.3*	19.1 ± 1.51	22.8 ± 2.78*	20.8 ± 2.5*	14.6 ± 3.2*	12.9 ± .25

*P < 0.05, **P < 0.01, NS: Not significant.

Table 5. Mean ± SD lipids fractions for hypothyroidism, hyperthyroidism patients, and Euthyrodism groups.

Diagnostic group	hypothyroidism		Hyperthyroidism		Euthyrodism	
	Males. Mean ± D	Females. Mean ± SD	Males. Mean ± SD	Females. Mean ± SD	Males. Mean ± SD	Females. Mean ± SD
CHL (mmol/L)	6.16 ± 1.53*	5.72 ± .99*	3.50 ± .57	3.425 ± .325	3.96 ± .93	3.50 ± .57
TG (mmol/L)	2.86 ± .59	2.71 ± .42*	1.51 ± .409	1.05 ± .1730	.86 ± .49	1.51 ± .409
HDL (mmol/L)	.55 ± .33	.60 ± .25*	.94 ± .31	.8583 ± .1782	.85 ± .33	.95 ± .31*
LDL (mmol/L)	2.75 ± .58**	2.41 ± .812**	1.05 ± .708	1.51 ± .347*	2.25 ± .58	1.04 ± .70
vLDL (mmol/L)	.572 ± .45	.542 ± .83	.302 ± .56	0.21 ± .725	.172 ± .95	.302 ± .45

*P < 0.05; **P < 0.01, NS: Not significant.

Table 6. Mean ± SD of macronutrient intake for hypothyroidism, hyperthyroidism patients, and Euthyrodism groups.

Diagnostic group	hypothyroidism		Hyperthyroidism		Euthyrodism	
	Males. Mean ± D	Females. Mean. ± SD	Males. Mean. ± SD	Females. Mean. ± SD	Males. Mean. ± SD	Females. Mean. ± SD
Total protein (g)	43.52 ± 5.50	40.92 ± 7.26	55.65 ± 6.90	50.75 ± 8.79	44.65 ± 6.90	44.65 ± 6.90
Lipid (g)	36.56 ± 5.4	36.49 ± 6.2	45.39 ± 7.66	40.58 ± 6.22	39.39 ± 5.66	36.48 ± 6.22
CHO (g)	287 ± 39.12	225.3 ± 44.5	376.58 ± 57.2	376.58 ± 57.2	266.8 ± 52	268.8 ± 52
Energy (kcal)	1651.12 ± 61.	13,933 ± 99	2137.4 ± 71	2074.5 ± 234.2	1600.31 ± 99	1582.12 ± 62
Fiber(g)	9.8 ± 1.9	5.8 ± 8.9	11.9 ± 1.9	5.4 ± 2.3	9.9 ± 2.9	8.9 ± 1.9

Table 7 shows the mean ± SD of vitamin intake by a diagnostic group it was shown that the mean of vitamin A intake was less than daily requirements (800 mg). Moreover, from the results of Table 7, it was observed that the intake of vitamin C and vitamin D was less than 100% of RDA RDA which is also in

shortage in all cases for vitamin B_1 and vitamin B_2. Table 8 of data presents mineral intakes by diagnostic group. It was clear that the calcium consumption fell short of the RDA. Moreover, the intake of phosphorus, iodine, iron and zinc was less than 100% of the RDA. Table 9 shows urine concentrations for groups The analysis of urine samples of hyperthyroidism groups for females revealed significant ($p < 0.05$) increases in calcium, phosphorous and nitrogen concentration when compared with normal groups. hypothyroidism groups ($p < 0.001$) increased phosphorous and nitrogen concentrations when compared with contort groups.

Table 7. Mean ± SD of vitamin intake for hypothyroidism, hyperthyroidism patients, and Euthyrodism groups.

