



ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF INTERNAL MEDICINE

**Pattern, Clinical Profile and complications related to Thyroid Disorders
among Patients Attending Endocrine Clinic of Tikur Anbessa Specialized
Hospital**

By: Abdulhafiz Mohammed (MD, Internal Medicine Resident)

Oct, 2020

Addis Ababa, Ethiopia

**ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF INTERNAL MEDICINE**

**Pattern and Clinical Profile of Thyroid Disorders among Patients Attending
Endocrine Clinic of Tikur Anbessa Specialized Hospital**

By: Abdulhafiz Mohammed (MD, IM Resident)

Advisors: Dr. Getahun Tarekegn (MD, Internist, Endocrinology Consultant)

Professor . Yeweyenhareg Feleke (MD, CSIM, MPhil)

A Thesis Report Submitted to the Department of Internal Medicine

Addis Ababa University.

Dec, 2020

Addis Ababa, Ethiopia

Addis Ababa University
College of Health Sciences
School of Medicine
Department of Internal Medicine



**Pattern and Clinical Profile of Thyroid Disorders among Patients Attending
Endocrine Clinic of Tikur Anbessa Specialized Hospital**

Principal investigator:

Abdulhafiz Mohammed (MD, Internal Medicine Resident)

Mobile Number: +251 911884897

E-mail: Hafoz48@yahoo.com

Advisor:

Getahun Tarekegn (MD, Internist, Endocrinologist)

Signature.....

Department Head:

Tewodros Haile (MD, Internist, Pulmonary & Critical care Specialist) Signature.....

December 2020 G.C

Acknowledgement

I would like to acknowledge College of Health Sciences, Addis Ababa University in general and Internal Medicine Department in particular for giving me the chance to come across this academic research work. Also, I would like to express my gratitude to both of my advisors: Dr. Getahun Tarekegn (MD, Internist, Endocrinology Consultant) & Prof. Yeweyenhareg Feleke (MD, CSIM, MPhil) for their continuous guidance and valuable direction during this research work.

Acronyms and Abbreviations

AAU	Addis Ababa University
FT ₃	Free triiodothyronine
FT ₄	Free thyroxine
IRB	Institutional Review Board
OPD	Outpatient Department
PTU	Propylthiouracil
SPSS	Statistical Package for Social Sciences
TASH	Tikur Anbessa Specialized Hospital
TFT	Thyroid function test
TMNG	Toxic multinodular goiter
TSH	Thyroid stimulating hormone

Abstract

Introduction

Thyroid diseases are common endocrine disorders with a number of potentially serious complications. There are inadequate recent studies addressing the clinical picture of thyroid diseases in Ethiopia.

Objectives

The aim of this study was to assess the pattern and clinical presentations thyroid disorders.

Methods

A cross-sectional study was conducted on successive thyroid disease patients visiting Endocrinology Referral Clinic of TASH from Feb 2020 to June 2020 were included in this study. A retrospective medical chart review was carried out. Certain socio-demographic parameters and clinical characteristics of patients were assessed. Descriptive analysis was used for statistical analysis. The data was processed, summarized and presented in the form of narratives & tables.

Results

A total of 271 patients, 86.3% female and 13.7% male, with an age range of 14 to 81 years were included. And 60.5% of the patients were 40 to 81 years. Among all, 56.8% had overt hyperthyroidism and 39.5% had hypothyroidism while subclinical hypothyroidism and subclinical hyperthyroidism were documented in 2.6% & 1.1% of the patients. TMNG was responsible for 55.8% of hyperthyroidism cases as primary hypothyroidism accounted for 53.3% of the hypothyroidism cases. Palpitation (54.7%), goitre (26.4%), heat intolerance (25.9%) & hyperhidrosis (10.7%) were the commonest presentations of thyrotoxicosis, whereas hypothyroidism patients presented mostly with fatigue (49.1%), menstrual disturbance (25%), cold intolerance (20.5%) & weight gain (14.3%).

Conclusion

Thyroid diseases were more common in females and more prevalent in old age. More than half of the thyroid disorders were caused by TMNG and primary hypothyroidism. The most common presenting feature of thyrotoxicosis was palpitation, and of hypothyroidism, fatigue. Therefore, it is better to reinforce multidisciplinary approach, and introduce radioactive iodine uptake study and radioactive iodine therapy.

Table of Contents

Acknowledgement	v
Acronyms and Abbreviations	l
Abstract.....	ll
1. Introduction.....	1
1.1 Background.....	1
1.2 Statement of the problem	2
1.3 Significance of the study	2
2. Literature review.....	4
2.1 Pattern and prevalence of thyroid diseases	4
3. Objectives.....	6
3.1 General objectives	6
3.2 Specific objectives.....	6
4. Methods and Materials.....	7
4.1 Study design.....	7
4.2 Study setting.....	7
4.3 Source population	7
4.4 Study population	7
4.5 Inclusion criteria	7
4.6 Exclusion criteria	8
4.7 Sampling techniques.....	8
4.8 Study variables.....	8
4.9 Operational definition	8
4.10 Data collection procedures and quality control.....	8
4.11 Methods of data analysis.....	9
5. Results.....	10
5.1 Baseline characteristics of patients	10
5.2 Pattern of thyroid disorders.....	11
5.3 Clinical profiles of thyroid disorders	12
5.4 Biochemical profiles of thyroid disorder patients	14
5.5 Thyroid disorder-related complications.....	15
6. Discussion	16
7. Strength and Limitation of the Study.....	18
8. Conclusion and Recommendation	19

References	20
Lists of Annexes.....	22
Annex 1: Consent form.....	22
.....	22
Annex : Declaration	22
Annex 2: Questionnaire.....	24

List of figures

Figure 1: Types of thyroid disorders among patients attending endocrinology clinic of TASH, AA, Ethiopia, Feb 1 to June 30, 2020.....	11
---	----

1. Introduction

1.1 Background

Thyroid gland is a vital endocrine organ that is known for its production & secretion of thyroid hormone, a hormone that plays a pivotal role in the growth, development, metabolism, reproduction and function of almost every organ of humans' body (1,2). Thyroid disorders refer to the group of non-communicable disease conditions that are caused by structural and functional dysfunction of the thyroid gland and that may present as a derangement of thyroid hormone secretion, thyroid enlargement or discomfort (3,4).

