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Research Article

The Thyroid Status Among Patients of Nimra Hospitals in Jamshoro, Sindh, Pakistan

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ABSTRACT:

The tiny gland described as the thyroid which is located around the trachea on the side line of throat that depicts a butterfly appearance with smaller center and two wide wings which wrap over the side of your throat. When the body has too much thyroid hormone, it develops an overactive thyroid, sometimes referred to as hyperthyroidism, which is a rather common hormonal disorder. **Methods:** To collect demographic information a standard questionnaire was designed to gather data concerning on different variables which includes; name, gender, age, smoking and drinking practices, income, water source, drinking duration, and personal or family history of thyroid issues. **Results:** According to research studies at Nimra Hospital, in Jamshoro, roughly 45% of people had thyroid deficiencies and 60% had excess thyroid hormones, which can speed up the body's metabolism and cause a variety of symptoms. The thyroid hormones control numerous crucial bodily processes. Thyroid-related issues disrupt a variety of physiological processes of human body notably heart rate, mood, energy level, metabolism, bone health, and reproductive health. Because endocrine illnesses primarily present as hormonal imbalances, they could be difficult to spot at an autopsy, organomegaly or nodules are examples of anatomical observations that may point to an aberration that requires more investigation through microscopic analysis or laboratory testing. **Conclusion:** Thyroid problems can impact many different organ systems and appear in a variety of ways. An extensive overview of thyroid disorders, thyroid hormones, possible thyroid-related fatalities, and unintentional autopsy results are given in this article.

Keywords:
Thyroid status, Hyperthyroidisms, Hypothyroidism, Nimra Hospital, District Jamshoro, Sindh, Pakistan

1 | INTRODUCTION

Making and storing thyroid hormone is the role of the thyroid gland, its structures called thyroid follicles. Also known as follicular cells, thyrocytes are epithelial cells that surround the colloid in the center of the thyroid. Ultimo-branchial cells are special neural cells found together with the ultimo-branchial bodies. They are the beginning of the thyroid C-cells which release hormone calcitonin. [1] After being released by the hypothalamus, TRH helps pituitary gland thyrotrophs to produce TSH. Upon receiving (TSH) from the anterior pituitary, the thyroid gland produces and releases 20% (T3) and 80% (T4). The thyroid can only create hormones with all three ingredients: rayosine residues, TSH signaling and iodide. During deiodination, (T4) is converted into (T3) after it reaches the blood. If temperatures both T4 and T3 rise, the pituitary decreases TSH; if temperatures for T4 and T3 are low, the pituitary increases the TSH output. In this article, the structure, the way they function and how they operate are discussed. [2] When a condition is primary, the thyroid gland is the site of origin. The anterior pituitary will receive negative feedback if the thyroid gland secretes excessive amounts of T3/T4, which will reduce the release of TSH. The anterior pituitary will secrete more TSH if the thyroid gland is not receiving any negative feedback regarding its production of (T3/T4 hormones). The pituitary anterior is the site of origin for secondary illness, central hyperthyroidism, or hypothyroidism. The thyroid follicular cells will release significant amounts of (T3/T4 hormones) if an anterior pituitary tumor is secreting an excessive amount of TSH. Thyroid follicular

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cells are not stimulated if pan-hypopituitarism, in which the anterior pituitary secretes inadequate quantities of TSH [3]. Thyroid follicles, which make and store thyroid hormone, make up the thyroid gland. There are no longer any luminal connections between these follicles and other body parts. Their function as the main organ units that secrete thyroid hormone is what they do. A normal gland's epithelium is cuboidal. Thyroid parenchymal cells have a smooth acinar surface that is covered in some pseudopods and microscopic villi. In the follicular lumen, every cell possesses a cilium. The colloid's edge is scalloped by resorption vacuoles, which are eosinophilic in hyperactive follicles. Thyroid follicles are made up of the arranged thyroid epithelial cells. [4] Many organs have been shown to contain different types of thyroid hormone receptors. In most cases, the thyroid hormone receptor alpha (TRa) is found in the brain, heart and skeleton. It can be found in TRb1 on the thyroid, kidney and liver. Most of the TRb2 protein is found in the retina, cochlea and pituitary. [5]