Diagnostic group	Hypothyroidism		Hyperthyroidism		Euthyrodism	
	Males. Mean. ± D	Females. Mean. ± SD	Males. Mean. ± SD	Females. Mean. ± SD	Males. Mean ± SD	Females. Mean ± SD
Thiamin (mg)	.67 ± .29	.71 ± .24	.856 ± .25*	.71 ± .20	.766 ± .25	.776 ± .26
Riboflavin (mg)	.82 ± .12	.72 ± .15	.973 ± .25	.816 ± .307	.774 ± .22	.783 ± .23
Vitamin C (mg)	38.05 ± 11.7	35.11 ± 9.02	38.8 ± 6.2	29.9 ± 5.24	40.11 ± 9.92*	35.11 ± 9.02
Vitamin A (mcg)	499.9 ± 177.1	487 ± 166.6	684 ± 103.1	579.3 ± 54.7	674 ± 123.1	874 ± 133.1*
Vitamin D(mcg)	6.45 ± 2.06	6.78 ± 1.6	6.40 ± 1.88	7.85 ± 1.54	6.77 ± 1.5	6.31 ± 1.89

P < 0.05, **P < 0.01, ***P < 0.001.

Table 8. Mean ± SD of Minerals intake for hypothyroidism, Hyperthyroidism patients, and Euthyrodism groups.

Diagnostic group	hypothyroidism		hyperthyroidism		Euthyrodism	
	Males Mean. ± D	Females Mean. ± SD	Males Mean. ± SD	Females Mean ± SD	Males Mean. ± SD	Females Mean ± SD
Calcium (mg)	897.3 ± 267.6*	738.5 ± 247.9	964.8 ± 131.8*	855.8 ± 108.4*	764.8 ± 131.8	764.8 ± 131.8
Phosphorus (mg)	365.9 ± 172.9	385.9 ± 173.9	392.5 ± 158.2*	398.5 ± 158.2*	382.5 ± 158.2	452.5 ± 168.2*
Total iron (mg)	11.7 ± 1.76	10.1 ± 1.35*	13.18 ± 1.92*	12.50 ± .1.03*	9.18 ± 1.92	10.18 ± 1.99
Zinc (mg)	8.74 ± .93*	7.50 ± 2.04	9.98 ± 1.55*	6.44 ± 2.38	8.98 ± 1.55*	7.98 ± 1.55
Iodine(mg)	116.1 ± 33.4*	123.8 ± 26.5	133 ± 10.32**	114.5 ± 22.1	124.7 ± 4.5	144.3 ± 11.4

*P < 0.05; **P < 0.01; ***P < 0.001.

Table 9. Mean ± SD Urine concentrations for Hypothyroidism, Hyperthyroidism patients, and Euthyrodism groups.

Diagnostic group	hypothyroidism		hyperthyroidism		Euthyrodism	
	Males. Mean. ± D	Females. Mean. ± SD	Males. Mean ± SD	Females. Mean ± SD	Males. Mean ± SD	Females. Mean ± SD
Ca (mg/dL)	8.15 ± 0.7*	4.67 ± 0.6	7.55 ± 0.7*	8.45 ± 0.4*	6.33 ± 0.6	6.33 ± 0.6
P (mg/dL)	11.24 ± 0.7*	9.55 ± 0.3*	8.45 ± 0.3	8.57 ± 0.2*	8.35 ± 0.5	8.35 ± 0.5*
N (mg/dL)	24.7 ± 2.15	28.8 ± 5.9*	36.9 ± 3.42*	40.1 ± 6.6*	29.4 ± 5.8*	26.1 ± 6.53*

In hyperthyroidism, Table 10 showed Mean correlations between iodine intake, weight and some blood analysis, correlations were observed between. T3 with T4 (r = .507, p = .000), TSH (r = .306, p = .017), weight (r = .550, p = .000) and nitrogen (r = −.379, p = .003) percentage.

In hypothyroidism, Table 11 showed Mean correlation between iodine intake with cortisol (r = .257, p = .048) T4 with uric (r = .287, p = .026) and some blood analysis correlations were observed between weight with T4 (r = −.02, p.831) TSH (r = .270, p = .037) percentage. No correlations were observed between the percentage of variation of any independent variable Table 12 shows the distribution of the studied sample according to some risk factors and questionnaires It could be noticed that all subjects preferred to eat chicken and drink juice (100 %) with a lower intake of eat fresh vegetables and fruits (50% to 75%) of total sample study.

Table 10. Mean correlation between minerals intake, weight, and some Blood analysis in hyperthyroidism.