Thyroid disorders are a global health problem and, following diabetes mellitus, the most common type of endocrine disorders accounting for 30% to 40% burden of the endocrine disorders (5,6). They affect around 300 million people worldwide and it is presumed that more than half are unaware of their condition. The major thyroid disorders are hyperthyroidism and hypothyroidism, with 1.6 billion people at risk in more than 110 countries around the world (7). A significant burden of the disease lies in Africa and WHO revealed that the continent represents over 25% of the global burden of the disease (8).

Thyroid disorders can cause profound systemic effects, being incriminated for significant morbidity and mortality. Both hypothyroidism and hyperthyroidism have been linked with increased risk of cardiovascular disease and the adverse effects of thyrotoxicosis in terms of osteoporosis risk are well established. Hypothyroidism itself contributes to morbidity from osteoporosis, hyperlipidemia, hypercholesterolemia, cardiovascular and neuropsychiatry disease in the population. Moreover, these thyroid disorders can even lead to thyroid storm and myxedema coma in significant number of patients (3).

The incidence of hyperthyroidism in adults appears to be independent of patient age. By contrast, the epidemiology of hypothyroidism is notable for an increasing incidence with advancing patient age. Nearly all thyroid illnesses (with only a few exceptions) demonstrate a substantial female predominance, although the underlying basis for this is unclear. Nodular thyroid disease is also quite common and often unrelated to gland function. (4,5)

Significant risk factors for thyroid dysfunction, specifically hypothyroidism, are smoking, family history of thyroid disease, female gender, alcohol, pregnancy, age, body mass index (BMI), family history of diabetes mellitus, and iodine intake (9). Higher risks for the

developing of hypothyroidism are autoimmune disease, women with postpartum period, personal history of neck or head irradiation, primary pulmonary hypertension, genetic syndromes, and people over 65 years old (10). Similarly, a recent study conducted in Ethiopian setting showed that thyroid disorders are far more common in women than in men (11).

Although the burden of the disease is estimated to be substantial, data available on the prevalence and pattern of the various thyroid disorders in Ethiopia is scanty. Therefore, the present study was carried out at endocrine referral clinic of Tikur Anbessa Specialized Hospital to assess the pattern of the various types of thyroid disorders along with the clinical picture in attending the endocrinology unit of this tertiary care center.

1.2 Statement of the problem

Thyroid dysfunction is common, readily identifiable and easily treatable, but if undiagnosed or untreated, it can have profound adverse effects. Understanding of the effects of thyroid hormones under physiological circumstances, as well as in pathological conditions, has increased dramatically during the last few decades and it has become clear that overt thyroid dysfunction is associated with significant morbidity and mortality.

Thus, timely screening, discriminating types and management is mandatory because the ultimate goal of establishing routine screening programs is to provide appropriate timely treatment, prevent complications and reduce morbidity and mortality related to disease (2). Although the thyroid is a relatively small organ in the body, thyroid disorders such as hyperthyroidism and hypothyroidism can cause profound systemic effects (1).

It has been implied that Ethiopia is one of the African countries where the burden of thyroid disorders is bothersome. Although the endocrinology clinic of TASH is the leading referral endocrinology unit in the country with relatively highest thyroid disorders, there still remains lack of adequate data regarding the overall picture of thyroid disease patients that depicts the pattern and the subtypes of thyroid disorders in this particular set up.

1.3 Significance of the study

The health sector transformation plan, in line with our country's second growth and transformation plan, has set ambitious goals to improve equity, coverage and utilization of essential health services, improve quality of healthcare, and enhance the implementation capacity of the health sector at all levels of the system. Hence, knowing the pattern and the

clinical picture of thyroid disease patients is an integral component of clinical care and will help in realizing improved health outcomes, increased patient satisfaction, better adherence to treatment recommendations, fewer malpractice claims and reduced healthcare expenditure in patients that have thyroid disorders. Moreover, a better understanding of the clinical picture of thyroid dysfunction in our set up will create a better opportunity to tackle the potential limitations and build up on our strength.

The information that will be obtained from this research is intended to help health care decision makers, patients and clinicians, health system leaders, and policymakers, among others make well informed decisions and thereby improve the quality of health care services towards the overall treatment plans of thyroid diseases. Furthermore, because there is dearth of study in this area, this study will be a baseline research and invites those interested intellectuals to perform a detailed search which needs a careful and long period of study in health literacy to bring a difference.

2. Literature review

2.1 Pattern and prevalence of thyroid diseases

The prevalence and pattern of thyroid disorders differ across different settings as a function of several factors. In Nepal, for instance, a hospital based cross-sectional study was conducted from January - December, 2015 to find out the prevalence of thyroid disorder among the patients attending the immunoassay laboratory at Department of Biochemistry, B.P. Koirala Institute of Health Sciences, Dhahran, Nepal. In this study, 39.3% had some kind of thyroid disorders and 61.7% were euthyroid. Majority of the subjects in thyroid disorder were female with 78.6% while males only 21.4% in total. Overt hypothyroidism cases were most abundant with 16.49% (n= 345) of the total thyroid disorder patients followed by subclinical hypothyroidism (n=338, 16.06%), overt hyperthyroidism (n=85, 4.04%) and subclinical hyperthyroidism (n=61, 2.9%) respectively. Female to male ratio in total hypothyroid cases was approximately 3.6:1(12)

