

STUDIES ON HUMAN "THYROID DISORDERS": BASED UPON TSH ASSAY IN UJJAIN DISTRICT (M.P) INDIA

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Abstract: Thyroid disorder is one of the most serious health problems due to iodine deficiency in the world, especially in the developing countries. Adults are mostly affected by thyroid disorder. Both male and female thyroid patients were studied from Nov. 2009 to May 2013, from R.D. Gardi medical college, CHL Apollo hospital, and J.K. Nursing Home. Among the selected patients 69.33% were female and 30.66% were male. The present study include following aspects- Social status of people, Nutritional status and feeding habit, Climatic condition, Genetic defects etc.

Keywords: Hypothyroidism, Hyperthyroidism, Triiodothyronine (T₃), Thyroxine (T₄) and Thyroid Stimulating hormone (Thyrotropin-TSH).Goiter, Cretinism, Myxoedema etc.

Introduction: Anatomist Thomas Watson in year 1656 gave the first complete description of the thyroid gland and its diseases. The thyroid gland produces hormones that are essential for normal body metabolic activities. Blood testing is now commonly available to determine the adequacy of the levels of thyroid hormones. When thyroid become overactive and pump out too much hormone called hyperthyroidism and it produce too little hormone called hypothyroidism. Interpretation of the TSH level depends upon the level of thyroid hormone; therefore, the TSH is usually used in combination with other thyroid tests such as the T₄ and T₃. The ranges of TSH in mU/L are: - normal= 0.4, at risk= 2.5, mild hypothyroidism= 4.0, hypothyroidism= 10.0 [1].

Significance Of Iodine: Thyroid disorder occurs due to Iodine deficiency. Thyroid gland use iodine for biosynthesis of thyroid hormones [2]. Iodine rich diet includes:- Sea weeds, Brassica vegetables- cabbage, cauliflower, fish oil, fast food- Poha, chocolates, banana, milk, eggs, etc and other vitamin-E rich compounds which stimulate Iodine absorption such as Soya bin oil, Alfa-Alfa, Groundnut and oil, germinating seeds etc [3]. The daily requirement of iodine depends on the individual metabolic rate the usual intake of iodine in average rate in male is about 1 mg. and for female is about 100 mg.

Types of thyroid disorders:

Hypothyroidism (HPO):

Hypothyroidism is a condition in which the body lacks sufficient thyroid hormone, symptoms associated with a slow metabolism. Hypothyroidism is associated with an increased risk for cardiovascular disease [4].

Symptoms are: Fatigue, Weakness, Weight gain, coarse dry hair, Dry rough pale skin, Hair loss, Cold intolerance, Muscle aches, Constipation, Irritability, Memory loss, Abnormal menstrual cycles.

Abnormalities related to Hypothyroidism:

- 1. Goitre:** - Any enlargement of the Thyroid Gland is called Goitre and antithyroid substance that causes Thyroid enlargement are called Goitrogens. (Fig. 1)
- 2. Cretinism:-** It is caused due to congenital absence or mal development of Thyroid in Infant symptoms are short status with deformed teeth and bones. Abnormal viscera are relatively large resembling pot and belly appearance.
- 3. Myxoedema:** Hypothyroidism in adult Human being produces Myxoedema or Gulls disease. it shows following symptoms-the face becomes swollen, BMR lowered by 30-45%. Mental dullness and loss of memory. Hair tends to fall. Appetite is reduced etc Fig.-3.
- 4. Hashimoto's disease:** Hashimoto's disease is an Autoimmune disease in which the thyroid gland is gradually destroyed by a variety of cell and antibody mediated immune processes. It was the first described by the Japanese specialist Dr. Hashimoto Hakaru in Germany in 1912.

Hyperthyroidism (HPR): Hyperthyroidism is a caused by too much thyroid hormone. Hyperthyroidism conditions are (a) Toxic goitre (b) Thyroiditis (c) Grave's disease (d) Exophthalmic goitre. The symptoms are: - Sensitive to heat, Hyperactive eat excessively increase heart beat, large eye. (Fig-II)

Causes: Too much or too little Thyroid Hormone, Deficiency of Iodine in body, Abnormal Thyroid growth, Nodules or Lumps within the Thyroid gland, Thyroid cancer etc.

