



ST. PAUL HOSPITAL MILLENNIUM MEDICAL COLLEGE
DEPARTMENT OF INTERNAL MEDICINE

ASSESSMENT OF HEALTH-RELATED QUALITY OF LIFE
AMONG HYPERTHYROID PATIENTS TREATED WITH
ANTI-THYROID DRUGS AND DEFINITIVE MANAGEMENT,
CROSS-SECTIONAL STUDY

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Assessment of Health-Related Quality of Life among Hyperthyroid
Patients Treated with Anti-Thyroid Drugs and Definitive
Management, Cross-Sectional Study

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ABSTRACT

Background: The purpose of treating hyperthyroidism is to reverse or preserve thyroid function, prevent recurrent disease, relieve symptoms and improve quality of life. Symptoms often may persist for a long time following euthyroidism, with long-term quality of life impairments.

Objective: This study assessed disease-specific quality of life in patients with hyperthyroidism treated with Anti-thyroid drugs and definitive management.

Methodology: Institutional-based cross-sectional study design applied with simple random sampling technique used to recruit 240 Patients. Self-administered ThyPRO Questionnaire used for data collection and analysis done with SPSS software version 27.0.1.

Result: The median age of the participant is 40 years with interquartile range of 32 to 50 years. 84.6% of the participants are females. 67.9% of patients had Toxic multinodular goiter as cause of hyperthyroidism and 73.5% of study participants were treated with anti-thyroid drugs, the rest with thyroidectomy. Overall quality of life significantly affected in patients treated with Anti-thyroid drugs than Thyroidectomy. Despite that more than half of participants recommended ATD for their loved ones if they had to advise them.

Conclusion: Hyperthyroidism is more prevalent in younger adults and females. Patients treated with anti-thyroid drug have less overall quality of life than those who had thyroidectomy.

KEY WORDS:

Ant-thyroid drug; Graves 'disease; Quality of life; Hyperthyroidism; Thyroidectomy; ThyPRO; Toxic nodular goiter

ABBREVIATIONS AND ACRONYMS

- ATD: Anti-Thyroid Drugs
- GD: Graves' Disease
- HRQL: Health-related quality of life
- IQR: Interquartile Range
- MWM: Wilcoxon-Mann-Whitney test
- PRO: Patient reported outcome
- RAI: Radioactive Iodine Treatment
- SPHMMC: Saint Paul Hospital Millennium Medical College
- SF-36: Short Form Health Survey
- ThyPRO: Thyroid-Specific Patient-Reported Outcome Measures
- TNG/TMNG: Toxic Nodular/Multinodular Goiter
- TRAb: Thyrotropin Receptor Antibody
- TSH: Thyroid stimulating Hormone

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1. INTRODUCTION

1.1. Background

Hyperthyroidism is a condition that occurs when the thyroid gland makes more thyroid hormones than the body needs (1). It is a global health problem that has a substantial impact on well-being (2). The epidemiology of Hyperthyroidism and its causes may vary among different countries. The most common cause of Hyperthyroidism in developed countries is due to Graves' disease But in Iodine deficient areas the most common cause is Toxic Multinodular Goiter followed by Graves' disease(3, 4). In Africa and also Ethiopia Toxic Multinodular Goiter is the leading cause of Hyperthyroidism, followed by Graves' Disease and Toxic Nodular Goiter(5, 6).

Hyperthyroid symptoms are nonspecific and may be present in patients with the subclinical disease and absent in those with overt disease, especially older adults. Patients with overt hyperthyroidism may have a dramatic constellation of symptoms with different organs involved(7). Classic features like heat intolerance, increased sweating, tremor, nervousness, polydipsia, increased appetite, and hyperactive reflexes are more common at young ages (8). In older patients, cardiopulmonary symptoms such as tachycardia (or atrial fibrillation), dyspnea on exertion, and edema may predominate. Studies recommend a lower threshold for performing thyroid function tests in patients older than 60 years (9). Some of the clinical manifestations are highly associated with the specific cause of Hyperthyroidism. For example, Neuropsychiatric impairments are highly prevalent in Graves' disease, which may lead to initial misdiagnosis or delays in diagnosis. Patients with Thyroid eye disease (Graves' orbitopathy) may have no ocular symptoms, may be distressed by the appearance of their eyes, or maybe symptomatic(7)

Health-related Quality of life is a patient-reported outcome measure that evaluates the extent to which diseases, disability, and treatment affects the health status of the patients (10, 11). It assesses the impact of disease and its treatment across the physical, psychological, social, and somatic domains of functioning and well-being which is evaluated by the patients themselves via patient-reported outcome measures (12, 13). There is a validated and standardized thyroid-specific quality of life patient-reported

outcome measure for benign thyroid disorders, which is developed by Watt et al. in Denmark and tested effective by different studies([14](#), [15](#)).It has been translated in to a different languages across different countries and culturally adapted as an effective measure of the thyroid-related quality of life and patient-reported outcome in benign thyroid disease([12](#), [16](#), [17](#)). It was also found to be more specific and reliable than generic form of HRQoL assessment tool([18](#), [19](#))

Studies shows that patients with hyperthyroidism have worse Health-related Quality of Life (HRQOL) than normal control population even after rendered euthyroid ([20](#)). Patients with Graves' disease have relatively worse HRQoL than patients with Toxic Multinodular Goiter. But in both groups there was residual symptoms of Hyperthyroidism reported even once patients are believed to be euthyroid ([21](#)). Not only the causes of hyperthyroidism, but also the options of management the patient getting have a significant impact on health-related quality of life outcomes. The choices of management differs based on patients preference, causes of Hyperthyroidism and other indications, that it should be individualized ([22](#)). Graves' Disease patients treated only with Anti-thyroid drugs have documented a high relapse rate, despite the same thyrotropin receptor antibody (TRAb) level([23](#)). Graves' Disease patient treated with Radioactive Iodine (RAI) has reported worsening in Graves orbitopathy and low HRQoL when compared to Total thyroidectomy([24](#)). The working status is also a fundamental aspect in hyperthyroid patients affecting their quality of life. Patients with hyperthyroidism has a higher risk of long sick leave within the first year after the diagnosis and a lower probability to return to work in the subsequent years. Patients with Graves' orbitopathy (HR 6.94) had a significantly higher risk of long-term sickness absence than the control population ([25](#), [26](#)). This would lead render them to a productivity loss and greater indirect and direct costs([27](#)).

Gunn AH et al 2021 study suggested that Graves' disease patients who were on ATD having a normal serum free thyroxine (FT4) underwent surgery to assess improvement in quality of life. The reported quality-of-life symptoms improved significantly starting within one month of thyroidectomy ([28](#)). But this study was done in a single center with

small number of sample sizes used (only 85 patients included) to be generalized and it doesn't include patients with TMNG which is more common in our setup.

There are no previous studies on HRQoL of patients with Hyperthyroidism using ThyPRO Questionnaire in Ethiopia; however, a few studies have explored patterns of symptom resolution with management. In this study Amharic translated version of ThyPRO Questionnaire used for data collection. This study demonstrates Health related quality of life in Hyperthyroid patients who had been managed either with Anti-thyroid drug or Definitive management for at least 6 months. The study also explores the most affected dimensions of health-related quality of life across different treatment groups and causes of hyperthyroidism. It also incorporated patients experience and perspectives about their management and assessed their recommendation for their loved ones, if they had to choose or asked for advice.

1.2. Statement of problem

Due to the lasting effect of thyroid hormone on the multisystem and subsequent impact on daily life, managing patient with hyperthyroidism become broader than correcting the biochemical derangement ([21](#), [29](#)). There is a higher risk of long sick leave in patients with hyperthyroidism within the first year after the diagnosis and a lower probability to return to work in the subsequent years ([25](#), [26](#)) with productivity loss and greater indirect and direct costs which is more significant in patients with Graves orbitopathy ([27](#)). In addition patients were also rendered to different costs; including regular laboratories, medication cost, transportation and others. Study assessed cost-effectiveness of ATD (Propylthiouracil) compared to RAI from a health care payer perspective at Black Lion Specialized Hospital, Ethiopia. Cost data of ATD (PTU) and RAI were converted with at a time (November 19, 2021) exchange rate of 1 ETB for 0.021 US Dollar. The overall treatment costs for the two alternatives were calculated based on the treatment protocols followed by the institution. Therefore, ATD's overall treatment cost (US\$ 12,531.68) is around three and a half times higher than RAI's overall treatment cost (US\$ 3583.22). This may be due to the duration and frequency of the treatment (ie, RAI is given a single dose for a maximum of three doses, whereas ATD is given for a prolonged period with multiple frequencies per day). On the other hand, the QALYs of ATD (16.54) is 1.165 times higher than that of RAI (14.19). This study found that RAI as the preferred treatment strategy over ATD for Graves' disease.[\(30\)](#). Patients with Hyperthyroidism due to either Graves' disease or Nodular goiters have impaired Health-related quality of life in the long term even after treatment on all comparable scales when compared to the general population and it was found to be worse with RAI than others. From Toerring et al study, about 65.0% of patients treated with Anti-thyroid drug has Treatment failure or recurrent disease ([20](#), [21](#), [31](#)). In Gabriel Sjölin et al study, Toxic Nodular Goiter patients followed for 6-10 years after managed according to the guideline with ATD, RAI and thyroid surgery. At the end of study about 18.1% of the patients reported that they had not yet fully recovered and there was no significant difference among those treated with RAI (21.1%) compared to ATD (12.8%) and surgery (8.3%) ([32](#)).

From a study done at the University of Gondar Comprehensive Specialized Hospital in 2019, patients treated with Propyl-thiouracil (PTU) had the mean time to symptom resolution was 5.37 (± 6.59) months. 29.81% and 58.65% of patients achieved normalization of TSH and FT4, respectively. The mean time to normalization of TSH and FT4 was 13 (± 13.28) and 11.53 (± 13.39) months, respectively. On the other hand, T3 and all three TFTs were normalized only among 38.16% and 26.32% of patients, respectively ([33](#)).

There are also risks associated with surgery. Both short and long term complications following thyroid surgery assessed. Seventy-seven (29.4%) patients had complication at first follow-up visit, and 54 (20.6%) had permanent complications at the 6-month follow-up. The most frequent complications at the first visit were hypothyroidism (9.9%), symptomatic hypocalcemia (9.5%), and voice hoarseness (5.7%). At the 6-month follow-up, 14.5%, 6.1%, and 2.7% of patients had hypothyroidism, hypocalcemia, and hoarseness of voice, respectively. Subtotal thyroidectomy was significantly associated with postoperative complications ($P < 0.01$), but factors associated with complications after 6 months was not assessed in this study ([34](#)).

1.3. Significance of the study

This study assessed Thyroid-related quality of life in Hyperthyroid patients who get managed. As there is scarcity of evidence regarding the impact of hyperthyroidism and its management on patients' quality of life, this study aimed to fill this gap. Up to my knowledge, it is the first study in Ethiopia to assess disease-specific quality of life and patient reported outcomes in treated Hyperthyroidism patient using disease specific Multi-dimensional Questionnaire. Understanding patients' health-related quality of life outcomes holds significant importance for patient-physician interactions. This knowledge will serve as a catalyst, shifting the management approach to emphasize understanding patients' perspectives rather than focusing solely on biochemical stability. This study will serve as a baseline and pave the way for future comprehensive population-based research to establish normative data for comparison in relation to thyroid-related quality of life.