From a retrospective study conducted at Komfo Anokye Teaching Hospital Ten thousand four hundred and eighty-four (10,484) thyroid cases were seen between 1982 and 2014. This was made up of 7584 females and 2936 males with a ratio of 3.5: 1. The average prevalence rate of thyroid cases seen between 1982 and 2014 was 343/100,000 admissions. Proportions of female thyroid admissions ranged between 58% in 1982 and 81% in 1998. The crude incidence rate of thyroid admissions increased from 146/100,000 patients in 1982 to 426/100,000 patients in 2012. The increase in the rates of thyroid admission was highly significant ($p < 0.0001$)(13)

From nationwide population-based cohort study, 51,834,660 subjects were included using the National Health Information database from 2006 to 2015 and The prevalence in Korea in 2015 of thyroid nodules, hypothyroidism in patients taking thyroid hormone, and hyperthyroidism in patients undergoing treatment was 15.82/1,000 population, 15.94/1,000 population, and 2.76/1,000 population, respectively(14)

All these diseases were more prevalent among women than among men. The number of incident cases of these three thyroid diseases steadily increased from 2006 to 2012, and then decreased through 2015. The incidence of thyroid nodules, hypothyroidism treated with thyroid hormone, and treated hyperthyroidism was 6.79/1,000 population, 1.76/1,000 population, and 0.55/1,000 population, respectively, in Korea in 2015 (14).

Another cross-sectional study was conducted from February 8th to April 8th, 2017, among patients who requested for the thyroid function test in an endemic goiter area at the Gondar Hospital, University of Gondar. Results of the total 384 study participants, 346 (90.1%) were females and the study participants' mean age was 38 ± 13.9 years. &e overall thyroid dysfunction prevalence was 26.3% (101): 1.6% was identified as subclinical hypothyroidism, 0.5% hypothyroidism, 9.6% subclinical hyperthyroidism, and 14.6% hyperthyroidism, and 23.4% had goiter (15).

A cross-sectional study was employed among the sampled 239 patients, with anterior neck mass visiting JMC. A total of 239 patients with anterior neck mass visiting outpatient clinic of JMC were recruited in the study with mean age of 41.83 ± 17.52 SD years ranged from 18 to 90 years. Majority of the patients were females 212 (88.7%) while the left 27 (11.3%) were males; 155 (64.8%) of the study subjects were living in rural part while the rest 84 (35.2%) were from urban. Majority of the patients were belonged to stage II [117 (48.9%)] while others were allocated to stage III [86 (36%)], stage IB [30 (12.6%)] and stage IA [6 (2.5%)]. The mean of TSH was 0.95 ± 49 and 0.83 ± 56 among males and females respectively while the mean of FT3 (4.58 ± 38 vs. 4.27 ± 86 vs.) and FT4 (15.47 ± 92 vs. 14.98 ± 44) among males and females respectively. The magnitude of signs and symptoms of patients with highest frequency were heat intolerance, irregular pulse, palpitation, cold intolerance, tachycardia, hypertension, weight gain, swelling, poor memory, weight loss and menstrual irregularity.

The discriminated types of thyroid disorders were euthyroidism 83 (34.7%), sub-clinical hypothyroidism 46 (19.2%), sub-clinical hyperthyroidism 42 (17.6%), overt hypothyroidism 35 (14.6%) and overt hyperthyroidism 33 (13.8%).(16)

2.2 Thyroid disorder complications

Thyroid disorders are known to cause a number of complications that include dyslipidemia, thyrocardiac diseases, atrial fibrillation and others (1,3). A number of studies conducted in different areas of the world had confirmed this. For example, authors (17,18) noted that individuals with hypothyroidism had the highest levels of serum total and low-density lipoprotein cholesterol in Indian population. Moreover, these studied highlighted that increased total cholesterol and LDL level increased the cardiovascular morbidity and mortality (18).

3. Objectives

3.1 General objectives

- To assess the clinical characteristics and pattern of thyroid disorders in thyroid disorder patients attending TASH

3.2 Specific objectives

- To describe the characteristics of patients with thyroid disorders
- To determine prevalence of thyroid disease subtypes in patients with thyroid disorders at endocrinology clinic of TASH
- To describe clinical profile of thyroid patients seen at TASH endocrinology unit
- To assess the biochemical profile of thyroid disease patients
- To assess the thyroid disorder related clinical complications

4. Methods and Materials

4.1 Study design

A facility based cross sectional study, descriptive design was employed to assess the pattern and clinical features of thyroid disease patients attending Endocrinology clinic of TASH, Addis Ababa, Ethiopia.

4.2 Study setting

The study was conducted at Endocrinology clinic of TASH, Addis Ababa, Ethiopia, starting from February 1 to June 30, 2020. Tikur Anbessa Specialized Hospital (TASH) is a tertiary hospital located in Addis Ababa which is a capital city of the country. It is the largest & oldest public hospital of the country providing high level of clinical care for millions of people and training to health science students from different parts of the country and from the Horn of Africa.

It is one of the few hospitals in the country where a well-functioning endocrinology department is available. The unit delivers clinical service for 2000-2600 patients with endocrinology problems. The hospital was selected for this study because it provides relatively a large size of population from different parts of the country with a range of endocrinology facilities, particularly thyroid problems. This Endocrinology clinic evaluates patients with a wide array of endocrinology cases (including thyroid disorders) and, like the other specialty clinics, is one of the most popular rotations for endocrinology fellow, residents, and medical students.

4.3 Source population

All thyroid disease patients who had regular follow up at Endocrinology clinic of TASH

4.4 Study population

All patients with thyroid disorders who attended Endocrinology Clinic of TASH from February 1, 2020-June 30, 2020

4.5 Inclusion criteria

- All patients with confirmed thyroid disorder who visited the hospital in the specified period aging ≥ 14 years
- All thyroid disease patients who had complete medical record

4.6 Exclusion criteria

- Thyroid patients who come more than once during the study period

4.7 Sampling techniques

All medical records of 298 patients with thyroid disorders were reviewed. Of these, 271 patients were eligible for the study as they fulfil the inclusion criteria, and all of these 271 patients' were included in the study.

