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ORIGINAL ARTICLE

Influence of thyroid hormones and effect of treatment choice on the quality of life of hyperthyroid patients.

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ABSTRACT… Objective: To evaluate the influence of thyroid hormones as well as the effect of treatment choice on the quality of life of patients visiting / admitted in tertiary healthcare centers in Karachi, Sindh Pakistan. **Study Design:** Cross-sectional study. **Setting:** Rafae Aam General Hospital Federal Area Karachi, Sindh, Pakistan. **Period:** March 2022 to June 2022. **Material & Methods:** Patient's data related to their socio-demographic and clinical details was collected by using a pre-tested written questionnaire. Brazilian version of 36-Item Short Form Health Survey questionnaire was completed by all the study participants. **Results:** Total 337 participants were included in the study. Mean age of the study participants was 34.03 ± 10.06. Majority of them were females while most of them belonged to the age group of 18-29 years. Most of our study participants were urban residents, married, having no any formal education and suffering from comorbidities. Based on clinical examination, 272 (80.7%) patients were found euthyroidism while 65 (19.3%) were hyperthyroid. Thus, hyperthyroid patients displayed a greater toll on the quality of life, particularly in areas of physical (59.62 vs. 82.81; $p<0.05$) as well as emotional (61.54 vs. 82.81; $p<0.05$) functioning. **Conclusion:** This study concludes that hyperthyroid patients have a significant quality of life impairment, particularly in the physical and emotional domains. Moreover, regardless of the findings of the serum thyroid hormone levels, quality of life of hyperthyroid patients is compromised.

Key words: Euthyroidism, Hyperthyroidism, Quality of Life.

INTRODUCTION

Thyroid related disorders are one of the most frequent chronic endocrine illnesses. The thyroid related chronic disorders significantly affects the patients' quality of life.[1] Studies have reported that the Health-related quality of life (HRQL) of patients with benign thyroid disorders and patients on treatment of such disorders are highly affected.[2] Globally, about 200 million people have been reported with thyroid related disorder whereas, 50 million of patients of such disorders are residing in America.[3]

Hyperthyroidism, as the name suggests, is an abnormal condition characterized by excessive circulatory amounts of T_3 and T_4 produced by the thyroid gland. Some of the notable signs and symptoms of this disorder are tachycardia, enlargement of the thyroid gland itself, intolerance of heat, loss of body weight, increased intestinal motility, agitation, etc.[2,4] Many factors are can be attributed to the development of this disorder such as genetic susceptibility, iodine intake, etc. Another characteristic of this disorder is the suppression of serum TSH levels due to the negative feedback by the thyroid hormones. However, regardless of its underlying cause, hyperthyroidism can lead to numerous serious complications including fibrillation, pulmonary embolism, stroke, etc.[5,6]

The significance of using HRQL components in the evaluation of thyroid patients is becoming better recognized. This is motivated by several features of thyroid disorders. To begin with, benign thyroid problems are rarely life threatening, therefore therapy focuses on improving patients' quality of life. Furthermore, the disorders are widespread

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and affect people of all ages. Furthermore, because many thyroid illnesses can be treated in a variety of methods (e.g., radioiodine, medicinal treatment, or surgery), precise information of the influence of each treatment modality on patients' HRQL is essential.[4,7,8]

Despite significant progress in developing clinical diagnostic and therapeutic standards for managing hyperthyroidism, the impact of these management standards on patient health and QOL is not addressed properly. Keeping this in view, present study was designed with objective to evaluate the influence of thyroid hormones as well as the effect of treatment choice on the quality of life of patients visiting / admitted in tertiary healthcare centers in Karachi, Sindh Pakistan.

MATERIAL & METHODS

A cross-sectional study was conducted at Rafae Aam General Hospital Federal Area based in Karachi Sindh Pakistan from March 2022 to June 2022. All patients belong to age 18 to 65 years, either gender, who were receiving treatment for thyroid disorder at the study site, previously received any radiation therapy or surgical management, patients with hypothyroidism after thyroid surgery and those gave consent of participation were included in the study. While patients age below 18 and over 65 with or without hyperthyroidism, pregnant women, patients with cognitive impairment, with any cardiac disease, severe hepatic and kidney disease, those who were unable to communicate due to any physical disability and those who didn't gave consent were excluded from the study.

Sample size was calculated using online calculator (epi info). Keeping confidence level at 95%, margin of error at 5% and prevalence of hyperthyroidism at 32.5%[3] a sample size of 337 calculated. While participants were selected through non-probability consecutive sampling technique.