2. LITERATURE REVIEW

Hyperthyroidism, a widespread health concern, can greatly impact individuals' well-being. The epidemiology varies among different countries across the world (2). In iodine-sufficient areas, the prevalence of overt hyperthyroidism ranges from 0.2% to 1.3%. The mean prevalence of total thyroid dysfunction in Europe was 3.82% (95% CI, 3.77%–3.86). According to the metanalysis, the prevalence of previously known and undiagnosed hyperthyroidism was 0.75% (95% CI, 0.73%–0.77%). The study also indicates a clear female predominance with the prevalence of 1.37%, whereas in males it was found 0.31% (4). According to the 2002 United States National Health and Nutrition Examination Survey (NHANES III), 1.3% of the general population have either overt or subclinical hyperthyroidism, with 0.5% having overt hyperthyroidism (3, 35). There were significantly more females than males with combined subclinical and clinical hyperthyroidism. The extent of thyroid disorders in Africa remains unknown because of under-diagnosis and underreporting but the few available studies noted a prevalence rate of 1.2 to 9.9% (5). As a majority of a study done in Ethiopia are institutionally based, there is a scarcity of evidence on the prevalence of Hyperthyroidism at the population level. Nevertheless, goiter prevalence among school-aged children in Ethiopia is recorded at 42.9% (36). The most common causes of hyperthyroidism vary between countries. In developed nations, Graves' disease is the leading cause(4). However, in iodine-deficient areas such as Ethiopia, the primary cause is TMNG, followed by Graves' disease and toxic thyroid nodules(37, 38). From a study done at Saint Paul Hospital Millenium Medical College, multinodular Goiter accounts for 57.2%, diffuse goiter (23.9% and solitary nodule (5.8%) (6). Since HRQoL measured the disease and treatment outcome from the patient's point of view, it was rapidly gaining acceptance as a measurable health outcome and became an important component of health surveillance (10, 11). Plenty of instruments were developed to measure and evaluate the status of HRQoL scientifically. Some of them were generic instruments, for example, EuroQol Five Dimensions Questionnaire (EQ-5D) and The 36-item short-form (SF-36) Questionnaire which yielded an eight-scale profile of scores as well as physical and mental health summary measures (18, 19). Specific instruments

have also achieved great development. There is thyroid-specific quality of life patient-reported outcome (ThyPRO) measures for benign thyroid disorder, which is developed by Watt et al. in Denmark and tested to be effective by different studies ([12](#), [13](#), [14](#)). It is the standardized and validated tools which proven to be effective to assess the impact of thyroid disease and its treatment across the physical, psychological, social, and somatic domains of functioning and well-being ([12](#), [16](#), [39](#)). The comparison of thyroid-specific quality of life (ThyPRO) Questionnaire and Generic form (SF-36) showed that ThyPRO was more responsive with the highest relative validity index across majority of symptom scales than SF-36 ([40](#)).

Treatment of hyperthyroidism with antithyroid drugs, radioiodine and thyroidectomy can restore euthyroidism successfully, but may not restore QoL even after many years, maybe because hyperthyroidism induces permanent changes in cell functioning ([41](#)). Indeed, regardless of the hyperthyroidism etiology, treatment will ameliorate or control the symptoms. However, rapid changes in serum thyroid hormones levels and the consequent variations in catecholamine receptor sensitivity and catecholamine metabolism upon management would trigger symptoms in predisposed subjects ([42](#)). This study finding is consistent with Ove Toerring et al study that assessed the long term HRQOL in Graves' disease patient managed with either ATD, RAI or thyroid surgery and found that patients treated with RAI had worse QoL than patients treated with ATD or surgery measured by ThyPRO. Patients treated with surgery had also worse ThyPRO scores when compared to patients treated with ATD mainly on hypothyroid and eye symptoms as well as on appearance ([20](#)).

From Cramon et.al 2016 prospective cohort study the baseline HRQoL was significantly affected in patients with hyperthyroidism on all disease-specific and generic health domains compared with the general population. But there was improvement in some domains after treatment in both groups. In Graves' disease patient, Significant improvements were found on 10 scales after 6 months of treatment, and changes were large (effect size ≥ 0.8) for three scales (Hyperthyroid Symptoms, Tiredness, and Overall Quality of Life) and moderate (effect size 0.5–0.8) for three scales (Anxiety, Emotional Susceptibility, and Impaired Daily Life). But ThyPRO scale

scores still remained significantly worse in patients with GD compared with those for the general population on all comparable scales, except Anxiety. The largest differences at follow-up were observed in the Eye Symptoms scale (large effect size) and in the Hyperthyroid Symptoms scale (moderate effect size). In TNG there was also improvement significantly on four scales, moderately on Anxiety and Overall Quality of Life, and with small changes on Goiter Symptoms and Hyperthyroid Symptoms. Patients were still had significantly worse scores on three scales compared with the general population sample after treatment (21). This data has a clinical relevance on informing physicians and patients about the impact of hyperthyroidism and its treatment on HRQoL. But there are limitations to this study that it is not mentioned which group of patients regarding the management they took had worse or better clinical scores. The study also lacked a power to examine the relation between normalization, or not, of thyroid function, and the effect on HRQoL and Thyroid function in the control group (general population samples) was not known.

In prospective randomized study done at Sweden on GD patient treated with either ATD, RAI or thyroid surgery and followed for four years, 6% patients from ATD group did not become euthyroid despite increase in doses up to 60 mg methimazole or 600 mg propylthiouracil daily. After discontinuation of the drugs, hyperthyroidism relapsed in 42% of patients among young adults and 34% old adults within a mean duration of 15 months. In this study the investigator tried to assess patients' perspective of recovery. Among three treatment groups, 39%, 48%, and 61% of patients on Anti-thyroid medications, radioiodine therapy and those who had thyroid surgery group feels recovered within 12 months of therapy. In reverse 10% of those who took ATD, 16% on RAI, and 5% of those who had surgery responded feeling not well even at 3 years of follow-up (23). But small sample size limits this study to recommend specific treatment. It also didn't assess the different dimensions of quality of life in this patient group.

From a systematic review of prospective, randomized, controlled trials on choices of thyroid surgery, total thyroidectomy was associated with a significant reduction in recurrent hyperthyroidism (RR 0.14, 95% CI = 0.05–0.41; $P < 0.01$) when compared with subtotal thyroidectomy with comparable post-operative complication (43). In Gunn

AH et al 2021 study on Graves's disease patients who were on ATD with around two-thirds having a normal serum-free thyroxine (FT4) and underwent surgery to assess improvement in quality of life. The patient-reported burden in the Thyroid Symptom Score and the Quality-of-Life Symptom Score exhibited a reduction in the short term (within 30 days) (thyroid symptoms, rate ratio [RR] 0.55, confidence interval [CI]: 0.42–0.72; quality of life, RR 0.57, CI: 0.40–0.81) and long term (thyroid symptoms, RR 0.59, CI: 0.44–0.79; quality of Life, RR 0.43, CI: 0.28–0.65). regarding the Core Symptoms Score which is improved from a mean of 27.78 before surgery to 21.84 in the short term ($p = 0.04$), but no improvement was seen from before surgery to long term (23.56, $p = 0.45$) (28).

In a prospective case-control study conducted in Serbia, patients with hyperthyroidism were initially treated with Antithyroid medication before thyroid surgery and HRQoL was assessed using the ThyPRO questionnaire before and after surgery. none of the patients were overtly toxic at the time of completing the preoperative ThyPRO. At the time of enrollment in the study, 8 (28.6%) and 19 (61.3%) patients in the TNG and GD groups, respectively, were sub clinically hyperthyroid, despite antithyroid therapy. In both groups, the most affected QoL domain was tiredness. The preoperative QoL was worse in patients with GD than in those with TNG with significant differences between the groups in eye symptoms, anxiety, and sex life ($P < 0.001$, $P = 0.005$, and $P = 0.004$, respectively). When the patients with TA were excluded from the TNG group, still the same ThyPRO domains were significantly more affected in the GD group than in the TMNG group; eye symptoms, anxiety, and sex life ($P < 0.001$, $P = 0.011$, and $P = 0.011$, respectively). There was no significant difference in preoperative QoL in patients with TA and in those with TMNG. In both groups, the greatest postoperative improvement was in overall QoL. Postoperative QoL improvement was better in the GD patients than in the TNG patients in all but one ThyPRO domain, cognitive impairment, with a significant difference between the groups in eye symptoms, anxiety, daily life, and sex life ($P < 0.001$, $P = 0.019$, $P = 0.035$, and $P = 0.002$, respectively) (31). According to Cohen et al., despite small changes which was not statistically

significant, found to be clinically significant (i.e., with effect sizes 0.2–0.5, corresponding to a difference in ThyPRO 0–100 scores of 4–10 points) ([44](#)).

Gabriel Sjölin et al study followed Patients with Toxic Nodular Goiter managed according to the guideline with ATD, RAI and thyroid surgery for six to ten years with assessments of demographics, comorbidities, and quality of life using ThyPRO questionnaires. At the end of the study period, 18.1% of the patients reported that they had not yet fully recovered. This answer was more common, but not significantly different, among those treated with RAI (21.1%) compared to ATD (12.8%) and surgery (8.3%). Quality of life in Patients with TNG had comparatively worse thyroid related QoL in a broad spectrum than the Danish general population. They differed in all nine scales, with the exception of the following three: Tiredness, Cognitive Complaints and Emotional Susceptibility. The most pronounced difference was in Eye Symptoms (ThyPRO-scale), followed by Hyperthyroid Symptoms, Anxiety and Depressivity. Small differences were also seen in Goitre Symptoms and Hypothyroid Symptoms. The lack of significant variability among treatment modalities could be due to small number of patients and low statistical power ([32](#)).

There is lack of evidence in our country regarding the impact of hyperthyroidism and its management outcome regarding Health-related quality of life. Eyob Alemayehu et al, retrospectively assessed the normalization of thyroid function test on patients managed with Propyl-thiouracil (PTU). The mean time to symptom resolution was 5.37 (± 6.59) months. 29.81% and 58.65% of patients achieved normalization of TSH and FT4, respectively. The mean time to normalization of TSH and FT4 was 13 (± 13.28) and 11.53 (± 13.39) months, respectively. On the other hand, T3 and all three TFTs were normalized only among 38.16% and 26.32% of patients, respectively ([33](#)).

The original version of the ThyPRO ([14](#)) measures HRQOL among patients with benign thyroid diseases. The current 85-item version of ThyPRO measures quality of life in 13 scales, covering physical (4 scales) and mental (2 scales) symptoms, function and well-being (3 scales) and participation/social function (4 scales) and one single item about overall quality of life. The dimensionality of the scales were tested at different studies and the items confirmed to be fit ([12](#)). the clinical validity and evidence of good test–

retest reliability is also confirmed by studies ([14](#)). ThyPRO has been translated into different languages and tested to be effective across various cultures. For example it has been translated into Greek language (ThyPROgr) which is validated in the consecutive patients with thyroid diseases and can be used to assess thyroid-specific quality of life in the Greek population ([16](#)). Romanian version of the ThyPRO (ThyPROro) ([39](#)), Chinese version ([45](#)) and the Spanish versions of the ThyPRO ([46](#)) showed acceptable psychometric properties and good cross-lingual validity, and are suitable for use in clinical studies. Despite its well-known efficacy to assess Health related quality of life and patient reported outcome, up to my knowledge ThyPRO questionnaire has never been translated and applied in Ethiopia or African countries.

2.1. CONCEPTUAL FRAME WORK

Health related quality of life in Hyperthyroid Patients is affected by multiple variables. Different causes of hyperthyroidism have relatively different systems affected. The choices of treatment have also its own impact on the outcomes of health-related quality of life. Age, Sex and underlying comorbidity can also affect health-related quality of life in hyperthyroid patients. The conceptual framework is depicted in Figure 2. 1 below.