	T3	T4	TSH	Cortisol	Uric	Iodine	Weight	Nitrogen
T3	1	.507** .000	.306* .017	.158 .229	−.077 .560	.233 .074	.550** .000	−.379** .003
T4	.507** .000	1	.478** .001	.204 .118	.134 .308	.290* .025	−.310* .016	.251 .053
TSH	.306* .017	.428** .001	1	−.034 .799	−.115 .382	.028 .830	.013 .016	.036 .782
Cortisol	.158 .228	.204 .118	.034 .799	1	.017 .897	.37 .068	.160 .221	.258 .047
Uric	.077 .560	.134 .308	.115 .382	.115 .308	1	.237 .068	−.347** .007	.258* .047
Iodine	.233 .073	.290* .025	−.028 .830	.237 .068	.225 .084	1	.171 .190	−.269 .038
Weight	.550** .000	.310* .016	.013 .921	.160 .221	−.347** .007	.171 .190	1	−.101 .443
Nitrogen	−.379** .003	−.251 .053	.036 .782	.258* .947	−.184 .159	−.269* .038	−.101 .443	1

**Correlation is significant at .01 level (2-tailed). *Correlation is significant at .05 level (2-tailed).

Table 11. Mean. correlation between minerals intake, weight, and some blood analysis in hypothyroidism.

	T3	T4	TSH	Cortisol	Uric	Iodine	Weight
T3	1	.080 .541	−.063 .635	−.150 .254	−.009 .948	.012 .928	.251 .053
T4	.080 .541	1	−.093 .478	−.185 −.156	.287* .026	.728 −.046	−.02* .831

Continued

TSH	.063 .635	−.093 .478	1	−.019 .883	.026 .110	−.163 .214	.270* .037
Cortisol	−.150 .254	−.185 .156	−.019 .882	1	−.136 .299	.257* .048	.047 .721
Uric	−.009 .948	.287* .025	.209 .110	−.136 .299	1	.225 .084	−.019 .885
Iodine	.012 .928	−.046 .728	−.163 .214	.257* .048	.225 .084	1	.004 .975
Weight	.251 .503	.112 .831	.270 .037	.047 .721	−.195 .885	.004 .975	1

**Correlation is significant at .01 level (2-tailed). *Correlation is significant at .05 level (2-tailed).

Table 12 shows the distribution of the studied sample according to some risk factors and questionnaires It could be noticed that all subjects preferred to eat chicken and drink juice (100 %) with a lower intake of fresh vegetables and fruits (50 to 75%) of total sample study.

Table 12. Distribution of studied sample according to some risk factors.

parameters	Categories	hypothyroidism (N - 60)				hyperthyroidism (N - 70)			
		No - 40		No - 20		No - 40		No - 30	
		Females		Males		Females		Males	
		No	No%	No	No%	No	No%	No	No%
Do you eat white rice, flour or bread more whole grains?		40	100	20	100	40	100	30	100
Do you eat chicken more than 4 times a week?		40	100	20	100	40	100	30	100
Do you eat fresh vegetables and fruits every day?		20	50	10	50	30	75	10	33.33
Do you take the juice found in cans lined with plastic?		40	100	20	100	40	100	30	100
Do you use birth control Tablets?		30	75	-	-	35	87.5	-	-
Do you take aspirin and painkillers often?		35	87.5	20	100	37	32.5	20	66.66
Do you take antibiotics frequently?		27	65	10	50	25	62.5	10	33.33
Do you suffer from arthritis and osteoporosis in bones?		10	25	5	25	20	50	15	50
Do you suffer from headaches, migraines and low memory?		35	87.5	10	50	25	83.3	17	56.6
Do you suffer from vibration in the hand and muscle pain?		20	50	10	50	39	97.5	19	63.3
Do you suffer from weight loss in the recent period?		-	-	-	-	40	100	20	100

Cases % parenthesis and questionnaires.

5. Discussion

The current study aimed to survey the prevalence of dysfunction of the thyroid gland and the relationship with nutrient status, important risk factors and thy-

roid autoimmunity in AL-Baha. The results from Table 1 showed that the disease was more prevalent among females by 65% and was the highest. prevalence in the age group of 30 to 50 years increased by 32.1%. Our data show that hyperthyroidism is more frequent in female patients than in male patients a finding which is generally found in all other studies though the highest incidence is at 40 - 60 years. Also, The age of onset of hyperthyroidism was not different among males and females in many studies [8] [9] and [10].

