

## Magnitude of thyroid disorders: Global epidemic and Bangladesh perspective

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The thyroid gland is one of the important endocrine organs. It is a butterfly-shaped organ, situated in front of the neck in the lower part of the throat and consists of two connected lobes on either side of the trachea. The lower end of the lobes is connected by an isthmus, which is a thin band of connective tissue (Figure-1).<sup>1-3</sup> The thyroid gland is comparatively larger in women as compared to men and also increases in size during pregnancy as a physiological demand.<sup>2</sup>

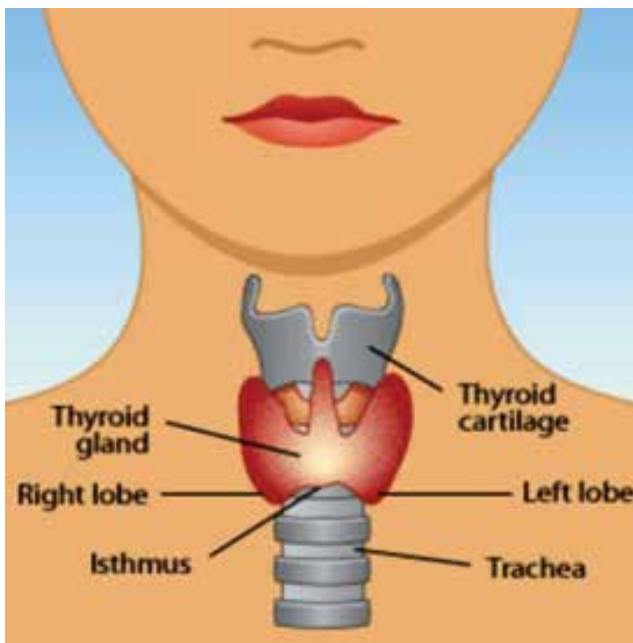


Figure-1: Location of thyroid gland

The thyroid gland produces three important hormones: triiodothyronine (T3), tetraiodothyronine (T4) also called thyroxine, and calcitonin. Iodine is the building block of thyroid hormones, T3 and T4. Dietary intake of this trace element iodine is vital for the synthesis of thyroid hormones. The function of the thyroid gland is under strict control of the hypothalamic-pituitary axis (figure-2).<sup>3</sup>

The effects of thyroid hormones on the body are diverse. It controls the metabolic activities of the body,

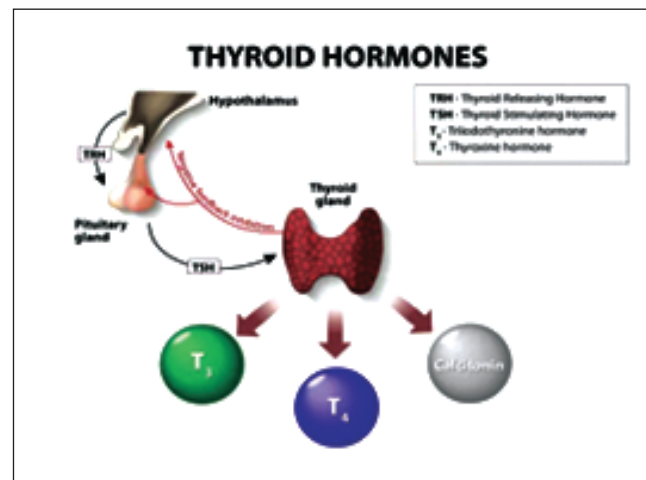
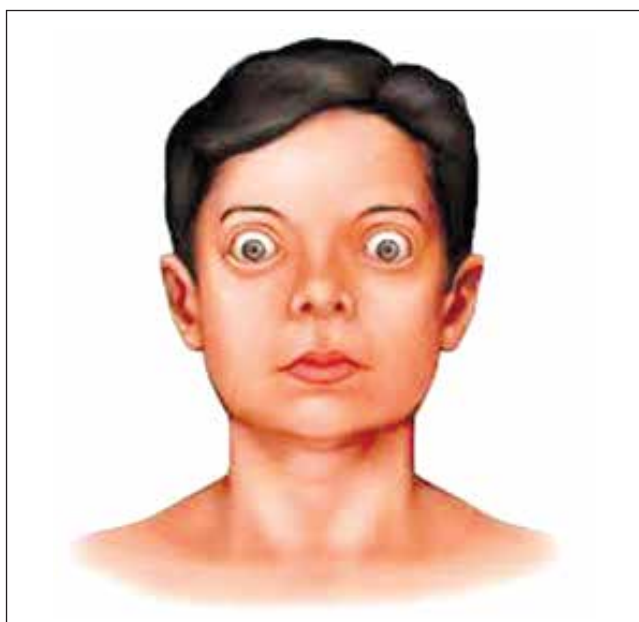