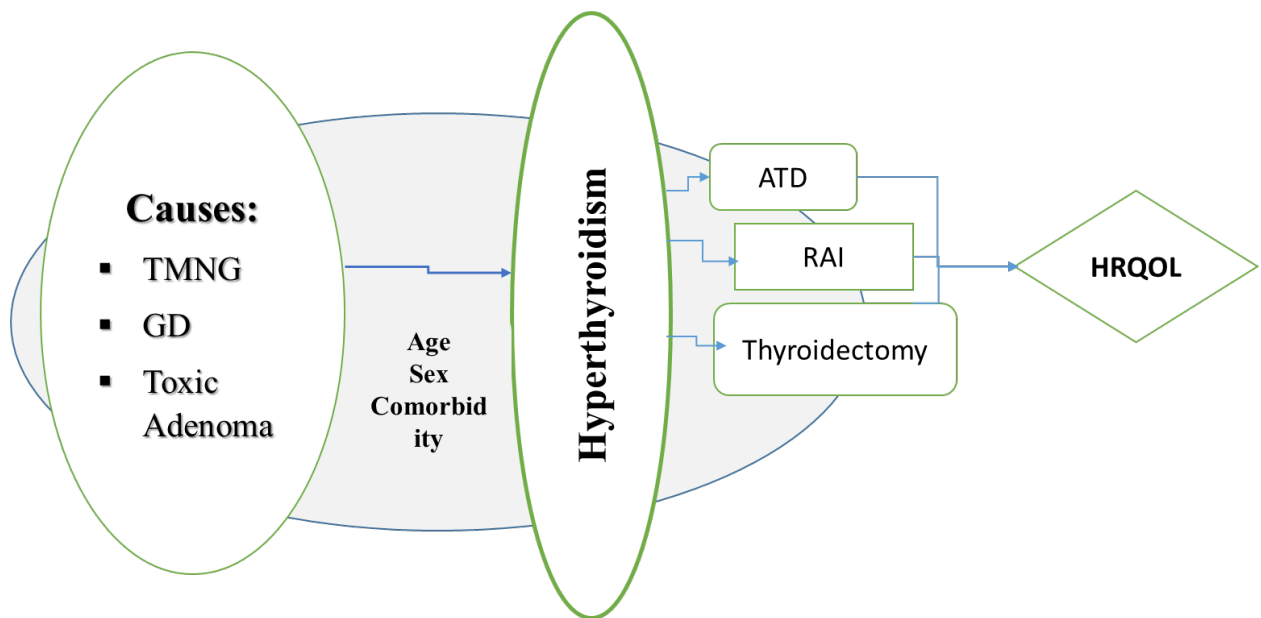


Figure 2. 1 Conceptual framework

3. OBJECTIVES

3.1. General

- ✚ The main aim of this study is to assess Health-related Quality of life in Hyperthyroidism Patients treated with either Anti-thyroid drugs or Definitive management having regular follow up at St. Paul Hospital Millennium Medical College, Addis Ababa, Ethiopia.

3.2. Specific objectives

- To assess the impact of Hyperthyroidism on Health-related Quality of life among patients treated with ATD and Definitive management.
- To assess which approach of management has a better patient reported outcome regarding health-related quality of life in our setup.

4. METHODS OF STUDY

4.1. Study area

The study conducted at Saint Paul Hospital Millennium Medical College Endocrine and Surgical regular follow-up clinic in Addis Ababa, Ethiopia. St Paul's Millennium Medical College, as it is known today, was established through a decree of the Council of Ministers in 2010, although the medical school opened in 2007 and the hospital was established in 1968. It is governed by a board under the Federal Ministry of Health. The college has more than 2800 clinical, academic and administrative and support staffs that provide medical specialty services to patients who are referred from all over the country, teaching medicine and nursing students and doing basic and applied researches. While the inpatient capacity is more than 700 beds, The College sees an average of more than 1200 emergency and outpatient clients daily. The internal medicine department has multiple subspecialties with inpatient and outpatient services. Endocrine clinic at SPHMMC is one of the subspecialty clinics that give service to patients with Endocrine disorders four days per week serving the average of 70-90 patients daily, from that 15-20% of patients are estimated to be patients with Thyroid disorder (Hyperthyroidism). Patients with hyperthyroidism also have follow up at surgical follow up clinic either for taking anti-thyroid medication and waiting for surgery or on their post-surgery visit. At Surgical follow up clinic, there is specific schedule particularly on Tuesday afternoon and Thursday morning for patients with endocrine disorders to be regularly evaluated by Endocrine surgeons. Majority of hyperthyroid patients have regular visit on this specific days but there were cases of hyperthyroidism having follow up on other days with general surgical follow ups. On average about 18 to 32 hyperthyroid cases were visiting surgical follow up clinic, mainly on above mentioned endocrine follow up clinic days.

4.2. Study period

This study conducted from September 15, 2023 to January18, 2024 G.C.

4.3. Study design

An Institutional based descriptive cross-sectional study design applied in this study.

4.4. Population

4.4.1. Target population:

✚ All patients with Hyperthyroidism

4.4.2. Source population:

✚ All patients Treated for Hyperthyroidism at SPHMMC.

4.4.3. Study population:

✚ Patients treated for Hyperthyroidism and visited endocrine sub-specialty clinic and surgical follow up clinic at SPHMMC with in the study period and fulfill the inclusion criteria.

4.4.4. Eligibility Criteria

Inclusion Criteria

- ❖ Individual who had confirmed Hyperthyroidism (at least one record of previous biochemical evidence of hyperthyroidism is required).
- ❖ Hyperthyroidism patient treated with Anti-thyroid drugs for at least six months.
- ❖ Patients who had thyroid surgery for Hyperthyroidism at least six months back.
- ❖ Patients Volunteer to respond

Exclusion Criteria

- ✚ Patients who were on anti-thyroid drug for less than six months
- ✚ Pregnant mother
- ✚ Postpartum mother within three months of delivery
- ✚ Age less than 18 or above 75 years old.
- ✚ Patients who have other comorbidities that significantly affected their routine life activities. See operational definitions for comorbidity.
- ✚ Patients with diagnosed active illness that impaired their routine life active over the past one month. See operational definition.
- ✚ Thyrotoxicosis patient with documented Thyroiditis or due to excessive exogenous ingestion of thyroid hormone or its substrate were excluded from this study. The information was taken from patients chart before enrolling the candidates.

4.5. Sample size Calculation

As Toxic multi-nodular goiter is more predominant in our setup (16,17) and According to Sjölin et al in 2022, At the end of a mean follow-up of 8 years, about 18.1% of the patients with Toxic nodular goiter reported that they had not yet fully recovered and there was no significant difference among those treated with RAI or surgery when compared to ATD. Based on this evidence with 95% confidence interval and 5% precision, the sample size for this study will be calculated using Cochran's sample size calculation formula as:

$$N = \frac{(z_{\alpha/2})^2 p (1-p)}{d^2}$$

Where

N=Sample size for infinite population

d= margin of error

$z_{\alpha/2}$ =confidence interval

P= Estimated proportion

$$N = \frac{(1.96)^2 (0.181) (1-0.181)}{(0.05)^2}$$

$$N = \frac{(1.96)^2 (0.181) (0.819)}{0.0025} = 228$$

Assuming attrition rate of 5%, the total sample size of **240** participants enrolled. But during data cleaning 6 cases were eliminated due to incomplete information and outliers, and data analysis done for total cases of 234.

4.6. Sampling Procedure

From patients visiting to Endocrine sub-specialty clinic and Surgical follow up clinic at SPHMMC from September 15, 2023 to January 18, 2024, appointment lists checked from computer based dataset software at least a day earlier for potential candidates. Software based medical charts reviewed for inclusion and exclusion criteria before selecting the candidate with simple random sampling technique. Randomly selected patients approached on their clinic visit day for consent to participate in the study. Volunteer participants given the structured self-administered questionnaire to fill on the same day. This process continued until sample size of 240 achieved. One patient was only allowed to participate once, there was no re-selection.

4.7. Data collection tools & procedures:

ThyPRO Questionnaire, a well validated thyroid disease-specific quality of life measure used in this study. The original English version of ThyPRO translated into Amharic language before data collection. The English version of ThyPRO Questionnaire translated into Amharic version by non-medical officially licensed English to Amharic Translators and Medical Professionals, then reviewed and cross checked for its consistency. The reliability and validity of the questionnaire tested up on 22 samples before formal data collection started.

ThyPRO Questionnaire is the standardized and validated tools which proven to be effective across different countries, to assess the impact of thyroid disease and its treatment ([12](#), [16](#), [39](#)). It consists of 85-items to measure quality of life in 13 scales, covering physical (4 scales) and mental (2 scales) symptoms, function and well-being (3 scales) and participation/social function (4 scales) and one single item about overall quality of life. Each item is rated on a five-point Likert scale, with “0” for “not at all” to “4” for “very much”. The demographic instrument consists of basic demographic questions such as age, sex, education level, and questions related to the disease, such as the subtype of thyroid diseases, types of treatment received, the duration of the treatment, TSH level, the presence or absence of comorbidities and based on patients

experience their recommendation of possible treatment for their loved ones were also included in the questionnaire. Regarding the causes of hyperthyroidism and recent TSH (which was done over the past 6 months) taken from the patients electronic database.

Data collectors were well trained for data collection process. The primary responsibility of data collector will be passive guidance of the respondents whenever needed; otherwise Questionnaires will be filled by the respondents.

4.8. Data quality control:

Before collection of data, questionnaires checked for validity by advisors and Hospitals Ethical committee. In addition Questionnaire was tested for reliability in 22 sample populations. Data collectors were well trained about data collection procedures and necessary information's that need to be fulfilled. Data checked for completeness and accuracy before coded in to statistical software and cleaned for outliers.

4.9. Data analysis:

Data checked for completeness, then coded in to SPSS version 27.0.1. Age was coded as continuous variable. There are four options for Educational levels , including “1= No formal education, “2= below 12th grade, “3= 12th grade up to Diploma, “ 4= Bachelor degree and above. The duration of treatment variable was asked as an open-ended question, and it was recoded to a variable with 3 levels, which was “1 = less than 1 year”, “2 = 1 to 2 years”, “3 = above 2 years”. Thyroid function tests are assessed as continuous variable and recoded with 4 levels for TSH, “0=no recent documentation, “1=less than 0.4mU/L, “2=0.4mU/L-4.0mU/L, “3=above 4.0mU/L. The cut points were used for easy of interpretation and it's based on American thyroid Association recommendation for acceptable TSH reference range of 0.4- 4.0mU/L, as there was no evidence of negative outcome documented for TSH level maintained with in this range (ATA, 2020, vol 13, p5-6). Each ThyPRO item is rated on a five-point Likert scale, with “0” for “not at all” to “4” for “very much” and Rescaled from 0 (best) to 100 (worst) by using standard summation and linear transformation. Literature suggests that

the difference among groups score of 4-10 points in linear transformed ThyPRO 0-100 scale scores was associated with clinically significant quality of life impairment and it will be used as a reference value in this study.

The internal consistency and reliability of scores was judged based on the Cronbach's α coefficient for each scale, where a value > 0.7 indicated good internal consistency. In addition, the assumption checking for each model was conducted before each test, normality distribution checked with Histogram and Kolmogorov-Smirnov test. Binary logistic regression test was done to assess the relationship between comorbidities and age, comorbidities and treatment options, after Hosmer and Lemeshow test was done to test for the Model fitness. To compare health related quality of life among causes of Hyperthyroidism, data for TMNG and toxic nodule recoded under toxic nodular goiter. Then data split into Graves' disease and Toxic nodular goiter and correlation assessed for individual ThyPRO item scores. ThyPRO scale scores were also assessed for cases among treatment group for patients who took anti-thyroid drugs and Thyroidectomy using Mann Whitney rank score, as some of scales were found to be not normally distributed. Quantile regression model used to adjust for confounding variables. In this study no cases managed with RAI found. Bonferroni correction was not done for subgroup analysis and the inferential used in this study are for exploratory purpose, unless the study was designed for descriptive statistics.

4.10. Variables

Dependent variables:

- Health-Related Quality of Life

Independent variables:

- Anti-thyroid Drug
- Thyroid Surgery
- Toxic Multi Nodular Goiter
- Graves' Disease
- Toxic Nodule
- Duration of Treatment

Confounding variables

- Age
- Sex
- Comorbidity

4.11. Operational definitions:

- **Active disease:** Active disease could be any treatable or self-limiting health condition that affected at least one of the patient's quality of life scale scores with in the past four weeks. E.g; Malarial infection, pneumonia. If it was treated and cured before one month, it is no longer considered as active disease and patient can participate in the study. Disease that occurred before one month but stabilized and not cured over the past four weeks will be considered as comorbidities. See definition of comorbidity
- **Anti-Thyroid Drug:** is a class of drugs used to treat an overactive thyroid gland. It does not include medications used for symptom control.
- **Benign Thyroid disease:** Over activity or underproduction of thyroid hormones with underlying noncancerous process.
- ✚ **Comorbidity:** A chronic medical condition that occurred either before or after hyperthyroidism and not cured over the past one month. Patients with comorbidities were excluded if it has significant impact on their routine life activities. E.g: Patients with cardiac disease either due to thyrocardiac disease or other causes with NYHA class two and above heart failure, Diabetic patients with vascular complications, Patients with chronic renal failure or those on maintenance dialysis, Patients with stroke and dependent on others for daily life activities, Malignancy (all type) unless treated and cured, Organ transplanted patients (kidney, or Liver), Advanced COPD, Bronchial Asthma with moderate persistent and above, Known Psychiatric illness (e.g. MDD, Bipolar disorder, Schizophrenia). Patients with Hypertension, Diabetes mellitus with no vascular complications, patients with HIV infection and other chronic illness that didn't impair patient's life activities and independency were enrolled in this study.
- **Health-related quality of life:** Subjective assessment of the impact of disease and its treatment across the physical, psychological, social, and somatic domains of functioning and well-being which is evaluated by the patients themselves.
- **Hyperthyroidism:** An excess production of thyroid hormones by the gland. It could be overt or sub-clinical hyperthyroidism.