Table 2 demonstrates that the hypothyroidism groups had an increase in weight gain BMI, when compared with the Euthyrodism and hyperthyroidism groups. this study agreed with that reported by [11] who found that the prevalence of subclinical hypothyroidism was 10.3% and 2.1% had subclinical hyperthyroidism [12]. the results from Table 3 revealed that the hyperthyroidism groups had decreased serum TSH levels and elevated serum levels of T4 and T3 while the hypothyroid group showed elevated serum TSH this study agreed with the United States revealed 1.8% of the general population to have low but detectable serum TSH and only 0.7% to have fully suppressed serum TSH [13]. There were changes in the levels of thyroid hormone (T3, T4 and TSH) in the blood among the samples that suffer from thyroid disease. this study agreed with that reported by [14], who examined the connection between TSH alone is a suitable first the recommendations state that serum thyroid stimulating hormone (TSH) is the most accurate test for identifying all types of common hypothyroidism and hyperthyroidism.

Our study demonstrates that Al-Baha when compared to other populations exhibits a variety of demographic as well as clinical distinctions in the spectrum of the type of hyperthyroidism and adverse effects of hyperthyroidism therapy. These are most probably because iodine deficiency is still present in the country and possibly due to nutritional factors. Table 10 showed correlations between iodine intake, weight and some blood analysis this study agreed with that reported by [15] who examined the major difference in risk factors is the amount of iodine intake; hyperthyroidism is more common in iodine-insufficient areas.

Our study showed that vitamin intake by the diagnostic group was less than daily requirements this study agreed with [16] found diet rich in goitrogens or deficient in iodine, Pregnancy, Radiation to the neck, Family history and Smoking, Similarly [17] reported that conditions such as bad nutrition and poorly controlled diabetes were among causes of hypothyroidism in females and the beneficial effects of growth factors involved in physiological control and the TSH sensitivity are increased by low iodine consumption.

In the present study, most cases with hypothyroidism were suffering from an increased serum lipid profile and this is due to a decrease of thyroid hormones. The results agree with [18] that most of the participants in this study had one or more of the risk factors for hypothyroidism. Among the risk factors for hypothyroidism include high levels of LDL cholesterol, triglycerides, total cholesterol, obesity, high blood pressure, and metabolic syndrome. Studies found a deep association between DM and thyroid diseases [19] and [20] investigated that thy-

roid hormones regulate cholesterol and lipoprotein metabolism, considerably alter lipid profile and promote cardiovascular disease. This study supports our findings that most cases of hyperthyroidism result in underweight conditions whereas hypothyroidism causes weight gain

[21], who looked into how subclinical hypothyroidism (SH) affects energy in patients with obesity. Ghrelin levels appeared to be related to insulin resistance in thyroid dysfunction conditions rather than energy balance and food intake management, as was the case in other physiological and pathological states. Deep association is established correlating thyroid dysfunction and DM [22].

Our study found that 75 % the findings that the majority of study participants who take birth control pills this study agreed with [23] which may be the cause of their thyroid disorders. Also, Thyroid disorders are common in women during pregnancy. Both hypothyroidism and hyperthyroidism are associated with adverse effects on pregnancy and fetal outcomes, It is important to recognize the various drugs contributing to thyroid. According to the data, eating chicken (100%) had identical impacts on the body as chicken hormones did. These effects shared some similarities with earlier research, which showed that the levels of T3 and T4 in chicken blood plasma steadily rose over time. This explains the increase in blood plasma T3 content seen in this study. It is well recognized that T3 is much more important than T4 in the bio-oxidation activities that take place within cells [17].

It is well known that calcium and phosphorus are widely accepted as phenotype markers for bone formation. In the present study, the results showed that hyperthyroidism developed bone this change similar to those reported by [24] that patients with well-differentiated thyroid carcinoma are not at increased risk of developing low bone mass.