Virtually every organ system in the body is impacted by the thyroid gland which influencing the heart's contractility, heart rate, cardiac output, and stroke volume, it has a direct effect on the cardiovascular system. The neurological system may be negatively affected by thyroid mechanism challenges, which emerge as burning, tingling, pain, or numbness in the afflicted areas. Patients with hypothyroidism might also suffer from depression. Furthermore, it influences the motility of the gastrointestinal tract. The cycle of reproduction would be subject to thyroid gland diseases, leaving women to experience infrequent menstrual cycles and troubles in conceiving. [6] (TSH) from the anterior pituitary helps thyroid follicular cells release thyroid (T3/T4 hormone). T4 is changed into T3 during deiodination. Thyroid glands produce about 20% of T3, but the majority (80%) is produced peripherally by deiodinase, particularly type 2. Proteins called thyroid binding globulin, pre-albumin, and albumin bind over 99 percent of thyroid hormone. After binding to its receptor in the nucleus, T3 initiates the synthesis of new proteins necessary for the gland's operation by promoting DNA transcription and mRNA translation. [7]

Among other things, the thyroid is important for normal growth of the brain and for the development of bones. An increase in the basal metabolic rate is caused by higher production of sodium (Na+)-potassium (K+)-ATPase, greater oxygen use and more heat generation. Higher glucose uptake, glycogen formation, making glucose from other molecules, using stored fats, making proteins and slip into catabolism all indicate your metabolism is speeding up. Increasing the beta-1 receptors on the myocardium, these hormones can raise heart rate, the amount of blood pumped from the heart, the amount of blood in each heartbeat and the strength of contraction. Therefore, the myocardium reacts more strongly to the sympathetic nervous system, leading to higher strength of contraction. [8] The thyroid gland is stimulated by TSH. TSH linking to the membrane receptor on epithelial cells results in cAMP levels going up, thanks to the activity of adenylate cyclase. After these hormones bind to cells, the thyroid gland makes thyroid hormone. [9] Bringing iodide into thyroid cells happens because of NIS associated with the basolateral membrane of thyrocytes. Natural activity of sodium allows iodide to move into the cell against both its gradient and down its gradient. Iodide has to move across the TG-enriched colloid at the apical surface and this process appears to be controlled by pendrin. Thyroid peroxidase attaches iodine to tyrosine found in TG and helps organize them inside the thyroid follicle. Errors in any part of thyroid hormone synthesis, transport or release may lead to congenital hypothyroidism or dyshormonogenetic goiter. [10]

2 | MATERIAL AND METHODS

A standard questionnaire has been established for recording statistical data, including name, gender, age, smoking and drinking habits, financial income, water source, duration of drinking, and history of thyroid illness in oneself or one's family. Participants' smoking habits were broken down into four categories: non-smokers, (smokers who smoke one to three (1 to 3 cigarettes) a day), (those who smoke eleven to twenty cigarettes (11 to 20) a day) and (those who smoke more than twenty cigarettes (>20 cigarettes per day) day. Participants were split into three categories based on their pattern of alcohol consumption: never drink, light drink on occasion (less than once per week), and heavy drink (more than once per week). Trained personnel conducted the inquiry in a vernacular, face-to-face.

3 | RESULTS AND DISCUSSION

Adding 200 to 500 µg of iodine to the daily dietary intake does not seem to have a significant impact on thyroid function. We need clinical data on the effects of excess iodine during pregnancy. Thirteen Thyroid function is altered in accordance with the amount of iodine administered, as follows: [11] [12] Iodine uptake, metabolism, and coupling to amino acids are unaffected by relatively low doses. In this scenario, the total amount of intra-thyroidal iodine in the form of (T3 and T4) increases proportionate to the iodine dose that was provided.

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Lastly, a human study revealed the presence of auto-regulatory systems that maintain healthy thyroid function when long-term iodine treatment is administered [13] [14]. The amount of iodide that is consumed on a daily basis is thought to be higher than 200 mg. After the consumption of kelp products was restricted in the impacted areas, this goiter has now cleared up [17]. According to a Chinese study, drinking water high in iodine caused 10% of the participants from 19 Chinese counties to develop euthyroid goiter [18]. Smaller doses of iodine may have an impact on thyroid function in the general population. While low TSH levels (<0.4 mU/L) were the most common finding in 9.7% of subjects living in Jutland with low urinary iodine secretion (median, 38 mg/L; range: 6-770), serum TSH concentrations above (4 mU/L were found in 18% of subjects) in an elderly Icelandic population with elevated iodine exertion rates (33 to 703 mg/L; median, 150 mg/L). The prevalence of antithyroid antibodies did not differ between the two groups [19]. It remains debatable whether exposure to high doses of iodide can cause disturbed thyroid function in subjects who are otherwise perfectly normal, even in spite of the evidence presented by earlier research. Twenty healthy adults were administered 80 mg of Lugol's solution for two months, and no abnormal thyroid function tests were discovered. [20]