- **Subclinical hyperthyroidism:** defined as patients who have low serum TSH concentrations ($<0.4\text{mU/L}$) but normal serum free T₄, T₃, and free T₃ concentrations.
- **Thyroid-related Quality of Life:** Quality of life which is affected by Abnormal anatomy (enlargement) or physiology (hyper/hypo functioning) of thyroid gland. It was assessed using ThyPRO questionnaire.
- **ThyPRO:** Is a self-administered questionnaire used for measuring quality of life in patients with benign thyroid diseases. It consists of 85-items in 13 scales, covering physical symptoms (4 scales) and mental symptoms (2 scales), function and well-being (3 scales) and participation/social function (4 scales) and one single item about overall quality of life. Each item is rated from “0” for “not at all” to “4” for “very much”. The response is subjective and patient answered it based on the severity and frequency of symptoms they were experiencing over the past four weeks. For the specific question, when they encircle “not at all” means they didn’t have such symptom over the past 4 weeks, if they answered “a little” which refers to there is symptom which either occur intermittently or only in a small amount, that does not affect their daily life activity, “some” when the symptom occurs frequently or in moderate amount but didn’t limit routine daily activity, “Quite a bit” when the symptom occurs very frequently or in severe or large amount which limited their life activities. If the patient encircled “very much” it refers to that the symptom is very severe, which impaired their routine activities and patient worries a lot about their symptoms. In general it is the patient who knew how frequent or severe their symptom affected their life quality and they were guided to answer based on this regard.
- **Thyroidectomy:** Thyroid surgery which was done for the reason of hyperthyroidism. In this study it refers to total thyroidectomy, near total and subtotal thyroidectomy. If patient had Thyroidectomy after taking ATDs, they were leveled under thyroidectomy.
- **RAI:** Radioactive iodine (also called I-131) used to treat overactive thyroid gland.
- **TRAb:** Antibodies directed against the TSH receptor (either stimulatory or blocking).

4.12. Ethical consideration

Ethical clearance obtained from the institutional review board of St Paul's Hospital Millennium Medical College before the beginning of data collection. Verbal informed consent was taken from the Individual participants before requesting to fill the questionnaire. All sensitive patient information was kept confidential and their names not included in the questionnaire.

4.13. Result Dissemination

The research findings will be submitted, presented and defended to the Department of Internal Medicine, SPHMMC and submitted to the Department of Public Health as one of the partial fulfillments of specialty certificate in Internal Medicine. In addition, the research report will be archived in the main Library of SPHMMC. As there are limited studies about Health-related quality of life in general and Thyroid-related quality of life, particularly in our country, the outcome of the study will be presented at research symposium and conferences. All efforts will be made to publish the findings of this study on peer reviewed reputable local and international journals.

5. RESULT

5.1. Questionnaire

The reliability of ThyPRO questionnaire is checked with Cronbach's alpha coefficients for overall and individual scale items. The cronbachs alpha score of individual scale scores are satisfactory expect for hypothyroid symptoms. The Cronbach's alpha coefficients for individual scale scores are; Goiter symptoms 0.879, Hyperthyroid symptoms 0.892, Hypothyroid symptoms 0.587, Eye Symptoms 0.872, Tiredness 0.824, Cognitive complaints 0.86, Anxiety 0.90, Depressive symptom 0.709, Emotional susceptibility 0.852, Impaired social life 0.879, Cosmetic concern 0.862, Sexual life 0.757, Impaired daily 0.925, with an overall Cronbachs' alpha score of 0.970.

5.2. Socio demographic characteristics of respondents

From September 15, 2023 to January 18, 2024 the total cases of Hyperthyroidism visited to SPHMMC Endocrine subspecialty clinic and Surgical follow up clinic was 992, with 534 had visit to SOPD and 458 to endocrine subspecialty clinic. After excluding repeat visits and patients who do not meet Inclusion criteria, 240 volunteer patients enrolled in this study. After data cleaning, 6 cases were removed due to incomplete information, with final data from 234 cases encoded in to SPSS 27.0.1 and analyzed.

The median age of participant was 40 years with interquartile range of 32 to 50 years and 51.3% of patients were age below 40 years. Regarding gender distribution, 198 (84.6%) of the participants are females. Educational background of the participants shows that 64(27.4%) does not have formal education, 85 (36.3%) has below 12th grade, 58(24.8%) has completed up to Diploma and 27(11.5%) has bachelor Degree and above. Among the participants 158 (67.5%) does not have any comorbid illness. The remaining 76(32.5%) had at least one comorbidity that does not meet the exclusion criteria. See Table 5. 1.

Table 5. 1 Participants demographic variables (N=234)

		N	%
AGE	18-40	120	51.3%
	41-60	89	38.0%
	above 61	25	10.7%
Sex	Male	36	15.4%
	Female	198	84.6%
Education	No formal education	64	27.4%
	Below 12 th	85	36.3%
	12th up to Diploma	58	24.8%
	Degree and above	27	11.5%

5.3. Hyperthyroidism related characteristics of Participants

Regarding the causes of Hyperthyroidism, TMNG is the most common cause with the prevalence of 159(67.9%), Graves' Disease 59 (25.2%) and Toxic Nodule 16 (6.8%). Both Graves' disease and Toxic nodular goiters are more common in females than male, see Table 5. 3. Among the treatment received by the patients majority was on anti-thyroid drugs, 172 (73.5%) and thyroid surgery was done for 60 (25.6%) of patients and 2(0.9%) treated with Anti-thyroid drugs and currently not on medication. From study participants, 34(14.5%) does not have TSH done over past 6 months, majority, 92 (39.3%) have normal reference TSH level, 81(34.6%) has below TSH level of below 0.4mU/L and 27(11.5%) have TSH level above 4.0mU/L. More than half of patients in this study have been on follow up and treatment for above 2 years. Other quarter had treatment with in the past 1 year and the rest for 1 to 2 years, See Table 5. 2.

The association between age and comorbidity was done using binary logistic regression, showed that as Age increases, the odds of having comorbidity increased by 4.05 (95% CI, 2.5-6.4, $P<0.001$). The presence of comorbidity and choices of management were assessed using binary logistic regression, that patients with comorbidity are less likely to be treated with thyroid surgery in this study, OR of 0.4 (95% CI; 0.2-0.8, $P<0.001$) see also Figure 5. 1 below.

Patients were also asked about the management options they would recommend for their loved ones, if they had to choose or asked for advice and above half of patients 124(53%) suggested Anti-thyroid medications and 17(7.3%) recommended to use if there is other better options than surgery and ATD. Multinomial logistic regression used to asses factors behind the patients recommendation for the specific treatment they suggested, and in this analysis, only previous treatment they received has significant prediction (OR=6.1, 95% CI=2.8-13.1, $P<.001$). That patient who had Thyroidectomy, the Odds of recommending surgery over ATD increases by factor 6.1. Causes of Hyperthyroidism, Duration of treatment, Presence of comorbidity and Educational background has no significant prediction in the model for the patients choosing thyroidectomy over anti-thyroid drugs. But patients with higher educational level opts

to recommend other better options if available than ATD with OR=2.0 (95% CI, 1.1-3.6, P=.016), See Table 5. 4.

Multinomial logistic regression also used after Model fitness confirmed, to assess the association of the level of TSH with causes of hyperthyroidism, duration and types of treatment. The type of treatment given has a significant prediction in the model for TSH to be within 0.4-4.0mU/l with OR of 13.9(95% CI=4.5-42.4, P<.0001) and above 4.0mU/L with OR of 52.4 (95% CI=12.5-218, P<.0001) than TSH less than 0.4mU/L. Duration of treatment has also a significant predictor of TSH above 0.4mU/L, which indicating that patients who was on treatment for long duration were more likely to have TSH above 4.0 mU/L than TSH less than 0.4mU/L. causes of hyperthyroidism does not have significant prediction for level of TSH.

Table 5. 2 Disease Related Variables (N=234)

		N	%
Comorbidities	No	158	67.5%
	Yes	76	32.5%
Causes of Hyperthyroidism	Graves' Disease	59	25.2%
	TMNG	159	67.9%
	Toxic Nodule	16	6.8%
	Other	0	0.0%
Treatment given	ATD	172	73.5%
	Thyroidectomy	60	25.6%
	Other	2	0.9%
TSH in mU/L	Not done recently	34	14.5%
	Less than 0.4	81	34.6%
	0.4- 4.0	92	39.3%
	Above 4.0	27	11.5%
Duration of Treatment	less than 1 year	59	25.2%
	1-2 years	57	24.4%
	above 2years	118	50.4%
Treatment suggestion from Participants	ATD	124	53.0%
	Thyroid surgery	93	39.7%
	Others	17	7.3%

Table 5. 3 Causes of Hyperthyroidism among Gender

			Sex		Total
			Male	Female	
Causes of Hyperthyroidism	Graves' Disease	N	8	51	59
		%	13.6%	86.4%	100.0%
	TMNG	N	22	137	159
		%	13.8%	86.2%	100.0%
	Toxic Nodule	N	6	10	16
		%	37.5%	62.5%	100.0%
Total		Count	36	198	234
		%	15.4%	84.6%	100.0%

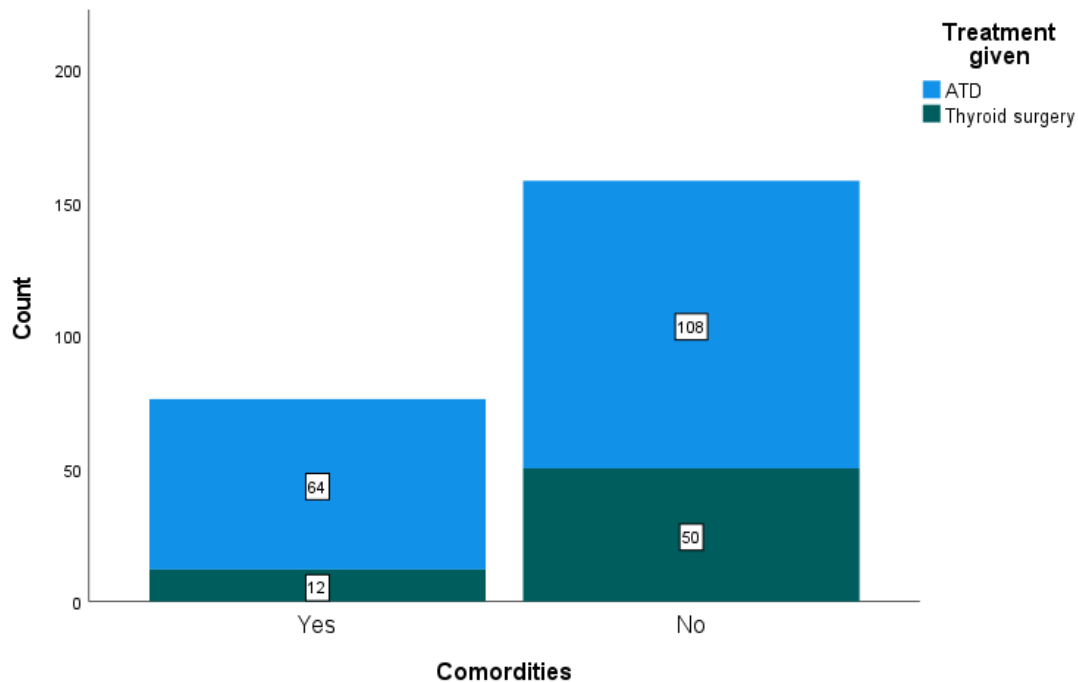


Figure 5. 1 Stacked Bar graph of Comorbidities by Treatment given

Table 5. 4 Multinomial logistic regression of Treatment suggested by participants

Participants suggestion of therapy ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Thyroid surgery	Intercept	- 3.388	.829	16.704	1	.000			
	Comordities	.101	.368	.075	1	.784	1.106	.538	2.275
	Education	.180	.183	.963	1	.326	1.197	.836	1.715
	Treatment given	1.812	.390	21.606	1	.000	6.122	2.852	13.142
	Causes of Hyperthyroidism	.185	.326	.323	1	.570	1.204	.635	2.282
Others	Intercept	- 6.962	1.600	18.921	1	.000			
	Comordities	.969	.608	2.542	1	.111	2.637	.801	8.681
	Education	.712	.295	5.821	1	.016	2.038	1.143	3.633
	Treatment given	1.509	.586	6.635	1	.010	4.523	1.435	14.260
	Causes of Hyperthyroidism	.623	.601	1.075	1	.300	1.865	.574	6.056
a. The reference category is: ATD.									