In the present study, most of the patients take the juice found in cans lined with plastic (100%), The authors point out that results obtained in this study indicate a direct effect of phthalates on thyroid hormone synthesis, metabolism, release and transport rather than on the hypothalamus or the pituitary gland. The results obtained from adults were contrary to those obtained from adolescents in the 12 to 19 age groups. Evidence from recent studies points to the possible role of DEHP as a thyroid, receptor antagonist that modifies the sodium-iodide balance are positive association was found between DEHP and levels of thyroid hormones in young participants [25].

6. Conclusion

The results indicate that iodine deficiency is widespread in mountainous areas leading to thyroid problems that develop due to lack of iodine in the diet and water. The cause of the disease is low intake of fresh fruits and vegetables, low fish intake, use of birth control tablets, frequent consumption of chicken that contains hormones, and consumption of canned juices. The study recommends eating fresh vegetables and eating fish twice a week, eating iodine-fortified salt,

reduce the use of plastic bags, and increasing research to learn more about thyroid diseases.

Acknowledgements

The authors, thank Prince Mishari and Prince Fahd Hospital for helping us in this research.

Funding Sources

There is no funding institution

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Velayutham, K., Selvan, S.A. and Unnikrishnan, A. (2015) Prevalence of Thyroid Dysfunction among Young Females in a South Indian Population. *Indian Journal of Endocrinology and Metabolism*, **19**, 781-784. https://doi.org/10.4103/2230-8210.167546

[2] Kanzaki, R., Higashiyama, M., Oda, K., Okami, J., Maeda, J., Takenaka, A., *et al.* (2012) Surgical Management of Primary Intrathoracic Goiters. *General Thoracic and Cardiovascular Surgery*, **60**, 171-174. https://doi.org/10.1007/s11748-011-0801-5

[3] Creswell, J., Eastman, M.D. and Michael, B. (2018) The Iodine Deficiency Disorders. https://www.endotext.org/leslie-degroot-md-endotext-founder-1928-2018/

[4] RDAs (1989) RDA Recommended Dietary Allowances. 10th Edition, National of Sciences Press.

[5] Bini, V., Celi, F., Berioli, M., Bacosi, M., Stella, P., Giglio, P., *et al.* (2000) Body Mass Index in Children and Adolescents According to Age and Pubertal Stage. *European Journal of Clinical Nutrition*, **54**, 214-218. https://doi.org/10.1038/sj.ejcn.1600922

[6] Nutrition Institute (1996) Food Composition Tables for Egypt. Nutrition Institute.

[7] Cary, N.C. (2004) Statistical Analysis System, SAS Users Guide: Statistics. SAS Institute Inc.

[8] Moussa, S., Alshammari, A., Gada Alshammari, G., Alshammar, K., Alanzim, M., Alanzi, N. and Alshammari, Z. (2013) Pattern of Thyroid Disease in Hail Region, Saudi Arabia. *International Journal of Science and Research*, **5**, 276-282.

[9] Aljarbou, A., Morgan, A. and Alshaalan, F. (2018) The Patterns of Surgically Treated Thyroid Disease in Central Rural Region of Saudi Arabia. *The Egyptian Journal of Hospital Medicine*, **70**, 1066-1071. https://doi.org/10.12816/0044365

[10] Alruwaili, A.E.M., Alshalan, M.H.F. and Alfuhigi, Z.D.M. (2018) Prevalence of Hypothyroidism and Its Associated Risk Factors in Arar City, Saudi Arabia. *The Egyptian Journal of Hospital Medicine*, **71**, 2765-2769. https://doi.org/10.12816/0045841

[11] Abbag, F.I., Abu-Eshy, S.A., Mahfouz, A.A., Al-Fifi, S.A., El-Wadie, H., Abdallah, S.M., *et al.* (2015) Iodine-Deficiency Disorders in the Aseer Region, South-Western Saudi Arabia: 20 Years after the National Survey and Universal Salt Iodization. *Public Health Nutrition*, **18**, 2523-2529. https://doi.org/10.1017/s1368980014003073

[12] Al Eidan, E., Ur Rahman, S., Al Qahtani, S., Al Farhan, A.I. and Abdulmajeed, I.