Figure-2: Regulation of thyroid hormone synthesis

promotes physical and mental growth in children, and stimulates the nervous system to control its activities. It affects the body temperature, circulation, appetite, energy level, growth and development, muscle tone, heart rate, blood sugar levels, central nervous system activities, bowel function, carbohydrate, protein, and fat metabolism.<sup>2,3</sup> The pleiotropic effect of thyroid hormones on several metabolic pathways is reflected by a diversity of clinical presentations that are commonly age and sex-related.<sup>4</sup>

The spectrum of thyroid dysfunction can extend from sub-clinical to overt disease that reflects a state of more severe thyroid derangement. Thyroid disorders are particularly common in women and have negative pregnancy consequences. A significant number of thyroid diseases, particularly subclinical remain undiagnosed.<sup>4-6</sup>

The disorders of thyroid hormones are also diverse and enormous like hypothyroidism, hyperthyroidism (Graves' disease) (figure-3), subclinical hypothyroidism, subclinical hyperthyroidism, thyroiditis, thyroid nodule (figure-4), iodine deficiency state, goiter (figure-5), thyroid malignancies, thyroid



**Figure-3:** Graves disease

disorders in pregnancy, cretinism (Figure-6), growth retardation, cognitive dysfunction in children.<sup>7,8</sup> The incidence of thyroid dysfunction is increasing worldwide and represents approximately 30-40% of the



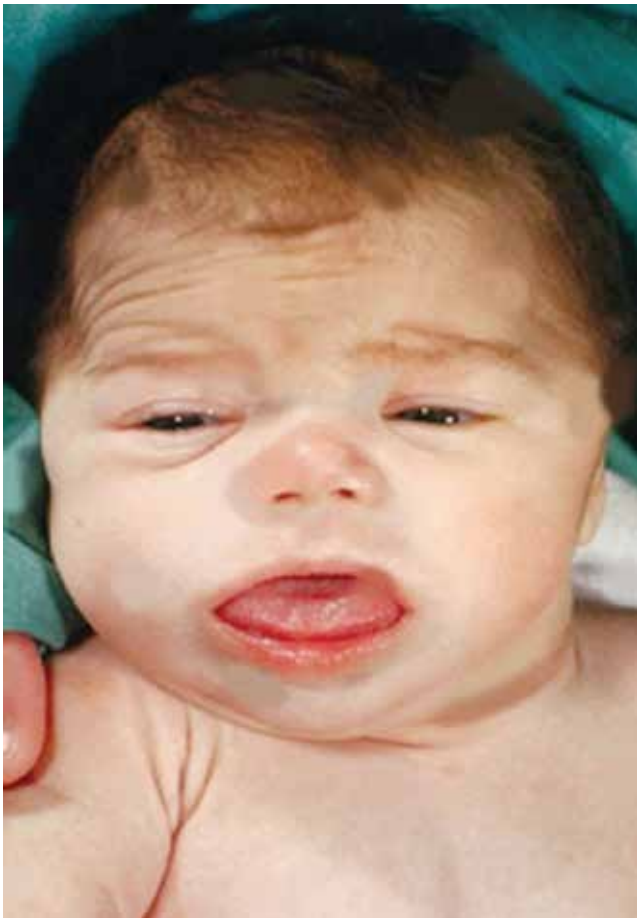
**Figure-4:** Thyroid nodule

Figure-4 Thyroid nodule patients seen in an endocrine clinic. It is one of the leading endocrine disorders.<sup>9</sup> Thyroid disorders and their treatment may have a great impact on long-term health outcomes. Thyrotoxicosis and sub-clinical hyperthyroidism are associated with a higher risk of cardiovascular disorders and osteoporosis<sup>10-12</sup>, while hypothyroidism is associated with dyslipidemia, atherosclerosis, and an increased risk of cardiovascular events.<sup>13-14</sup>