5.4. Health related quality of life in hyperthyroidism patients

The computed and linear transformed values of dependent variables will be reported in mean and standard deviations. From patient reported outcomes, Goiter symptoms has mean score of 14 with SD of 14, Hyperthyroid symptoms has mean score of 20 (SD of 20), Hypothyroid symptoms mean score 7 (SD of 13), Eye symptoms mean score of 11 (SD=17), Tiredness symptom mean score of 33(SD=21), Cognitive complaints mean score 11(SD=18), Anxiety mean score 28 (SD=30), Depressive symptoms 26 (SD=17), Emotional susceptibility mean score of 25(SD=19), Impaired social life mean score of 10 (SD=17),Cosmetic concern mean score 9(SD=14), Sexual life 25 (SD=30), Impaired Daily life mean score of 10 (SD=18) and overall quality of life mean score 43 (SD=34).

Scale items were assessed for its association with causes of hyperthyroidism using MWM test. Though Goiter symptoms were higher in Toxic nodular goiter than Graves disease, the difference is not significant, P-value=.33, Hyperthyroid symptoms were significantly higher in graves disease than toxic nodular goiters, P-value less than 0.001, Hypothyroid symptoms are higher in Toxic nodular goiter but not significant, P-value=0.20, Eye symptoms are significantly higher in patients with Graves disease than toxic nodular goiter with P-value <0.001, Tiredness is also significantly higher in GD than TNG, P-value <0.001, Cognitive disorder is more in GD than TNG, but not significantly different among two groups, P-value=0.68, Anxiety is significantly higher in GD than TNG, P-value=0.006, depressive symptoms are significantly higher in GD than TNG, P-value=0.005, Emotional susceptibility is also significantly higher in patients with GD than TNG, P-value=0.003, Impaired social life is worst in GD than TNG, P-value=0.014, Cosmetic concerns are almost similar among groups, P-value=0.75, sexual life was impaired more in patients with GD than TNG, P-value=0.013, Daily life impaired almost similar among two groups, P-value=0.10, overall quality of life is significantly affected in GD patients than TNG, P-value=0.003 and in general the composite score is also significantly affected in GD patients than TNG, P-value<0.001.

Specific items were also assessed for its association with causes of hyperthyroidism using Chi-square test. From the analysis, causes of hyperthyroidism has significant association with Lump in the anterior neck ($\chi^2=13.6$, P=.009) and discomfort up on

swallowing ($\chi^2=16$, $P=.001$) and difficulty on swallowing ($\chi^2=12.5$, $P=.006$) but has no significant correlation with scale items of Goiter symptoms. Among Hyperthyroid symptoms; trembling hands ($\chi^2=19.3$, $p<.001$), Increased sweating($\chi^2=23.9$, $P<.001$), Palpitation ($\chi^2=22.8$, $P<.001$), Shortness of breath ($\chi^2=23.2$, $P<.001$), sensitive to heat ($\chi^2=22.9$, $P<.001$), Increased appetite ($\chi^2=8.0$, $P=.046$) and stomach upset ($\chi^2=17.00$, $P=.002$). Among Hypothyroid symptoms none are found to be strongly associated with causes of hyperthyroidism. All components of Tiredness scale showed significant association with causes of hyperthyroidism. From cognitive scales; been confused ($\chi^2=11.6$, $P=.02$) and difficulty concentrating ($\chi^2=11.9$, $P=.018$) are shown to be strongly associated with causes of hyperthyroidism. From the analysis all components of Eye symptoms has shown significant association with the causes of Hyperthyroidism. From Anxiety scale scores feeling tension ($\chi^2=16.9$, $P=.002$), Afraid for being seriously ill ($\chi^2=14.6$, $P=.006$) and Restlessness ($\chi^2=20.0$, $P<.001$) are associated with causes of hyperthyroidism, other items did not show strong association. Among depressive scales, feeling discouraged, crying easily and feeling unhappy showed significant association with the cause of hyperthyroidism. From Emotional susceptibility components; Difficulty of coping, Irritability and Angriiness showed significant association with underlying causes of hyperthyroidism From Impaired social life scale: Difficulty with people and conflict with people items are strongly associated with causes of hyperthyroidism. Among cosmetic concerns; unsatisfied appearance and feeling too fat has strong association with the underlying cause of hyperthyroidism. The chi-square test also showed that underlying causes of hyperthyroidism has strong association with having a negative influence on sex life. Only difficulty to manage job and Things are taking longer items are strongly associated with causes of hyperthyroidism from impaired daily life scale scores.

HRQOL scale scores were tested for two treatment groups, Anti-thyroid drugs versus Thyroid surgery using Mann Whitney U test as shown, see Table 5. 5. The mean rank for Goiter shows that it was highest for patients on Anti-thyroid drugs than those who had Thyroidectomy but it was not statistically significant. According to the test hyperthyroid symptoms, Tiredness, depressive symptoms, impaired social life, impaired

daily life, impaired sexual life and overall quality of life were significantly affected in patients who have been on Anti-thyroid drugs than those who had thyroidectomy. Total scale scores among two treatment groups, ATD has more score (worse outcome) than thyroid surgery, see Figure 5. 2. The two treatment groups were compared for overall quality of life and composite scores, after adjusting for sex and comorbidities using Quantile regression model for medians, patients treated with ATD have higher scores (worst outcome) than patients treated with thyroid surgery, with P-values of .005 and .028 respectively. The effect of comorbidity on thyroid related quality of life assessed by using MWM test and values found to have significant effect on quality of life scale items re-assessed with Quantile regression after adjusting for sex, age and treatments given. Patients with comorbidity have higher risk of having Goiter symptoms, hyperthyroid symptoms, cosmetic complaints and impaired daily life with P-value of 0.006, 0.034, 0.006 and <0.001 respectively. See Table 5. 6 for detail information.

Table 5. 5 Association of HRQOL scale with dependent, Mann Whitney U test

Scales	Patients treated with ATD	Thyroid Surgery	Mean Rank On Mann Whitney U test		P- value
	N=172	N=62	Mean Rank ATD	Mean Rank Thyroide ctomy	
	Mean (s)	Mean (s)			
Goiter Symptoms	14.2 (12.2)	9.1(9)	122	103	.056
Hyperthyroid Symptoms	21.5 (19.7)	3.13(3)	124	99	.015
Hypothyroid Symptoms	5.4 (9.7)	10.6(18.4)	113	129	.072
Eye Symptoms	13.3 (18.3)	8.3(14.3)	121	106	.112
Cognitive Complaints	12(18)	11(20)	119	113	.489
Tiredness	35 (20)	26(22)	124	99	.013
Depressive symptoms	27(17)	20(16)	124	100	.017
Anxiety	30(30)	10(11)	121	106	.148
Emotional Susceptibility	26(19)	16(17)	122	103	.057
Impaired Social Life	12(19)	6(12)	122	104	.045
Cosmetic Complaints	9(14)	9(14)	118	117	.935
Impaired Sexual life	29(32)	14(22)	125	94	<.001
Impaired Daily Life	12(19)	6(14)	125	96	.002
Overall QOL	46(36)	35(31)	122	102	.036

N.B: s...stands for standard deviation

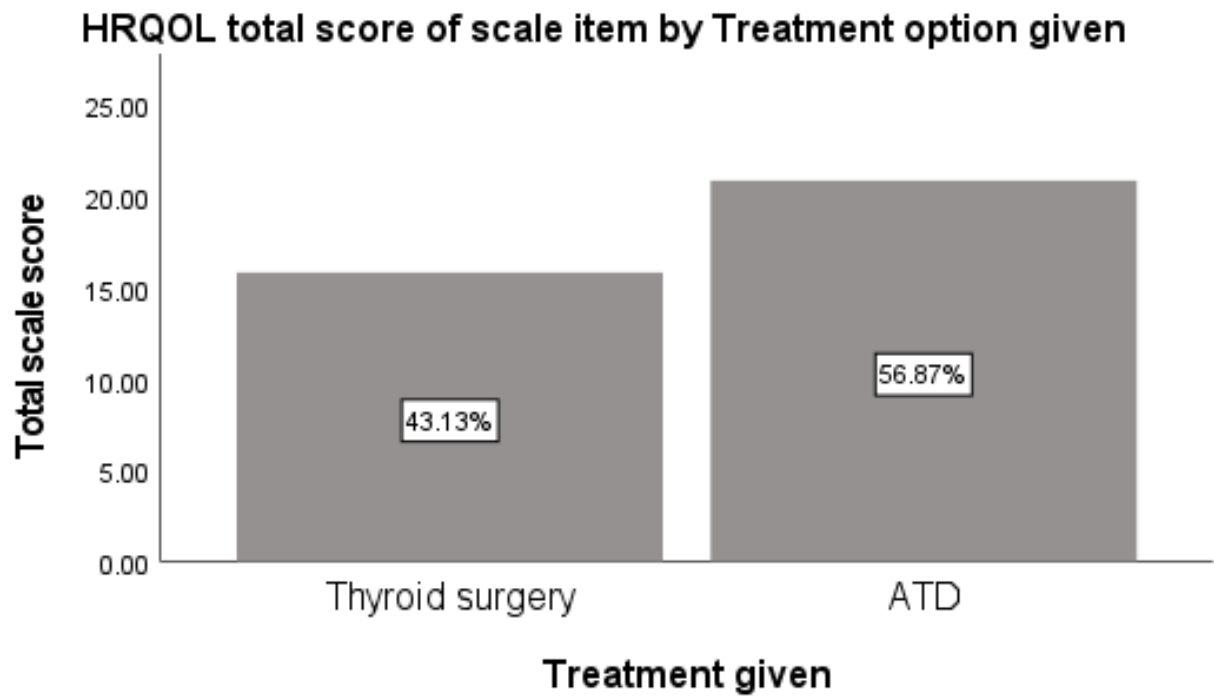


Figure 5. 2 HRQOL total score of scale item by Treatment option given.