4.8 Study variables

4.8.1 Dependant variables

- Pattern of thyroid dysfunction
- Clinical presentation of thyroid dysfunction

4.8.2 Independent variables

- Socio-demographic data such as age, gender, religion, marital status, residence
- Clinical history such as comorbidity, presenting complaint, physical finding, pregnancy
- Biochemical profiles of study subjects (TSH, FT₃, FT₄)

4.9 Operational definition

- **Euthyroid:** refers to normal level of TSH (0.45–4.5 mIU/L), FT₃ (2.3 –6.3 pmol/l), FT₄ (10.3–24.5 pmol/l).
- **Subclinical Hypothyroidism:** is an elevation in serum TSH (>4.5 mIU/L) with normal serum FT₄ (10.3– 24.5 pmol/l) and FT₃ (2.3 –6.3 pmol/l).
- **Hypothyroidism:** is an elevation in serum TSH (>4.5 mIU/L) with low serum FT₄ (<10.3pmol/l) and FT₃ (<2.3 pmol/l) concentration.
- **Subclinical Hyperthyroidism:** low serum TSH (<0.45 mIU/L), but normal level of FT₃ and FT₄.
- **Hyperthyroidism:** If serum TSH is low (<0.45 mU/l) and FT₄ >24.5 pmol/l or FT₃ >6.3 pmol/l or both.

4.10 Data collection procedures and quality control

Data were collected from endocrinology unit of TASH using a structured checklist. The checklist was prepared by reviewing related literatures done in other areas. Patient medical registration number was taken from registry logbooks, and with it, patients' medical records were accessed from their electronic chart. The data were collected from the electronic medical chart of each patient by trained health professionals, under close supervision and facilitation by the principal investigator. Each day, the collected data was being checked for accuracy and completeness.

4.11 Methods of data analysis

Data entering, coding and clearing for the quantitative data and the analysis was performed using SPSS version 25. After checking its completeness and consistency of the tool, further clearance was made using this software. The socio-demographic & clinical characteristics of participants were computed using simple descriptive statistics (mean, percentage, frequencies, and standard deviation).

4.12 Ethical Considerations

Ethical clearance was obtained from Institutional Review Board of the college. Permission letter was submitted to the endocrinology unit to retrieve and review the electronic charts. All the data collectors were informed about the purpose of the study. Maximum effort was exercised to maintain participants' confidentiality and to keep the anonymity of the data collected.

5. Results

5.1 Baseline characteristics of patients

This study included data derived from 271 thyroid disease patients who attended endocrine clinic of TASH, after excluding 27 patients who didn't fulfill the inclusion criteria.

Table 1: Baseline characteristics of thyroid disease patients attending endocrine clinic of TASH, AA, Ethiopia, Feb 1 to June 30, 2020

Variable		Frequency	Percent (%)
Sex (n=271)	Male	37	13.7
	Female	234	86.3
Residence (n=271)	Urban	220	81.2
	Rural	51	18.8
Age range (n=271)	14-29 years	42	15.5
	30-39 years	65	24
	40-49 years	72	26.6
	50-81 years	92	33.9
History of comorbidity (n=91)	Diabetes Mellitus	31	34
	Hypertension	26	28.6
	Chronic cardiac disease	13	14.3
	HIV/AIDS	9	9.9
	Psychiatric diseases	5	5.5
	Other endocrinopathies	5	5.5
	Hematologic disorders	3	3.3
	Primary infertility	2	2.2
	No	183	66.6
Current pregnancy (n=234)	Yes	16	6.8
	No	218	93.1
Abortion history (n=234)	Yes	3	1.3
	No	231	98.7

Among the study participants, most of the patients 234 (;86.3%) were females and the remaining 37(13.7%) were males. And participants' age ranged from 14 to 81 with a mean age of 43.7 ± 13.5 years. More than one-third (92;33.9%) of the studied patients were at least 50 year-olds while only 42 (15.5%) of them were younger than 30 years by the time of data collection. Regarding the residence of the patients, majority (220;81.2%) of the patients were dwellers of Addis Ababa whereas the rest 51 (18.8%) claim to reside out of the capital.

With regard to the presence of comorbidity, while the majority 180 (66.4%) of the patients had no any documented comorbid illness, the remaining one-third (91;33.6%) of all participants

were recorded to have a coexisting medical condition. In particular, among the comorbid illnesses, diabetes mellitus accounted for 34% of the cases while hypertension, pre-existing chronic cardiac problems and retroviral infection constituted 28.6%, 14.3%, & 9.9%, respectively. The remaining comorbid medical conditions mentioned were other endocrine disorders (5.5%), certain psychiatric disorders (5.5%), hematologic disorders (3.3%) and primary infertility (2.2%), as detailed in Table 1.

Regarding the obstetric history of the female patients, most (218;93.1%) of the women were not pregnant during the time of evaluation while only 16 (6.8%) were pregnant. Similarly, 3 women (1.3%) reported to have history of spontaneous abortion after being diagnosed to have the thyroid illness while the remaining majorities (231; 98.7%) lack any medical record suggestive of such an experience, as shown in Table 1.

