SPECTRUM OF THYROID DYSFUNCTION IN NORTH COASTAL ANDHRA PRADESH

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ABSTRACT

BACKGROUND

The pathological spectrum of thyroid dysfunction varies from overactive to underactive thyroidism. It is a common Endocrine disorder worldwide and leads to major consequences in the absence of appropriate treatment.

MATERIALS AND METHODS

This is a hospital based retrospective study based on medical records from the period of January 2013 to December 2015. Thyroid hormones were evaluated by RIA for T3 & T4 and IRMA for TSH, kits supplied by BRIT, Mumbai.

RESULTS

2322 study subjects comprised of males 403 and 1919 females. Thyroid dysfunction categorized was as hypothyroidism, subclinical hypothyroidism, hyperthyroidism and Subclinical hyperthyroidism as per reference values for thyroid hormones. Prevalence of thyroid dysfunction was 43.7% in females and females were more affected than males. Hypothyroidism 15.80% and Subclinical hypothyroidism 21.40% were higher than hyperthyroidism 3.91% and subclinical hyperthyroidism 2.58% subjects aged 30-45 years had a higher prevalence. Euthyroid subjects constituted 56.28%.

CONCLUSION

Study revealed high prevalence of abnormal thyroid function. Females and elderly are more susceptible. Since untreated thyroid disease leads to significant morbidity, public awareness in the context of primary care setting will be valuable.

KEYWORDS

Hypothyroidism, Hyperthyroidism, Subclinical dysfunction.

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BACKGROUND

300 million people worldwide are affected by thyroid disorders.[1] Thyroid burden in India is estimated at 42 million.[2] Thyroid gland produces thyroxine (T4) and tri-iodothyronine, the two key hormones that regulate growth, metabolism, and development. These are under the control of anterior pituitary hormone thyrotropin (thyroid stimulating hormone TSH) which stimulates production of thyroid hormone. Thyroid hormone synthesis requires iodine a crucial mineral derived from sea food or iodized salt in the diet. The spectrum of thyroid function ranges from overactive hyper thyroidism to underactive hypothyroidism prevalence and pattern depends on age, sex, ethnic, geographical factors including iodine intake.[3] While abnormal function is more common in adults[4] the disorders are 8 times more common in women.[5]

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Present study aims to assess the prevalence of abnormal thyroid dysfunction and analyse the pattern in referral patient population of coastal Andhra Pradesh, presenting at the tertiary referral hospital in Visakhapatnam.

Objectives

To study the prevalence and pattern of thyroid dysfunction and identify the most common forms in patients attending King George Hospital, Visakhapatnam.

MATERIALS AND METHODS

Retrospective study was conducted on patient data obtained from the thyroid laboratory, department of Nuclear medicine, King George Hospital at 1200 beds tertiary teaching hospital. Medical records of patients were from January 2013 to December 2015 and included out- patient and in- patient data. Those with incomplete Thyroid function test results were excluded. Patients with previous history of thyroid disease which were confirmed by fine needle aspiration cytology and histopathology following surgery, radio ablation, treatment with L-thyroxine and pregnancy were not included.

TSH, T3 and T4 assays were assayed by Radio Immunoassay (RIA) & Immuno Radiometric assay (IRMA) using standard kits supplied by BRIT, Mumbai under standard laboratory conditions on automated Genesis RIA analyser which works on the principles of RIA.

The Reference Ranges for Variables were-
T3 -0.70 to 2.00 ng/ml, **T4**- 5.00 to 13.00 µg%,
TSH-0.25 to 4.30 µIU/ml.

Cut-off Values for Subclinical Cases were-
TSH - >4.3 to ≤10 µIU/ml for Subclinical hypothyroidism.
and <0.15 to 0.30 µIU/ml for subclinical hyperthyroidism.

Abnormal function was stratified as-
Hypothyroidism – decreased T4, T3; increased TSH,
Subclinical hypothyroidism – T4 T3 increased TSH.
Hyperthyroidism – increased T4, T3; decreased to suppressed TSH.
Sub clinical hyperthyroidism – normal T4, T3; decreased to suppressed TSH.

Statistical analysis of data was done by SSPS package and presented percentage, mean, standard error of mean. Chi square test, ANOVA test and Mann Whitney's test were applied. Data was considered significant at $P<0.05$.