N.B: the highest the score the worse quality of life outcome

Table 5. 6 Comorbidity on HRQOL

Scales	Mann Whitney U test			Quantile Regression		
				Coefficients for comorbidity	95% CI	P-value
	Comorbidity Mean Rank	No comorbidity Mean Rank	P-value (Z)			
Goiter Symptoms	110	134	.025	4.5	1.3 to 7.7	.006*
Hyperthyroid Sxm♦	112	129	.067	9.5	0.7 to 18.4	.034*
Hypothyroid Sxm.♦	120	114	.478	.001	-0.3 to .3	1.0
Eye Symptoms	108	136	.001	3.1	-1.3to 7.5	.16
Cognitive Complaints	112	129	.031	.001	-0.59 to 5.9	1.0
Tiredness	110	131	.033	7.8	-0.8 to 16	.06
Depressive symptoms	116	120	.74	1.5	-5.8 to 8.8	.68
Anxiety	110	133	.013	9.9	-0.36 to 23	.15
Emotional Sxm♦	112	129	.083	7.8	-0.3 to 16	.06
Impaired Social Life	115	123	.33	0.01	-2.2 to 2.2	1.00
Cosmetic Complaints	116	123	.34	4.2	1.2 to 7.1	.006 *
Impaired Sexual life	116	120	.70	0.01	-17.7 to 17.7	1.0
Impaired Daily Life	112	129	.045	4.2	2.7 to 5.6	<.001*
Overall QOL	117	118	.89	10.6	-7.8 to 29	.26
Composite outcomes	110	134	.011	5.0	-0.2 to 10.2	.06

*...Statistically significant on quantile regression

Sxm♦..refers to symptoms

6. DISCUSSION

Treatment of hyperthyroidism with anti-thyroid drugs, radioiodine and thyroidectomy can restore euthyroid successfully, but may not restore QoL even after many years, maybe because hyperthyroidism induces permanent changes in cell functioning (41). As Hyperthyroidism is a widespread health concern that can greatly impact individuals' well-being, it is found to be necessary to give emphasis on thyroid related quality of life along rendering to be euthyroid. Over five months duration from September to January, 2024, about 992 patients visit endocrine subspecialty and surgical follow up clinic for Hyperthyroidism primarily. Among 234 cases enrolled in this study, majority were females around 198(84.6%) which is comparable with previous study in this institution that female accounted for 91.4% of cases(6) and study at Gondar university (71.2%) (28). The median age of participant was 40 years with interquartile range of 32 to 50 years and 51.3% of patients were age below 40 years. The age category is also comparable with other studies(6, 47)

Educational background of the participants shows that 64(27.4%) does not have formal education, 85 (36.3%) has below 12th grade and 85 (36.3%) completed 12 grade and above. This is important for awareness of disease and its impact on their quality of life. Among the participants majority, 158 (67.5%) does not have any comorbid illness. That could be due to predominantly young participants in this study. The association between age and comorbidity assessed using binary logistic regression and showed that as Age increases, the odds of having comorbidity increased by 4.05 (95% CI, 2.5-6.4, $P<0.001$).

Regarding the causes of Hyperthyroidism, TMNG is the most common cause with the prevalence of 159(67.9%) and Graves' Disease 59 (25.2%). This is almost similar in majority of iodine deficient areas (37, 38) (3, 4) (5, 6). Among the treatment received by the patients majority was on anti-thyroid drugs, 172 (73.5%) and thyroid surgery was done for 60 (25.6%) of patients. This may be explained that most patients required to have corrected thyroid function with anti-thyroid drugs before proceeding to surgery and Radioactive iodine is not available in our set up.

From study participant, around one third, 81(34.6%) has TSH level of below 0.4mU/l and 27(11.5%) have TSH level above 4.0mU/l. This may be due to that low comparably low numbers of participants with thyroidectomy but this is in contrary to three fourth of participants had been treated with ant-thyroid drugs for more than 12 months. In this study, both univariate and multivariate analysis shows that causes of hyperthyroidism do not have significant prediction for the TSH. This may be due to that majority of patients 98.4% Toxic nodular goiter had thyroidectomy in this study, See Figure 6. 1. But This finding is still concordant with martin et al, that compared TSH normalization among GD and TMNG, and At the first visit after ATDs administration, GD patients presented with lower TSH levels than patients with autonomous forms of hyperthyroidism ($p=0.017$), but up on next following visits TSH levels were not significantly different between the 2 groups (48) . According to Eyob et al The mean time to symptom resolution was 5.37 (± 6.59) months, but only Sixty-two (29.81%) patients achieved normalization of TSH and The mean time to normalization of TSH 13 (± 13.28). in the same study Univariate analysis identified that patients with TMNG had less chance of achieving normalization of TSH by 65.7% [Crude Hazard Ratio (CHR) (95% CI): 0.343 (0.141–0.836), $p = 0.019$] compared to patients with GD (33)

As mentioned above, the type of treatment given has a significant prediction in the model for TSH to be within 0.4-4.0mU/l with OR of 13.9(95% CI=4.5-42.4, $P<.0001$) and above 4.0 with OR of 52.4 (95% CI=12.5-218, $P<.0001$) than TSH less than 0.4mU/L. Duration of treatment has also a significant predictor of TSH above 0.4, which indicating that patients who was on treatment for long duration were more likely to have TSH above 4.0 than TSH less than 0.4mU/L. This finding is comparable with previous studies (28).

Patients were also asked about the management options they would recommend for their loved ones, if they had to choose or asked for advice and above half of patients 124(53%) suggested Anti-thyroid medications and 17(7.3%) recommended to use if there is other better options than surgery and ATD. How patients managed affects their perception about the options of management that the odds they would recommend similar treatment for their relative is OR=6.1, 95% CI=2.8-13.1, $P<.001$). That patient

who had Thyroidectomy, the Odds of recommending surgery over ATD increases by factor 6.1. The causes of Hyperthyroidism, Duration of treatment, Presence of comorbidity and Educational background has no significant prediction in the model for the patients choosing thyroidectomy over anti-thyroid drugs. But patients with higher educational level opts to recommend other better options if available than ATD with OR=2.0 (95% CI, 1.1- 3.6, P=.016). This may be that with increased Educational level, they are more concerned about their specific aspect of quality of life.

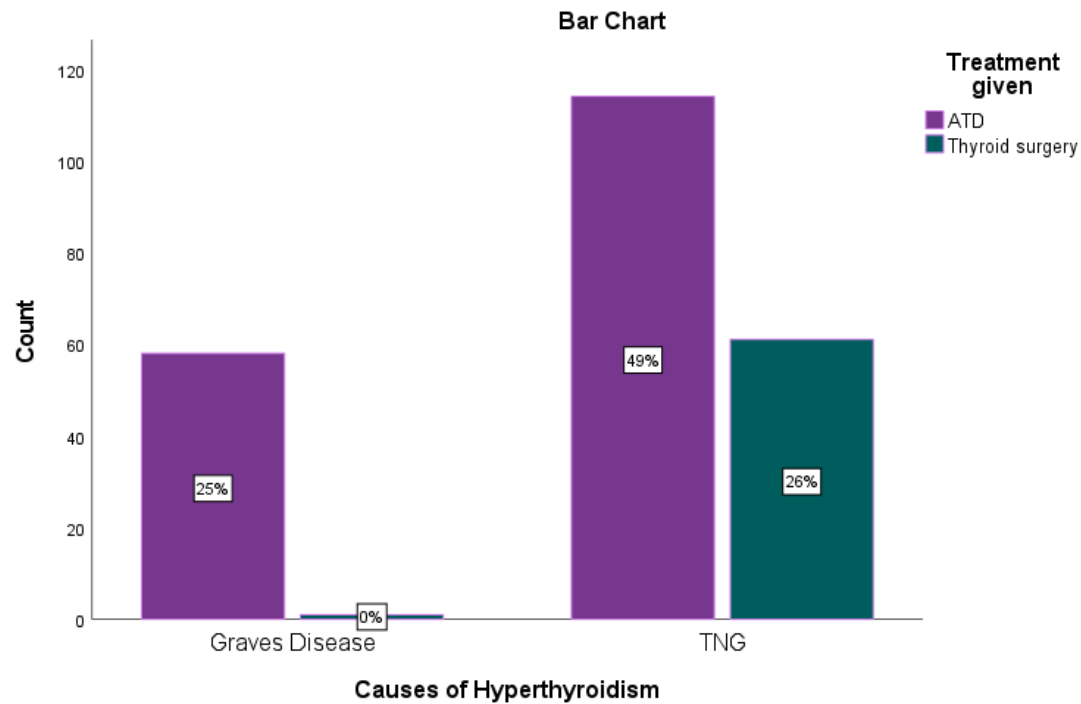


Figure 6. 1 Clustered bar graph for causes of hyperthyroidism and treatment given
Nearly no patients with underlying cause of Graves' disease undergo surgery in this study. 26%(61)of all causes treated with thyroid surgery.

ThyPRO scale scores were reported in mean scales and standard deviation for linear transformed values (0-100 scores) with highest value shows worst health related quality of life. Changes (difference) in Total scale scores of 4-10 points among groups were considered as clinically ([20](#), [44](#)). When mean scale score of patients in this study compared with results from an original Danish patient follow up value after 6 months of treatment; The Goiter symptoms, Hyperthyroid symptoms, Eye symptoms, Depressive symptoms, Impaired social life and impaired daily life scale have nearly similar mean score among the patients. Our patients have relatively less hypothyroid symptoms, Tiredness, Cognitive complaints, Emotional susceptibility and cosmetic complaints. But relatively more affected on scale scores on Anxiety and sexual life([12](#)). See Table 6. 1

As there is no previous study done on thyroid related quality of life found in our country, and the majority of demographic figures in study done at Copenhagen University Hospital, Denmark are comparable to results in this study. Even though there is a difference in socioeconomic and cultural backgrounds between patients living in Denmark and Ethiopia, studies robustly shown that ThyPRO questionnaire is well validated to pick thyroid disease related patient reported outcomes at different countries and across different cultures([14](#), [15](#), [16](#), [39](#), [40](#), [46](#)) . Patients with Graves' disease have worst health related quality of life than toxic nodular goiter. This is comparable with finding from a prospective case-control study conducted in Serbia ([31](#)).

Table 6. 1 Mean ThyPRO scale scores of Danish patients 6 months after treatment and participants in this study (higher scores with worse symptoms/problems)(20)

Demographic Backgrounds	Danish Patients(N=92)	This study (N=234)	Score difference
	Age median=53 (IQ 46-61) Sex=F-79%	Age Median=40years (IQ Sex=F (84.6%)	
	Comorbidities: No (60%) At least 1 comorbidity=39%	Comorbidity=No (67.5%)	
Scales	Mean (s)	Mean (s)	
Goiter Symptoms	17 (18)	14(14)	3
Hyperthyroid Symptoms	16 (17)	20(20)	-4
Hypothyroid Symptoms	20 (21)	7(13)	13
Eye Symptoms	12 (14)	11(17)	1
Cognitive Complaints	18 (22)	11(18)	7
Tiredness	43 (24)	33(21)	10
Depressive symptoms	29 (22)	26(17)	3
Anxiety	17 (18)	28(30)	-11
Emotional Susceptibility	31 (23)	25(19)	6
Impaired Social Life	7.4 (14)	10(17)	-2.6
Cosmetic Complaints	15 (19)	9(14)	6
Impaired Sexual life	17 (26)	25(30)	-8
Impaired Daily Life	11 (17)	10 (18)	1

N.B: score difference represents the subtraction of mean of study population from Danish population mean. If result shows above four, it refers to clinically significant one group than the other. If negative , it means its more common in study group and if positive more common in Danish population.

“s”...stands for standard deviation

HRQOL scale scores were tested for two treatment groups, Anti-thyroid drugs versus Thyroid surgery. According to the test hyperthyroid symptoms, Tiredness, depressive symptoms, impaired social life, impaired daily life, impaired sexual life and overall quality of life were significantly affected in patients who have been on Anti-thyroid drugs than those who had thyroidectomy. Hypothyroidism symptoms were worse for thyroidectomy than anti- thyroid drugs but not statistically significant. Total scale scores among two treatment groups, ATD has more score (worse outcome) than thyroid surgery. After adjusting for sex and comorbidities, the overall quality of life and composite scores were significantly affected in Anti-thyroid groups than patients who had thyroid surgery with P-value 0.005 and 0.023 respectively. This is in contrast to Torring et al that compared long term QOL in Graves ' disease patients after treated with ATD, RAI or surgery. It showed that in Patients treated with surgery had worse ThyPRO scores compared to patients treated with ATD on hypothyroid and eye symptoms as well as on appearance. The other scale items are comparable after adjusted for age and sex. (20). In Gabriel Sjölin et al that studied the long term outcome of TNG after treated with ATD or RAI or surgery and showed that Patients with TNG had a lower QoL than the general population, but failed to conclude regarding differences between treatments (32). The issue is that majority of patients in this group are old ages with mean age of 62 years and most are treated with RAI. This is opposite to demographic data in this study. Patients with comorbidity have higher risk of having Goiter symptoms, hyperthyroid symptoms, cosmetic complaints and impaired daily life with P-value of 0.006, 0.034, 0.006 and <0.001 respectively. This could be explained by the option of treatment they received. Patients with comorbidity are less likely to be treated with thyroid surgery (OR=0.4, P-value less than 0.001) than Anti-thyroid medication. Cosmetic complains and impaired daily life may be the combined effect of underlying comorbidity and hyperthyroidism.