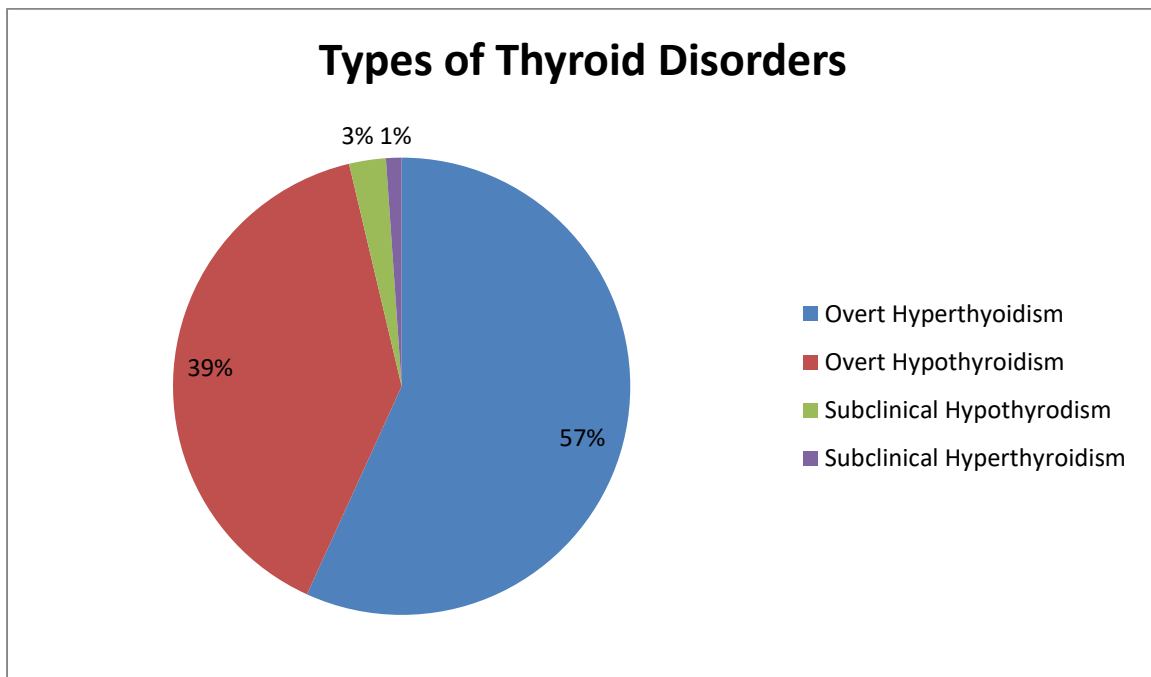


Figure 2 Types of thyroid disorders among patients attending endocrinology clinic of TASH, AA, Ethiopia, Feb 1 to June 30, 2020

5.2 Pattern of thyroid disorders

With respect to the pattern of the thyroid dysfunctions, this study found that a little more than half (155;56.8%) of the patients have overt hyperthyroidism and two-fifth (107;39.5%) of the patients were diagnosed to have overt hypothyroidism. Besides, subclinical hypothyroidism and subclinical hyperthyroidism were documented in 7(2.6%) & 3(1.1%) of the patients, respectively (Fig. 1).

Furthermore, looking at the subtypes of the thyroid dysfunctions, the most commonly reported cause of overt hyperthyroidism in the studied population was toxic multinodular goiter (TMNG) (87;55.8%), followed by Graves' disease and toxic nodular goiter, which appeared in 35 (22.4%) & 32 (20.5%) of the patients, respectively. And, the remaining 2 patients with overt hyperthyroidism had no any specifying diagnosis upon inspection of the medical chart. On the other hand, overt hypothyroidism is seen in 56 (53.3%), post-thyroidectomy hypothyroidism in 38 (36.2%) & Hashimoto's thyroiditis in 11 (10.5%) of the patients. Apart from this, 10 patients had subclinical forms of thyroid dysfunction (Table 2).

Table 2: Pattern of thyroid disorders among patients attending endocrinology clinic of TASH, AA, Ethiopia, Feb 1 to June 30, 2020

Variable		Frequency	Percent (%)
Hyperthyroidism (n=156)	TMNG	87	55.8
	Graves' disease	35	22.4
	Toxic nodular goiter	32	20.5
	Unspecified	2	1.3
Subclinical hyperthyroidism			
Hypothyroidism (n=105)	overt hypothyroidism	56	53.3
	Post thyroidectomy hypothyroidism	38	36.2
	Hashimoto's thyroiditis	11	10.5
Subclinical hypothyroidism			

5.3 Clinical profiles of thyroid disorders

Clinical data of the studied subjects' medical records reveals that palpitation is the commonly presenting symptom in patients with hyperthyroidism as it was documented in 87 (54.7%) of the hyperthyroid patients. The next most common symptoms of hyperthyroidism were anterior neck swelling (26.4%), heat intolerance (25.9%), irritability (11.3%) and excessive sweating (10.7%). Likewise, the most commonly observed symptoms of hypothyroidism were fatigue, menstrual disturbance, cold intolerance & weight gain as they were observed in 49.1%, 25%, 20.5%, & 14.3% of the hypothyroid patients, respectively (Table 3).

On the other hand, regarding the clinical signs of the patients, thyroid enlargement was the most frequently documented sign, as it appeared in both hyperthyroid (65.4%) and hypothyroid patients (20.5%). The other commonly observed clinical signs among the

Table 3: Clinical profile of thyroid disease patients attending endocrine clinic of TASH, AA, Ethiopia, Feb 1 to June 30, 2020

Clinical features		Hyperthyroidism (n=159)		Hypothyroidism (n=112)	
		Number	Percent(%)	Number	Percent(%)
Symptoms	Palpitation	87	54.7	-	-
	Anterior neck swelling	42	26.4	-	-
	Heat intolerance	41	25.8	-	-
	Irritability	18	11.3		
	Excessive sweating	17	10.7	-	-
	Diarrhea + Weight loss	4	2.5	-	-
	Sleep irregularity	5	3.1	-	-
	Fatigue	-	-	55	49.1
	Menstrual disturbance	-	-	28	25
	Cold intolerance	-	-	23	20.5
	Weight gain	-	-	16	14.3
	Hypersomnia	-	-	8	7.1
	Forgetfulness	-	-	8	7.1
	Constipation	-	-	3	2.7
Hair loss	-	-	1	0.8	
Signs	Thyroid enlargement	104	65.4	23	20.5
	Tachycardia	55	34.6	-	-
	Proptosis ± ophthalmopathy	22	13.8	-	-
	Tremor	8	5	-	-
	Hypertension	3	1.9	-	-
	Hyporeflexia	-	-	23	20.5
	Periorbital edema	-	-	13	11.6
Bradycardia	-	-	8	7.1	

hyperthyroid patients include tachycardia, exophthalmia with/without ophthalmopathy, tremor & hypertension which were recorded in 34.6%, 13.8%, 5%, & 1.9%, respectively. Conversely, other than thyroid enlargement, hyporeflexia, periorbital oedema, & bradycardia were the commonly observed hypothyroidism signs, representing 20.5%, 11.6%, & 7.1%, correspondingly (Table 3).