(2018) Prevalence of Subclinical Hypothyroidism in Adults Visiting Primary Health-Care Setting in Riyadh. *Journal of Community Hospital Internal Medicine Perspectives*, **8**, 11-15. https://doi.org/10.1080/20009666.2017.1422672

[13] Al Shahrani, A.S., El-Metwally, A., Al-Surimi, K., Salih, S.B., Saleh, Y., Al-Shehri, A. and Ali, A. (2016) The Epidemiology of Thyroid Diseases in the Arab World: A Systematic Review. *Journal of Public Health and Epidemiology*, **8**, 17-26.

[14] Gupta, S., Verma, M., Gupta, A.K., Kaur, A., Kaur, V. and Singh, K. (2011) Are We Using Thyroid Function Tests Appropriately? *Indian Journal of Clinical Biochemistry*, **26**, 178-181. https://doi.org/10.1007/s12291-011-0128-0

[15] Moussa, S., Alshammari, A., Alshammari, G., *et al.* (2016) Pattern of Thyroid Disease in Hail Region, Saudi Arabia. *International Journal of Science and Research*, **5**, 276-282. https://doi.org/10.21474/IJAR01/1607

[16] Maitra, A. and Abbas, A.K. (2008) The Endocrine System. In: Kumar, V., Abbas, A.K. and Fausto, N., Eds., *Robbins and Cotran*, *Pathologic Basis of Disease*, 7th Edition, Elsevier, 1155-1226.

[17] Mamtani, M., Kulkarni, H., Dyer, T.D., Almasy, L., Mahaney, M.C., Duggirala, R., *et al.* (2014) Increased Waist Circumference Is Independently Associated with Hypothyroidism in Mexican Americans: Replicative Evidence from Two Large, Population-Based Studies. *BMC Endocrine Disorders*, **14**, Article No. 46. https://doi.org/10.1186/1472-6823-14-46

[18] Hollowell, J.G., Staehling, N.W., Flanders, W.D., Hannon, W.H., Gunter, E.W., Spencer, C.A., *et al.* (2002) Serum TSH, T_4, and Thyroid Antibodies in the United States Population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). *The Journal of Clinical Endocrinology & Metabolism*, **87**, 489-499. https://doi.org/10.1210/jcem.87.2.8182

[19] Hage, M., Zantout, M.S. and Azar, S.T. (2011) Thyroid Disorders and Diabetes Mellitus. *Journal of Thyroid Research*, **2011**, Article 439463.

[20] Duntas, L.H. and Brenta, G. (2012) The Effect of Thyroid Disorders on Lipid Levels and Metabolism. *Medical Clinics of North America*, **96**, 269-281. https://doi.org/10.1016/j.mcna.2012.01.012

[21] Sanyal, D. and Raychaudhuri, M. (2016) Hypothyroidism and Obesity: An Intriguing Link. *Indian Journal of Endocrinology and Metabolism*, **20**, 554-557. https://doi.org/10.4103/2230-8210.183454

[22] Wang, C. (2013) The Relationship between Type 2 Diabetes Mellitus and Related Thyroid Diseases. *Journal of Diabetes Research*, **2013**, Article 390534. https://doi.org/10.1155/2013/390534

[23] Jiang, S., Mohammed, A.A., Jacobs, J.A., Cramer, T.A. and Cheng, H.W. (2020) Effect of Synbiotics on Thyroid Hormones, Intestinal Histomorphology, and Heat Shock Protein 70 Expression in Broiler Chickens Reared under Cyclic Heat Stress. *Poultry Science*, **99**, 142-150. https://doi.org/10.3382/ps/pez571

[24] Meeker, J.D. and Ferguson, K.K. (2011) Relationship between Urinary Phthalate and Bisphenol A Concentrations and Serum Thyroid Measures in U.S. Adults and Adolescents from the National Health and Nutrition Examination Survey (NHANES) 2007-2008. *Environmental Health Perspectives*, **119**, 1396-1402. https://doi.org/10.1289/ehp.1103582

[25] Alruwaili, A.E.M., Alshalan, M.H.F. and Alfuhigi, Z.D.M. (2018) Prevalence of Hypothyroidism and Its Associated Risk Factors in Arar City, Saudi Arabia. *The Egyptian Journal of Hospital Medicine*, **71**, 2765-2769. https://doi.org/10.12816/0045841