6.1. Strength of the study

The main strength of this study is bringing Thyroid- related quality of health on to awareness of the clinician and patients which had limited emphasis in resource limited setups. The sample size used is also adequate for descriptive studies and most importantly patients enrolled randomly. The data was collected with self-administered questionnaires, which has more reliability than electronic and interview methods to pick sensitive patient reported outcomes.

6.2. Limitations of the study

Due to it is cross-sectional design, the baseline and follow up scale scores were not available to assess the responsiveness and effect size. Due to lack of population based health related quality of life parameters in our country, the scales were compared with population with different socio-economic and cultural backgrounds. For some inferential mentioned in the analysis, Bonferroni correction for statistical significance was not done, that unless used as exploratory objectives, it is not adequately powered to detect the differences.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Conclusions

Majority of patients with Toxic multi-nodular goiter had thyroid surgery than Graves' disease. Graves' disease patients have higher overall and composite scale scores than Toxic nodular goiter. Patients managed with Thyroid surgery has better thyroid related quality of life than patients who were on anti-thyroid drugs.

7.2. Recommendations

For Treating Physicians:

- Clinicians should understand that treating for hyperthyroidism should emphasize on thyroid related quality of life in addition to reversing or preserving thyroid function at physiologic range. As there is no magic rule for detecting specific quality of life aspect affected in every patient, all Patients should always be asked about their symptoms and managed accordingly.

For St. Paul Hospital Millennium Medical College:

- Quality of life in our setup requires robust research, both at patient and community level. As one of the leading institution in the country, we recommend SPHMMC to facilitate and invest on researches that focus on health related quality of life and that will improve patient reported outcomes.

For fellow researchers:

- Despite Quality of life and patient reported outcomes getting more emphasis globally, there is still a wide evidence gap in our setups. It is an opportunity and also responsibility for fellow researchers to dig deep on this overlooked areas to improve clinical care and patient outcome.
- Future prospective studies with large sample sizes will answer questions like validity of ThyPRO questionnaire (cross-cultural, structural and construct validity) and responsiveness in our set up.

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ANNEXES

ANNEX1: Information sheet

Research Title: Assessment of Health-Related Quality of Life Among Hyperthyroid Patients Treated with Anti-Thyroid Drugs and Definitive Management, Cross-Sectional Study

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Sponsor: St. Paul's Hospital Millennium Medical College

ANNEX2 : Questionnaire

This questionnaire is designed to assess Health-related quality of life in individuals with thyroid conditions. The responses you provide will be kept confidential and used only for research purposes. Please would you take a few moments to complete the questionnaires? If you have any comment, please talk to the respective data collectors. Thank you for your participation.

Data collector _____ Date _____ Signature _____

ID _____

I. BACKGROUND INFORMATION:

1. Sex A. Male ☐ B. Female ☐
2. Age (in years) -----
3. Educational level
 A. No formal education ☐ C. Diploma ☐
 B. Only writing & reading ☐ D. Degree & above ☐
4. Do you have any chronic illness other than Thyroid disorder?
 A. Yes
 B. No
5. If Yes, Mention.....
6. What is the cause of Hyperthyroidism
 A. Graves' Disease ☐ B. TMNG ☐
 C. Thyroiditis ☐ D. Toxic Nodule ☐ E. other (specify).....
7. Duration since Diagnosis (In Years)
8. The last Thyroid function test? TSH.....Free T4.....Total
 T3/FT3...../.....
9. Thyroid Treatment given
 A. ATDs ☐ C. Thyroid surgery ☐
 B. Radioactive iodine ☐ D. other (specify).....
10. Duration since the start of management (in Months)
11. If your family member develops Hyperthyroidism, which treatment option would you advice for them?
 A. ATDs ☐ C. Thyroid surgery ☐
 B. Radioactive iodine ☐ D. other (specify).....

II. Health-Related Quality of Life Questions:

- ❖ **N.B:** Please encircle the most appropriate number for each statement that corresponds most closely to your desired response. Encircle 0-for conditions you did not have at all, 1- a little, 2- some complaints, 3- Quite a bit, and 4- for complaints that worry you very much.

ITEMS		SCALES				
		Not at all	A little	Some	Quite a bit	Very much
Goiter symptoms						
Over the past 4 weeks have you had:	1. Sense of fullness in the neck?	0	1	2	3	4
	2. Visible swelling on your neck?	0	1	2	3	4
	3. Pressure in the throat?	0	1	2	3	4
	4. Pain in the front of your neck?	0	1	2	3	4
	5. Throat pain felt in your ears?	0	1	2	3	4
	6. Lump in the throat?	0	1	2	3	4
	7. Frequent throat clearing?	0	1	2	3	4
	8. Discomfort with swallowing?	0	1	2	3	4
	9. Difficulty swallowing?	0	1	2	3	4
	10. Sense of suffocating?	0	1	2	3	4
	11. Hoarseness?	0	1	2	3	4
Hyperthyroid Symptoms						
Over the past 4 weeks have you had:	1. Trembling hands?	0	1	2	3	4
	2. Increased sweating?	0	1	2	3	4
	3. Palpitations?	0	1	2	3	4
	4. Shortness of breath?	0	1	2	3	4
	5. Sensitive to heat?	0	1	2	3	4
	6. Increased appetite?	0	1	2	3	4
	7. Loose stools?	0	1	2	3	4
	8. Upset stomach?	0	1	2	3	4

Items

Scales

Hypothyroid Symptoms		Not at all	A little	Some	Quite a bit	Very much
Over the past 4 weeks have you had:	1. Sensitive to cold?	0	1	2	3	4
	2. Swollen hands or feet?	0	1	2	3	4
	3. Dry skin?	0	1	2	3	4
	4. Itching skin?	0	1	2	3	4
Eye symptoms						
Over the past 4 weeks have you had	1. Watery eyes?	0	1	2	3	4
	2. Bags under the eyes?	0	1	2	3	4
	3. Grittiness in eyes?	0	1	2	3	4
	4. Reduced sight?	0	1	2	3	4
	5. Pressure in eyes?	0	1	2	3	4
	6. Double vision?	0	1	2	3	4
	7. Pain in eyes?	0	1	2	3	4
	8. Sensitive to light?	0	1	2	3	4
Tiredness						
Over the past 4 weeks have you had	1. Been tired?	0	1	2	3	4
	2. Been exhausted?	0	1	2	3	4
	3. Difficult getting motivated?	0	1	2	3	4
	4. Felt worn out?	0	1	2	3	4
	5. Full of life?	0	1	2	3	4
	6. Energetic?	0	1	2	3	4
	7. Able to cope with life?	0	1	2	3	4

Items		Scales				
Cognitive Complaints		Not at all	A little	Some	Quite a bit	Very much
Over the past 4 weeks have you had:	1. Problems remembering?	0	1	2	3	4
	2. Slow or unclear thinking?	0	1	2	3	4
	3. Difficulty finding words?	0	1	2	3	4
	4. Been confused?	0	1	2	3	4

Anxiety	5. Difficulty learning?	0	1	2	3	4
	6. Difficulty concentrating?	0	1	2	3	4
	1. Nervousness?	0	1	2	3	4
	2. Afraid or anxious?	0	1	2	3	4
	3. Felt tension?	0	1	2	3	4
Over the past 4 weeks have you had:	4. Afraid of being seriously ill?	0	1	2	3	4
	5. Uneasy?	0	1	2	3	4
	6. Restless?	0	1	2	3	4
Depressive Symptoms						
Over the past 4 weeks have you had:	1. Sadness?	0	1	2	3	4
	2. Depressed?	0	1	2	3	4
	3. Discouraged?	0	1	2	3	4
	4. Crying easily?	0	1	2	3	4
	5. Unhappy?	0	1	2	3	4
	6. Happy?	0	1	2	3	4
	7. Self-confidence?	0	1	2	3	4

Items

		Scales				
		Not at all	A little	Some	Quite a bit	Very much
Emotional Susceptibility						
Over the past 4 weeks have you had:	1. Difficulty of coping?	0	1	2	3	4
	2. Not like yourself?	0	1	2	3	4
	3. Easily stressed?	0	1	2	3	4
	4. Mood swings?	0	1	2	3	4
	5. Irritability?	0	1	2	3	4
	6. Frustrated?	0	1	2	3	4
	7. Angry?	0	1	2	3	4
	8. Felt in control?	0	1	2	3	4
	9. Felt in balance?	0	1	2	3	4
Impaired Social Life						

Over the past 4 weeks have you had:	1. Difficult with people?	0	1	2	3	4
	2. A burden to people?	0	1	2	3	4
	3. Conflicts with people?	0	1	2	3	4
	4. Others lack understanding?	0	1	2	3	4

Cosmetic Concern

Over the past 4 weeks have you had:	1. Disease affecting appearance?	0	1	2	3	4
	2. Unsatisfied appearance?	0	1	2	3	4
	3. Camouflage visible signs?	0	1	2	3	4
	4. Other people's looking at you?	0	1	2	3	4
	5. An influence on clothes worn?	0	1	2	3	4
	6. Felt too fat?	0	1	2	3	4

Sex Life

Over the past 4 weeks have you had:	1. Negative influence on sex life?	0	1	2	3	4
	2. Decreased sexual desire?	0	1	2	3	4

Items

Scales

		Not at all	A little	Some	Quite a bit	Very much
Impaired Daily Life						
Over the past 4 weeks have you had:	1. Difficult to manage life?	0	1	2	3	4
	2. Limited leisure activities?	0	1	2	3	4
	3. Difficult to participate in life?	0	1	2	3	4
	4. Difficult of getting around?	0	1	2	3	4
	5. Everything taking longer?	0	1	2	3	4
	6. Difficulty of managing job?					

Overall quality of life	Not at all	A little	Some	Quite a bit	Very much
Does the thyroid disease have a negative effect on your overall quality of life?	0	1	2	3	4

Thank you for your cooperation!

(Questionnaire Amharic version)

መጠይቅ

ውድ የጥናቱ ተሳታፊዎች፣ የዚህ ጥናት አላማ በታይሮይድ ሆርሞን መብዛት ምክንያት ህክምና የሚከታተሉ ታካሚዎቻችን ላይ ከጤና ጋር የተያያዘ ሊከሰቱ የሚችሉ የህይወት ጥራት (Health-Related Quality of life) ሁኔታን ማጥናት ነው። በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ስለሆኑ እያመሰገንኩ ፤ ከዚህ ቀጥሎ ያለውን መጠይቅ በመሙላት ይተባበሩን። ከዚህ መጠይቅ የሚገኘው መረጃ ለመመረቂያ ፅሁፌ እንደግብዑት ሆኖ ያገለግላል፤ እንዲሁም ስለታካሚዎቻችንና ስለሚያገኙት ህክምና በጥልቀት እንድንረዳ ያግዛል ። ለመረጃዉ ደህንነት ሲባል ስምዎ የመረጃ ቁጥር ላይ አይጻፍም። ከርስዎ የሚናገረው መረጃ ምስኪራዊነቱ በተጠበቀ መልኩ እንደሚያዝ እናረጋግጥሎታለን።

ስለ ጥናቱ ማንኛውም አይነት ጥያቄ ወይም አስተያየት ካለዎት የጥናቱን ተመራማሪዎች ማናገር ይችላሉ፤ አሊያም በዚህ አድራሻ (Email: Tzedat12@gmail.com) በፅሁፍ መላክ ይችላሉ።