Patient's data related to their socio-demographic and clinical details was collected by using a pre-tested written questionnaire. The patient's age, gender, residence, marital status, education, duration of hyperthyroidism, and the presence and type of comorbidity. While clinical details like patient's appearance, general physical examination findings, pulse, blood pressure, and all associated symptoms of hyperthyroidism like; tiredness, nervousness, voice changes, mood swings, blurry vision, tremors of extremities, weight changes, goiter etc. were collected. The last section of the questionnaire comprises of the information related to the influence of hyperthyroidism on patient's daily life. Information related to the level of thyroid hormones was collected from the patient. For evaluating the effect of thyroid hormones on quality of life of patients. While different levels of thyroid hormones were compared and based on that levels patients were divided into Hyperthyroidism and Euthyroidism groups.

To assess health-related quality of life, a Brazilian adaptation of the SF-36 questionnaire was used, the questionnaire comprised of different questions related to the physical functions, limitations caused by both physical and emotional issues, inquiry for pain, general health, vitality or energy level, social functioning, and generalized mental health of the participants.The responses of all questions recorded and were scored from 0 (worst) to 100 (best) (best).[9]

Data was entered and analyzed using SPSS version 23. The findings were expressed as frequencies and percentages and mean ± standard deviation. The student's t-test was used for comparing the mean of different groups. The significance level was set at $p<0.05$.

RESULTS:

The socio-demographic characteristics of total 337 study participants are mentioned in Table-I. Mean age of the study participants was 34.03 ± 10.06. The majority of them were females while most of them belonged to the age group of 18-29 years. Most of our study participants were urban residents, married, had no formal education, and suffering from comorbidities. (Table-I)

	n (%)
Age	
• 18-29	56 (16.6)
• 30-41	159 (47.2)
• 42-53	102 (30.2)
• 54-65	20 (6.0)
Sex	
• Male	87 (25.8)
• Female	250 (74.2)
Marital status	
• Unmarried	61 (18.0)
• Married	276 (82.0)
Education	
• No formal education	223 (66.0)
• Primary/ secondary	101 (30.0)
• Higher	13 (4.0)
Resident	
• Urban	291 (86.4)
• Rural	46 (13.6)
Co-morbidities	
• Present	197 (58.4)
• Absent	140 (41.5)

Table-I. Socio-demographic details of study participants (n=337)

Out of all participants suffering from co-morbidities, 67 (34.0%) were hypertensive, 53 (27.0%) having gastrointestinal problem, 31(15.7%) were diabetic, 20 (10.1%) were having arthritis while 26 (13.2%) were having other co-morbidities. Findings of clinical examination of patients are mentioned in Table-II. Based on clinical examination, 272 (80.7%) patients were found euthyroidism while 65 (19.3%) were hyperthyroid.

Clinical examination findings	
Menstrual Irregularities	41 (11.4%)
Weight changes	16 (4.4%)
Eye problems	11 (3.1%)
Change in body temperature	7 (1.9%)
Hair, nail and skin changes	24 (6.7%)
Change in Appetite	18 (5.0%)
Depression/Anxiety	88 (24.4%)
Swallowing difficulties	15 (4.2%)
Mood swing	22 (6.1%)
Altered sleeping habits	8 (2.2%)
Muscular weakness	33 (9.2%)
Difficulties in bowel movement	7 (1.9%)
Tremor	55 (15.3%)
Fatigue/Tiredness	102 (28.3%)
Excessive sweating	39 (10.8%)
Palpitation	33 (9.2%)

Table-II. Findings of clinical examination of patients

Descriptive analysis of clinical and laboratory findings of patients are summarized in in Table-III below.

	Mean ± SD
Mean age at the time of diagnosis (in years)	36.4 ± 10.5
Mean age at the time of evaluation (in years)	44.7 ± 10.8
Mean duration of thyroid disease (years)	8.2 ± 5.6
Body Mass Index (Kg/m^2)	26.7 ± 3.8
Mean time of Hyperthyroidism (months)	26.1 ± 18.5
Mean time of euthyroidism (months)	58.2 ± 57.1
Mean TSH level (mUI/L)	1.01 ± 1.05
Mean fT4 level (m/dL)	1.32 ± 1.51

Table-III. Mean diagnostic and laboratory findings of study participants (n=337)

The results of the 36-Item Short Form Health Survey (SF-36) and the Quality of Life Questionnaire at the evaluation are shown in Table-IV, which compares patients with hyperthyroidism and euthyroidism. Based on the findings, the hyperthyroidism group had a greater impairment in quality of life. There was a statistically significant difference ($p<0.05$) in physical role functioning and emotional role functioning components between Hyper and euthyroidism groups. (Table-IV)

DISCUSSION

Hyperthyroidism being an endocrinological condition known to affect a number of body organs and has serious clinical consequences. In the present study 80.7% patients were found having euthyroidism while 19.3% were hyperthyroid. Majority (74.2%) of sample were females compared to their counterparts. This finding is consistent with the widely acknowledged global epidemiology that thyroid disease is highly prevalent in women. In another Pakistani study conducted by Rehman S. et al., high proportions of female patients (>70%) reported to suffering from thyroid related disorders in their study.[3] These findings are also similar to the findings of present study.