5.4 Biochemical profiles of thyroid disorder patients

Regarding the hormonal profiles of the studied patients, patients' latest thyroid function tests during the last six months prior to the time of data collection were reviewed. Accordingly, most (87%) of the hyperthyroid patients had low TSH levels and only 1 (0.6%) had high TSH measurement while 12 (8.8%) of the hyperthyroid patients had euthyroid TSH levels. Similarly, among all the hyperthyroid patients, 97(61%) had high, 26(16.4%) had normal and only 2 had low free T₃ laboratory measurements. Moreover, about two-fifth (64;40.2%) of the hyperthyroid patients had high free T₄ measurements, and about one-fifth (20.8%) of the hyperthyroid patients had within normal range records of free T₄ while only 3.8% of the patients had records lower than the reference range (Table 4).

Table 4: Biochemical profile of thyroid disease patients attending endocrinology clinic of TASH, AA, Ethiopia, Feb 1 to June 30, 2020

TFT		Hyperthyroidism (n=159)		Hypothyroidism(n=112)	
		Number	Percent(%)	Number	Percent(%)
TSH	Low (<0.25 IU/mL)	139	87.4	2	1.8
	Normal (0.25-5 IU/mL)	12	8.8	15	13.4
	High (>5 IU/mL)	1	0.6	86	76.8
	Not available	7	4.4	9	8
Free T ₃	Low (<4 pmol/L)	2	1.2	1	0.9
	Normal (4 - 8.3mol/L)	26	16.4	27	24.1
	High (>8.3 pmol/L)	97	61	2	1.8
	Not available	33	20.7	82	73.2
Free T ₄	Low (<9 pmol/L)	6	3.8	61	54.5
	Normal (9-20 pmol/L)	33	20.8	36	32.1
	High (>20 pmol/L)	64	40.2	2	1.8
	Not available	56	35.2	13	11.6

On the other hand, in reference to the latest thyroid function panel, more than three-fourth (86;76.8%) of the hypothyroid patients had above normal TSH records whereas 13.4% & 1.8% of the patients had within-range & below-range records, respectively. Again, with consideration of serum level of free T₃, about one-fourth of the hypothyroid patients were euthyroid while the majority (72.3%) had no any documented free T₃ study in the last six months prior to the study period. Moreover, a little more than half of the hypothyroid patients (54.5%) had depressed free T₄ levels and nearly one-third (32.1%) of them appeared to have euthyroid levels as per their latest thyroid function measurements shown in Table 4. And only 2 (1.8%) of the hypothyroid patients had elevated free T₄ measurements.

5.5 Thyroid disorder-related complications

This study has explored the medical complications primarily attributed to the underlying thyroid dysfunctions. Hence, out of the 271 studied patients, 19 (7%) had thyroid-related complications documented in their medical records. The most of commonly observed one in those with reported complications was dyslipidemia (42.1%), which was followed by atrial fibrillation (21%) & thyrocardiac disease (15.8%). The remaining three patients had either a PTU-related adverse effect or secondary infertility, as depicted in Table 5.

Table 5: Complications of thyroid disorders among patients attending endocrinology clinic of TASH, AA, Ethiopia, Feb 1 to June 30, 2020

Type of complication	Frequency(n=19)	Percent(%)
Dyslipidemia	8	42.1
Atrial fibrillation	4	21
Thyrocardiac disease	3	15.8
PTU-induced agranulocytosis	1	5.3
PTU-induced skin ulceration	1	5.3
Secondary infertility	1	5.3

6. Discussion

In developing countries, particularly in Ethiopia, there looks to be uncertainty regarding the frequency of thyroid disorder subtypes with fewer studies and widely varying estimates on the spectrum of thyroid diseases. The present study noted a higher prevalence of thyroid dysfunction in females which is comparable to other studies (5,6,19) and it can be partly because of autoimmune nature of the disease. Similarly, in line with the findings of the study conducted in Jimma Medical Center, Southwest Ethiopia (16) and India (20), this study noted the dominance of thyroid disorders in the older segment of the society. This can be attributed to the fact changes in the thyroid gland such as reduction in thyroid hormone secretion or sensitivity of the target organs are likely to occur with increasing age, mainly resulting in hypothyroidism. Besides, about one-fifth of the thyroid disorder patients were noted to come from the peripheral area for specialty care. Although this number might have been reduced because of COVID-19 crisis, it can be due the limited number of endocrinology units in the country.

The prevalence of diabetes mellitus in thyroid patients noted in this study highlights the fact that both of these endocrine disorders can have autoimmune component and that thyroid hormones contribute to the regulation of carbohydrate metabolism and pancreatic function, and diabetes affects thyroid function to a variable extent (21). This is consistent with the Indian authors that reported that comorbidities were reported in 36.36% thyroid disorder patients, with predominance of diabetes mellitus (13.54%) and hypertension (11.34%) (9,22).

Again, this study noted hyperthyroidism to be commoner than hypothyroidism, a similar pattern of which was documented by a previous study in Nigeria which documented that hyperthyroidism was the most common cause of presentation among the varied thyroid disorders seen (23).

Moreover, this study demonstrated a higher prevalence of overt thyroid dysfunctions than subclinical forms when compared to other studies such as (17,18) which documented subclinical hypothyroidism to be more common than the overt form, but was in agreement with a finding of Tekle et al who reported 6.47% among thyroid disease patients visiting endocrine clinic of Tikur Anbessa Specialized Hospital (24). This could be explained by the late presentation of the rural population as a result of lack of knowledge about their symptoms, poor health seeking behavior, access to appropriate medical care or may be due to genetic factors.