Material method: ELISA is a simple and highly sensitive method of analysis that allows for simultaneous and rapid quantification of a large no. of sample. "Enzyme Immune assay" for the quantitative determination of Thyroid hormone (T₃ and T₄) and pituitary hormone (TSH) concentration in human serum/plasma, is done by ELISA KIT. This

micro plate enzyme immunoassay methodology provides the technician with optimum sensitivity while requiring few technical manipulations [5].

Result & Discussion: Hypothyroidism is mainly reported and significantly more common in woman particularly those over age 50 Years. Woman developing Hypothyroidism is increased during pregnancy, after giving birth, and around the time of menopause. The commonest age group affected by Thyroid disorder is 21-60 years [6]. (Table I & II) All patients belong to Rural, Urban and Socio-economic Classes. In thyroid disorder hypothyroidism condition at risk & mild are mostly described in female-50.80% and male-59.20%. Thyroid disorder is a "Public Health Problem", occur due to iodine deficiency. Iodine is found in water and vegetable in trace amount. Severe Iodine Deficiency result in impaired thyroid hormone synthesis and thyroid enlargement leads to Goiter. Iodine deficiency disorders (IDDs) include Endemic goiter, Hypothyroidism, Cretinism, decreased fertility rate, increased infant mortality, mental retardation. To protect from thyroid deficiency iodized salt in micro quantity is needed daily. In present times 'TSH' test is very accurate and sensitive and can help to diagnose even the mildest cases of Hypothyroidism. Low concentration of the thyroid hormones T₃ and T₄, affect the following body activities: metabolic rates, energy production, brain activity, respiration, heart beats, nervous system functions, body temperature,

skin hydration, menstrual periods and blood cholesterol levels [7].

Bjoro T, *et al*, Hashimoto's Thyroiditis is the most common cause of Hypothyroidism and is detected with the help of Thyroid antibodies test: associated with a high level of Thyroid Antibodies in the blood. Thyroid stimulating hormone (TSH), Free Thyroxin (FT₄) and Free Triiodothyronine. (FT₃) were assayed in 505 women of Puducherry, India. 15.8% had thyroid Dysfunction and 84.2% were euthyroid. 11.5% were hypothyroid (9.5% sub-clinical) and 1.8% hyperthyroid (1.2%) [8]. In the present study TSH, FT₄, and FT₃ were assayed in 2438 thyroid patients in Ujjain (M.P.).

Statistical Analysis: Probabilities of significant differences in the mean of thyroid patients from different thyroid conditions were determined according "Student-t Test". Confidence limits were set at $P = >.001$ [9].

Thyroid disease in human being is growing fast in India and also in Ujjain (M.P.) for so many reasons found. There for, the present study provides important data, to the Govt. and other agencies so is to control this problem in future in India, and lunch some special programmes to prevent Thyroid disorder. These also help the Clinician to diagnose the mildest cases of thyroid disorders among Hospital patients, who presently affected by thyroid symptoms.



Fig.1 shows Goiter (Hypothyroidism)



Fig.2 Exophthalmic goiter (Hyperthyroidism)

Table-I Shows prevalence of female thyroid disorders in “Local Human Population” of both hospitals of Ujjain, based upon TSH and T₄ assay.

Age group	Thyroid conditions and number of Female patient of all hospitals.				Total	prevalence (%)of female thyroid disorder
	At risk TSH 2.5 mU/L	MildHPO TSH -4.0 mU/L	SevereHPO TSH -10.0 mU/L	HPR T ₄ Above 11.6 mg/dl		
0-10	83	71	09	02	165	2.42
11-20	234	183	18	05	440	6.46
21-30	551	415	91	11	1048	15.39
31-40	540	420	43	16	1019	14.96
41-50	620	517	43	50	1230	18.06
51-60	293	175	21	11	500	7.34
61-70	122	72	09	03	206	3.025
71-80	61	57	02	08	128	1.87
Total	2504	1910	216	106	4736	69.55

