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Original Article

Frequency of Subclinical Hyper and Hypothyroidism

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Abstract:
Introduction: Thyroid disorders are one of the commonest endocrine diseases. Subclinical thyroid dysfunction is a laboratory base diagnosis and patients may be asymptomatic. However, later on it can lead to some serious health problems. The purpose of this study is to assess the frequency of subclinical hypo and hyperthyroidism in a population of patients presenting to the private clinic.
Patients and Methods: This descriptive study was carried out in a private clinic in Peshawar between 2007 and 2012. The patients of all age groups, regardless of gender were selected by non-probability, random sampling technique. These patients presented with non-specific symptoms such as palpitation, constipation and generalized body aches. The findings of history, clinical examination and lab investigation of thyroid function were recorded and analyzed in SPSS v19.
Results: Out of 4198 patients 3229(76.92%) were female and 969 (23.08%) were male. Both in male and female population, most of the patients belonged to middle age group i.e. 25 to 44 years. Among male patients 117 (12%) were hyperthyroid and 51 (5%) were hypothyroid. Sixty-nine patients (7%) were found in each category of Subclinical hyperthyroidism and hypothyroidism. Similarly, regarding female population, hyperthyroidism was detected in 505 (16%), hypothyroidism in 182 (6%), subclinical hyperthyroidism in 211 (7%) and subclinical hypothyroidism in 260 (8%) patients.
Conclusions: Subclinical thyroid dysfunction is detected in substantial numbers in all the age groups. These patients should be monitored for complications of thyroid diseases, and patients with nonspecific symptoms and known risk factors should be evaluated for subclinical hypo or hyperthyroidism.
Key words: Subclinical thyroid dysfunction, Hypothyroidism, Hyperthyroidism, Euthyroid, Thyroid-stimulating hormone

Introduction

Subclinical hypothyroidism (S-Hypo) and subclinical hyperthyroidism (S-Hyper) are the earliest phases of thyroid dysfunction.[1] Sub-clinical hypothyroidism is defined as an elevation in serum thyroid stimulating hormone (TSH) above upper limit of the reference range (>4.5 - <10.0mIU/L) with normal serum free T_3 and T_4 concentration. Whereas sub-clinical hyperthyroidism is defined as a decrease in serum TSH below the reference range (>0.2 - <0.45 mIU/L) with normal serum free T_3 andT_4 concentration.[2]A Japanese study reported occurrence of subclinical hypothyroidism ranging between 4 to 8.5% of the population which might increase to about 20% in women over 60 years of age.[3]The reported prevalence of subclinical hyperthyroidism and hypothyroidism in Pakistan is 5.8% and 4.1% respectively.[4]

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There is significant clinical importance of subclinical thyroid dysfunctions. Increased palpitation and heat intolerance is usually linked with subclinical hyperthyroidism.[5] There is also increased risk of dementedness[6,7] and atrial fibrillation (AF) along with its consequences with this dysfunction.[8–11] Subclinical hyperthyroidism may be linked with altered bone metabolism especially in postmenopausal women and children[12–14].

As subclinical hypothyroidism is found to be associated with advancement to a number of different diseases, the 2002 consensus group's expert panel suggested preferable screening in high-risk groups. This group included persons with personal or family history of thyroid dysfunction, gross abnormality of thyroid gland, diabetes, or autoimmune disorder.[15]

Researchers of a 10-year, population-based cohort study noticed raised mortality rate in cases with cardiovascular disease having subclinical hyperthyroidism. Also, the patients with low levels of serum TSH have comparatively poor prognosis during follow up years.[16]

Early detection and treatment of subclinical thyroid dysfunction is very helpful in case of children and pregnant women.[17] However, routine screening by thyroid function tests for suspected or diagnosed cases is recommended.[18,19] The earliest test for screening of any thyroid disorder is TSH estimation.[20]The reported sensitivity and specificity of this test is 89-95% and 90-96% respectively.[21]

The purpose of this study is to assess frequency of subclinical hypo and subclinical hyperthyroidism in population of patients presenting to private clinic

Patients and Method

This study was carried out in a private clinic in Peshawar between 2007 and 2012. It was a descriptive study, which was conducted on both sexes, and in all age groups. Patients with non-specific symptoms like palpitation or constipation and generalized body aches were included. Already diagnosed cases with treatment for their thyroid dysfunction were excluded. Four thousand one hundred and ninety-eight patients were included using simple non-probability convenient random sampling technique. A detailed history was recorded about the presenting complaints, their duration and about the past illnesses. Thorough clinical examination was also performed.