During the present studies the number of participants varies across the three iodine groups: which includes; Iodine Excess Group has 720 participants, The Iodine Sufficient Group is the most substantial group which has 320 participants, Participants in the Iodine Deficient Group number 467. Iodine. Iodine Excess Group consist 181 males and 539 females the gender distribution shows a higher proportion of females in this group compared to males, Iodine Sufficient Group consisted of 112 males and 218 females which are Again, more females than males, though the proportion is more balanced than in the iodine excess group. Iodine Deficient Group consisted of 157 males and 310 females which is Similar to the other two groups, more females than males despite this, there are a few more men than in the group that gets adequate iodine. According to the Gender proportion across all groups, females make up the majority, but the exact ratio varies slightly across the groups. Which includes; Groups with excess iodine, sufficient iodine, and deficient iodine: According to the age (Mean ± SD): of Iodine Excess Group: (Mean age: 55.46 ± 12.11 years). This group has the youngest average age among the three groups. Iodine Sufficient Group: (Mean age: 57.7 ± 12.11 years). This group has the highest average age. Iodine Deficient Group: (Mean age: 51.71 ± 15.10 years).

The group lacking iodine is the youngest on average, compared to the iodine sufficient group. Age group Distribution reflects different ages viz: (30 and Below 30), (31-50 Years), (51 and Above). The age ranges between (30 and Below 30) it includes; Iodine Excess Group: 171 participants are aged 30 or below. This is the largest number in this category, Sufficient Iodine Group: (81 participants are aged 30 or below), (Deficient Iodine Group: 146 participants are aged 30 or below), The Iodine Excess group has the highest number of participants under 30, followed by the Iodine Deficient group, with the Iodine Sufficient group having the fewest. The age ranges between (31-50 Years) it includes; Iodine Excess Group: 332 participants are in this age range, making it the most populated group in this age category, Iodine Sufficient Group: 154 participants fall in this age group, Iodine Deficient Group: 114 participants are in this age range, The Iodine Excess group has the largest number of participants aged 31-50, followed by the Iodine adequate group, and then the Iodine inadequate group. The age ranges between (51 and above) it includes; Iodine Excess Group: 417 participants are aged 51 and above, which is the largest number in this category. Iodine Sufficient Group: 105 participants are aged 51 and above, Iodine Deficient Group: 100 participants are aged 51 and above. The Iodine Excess group has the highest proportion of older participants (51+ years), making up more than half of the participants in this group. The Iodine Sufficient and Iodine Deficient groups have similar numbers of older participants, but these are much fewer in comparison.

Table 1: Showing the hypo-iodine and hyper-iodine group age- wise among patients of Nimra hospitals in Jamshoro, Sindh, Pakistan

Characteristic	Iodine adequate Group	Iodine adequate Group	Iodine inadequate Group
Number of Participants	720	320	467
Male (♂)	181	112	157
Female (♀)	539	218	310
(Mean ± SD) (age-wise)	55.46 ± 12.11	57.7 ± 12.11	51.71 ± 15.10
Age Groups			
- 30 and below	171	81	146
- 31-50	332	154	114
- 51 and above	417	105	100

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Photograph1: Showing demographic history of thyroid patient at Nimra Hospital District Jamshoro, Sindh, Pakistan

Photograph 2: Showing newly diagnosed patient of thyroid at Nimra hospital, Jamshoro, Sindh, Pakistan

4 | CONCLUSION

The regulation of thyroid homeostasis has significant adaptability to varying iodine intakes. The severe circumstances in which a normal thyroid Iodine excess and shortage put function under strain. This article outlined the harmful effects of an overabundance of iodine. Both hyperthyroidism and hypothyroidism may be generated in these circumstances in people who seem to have normal thyroid function or with thyroid conditions, as well as in groups during or following the iodine elimination campaigns insufficiency. Additionally, a higher than recommended dietary iodine intake raises the ratio of Folic to Papillary thyroid cancer.

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