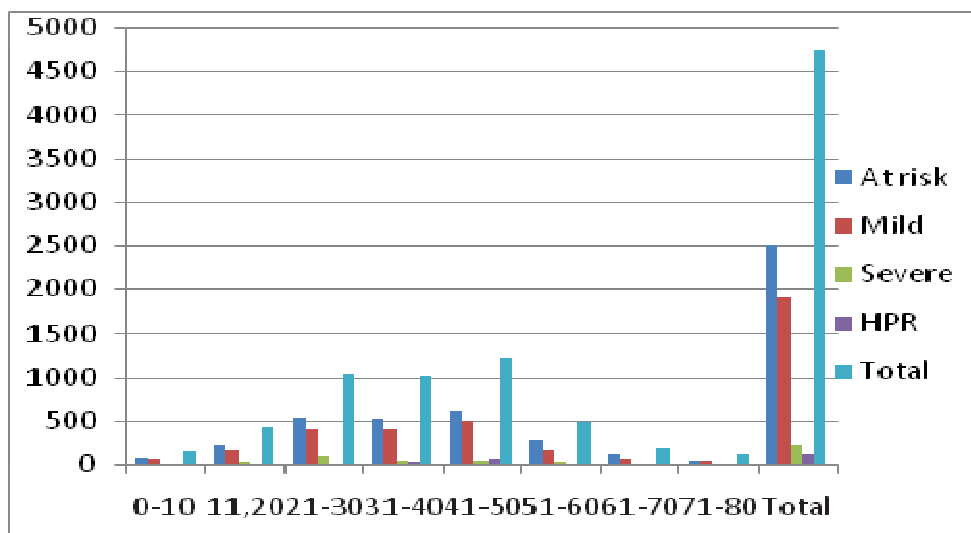
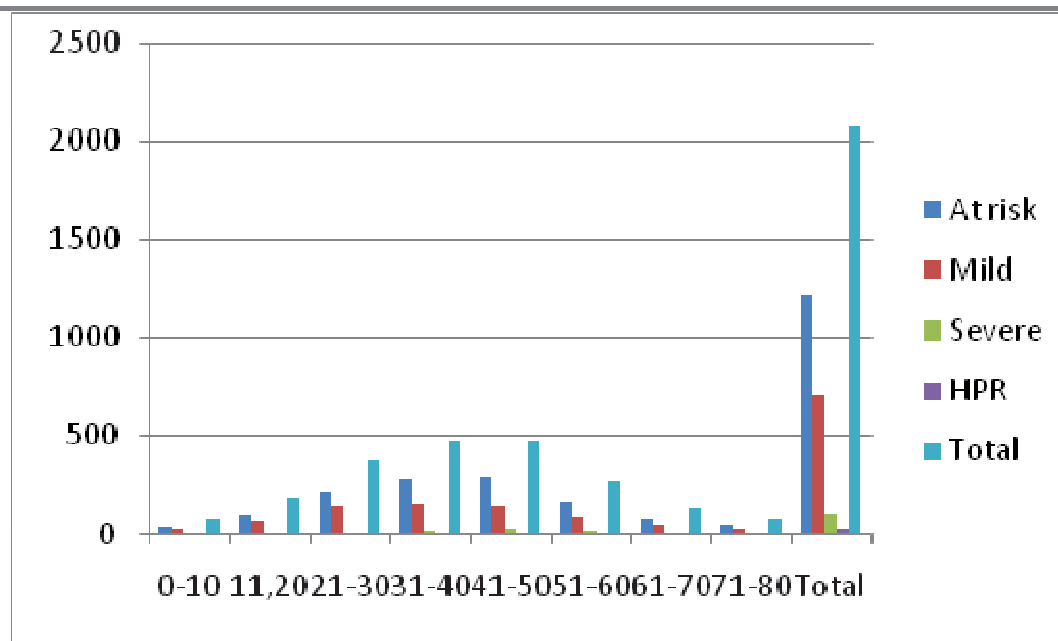


Table-II Shows prevalence of male thyroid disorders in “Local Human Population” of both hospitals of Ujjain, based upon TSH and T₄ assay.

Age group	Thyroid conditions and number of Male patients				Total	prevalence (%)of male thyroid disorder
	At risk TSH 2.5 mU/L	Mild HPO TSH-4.0 mU/L	Severe HPO TSH -10.0 mU/L	HPR Above T ₄ - 11.6 mg/dl		
0-10	39	33	04	01	77	1.13
11-20	99	75	12	02	188	2.76
21-30	217	142	13	01	373	5.47
31-40	283	154	25	12	477	7.00
41-50	292	143	31	08	474	6.96
51-60	160	91	19	03	273	4.00
61-70	78	49	05	00	132	1.93
71-80	51	29	01	01	82	1.20
Total	1219	716	110	28	2073	30.44



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