Although empirical diagnosis without definitive cyto-pathological evidence is not uncommon in the study setting, TMNG (55.8%) was a more common cause of hyperthyroidism than either Graves' disease (22.4%) or toxic nodular goiter/toxic thyroid adenoma (20.5%) in the studied population. This finding agrees with a similar study conducted about eight years back in the same setting, which noted TMNG to occur in 35.9%, Graves' disease in 17.3%, & toxic nodules in 8.5% of the thyroid disease patients (11).

Regarding the clinical symptomatology, palpitation, anterior neck swelling (26.4%), heat intolerance (25.9%), irritability (11.3%) and excessive sweating (10.7%) were the leading complaints in hyperthyroidism patients as fatigue, menstrual disturbance, cold intolerance & weight gain did in the the hypothyroid patients. This finding were more or less consistent with the previous study in which palpitation (96%), goiter (99%) and hot intolerance (81.9%) were the commonest presentations of thyrotoxicosis, whereas hypothyroidism patients presented mostly with cold intolerance (50.4%) and goiter (38%) (11). It was also in agreement with the clinical presentations observed in pregnant women with thyroid disorders (25)

Although regular TFT monitoring along with baseline investigations is recommended in the standard care, this study showed majority of the studied patients failed to have euthyroid biochemical state as per their latest TFT studies while a significant portion of the studied subjects lack any attached thyroid function test updated last six months prior to the study period. This can be due to lack of readily available investigation modality, absence of more effective therapeutic modalities such as a radioactive iodine therapy and patients' suboptimal adherence to prescribed medications.

Finally, a sizeable number of the studied patients were observed to have complications attributable to the underlying thyroid diseases or the anti-thyroid medications. These complications including dyslipidemia may be due to factors such as late presentation of the patients to the specialty care, suboptimal control of the disease, infrequent monitoring of laboratory parameters such as complete blood count and liver function tests, and chronicity of the disease of process. However, it is noteworthy to state that these medical conditions could have also been caused by other chronic medical conditions or other medications. This may indicate the need to avail radioactive iodine (RAI) therapy as it is a well-tolerated treatment modality, with only rare complications (6,26).

7. Strength and Limitation of the Study

7.1 Strength

- The study was done in one of the pioneer endocrinology unit of the country where the highest numbers of thyroid patients with varying socio-demographic characteristics are expected to be represented.

7.2 Limitations

- The study was a facility-based cross-sectional study limited to endocrinology unit of TASH. The findings may fail to reflect the situation in other areas of Ethiopia as there can be disparities in the socio-demographic constitution of the study population with differing availability of laboratory facilities and health care coverage.
- The source of data for this study was based on medical records, and provided limited validation opportunity of obtaining information from self-report of respondents.
- Difficulty in making definitive subtype diagnosis in some thyroid disorders was a challenge as there could be empirical diagnosis and diagnostic variability among clinical practitioners.

8. Conclusion and Recommendation

In summary, this study showed that hyperthyroidism was more prevalent than hypothyroidism with predominance in women. A significant segment of the thyroid patients has concomitant medical condition, necessitating integrated multidisciplinary approach. The clinical spectrum of the thyroid disorder patients ranges from asymptomatic presentation with euthyroid biochemical state to severe clinical presentation with poorly controlled thyroid function tests and medical complications.

Therefore, the researcher believes that comprehensive clinical profiling, assessment of risk factors and detailed endocrinology evaluations are helpful in better understanding and management of the varied thyroid disorders. Further, establishment of special clinics dedicated to thyroid disorders with a multidisciplinary team and adequate diagnostic facilities should be encouraged, probably by establishing an onsite Endocrine Testing Center. Particularly, radioactive iodine uptake study and radioactive iodine therapy for thyrotoxicosis should be instituted. Also, as significant portion of the population are rural dwellers, regular outreach endocrinology service should be considered. A large scale, prospective population and community survey should be conducted for the actual determination of pattern & prevalence of thyroid disorders.

References

1. Singh AK, Loscalzo J. The Brigham Intensive Review of Internal Medicine (3rd edition). 2019
2. Garber JR, Cobin RH, Gharib H, Hennessey JV, Klein I, Mechanick JI, et al. (2012) Clinical practice guidelines for hypothyroidism in adults: cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. *Endocr Pract* 18(6): 988-1028.
3. Kasper, D. L., Fauci, A. S., Hauser, S. L., Longo, D. L. 1., Jameson, J. L., & Loscalzo, J. (2015). *Harrison's principles of internal medicine* (19th edition.). New York: McGraw Hill Education.
4. Ruge JB, Bougatsos C, Chou R. Screening and treatment of thyroid dysfunction: an evidence review for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2015;162(1):35–45.
5. Vanderpump MP. The epidemiology of thyroid disease. *Br Med Bull.* 2011;99(1): 39-51.
6. American Thyroid Association (ATA), General Information/ Press Room, Association AT2013.
7. Yadav NK, Thanpari C, Shrewastwa MK, Sathian B, Mittal RK. Socio demographic wise risk assessment of thyroid function abnormalities in far western region of Nepal: a hospital based descriptive study. *Asian Pacific Journal of Tropical Disease.* 2013; 3(2):150–154.
8. WHO. The World Health Report 2002: reducing risks, promoting healthy life. World Health Organization 2002.
9. Khatiwada S, Rajendra KC, Sah SK, et al., Thyroid dysfunction and associated risk factors among Nepalese diabetes mellitus patients. *International Journal of Endocrinology.* 2015;5.
10. Skugor M, Fleseriu M. Hypothyroidism and Hyperthyroidism, Cleveland Clinic Center for Continuing Education, Lyndhurst, OH, USA, 2014
11. Kebede D, Abay Z, Feleke Y. Pattern, Clinical Presentations, and Management of Thyroid Diseases in National Endocrine Referral Clinics, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Ethiopian Medical Journal* 2012.
12. Khan SA, Sah SK, Sapkota S, Bataju M, Kunwar S and Lamsal M. Pattern of Thyroid Disorders in a Tertiary Care Centre, BPKIHS, Dharan. *Annals Thyroid Res.* 2017; 3(2): 105-108.
13. Sarfo-Kantanka O, Kyei I, Sarfo FS, Ansah EO. Thyroid Disorders in Central Ghana: The Influence of 20 Years of Iodization *Hindawi Journal of Thyroid Research.* 2017;8
14. Kwon H, et al. Prevalence and Annual Incidence of Thyroid Disease in Korea from 2006 to 2015: A Nationwide Population-Based Cohort Study *Endocrinol Metab* 2018;33:260-267
15. Asmelash D, Tesfa K, Biadgo B. Thyroid Dysfunction and Cytological Patterns among Patients Requested for Thyroid Function Test in an Endemic Goiter Area of Gondar, North West Ethiopia *Hindawi International Journal of Endocrinology* 2019:7