RESULTS

2322 subjects were enrolled in this retrospective study for the period of Jan-Dec 2013-2015. 1919 were females and 403 were males. Classification of subjects was made as per their thyroid function status. Total hypo thyroidism included hypothyroid and sub-clinical hypothyroid and total hyperthyroidism constituted hyperthyroidism and subclinical hyperthyroidism. (Figure 1) presents data of prevalence in the study population. 43.7% subjects had thyroid dysfunction among these 864 were total hypothyroid and 151 were total hyperthyroid (Table-1) with male to female ratio of 1:4.7. (Figure 2) illustrates the gender distribution in thyroid dysfunction. In euthyroid subjects 1052 were females and 255 were males. The percentage of female subjects with abnormal thyroid function was greater than males. (Table-2) delineates the prevalence of abnormal thyroid function in different age groups. Highest number of subjects was noted in 15-45 years group. Total hypothyroidism in a higher percentage was observed in 15-45 years and subclinical hyperthyroidism, total hypothyroidism were prevalent but to a lesser extent in ages below 15 years. Table-3 displays data of comparison between males and female euthyroid hormone levels of minor differences in T3 &TSH levels as evaluated by Mann Whitney test were not statistically significant. (Table-4) represents comparison between the various groups of abnormal thyroid function hormone profile. ANOVA test applied showed significant difference in S.TSH and T4 in various groups.

DISCUSSION

In the present study thyroid dysfunction higher in females compared to males is consistent with various studies reported, 82.64% females and 17.35% males, male to female ratio 1:4.7 similar to 5:1 ratio in Oqbera A O et al[6] in south western region of Nigeria, Sidbe et al[7] in sub Saharan Africa mention 94.2% of female affected, Mahato R V et al[8], reported 83.27% females and 16.73% males, Karachi study[9] consisted of 85.5% females and 11.5% males and in Rosemary Iken et al[10] study 85.9% were female and 14.1% were male.

As depicted in (Table 1), the highest number of cases reported in 31-45 years (20.9%) followed by 16-30 years (17.74%) are consistent with Pradip kumar et al[11] who reported a high ratio of thyroid disorders in 36-45 years age group. The most common type of thyroid disorder observed was total hypothyroidism including SCH 21.40% in which males were 12.9% and females 87.5% followed by overt hypothyroidism 15.80% with 81.74% affected females and 18.2% males. These prevalence rates a consistent with several studies[12,13] Hypothyroidism is usually autoimmune in origin and is generally associated with iodine deficiency reported in endemic areas like Nepal[14] and thyroablative therapy. It tends to increase with age[15] and is more common in women who are at risk of developing hypertension in pregnancy, increased risk of miscarriage, impaired mental performance in children born to untreated women.[16] By contrast hyperthyroidism is much less common. Graves' disease is most common cause and affects younger adults while toxic multinodular goiter affects older adults.[17] Present study observed a prevalence of 6.46% including 3.9% hyperthyroidism and 2.58% subclinical hyperthyroidism similar to Aryal et al study.[18] Both hypothyroidism and subclinical hypothyroidism are known to be associated with serious consequences such as IHD,[19] anxiety and depression disorders,[20] proper guidelines are required for screening and management as utility of universal screening for hypothyroidism is non-uniform.

ATA recommends screening to begin at 35 yrs. age there after every 5 yrs,[21] AACE[22] recommends measurement in women trying to conceive or in 1st trimester, USPSTF[23] (United States preventive services task force) concluded that there is insufficient evidence to recommend universal screening.

CONCLUSION

High prevalence of hypothyroidism was observed in the present study, particularly in women across all age groups, and was the most common manifestation in the spectrum of thyroid dysfunction. Hypothyroidism can be insidious, associated with other conditions, hence should be screened in this setting and in whole population above 65yrs. as most cases are diagnosed and managed within primary care setting.