Thyroid function tests (TFTs) were advised for which blood samples were collected at collection point of pathology lab of Peshawar Medical College using aseptic techniques. Tests on the samples was carried out on Cobos e 411 (Roche USA) using Electro=chemiluminescence assay (ECILA) method. The reference range used for TSH was 0.45 – 4.5 mIU/L. For diagnosing primary hyper- and hypothyroidism all components of TFTs were considered. The diagnosis of subclinical hypothyroidism was made when the TSH was more than 4.5 mIU/L but less than 10 mIU/L with normal free T_4 and T_3. For subclinical hyperthyroidism, TSH was more than 0.2 mIU/L but less than 0.45 mIU/L also with free T_4 and T_3within normal range.

The patients were categorized into following groups i.e. primary plus subclinical hyperthyroid, euthyroid and primary plus subclinical hypothyroid. The age stratification of the patients was based on WHO guidelines [31].

After recording data on specially designed Proforma, the results were obtained through analyses by using SPSS version 19.

The study was based on ethical principles for medical research involving human subjects; adopted by the 18th World Medical Association (WMA) General Assembly, Helsinki, Finland, June 1964, and amended by the 57th WMA General Assembly, Pilanesberg, South Africa, October 2006.

Results

Out of 4198 patients, 3229(76.92%) were female and 969 (23.08%) were male (Table 1). Most of the patients belong to middle age group i.e. 25 to 44 years, both in male and female population (Table 1 & 2). Among male patients 117 (12%) were hyperthyroid and 51 (5%) were hypothyroid. Sixty-nine patients (7%) were found in each category of subclinical hyperthyroidism and hypothyroidism (Table 01). Similarly, regarding female population, hyperthyroidism was found in 505 (16%), hypothyroidism in 182 (6%), subclinical hyperthyroidism in 211 (7%) and subclinical hypothyroidism in 260 (8%) patients. (Figure 1)

Figure-1: Subclinical thyroid dysfunction

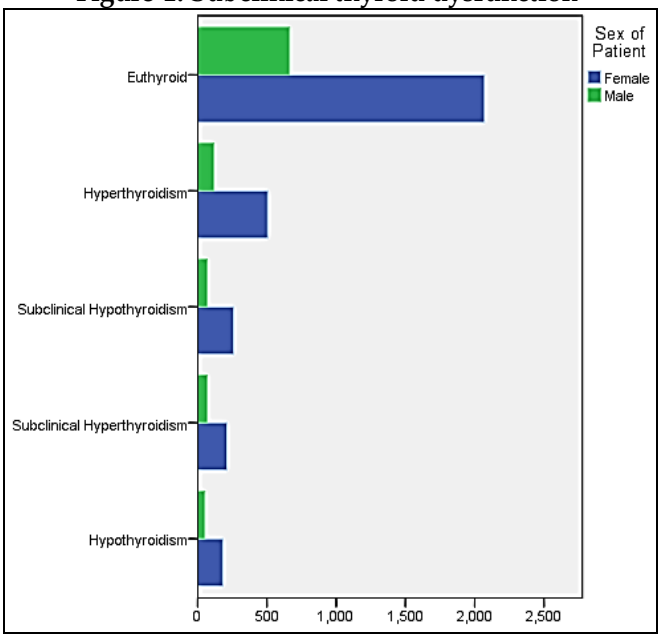

Table-1: Age wise distribution of thyroid dysfunction in Males

Age of Patient	Hypothyroidism		Subclinical Hypothyroidism		Euthyroid		Subclinical Hyperthyroidism		Hyperthyroidism	
≤ 14	2	(13%)	3	(19%)	11	(69%)	0	(0%)	0	(0%)
15 – 24	4	(5%)	8	(9%)	68	(78%)	2	(2%)	5	(6%)
25 – 44	17	(4%)	32	(7%)	310	(72%)	28	(6%)	46	(11%)
45 – 64	18	(6%)	18	(6%)	198	(65%)	27	(9%)	43	(14%)
65 ≥	10	(8%)	8	(6%)	76	(59%)	12	(9%)	23	(18%)
Total	**51**		**69**		**663**		**69**		**117**	