One of the main objective of the study was to assess the level of thyroid hormone in addition to their impact on QoL of thyroid patient.

SF-36 Components	Hyperthyroidism	Euthyroidism	P-Value
	Mean ± SD		
Physical functioning	84.78 ± 22.10	91.86 ± 11.72	0.463
Social role Functioning	93.75 ± 11.86	92.83 ± 19.11	0.583
Role : Physical	59.62 ± 47.47	83.11 ± 35.87	0.006*
Role: Emotional Functioning	61.54 ± 47.79	82.81 ± 36.70	0.009*
Vitality	70.58 ± 27.14	73.20 ± 22.53	0.874
Bodily Pain	71.81 ± 30.51	69.76 ± 25.84	0.671
General Health Perception	67.01 ± 27.12	73.83 ± 24.22	0.168
Mental health	68.83 ± 24.74	74.16 ± 24.78	0.455
Physical component scale	49.22 ± 9.67	50.73 ± 6.84	0.587
Mental health component scale	48.80 ± 10.23	52.16 ± 12.10	0.251

Table-IV. Patients with hyperthyroidism and euthyroidism comparison using SF-36 and the Quality of Life Questionnaire
*** Statistically significant (P<0.05)**

Based on objective, the thyroid hormones level were also assessed among patients. TSH level was observed within the reference in 60.2% of our patients. This rate is in line with the Al Quran T. et al. while these findings are nearly twice as high as those from an Iraqi tertiary hospital, where the percentage of hypothyroidism patients with normal TSH levels was 32.2%.[7,10]

Majority of the patients in our study ranked fatigue as the worst of all the problematic clinical findings. Additionally, there were higher levels of anxiety and emotional reactivity. Our results are in line with and comparable to what has been seen in cross-sectional studies and prospective trials at endocrine clinics.[7,11,12] Among the patients in this study, goiter symptoms, poor social life, and eye symptoms were among the least evident clinical findings. Findings from other studies on these findings were found identical to the present study.[7,11,12]

In the present study, we validated that patients with hyperthyroidism and euthyroidism had a poor quality of life, particularly on the physical and emotional scales of the SF-36 form. Cognitive evaluation revealed no differences; however, better calculation, memory, and attention were linked to shorter disease duration. Our study is in line with the study by Conaglen H.M. et. al. which also mentioned in their literature that patients with overt hyperthyroidism had a poor quality of life.[5] This is likely because of the physical restrictions brought on by the disease's symptoms in conjunction with the psychiatric symptoms.

Siegmann EM. et al., reported that they demonstrated a remarkably increased rates of psychiatric indices, such as generalized anxiety disorder and mood instability, when compared it with the control (healthy) group.[13] Another study carried out by Cramon P. et al. reported analysis of data from their prospective study about the constant impairment in quality of life after long duration (of months or even years) of euthyroidism. Furthermore, he also noted that patients with hyperthyroidism had severe disease-specific and general impairments.[6]

Our study have some limitations, limited time and resource restrictions, this study was conducted in a single tertiary care setting, only patients of hyperthyroidism were included in the study. We can point to the small number of patients as well as lack of prospective evaluation of the study due to its study design. On the other hand, a strength of our study is that we used the blend methods for assessing both quality of life and mental functions by same physician on the same sitting.

CONCLUSION

Based on the findings of this study, we concluded that hyperthyroid patients had a significant quality of life impairment, particularly in the physical and emotional domains. Moreover, regardless of the findings of the serum thyroid hormone levels, quality of life of hyperthyroid patients is compromised. Therefore, we cannot solely rely

on TSH or/and Free T4 as a measure of the best treatment success since it does not reflect the patients' level of concern at the time.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Javeria Salman	Study design, Patient selection, data collection, experimental work.	
2	Ayesha Iqbal	Study design, questionnaire design, Literature search.	
3	Shakeel Ahmed	Data analysis, Suggestions, Data interpretation.	
4	Sadia Naveed Abbasi	Data collection, Drafting in literature search.	
5	Heena Jilani	Patient selection, experiments and patients follow-up data acquisition.	
6	M. Siddiq Siddiqui	Drafting discussion chapter, Data analysis, drafting the manuscript.	