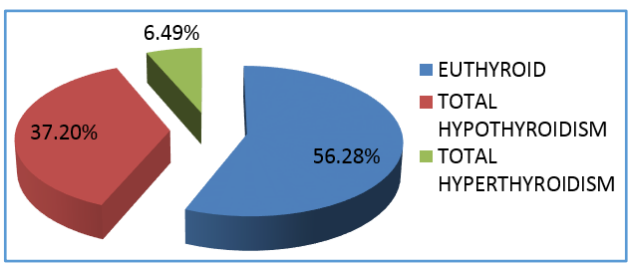

Figure 1. Prevalence of Thyroid Dysfunction in the Study Population

	n	Male		Female		Male:Female
		n	%	n	%	
Euthyroid	1307	255	19.5	1052	80.48	1: 4.1
Hypothyroid	367	67	18.25	300	81.74	1: 4.4
Sub clinical hypothyroid	497	62	12.40	435	87.50	1: 7
Hyper thyroid	91	12	13.18	79	86.81	1: 6
Sub clinical hyper thyroid	60	7	11.66	53	88.33	1: 7.5
Total	**2322**	**403**	**-**	**1919**		**-**

Table 1. Male Female Ratio in the Study Group

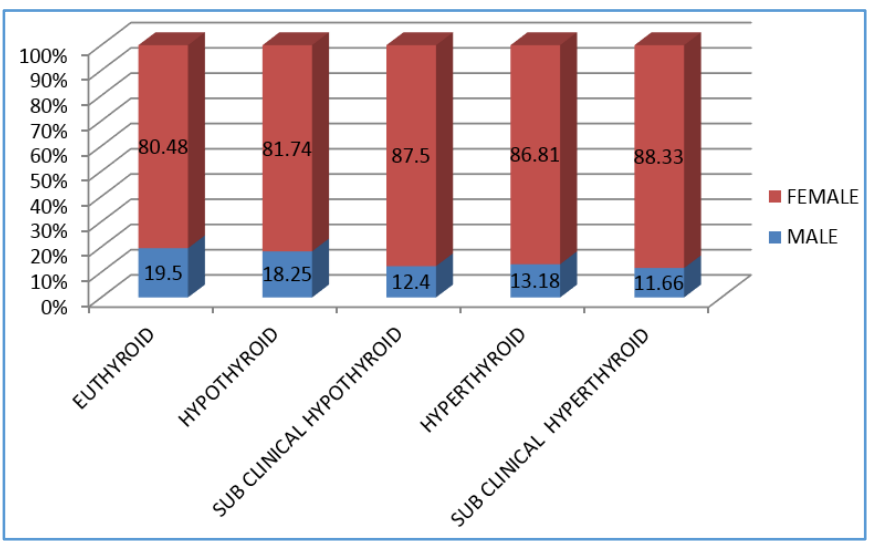

Figure 2. Gender Distribution in the Study Group

< 15		16-30		31-45		45-60		>60		TOTAL	
n	%	n	%	n	%	n	%	n	%	n	%
101	4.34	412	17.74	487	20.97	246	10.59	61	2.62	1307	56.28
16	0.68	117	5.03	151	6.50	74	3.18	9	0.38	367	15.80
10	0.43	147	6.33	215	9.25	98	4.22	27	1.16	497	21.40
2	0.08	29	1.25	40	1.72	17	0.73	3	0.12	91	3.91
4	0.77	18	0.77	20	0.86	16	0.68	2	0.08	60	2.58
133		723		913		451		102		2322	

Table 2. Prevalence of Abnormal Thyroid Functions in Different Age Groups

Thyroid Hormones	Euthyroid		Sub Clinical Hypothyroid	
	Male	Female	Male	Female
T3	1.16 ± 0.05	0.85 ± 0.29	0.88 ± 0.22	1.13 ± 0.05
T4	9.33 ± 0.25	9.86 ± 0.08	8.53 ± 0.33	9.56 ± 0.21
TSH	1.48 ± 0.38	2.26 ± 0.02	6.36 ± 0.07	6.3 ± 0.07

Table 3. Comparison between Male and Female, Euthyroid and Sub Clinical Hypothyroid Hormone Levels

Thyroid Hormones	Euthyroid	Hypothyroid	Sub Clinical Hypothyroid	Hyper Thyroid	Sub Clinical Hyper Thyroid	Patient Values <0.005
T3	1.23 ± 0.06	1.07 ± 0.02	1.18 ± 0.03	2.34 ± 0.22	1.36 ± 0.16	<0.001
T4	9.9 ± 0.13	6.36 ± 0.20	9.66 ± 0.43	18.4 ± 0.48	10.48 ± 0.41	0.002
TSH	2.28 ± 0.25	2.35 ± 0.74	6.33 ± 0.04	0.14 ± 0.06	0.15 ± 0.002	<0.001

Table 4. Thyroid Hormone Profile in Various Forms of Thyroid Dysfunction

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