ቀን _____ ፊርማ _____ መለያ ቁጥር _____

I. ጠቅላላ መረጃ:

1. ፆታ _____ ሀ. ወንድ _____ ለ. ሴት _____
2. ዕድሜ (በ ዓመት) _____
3. የትምህርት ደረጃ _____
ሀ. መሰረታዊ ት/ት _____ ሐ. ዲፕሎማ _____
ለ. መፃፍ እና ማንበብ ብቻ _____ መ. ድግሪ እና ከዚያ በላይ _____
4. ከታይሮይድ ውጪ ሌላ በሀክም የተነገሮት በሽታ አለበት?
ሀ. አዎ _____ ለ. የለም _____
5. በተቁ 4 ላይ መልሶት አዎ ከሆነ ይዘርዝሩ.....
6. የታይሮይድ ሆርሞን መብዛት ዋና መንስኤው ምንድነው?
ሀ. ግሬቭስ በሽታ (Graves' disease) _____ ለ. ጎይተር (TMNG) _____
ሐ. የታይሮይድ እባጭ (Toxic Nodule) _____ መ. ሌላ ከሆነ (ይግለጹ).....
7. በሽታው ከታወቀ ምን ያህል ጊዜ ሆነ (በዓመት) _____
8. መጨረሻ ግዜ የተሰራው የታይሮይድ ሆርሞን መጠን: TSH....., FT4.....T3.....
9. ለታይሮይድ ህክምና ምን ተሰጠዎት?
ሀ. የታይሮይድ መቀነሻ ክኒን (ATDs) _____ ለ. የታይሮይድ ቀዶ ጥገና (Thyroidectomy) _____
ሐ. ጨረር አመንጪ የአዮድን ኒጥረነገር (RAI) _____ መ. ሌላ ከሆነ (ይግለጹ) _____
10. ህክምናውን ከጀመሩ ምን ያህል ጊዜ ሆነ.....
11. ከቤተሰብ የታይሮይድ ታካሚ ብኖር የትኛውን የህክምና አማራጭ እንድከተል ይመከሩታል
ሀ. የታይሮይድ መቀነሻ ክኒን (ATDs) _____ ለ. የታይሮይድ ቀዶ ጥገና (Thyroidectomy) _____
ሐ. ጨረር አመንጪ የአዮድን ኒጥረ ነገር (RAI) _____ መ. ሌላ ከሆነ (ይግለጹ) _____

II. ከጤና ጋር ተያያዥነት ያላቸው የህይወት መስተጋብር ጥያቄዎች፡-

- ❖ ማስታወሻ፡- እባክዎትን በጥያቄ ላይ ተመስርተው በትክክል ይገልፀዋል ባሉት መልስ ስር ያለውን ቁጥር ያክብቡ፡፡
በሚያክብቡበት ወቅት 0ን ሲያክብቡ በፍጹም የለብኝም ለማለት፤ 1ን ሲያክብቡ በጥቅቱ፤ 2ን ሲያክብቡ የተወሰነ አለብኝ፤
3ን ሲያክብቡ በመጠኑ አለብኝ እና 4ን ሲያክብቡ በጣም እንደሚያስጨንቁዎት ለመግለጽ ይጠቀሙ፡፡

ዝርዝሮች		መለኪያዎች				
የጎይተር ምልክቶች		በፍጹም የለብኝም	በጥቅቱ አለብኝ	የተወሰነ አለብኝ	በመጠኑ አለብኝ	በጣም በብዛት አለብኝ
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. በአንገትዎ አካባቢ ሞላ ያለ ስሜት?	0	1	2	3	4
	2. በአንገትዎ አካባቢ የሚታይ እብጠት?	0	1	2	3	4
	3. ጉሮሮዎ አካባቢ ግፊት ይሰማዎታል?	0	1	2	3	4
	4. በአንገትዎ ከፊት አካባቢ የህመም ስሜት?	0	1	2	3	4
	5. ህመም ከጉሮሮ ተነስቶ ጆሮዎን ይሰማዎታል?	0	1	2	3	4
	6. የፊት አንገት አካባቢ እባጭ አለብዎት?	0	1	2	3	4
	7. በተከታታይ ጉሮሮዎትን ይበላዎታል?	0	1	2	3	4
	8. ምግብ ሲጫጩ ሚችት ይነሳዎታል?	0	1	2	3	4
	9. መዋጥ ያስቸግሮታል?	0	1	2	3	4
	10. የመታፈን (ትንፋሽ የማጠር) ስሜት?	0	1	2	3	4
	11. የድምጽ መቀየር (መጎርጎን) አለቦት?	0	1	2	3	4
የታይሮይድ እጢ(ሀይፐርታይሮይድ) የመጨመር ምልክቶች						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. የእጅ መንቀጥቀጥ?	0	1	2	3	4
	2. የላብ መጨመር?	0	1	2	3	4
	3. ልብዎት ሲመታ ይታወቅዎታል?	0	1	2	3	4
	4. የትንፋሽ እጥረት ያጋጥምዎታል?	0	1	2	3	4
	5. ሙቀትን የመጥላት?	0	1	2	3	4
	6. የምግብ ፍላጎት መጨመር?	0	1	2	3	4
	7. ተቅማጥ?	0	1	2	3	4
	8. የሆድ ቁርጠት?	0	1	2	3	4
የታይሮይድ እጢ(ሀይፖታይሮይድ) የመቀነስ ምልክቶች						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. ቅዝቃዜን መጥላት?	0	1	2	3	4
	2. የእጅ ወይም የእግር እብጠት?	0	1	2	3	4
	3. የቆዳ መድረቅ?	0	1	2	3	4
	4. የሰውነት ማሳከክ?	0	1	2	3	4
የአይን ምልክቶች						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. የአይን እንባ ማቅረር?	0	1	2	3	4
	2. አይን አካባቢ እብጠት?	0	1	2	3	4
	3. አይን ውስጥ የመቆርቆር ስሜት?	0	1	2	3	4
	4. የእይታ አቅም መቀነስ?	0	1	2	3	4
	5. አይን ላይ ግፊት መኖር?	0	1	2	3	4

	6. መንታ እይታ ያስቸግሮታል?	0	1	2	3	4
	7. አይን ላይ የህመም ስሜት?	0	1	2	3	4
	8. ብርሃን መጥላት ስሜት?	0	1	2	3	4
የድካም ምልክቶች						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረባቸው?	1. ይደክሞታል?	0	1	2	3	4
	2. ይዝላሉ?	0	1	2	3	4
	3. መነቃቃት አይችሉም?	0	1	2	3	4
	4. በጣም ድክምክም ይላሉ?	0	1	2	3	4
	5. ህይወት የተሟላለት ሰው ነዎት?	0	1	2	3	4
	6. ማንኛውንም ነገር ለመስራት የተነሳሱ ነዎት?	0	1	2	3	4
	7. የህይወትን ውጣ ውረድ ለመቋቋም ያለዎት አቅም?	0	1	2	3	4
ከዕውቀት/ ግንዛቤ ጋር የተያያዙ ምልክቶች						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረባቸው?	1. የማስታወስ ችግር?	0	1	2	3	4
	2. ዘገምተኝነት ወይም በግልጽ አለማሰብ?	0	1	2	3	4
	3. ቃላትን የመምረጥ ችግር?	0	1	2	3	4
	4. ግራ የመጋባት ሁኔታ?	0	1	2	3	4
	5. የመማር ችግር?	0	1	2	3	4
	6. በአንድ ነገር ላይ ትኩረት ያለማድረግ?	0	1	2	3	4
የጭንቀት ምልክቶች						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረባቸው?	1. ተናዳጅነት?	0	1	2	3	4
	2. መፍራት ወይም ድንጉጥነት?	0	1	2	3	4
	3. የውጥረት ስሜት?	0	1	2	3	4
	4. በጽኑ የመታመም ፍርሃት?	0	1	2	3	4
	5. ቀለል ያለማለት ስሜት?	0	1	2	3	4
	6. እረፍት ማጣት?	0	1	2	3	4
የድብርት ምልክቶች						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረባቸው?	1. የሀዘን ስሜት?	0	1	2	3	4
	2. የድብርት ስሜት?	0	1	2	3	4
	3. ብርታት ማጣት?	0	1	2	3	4
	4. በትንሽ ነገር ማልቀስ?	0	1	2	3	4
	5. ደስተኛ አለመሆን?	0	1	2	3	4
	6. ደስተኛ መሆን?	0	1	2	3	4
	7. በራስ የመተማመን ስሜት?	0	1	2	3	4
የስሜት ሁኔታ						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ	1. ነገሮችን ያለመቋቋም ችግር?	0	1	2	3	4
	2. እራስዎን አለመውደድ?	0	1	2	3	4

ነበረቦት?	3. በቀለሉ መጨነቅ?	0	1	2	3	4
	4. የስሜት መለዋወጥ	0	1	2	3	4
	5. መንጫነጭ?	0	1	2	3	4
	6. መጨነቅ?	0	1	2	3	4
	7. ተናዳጅ የመሆን?	0	1	2	3	4
	8. እራስህን መቆጣጠር መቻል	0	1	2	3	4
	9. ነገሮችን አመዛዝኖ የማየት?	0	1	2	3	4
የማህበራዊ ህይወት መዛባት						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. ከሰዎች ጋር መግባባት አለመቻል?	0	1	2	3	4
	2. ለሰዎች ሸክም መሆን?	0	1	2	3	4
	3. ከሰዎች ጋር ግጭት መፍጠር?	0	1	2	3	4
	4. ሌሎች ሰዎች ሊረዳዎት አለመቻል?	0	1	2	3	4
ስነአካላዊ ገፅታን በተመለከተ						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. በበሽታ የተጎዳ ገፅታ?	0	1	2	3	4
	2. ያልረኩበት መልክ/አካላዊ ገጽታ?	0	1	2	3	4
	3. የተቀየረ ፊት ገጽታ ማሳየት?	0	1	2	3	4
	4. ሌሎች ሰዎች እርስዎን የሚመለከቱ ይመስለዎታል?	0	1	2	3	4
	5. የሚለብሱትን ልብስ ለመምረጥ መቸገር?	0	1	2	3	4
	6. በጣም ወፍራም ሆነው መታየት?	0	1	2	3	4
የግብረሰጋ ግንኙነትን በተመለከተ						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. የግብረሰጋ ግንኙነት ላይ አሉታዊ ተጽእኖ መኖር?	0	1	2	3	4
	2. የግብረሰጋ ግንኙነት ፍላጎት መቀነስ?	0	1	2	3	4
በየቀኑ በሚያደርጉት የህይወት መስተጋብር ላይ ያለ ችግር						
ባለፉት 4 ሳምንታት ከሚከተሉት የትኞቹ ነበረቦት?	1. ህይወትን መምራት/ማስተዳደር አለመቻል?	0	1	2	3	4
	2. የሚያዝናና የትርፍ ሰዓት ስራ አለመኖር/መቀነስ?	0	1	2	3	4
	3. በህይወት እንቅስቃሴ ውስጥ ለመሳተፍ መቸገር?	0	1	2	3	4
	4. በዙሪያ ባሉ ነገሮች ላይ መሳተፍ አለመቻል?	0	1	2	3	4
	5. ሁሉም ነገር ረዘም ያለ ጊዜ የሚወስድበት ከሆነ?	0	1	2	3	4
	6. ስራን በአግባቡ የማከናወን ችግር	0	1	2	3	4
በአጠቃላይ ስለህይወት ያለዎት አመለካከት						
	የታይሮድ በሽታ መኖሩ በአጠቃላይ የህይወት ጥራት ላይ አሉታዊ ተጽእኖ አሳድሮታል?	0	1	2	3	4

እናመሰግናለን!

ANNEX3: Declaration

I the undersigned resident declare that this Thesis paper is my original work, to be submitted to department of Internal Medicine, at St. Paul Hospital Millennium Medical College in Partial fulfillment of requirements for Specialty Certificate in Internal Medicine.

I also declare that up to my knowledge, it has never been presented in this or any higher institution and all the resources and materials used in the thesis preparation have duly acknowledged.

Name of the Resident: Dr. Zerihun Teshale (MD, Internal Medicine Resident)

Signature: 

Date: February, 2024 G.C

Approval of Advisors:

Name of Clinical Advisor: Dr. Tiyouma Dugo (MD, Assistant Professor of Internal Medicine)

Signature: _____

Date: _____

Name of Public Health Advisor: Mr. Kinfu Haile (MPH)

Signature: _____

Date: _____