Table-2: Age wise distribution of thyroid dysfunction in Females

Age of Patient	Hypothyroidism		Subclinical Hypothyroidism		Euthyroid		Subclinical Hyperthyroidism		Hyperthyroidism	
≤ 14	3	(20%)	3	(20%)	7	(47%)	1	(7%)	1	(7%)
15 - 24	4	(1%)	26	(9%)	221	(79%)	12	(4%)	17	(6%)
25 - 44	98	(6%)	130	(8%)	1085	(66%)	103	(6%)	226	(14%)
45 - 64	73	(7%)	87	(8%)	659	(59%)	78	(7%)	215	(19%)
65 ≥	4	(2%)	14	(8%)	99	(55%)	17	(9%)	46	(26%)
Total	**182**		**260**		**2071**		**211**		**505**	

Table-3: Gender wise frequency of subclinical hypothyroidism

Gender	Subclinical Hypothyroidism	Other Cases
Female	260 (79%)	2969 (76.7%)
Male	69 (21%)	900 (23.3%)

Table-4: Gender wise frequency of subclinical hyperthyroidism

Gender	Subclinical Hyperthyroidism	Other Cases
Female	211 (75.4%)	3018 (77%)
Male	69 (24.6%)	900 (23%)

Discussion

The purpose of this study was to assess frequency of subclinical hypo and subclinical hyperthyroidism in population of patients belonging to Khyber Pakhtunkhwa province.

In our study 69 (7%) had subclinical hyperthyroidism and hypothyroidism each in male population. In female population 211 (7%) had subclinical hyperthyroidism and 260 (8%) had subclinical hypothyroidism. Interestingly, the percentage of subclinical thyroid dysfunction cases is almost the same irrespective of gender differences. These results are comparable with international studies in which they have shown the prevalence to be 1-15 % in general population and up to 15% in women over 60 years of age.[22-24]

Thyroid dysfunction was detected in 5 cases (0.1%) in males and 8 cases (0.2%) females in the age group less than 14 years. In 15-24 years age group 19 (.5 %) males and 59(1.4%) females were found to have thyroid dysfunction. Majority of cases with thyroid dysfunction were found to be in 25-44 age group in which123(2.9%) were males and 557(13.3% were females. In 45-64 age group, these figures were 106 (2.5%) males and 453(10.8%) females. In the patients more than 65 years of age, 53 (1.3%) males and 81(1.9%) females had thyroid dysfunction. (Table 01-02)

Thyroid dysfunction is one of the most common endocrine disorder which is associated with harmful impact on health therefore early diagnosis is necessary. In most of the patients with Subclinical Hypo and Subclinical Hyperthyroidism, there are minor or no clinical findings, therefore, lab investigations are used for diagnosis.[25]

The risk of sub-clinical thyroid dysfunction increases with advancing age.[26] Sub-clinical hypothyroidism is detected more commonly than hyperthyroidism.[2]In our study in males patients, subclinical

hypothyroidism and subclinical hyperthyroidism was detected in equal numbers of 69 each (1.4%). (Table 01) However in females 260 (6.2%) cases of S Hypo were detected as compared to 211(5%) cases of S Hyper (Table 02)

The consensus guidelines recommend that patients with serum TSH levels ranging between 0.10 and 0.45 mIU/ ml should be confirmed in a repeat test.[27]If findings are still the same, then serum free T_4 and T_3 levels should be determined in couple of weeks for patients with heart diseases. In case of otherwise healthy individuals, if the patient's serum TSH level remains within above mentioned range at follow-up, an iodine thyroid scan is recommended for exclusion of endogenous cause. i.e., thyroiditis or nodular goiter.[21] Repeated serum TSH measurements at regular interval are suggested for otherwise normal individuals.[15]

A higher incidence of diastolic hypertension and dyslipidemia is reported in females with subclinical hypothyroidism.[28]This finding was also found to be more prominent in older age group regardless of their gender.[29-30]

Recommendations

Majority of the general practitioners do not consider thyroid function evaluation in their practice without any recognizable sign and symptoms of thyroid dysfunction.

Patients with non-specific symptoms should be evaluated for subclinical hypo and hyperthyroidism.

Not all patients with subclinical hypo and hyperthyroidism need treatment but need close follow up because the subclinical states may progress to clinical disease and may cause harm to patients not properly evaluated with marked morbidity.

Patients with subclinical hypo and hyperthyroidism may present with complications of thyroid dysfunction so these conditions should be kept in mind.

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C. Analysis/Interpretation/Discussion
D. Manuscript Writing
E. Critical Review
F. Facilitated for Reagents/Material/Analysis