**Figure-5:** Large Goiter

Signs and symptoms of thyroid dysfunctions are often vague and non-specific and diagnosis is primarily based on bio-chemical confirmation. If it is overlooked or untreated, may have a substantial impact on general well-being and is associated with profound morbidity.<sup>4-6</sup> The most common causes of thyroid dysfunctions are iodine deficiency in the iodine-deficient population and thyroid auto-immunity in the iodine-replete population. Still, one-third of the world's population is living in iodine-deficient areas.<sup>15</sup> Until the iodine fortification program in Europe, goiter was a significant health problem. Increased iodine intake appears to cause an increase in the prevalence of hypothyroidism.<sup>16</sup> More than a billion people live in iodine-deficient areas with the most vulnerable areas being Southeast Asia, South America, and Central Africa.<sup>17</sup> Sufficient iodine intake has caused an increased prevalence of hypothyroidism in China in the last decade.<sup>18</sup> Another Chinese study showed an almost linear association between higher urinary iodine concentrations and an increased risk of Hashimoto's thyroiditis.<sup>19</sup> Several factors such as age, gender, ethnicity, and geographical location may affect the prevalence of thyroid dysfunction. The geographical location appears to be associated with dietary intake.<sup>20</sup> Over-substitution of levothyroxine in individuals with a thyroid disorder accounted for approximately half of both prevalent and incidental suppressed thyroid stimulating hormone (TSH) findings in a community-based cohort, especially among older women, which induces the risk of atrial fibrillation and



**Figure-6:** Cretinism

osteoporosis.<sup>21</sup> American Thyroid Association (ATA) reported that 20 million Americans have some form of thyroid disease and that more than 12% of the US population will develop a thyroid disorder during their lifetime.<sup>22</sup>

### Bangladesh

The prevalence of thyroid disorders in Bangladesh is high, but the exact prevalence is not known. About 20% of our general population may suffer from thyroid diseases. Unfortunately, about 50% of them do not know that they are suffering from thyroid diseases. Among the thyroid diseases, overt and subclinical hypothyroidism are the most common thyroid diseases in Bangladesh. One old study, conducted in Khulna district showed the prevalence of hypothyroidism as 4.97% and subclinical hypothyroidism as 6.59%.<sup>23</sup> In another study conducted in Dhaka district, showed 7.0% prevalence of hypothyroidism.<sup>24</sup>

Nowadays, autoimmune thyroid disease is a more common cause of goiter and hypothyroidism than iodine deficiency. In the study of Khulna, thyroid microsomal antibody (TMAB) was positive in 15.1% of

the participants and 29.3% in subclinical and overt hypothyroid patients.<sup>23</sup> The prevalence of autoimmune thyroid disease (AITD) was found in 48.4% of thyroid patients with positive TMAB and anti-thyroglobulin (TG) Ab in 6.4% and 12.8% respectively in healthy controls.<sup>25</sup> In one study, the prevalence of hyperthyroidism and subclinical hyperthyroidism were 1.01% and 1.7% respectively.<sup>26</sup>

The prevalence of goiter and iodine deficiency state in Bangladesh has been significantly reduced over the last decade due to the Universal Salt Iodization Program. But still, a significant number of people are iodine deficient. A survey conducted between 2011-2012 showed only 57.6% of households in Bangladesh used adequately iodized salt. This survey revealed 40% of school-age children and 42% of non-pregnant, non-lactating women suffered from iodine deficiency.<sup>27</sup> Thyroid cancer is the most common endocrine cancer representing about 92% of all endocrine malignancies. Incidences have been increasing over the last few decades in most countries.<sup>28</sup> Large-scale population-based data on thyroid malignancies in Bangladesh is lacking. One study showed a 4.5% prevalence of thyroid nodules and a 2% prevalence of thyroid malignancy in cadavers.<sup>29</sup>

Every year, the 25<sup>th</sup> of May is observed as World thyroid day since 2008, globally and also in Bangladesh to build up awareness among people about thyroid diseases. Different Institutions and medical colleges in Bangladesh observe this day as a part of thyroid disease awareness. Association of Clinical Endocrinologist and Diabetologist of Bangladesh (ACEDB) since its inception, is observing this day all over the country along with its members with due importance organizing seminars, symposiums, press releases, rallies, scientific talks on radio, television, etc. Through the active initiative of ACEDB, posts have been created in fourteen Government medical colleges to extend the endocrine service to the doorstep of our common people. Endocrinologists are rendering their services to patients all over the country through government and non-government institutions. The creation of adequate working facilities for young endocrinologists is vital for the proper diagnosis and treatment of thyroid disorders to achieve long-term healthy outcomes of thyroid diseases in our society. Government and non-government authorities should come forward with due priority to develop this sector.

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