16. Toyib S, Kabeta T, Dendir G, Bariso M, Reta W. Prevalence, Clinical Presentation and Patterns of Thyroid Disorders Among Anterior Neck Mass Patients Visiting Jimma Medical Center, Southwest Ethiopia. *Biomed J Sci & Tech Res* 2019;18(2)- BJSTR. MS.ID.003126.
17. Iglesias, P. et al. Alterations in thyroid functions in aged hospitalized patients: prevalence, aetiology and clinical outcome. *Clin Endocrinol.* 2009; 70 (6): 961-967.
18. Cappola, A., Fried, L., Arnold, A., Danese, M., Lewis, H., Kuller, G. L., Russell, B., Tracy, P., Ladenson, P. W. Thyroid Status, Cardiovascular Risk and Mortality in Older Adults. *JAMA* 2006; 295 (9): 1033-1041.
19. Tunbridge WMG, Evered DC, Hall R, et al., The spectrum of thyroid disease in a community: the Wickham survey. *Clinical Endocrinology*, 1977;7(6):481–493.
20. Unnikrishnan AG, Kalra S, Sahay RK, Bantwal G, John M, Tewari N. Prevalence of hypothyroidism in adults: An epidemiological study in eight cities of India. *Indian J Endocrinol Metab.* 2013;17(4):647-652
21. Hage M, Zantout MS, Azar ST. Thyroid disorders and Diabetes mellitus. *J Thyroid Res.* 2011
22. Sethi B, Barua S, Raghavendra M S, Gotur J, Khandelwal D, Vyas U. The thyroid registry: Clinical and hormonal characteristics of adult Indian patients with hypothyroidism. *Indian J Endocr Metab* 2017;21:302-7
23. Ale AO, Aloro OB, Adepoju IA, Odusan O. Spectrum of thyroid disorders at the endocrine clinic of Olabisi Onabanjo University Teaching Hospital, Sagamu, Southwest, Nigeria. *Ann Health Res* 2019;5:85-92.
24. Tekle HA, Bobe TM, Tufa EG, Solomon FB (2018) Age-sex disparities and sub-clinical hypothyroidism among patients in Tikur Anbesa Specialized Hospital, Addis Ababa, Ethiopia. *J Health Popul Nutr* 37(1): 18.
25. Debebe K, Genetu G, Feleke Y, Kebede T Pattern, Clinical Presentation and Pregnancy Outcome of Thyroid Diseases in Pregnant Women at National Endocrine Referral Clinic of Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia from June 2010 to June 2015. *Thyroid Disorder Ther.* 2017 6: 209.
26. Clinical practice guidelines. Management of thyroid disorders MOH/P/PAK/434.19(GU)-e. Malaysian Endocrine And Metabolic Society (MEMS) 2019.

Lists of Annexes

Annex 1: Consent form

Addis Ababa University, College of Health Sciences, Department of Internal Medicine.

Code _____.

Hello, my name is and I am conducting a research on Pattern and Clinical Profile of Thyroid Disorders among Patients Attending Endocrine Clinic of Tikur Anbessa Specialized Hospital at TASH. The information that is collected from the secondary data will be kept confidential and only be used for the research purpose and to improve the quality of care. The study has approval and ethical clearance from the department as well as from the hospital's ethical committee.

Data Collector _____ Signature _____

Date _____

.

Annex : Declaration

I, the undersigned, declare that this postgraduate thesis is my original work, has not been presented for a degree in this or any other university and that all sources of material used for the thesis have been duly acknowledged.

Postgraduate Candidate: Abdulhafiz.Mohammed (MD, Internal Medicine Resident)

Signature:

Date of Submission: December 29, 2020

This thesis has been submitted with my approval as advisor.

Advisor: Getahun Tarekegn (MD, Internist, Endocrinologist)

Signature:

Date:

Place: Addis Ababa, Ethiopia

Annex 2: Questionnaire

I) Demographic data

1.1 Age _____

1.2 sex _____

1.3 Address A) Addis Ababa B) Oromia C) Amhara D) SNNRP E) Others (specify)

2. Clinical presentation

A. Palpitation _____

B. goiter _____

C. Heat intolerance _____

D. Tremor _____

E. Anxiety _____

F. Shortness of breath _____

G. increase frequency of bowel movement _____

H. Menstrual irregularity _____

I. Weight loss _____

J. weight gain _____.

K. Cold intolerance _____

L. Other.....(specify)

3. Thyroid disease specific physical finding-----

4. Thyroid function profiles

A) TSH _____

B) FT₃ _____

C) FT₄ _____

5. Diagnosis.....

a) Gross Dx:.....

b) Specific Dx:.....

c) Comorbidity.....

6. Thyroid disorder related complications

A. Dyslipidemia-----

B. Atrial fibrillation-----

C. Thyrocardiac disease-----

D. Antithyroid drug adverse side effect (specify)-----

F. Other-----

Time Schedule

		Months																				
No	Activities	January-March 2020				April 2020				May 2020				June 2020				July 2020				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1	Data collection	■	■	■																		
2	Literature review			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3	Data preparation & analysis					■	■	■														
4	Analysis of models and soft wares								■	■	■	■										
5	Result and discussion												■	■	■	■	■					
6	Report writing																		■	■		
7	Compiling and submitting																			■	■	