# Graves' Disease: Current Knowledge and Management

**Irum Ghaffar[1], Kingsley Erhons ENERIJIOFI[2], Muhammad Akram[1], Momina Iftikhar[1], Surendar Rangasamy[3], Francisco Garcia-Sierra[4], Md. Al Hasibuzzaman[5], Fethi Ahmet Ozdemir[6], Gaweł Sołowski[6], Najmiatul Fitria[7], Marcos Altable[8], Adonis Sfera[9],**

[1]Department of Eastern Medicine, Government College University Faisalabad-Pakistan
[2]Department of Biological Sciences, Glorious Vision University, Ogwa, Edo State, Nigeria
[3]Department of Community Medicine, Sri Venkateshwaraa Medical College Hospital & Research Centre (SVMCH&RC) Puducherry, India
[4]Department of Cell Biology, Center of Research and Advanced Studies of the National Polytechnical Institute, Mexico City, Mexico.
[5]Department of Nutrition and Food Science, University of Dhaka, Dhaka 1000, Bangladesh
[6]Department of Molecular Biology and Genetics, Faculty of Science and Art, Bingol University, Bingol, 1200, Türkiye
[7]Department of Pharmacology and Clinical Pharmacy, Universitas Andalas, Indonesia
[8]Department of Neurology, Neuroceuta, (Virgen de Africa Clinic), Spain
[9]Department of Psychiatry, Patton State Hospital, USA
*Corresponding author email: **makram_0451@hotmail.com**

**Abstract:** This review was conducted to examine the causes, diagnoses, clinical manifestations, and available treatments for Graves' disease. Keywords like "Graves' disease," "radioactive iodine," "etiology," and "treatment" were used to search for data pertaining to Textbooks on endocrinology and other papers from these sources were also located. The introduction, etiology, risk factors, symptoms, diagnosis, course of treatment, and the contribution of many factors to the beginning of Graves' disease are all covered in this review article.

**Key words:** Grave disease, thyroid hormones, thyroid gland, TSH, Goiter

## Introduction

The hyperactivity of the thyroid gland as a whole is the cause of Graves' disease, a kind of hyperthyroidism. It bears Robert Graves' name, an Irish physician who roughly 150 years ago was the first to describe this type of hyperthyroidism. Graves' illness is categorized as an autoimmune thyroid condition, as is "Hashimoto's thyroiditis (Hubbard et al., 2009).

**Corresponding Author:** Dr. Muhammad Akram Department of Eastern Medicine. Government College University Faisalabad.
*E-Mail:makram_0451@hotmail.com*

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Elderly patients with Graves' illness have a higher prevalence of hyperthyroidism than previously believed. The clinical and hormonal features of older people with this illness differ from those of younger patients. Consequently, Graves' disease in older adults is more than just a milder version of the illness seen in youth, but differs greatly in many ways from it in terms of quality (Nordyke et al 1988). The pathogenic causes of these variations are unclear, in part because the etiology of Graves' disease is not fully understood. Metabolism is essential to maintaining a healthy weight, mood, and level of both physical and mental energy. The disease known as hyperthyroidism occurs when the body creates excessive amounts of thyroid hormone. (An underactive thyroid is the cause of hypothyroidism.) Graves' illness is the most typical cause of hyperthyroidism (Kravets., 2016). An abnormal immunological response causes the thyroid gland to overproduce thyroid hormone. Graves' illness is more common in women over 20 years of age. Endogenous, environmental, and genetic factors all influence a person's susceptibility to Graves disease illness, and it is because of these elements that T and B autoreactivity cells to the thyrotropin receptor emerge. It is unknown what mechanisms are at play. Depending on local factors, mainly iodine consumption, between 60 and 80 percent of individuals with hyperthyroidism also have Graves' disease (Volpe et al 1990). It is the most common autoimmune condition in the US, with an annual incidence in women of about 0.5 per 1,000 during a 20-year period, with the largest chance of occurring between 40 and 60 years of age. Men are 1/5 to 1/10 more likely than women to have Graves' disease, while children are not typically affected. Graves' illness is less common in black people and more common in Asians and White people (Vanderpump et al 2019). The thyroid gland will also gather radioactive iodine from the bloodstream since it needs iodine to produce thyroid hormone. More potent than the radioactive iodine used in diagnostic testing, iodine-131 will progressively kill the thyroid gland's cells while sparing other bodily parts (Skugor et al 2006). It may take several weeks or months for a patient receiving this medication to experience an improvement in their symptoms because results take time. According to a number of studies, some patients' ophthalmopathy may get worse after receiving radioactive Iodine treatment. Among the many drugs that can prevent this negative effect are steroids (Prummel et al 1993). Even though iodine-131 is not known to cause infertility or birth abnormalities, radioactive iodine therapy is not practiced. Radioactive iodine, which can harm the growing thyroid of the fetus, is present in breast milk (Fard-Esfahani et al 2014). The majority of individuals receiving radioactive iodine treatment develop hypothyroidism, a disorder in which the thyroid fails to generate adequate thyroid hormone. Supplemental thyroid hormones should be used by those who are hypothyroid. There were two pertinent trials that had 167 individuals in total (Surks et al 2004). Though little evidence suggests otherwise, gland-specific radioactive iodine treatment, although administered at a lower dose than with antithyroid medicine, has a considerably higher prevalence of hypothyroidism. Numerous investigations have demonstrated that remission is unrelated to the drug's kind or dosage and is associated with the restoration of the euthyroid state (Clinch et al 2009). Moreover, following thyroid surgery, patients who achieve euthyroid status experience a similar remission. According to the explanatory model presented, Graves' disease's autoimmune aberration is typically rather moderate and self-limited (Molinari.et al 2024). A

vicious cycle in which hyperthyroidism exacerbates autoimmunity and autoimmunity exacerbates hyperthyroidism might cause patients to become unwell. Most individuals will progressively go into disease remission after being made euthyroid through medication or thyroid surgery (Laurberg et al 2006). Smoking is linked to Graves' disease and raises the possibility of acquiring an increasingly severe ophthalmopathy in particular. Consequently, smoking seems to be one of the many variables that cause Graves' illness in people who are genetically predisposed (Solberg et al 1998). Smoking has been implicated in the etiology of Graves' illness, although its precise function in the disease's pathophysiology remains unknown. In this study, multivariate analysis was used to determine the relationship between smoking and Graves' illness (Marinò et al 2015). In 228 individuals (182 women and 46 males) with newly diagnosed Graves' illness, the relationship between the disease and drinking patterns, coping mechanisms, everyday problems, smoking behaviors, and social support was examined using a matched case-control methodology (Filipsson et al 2009). Following data adjustments for everyday issues, drinking, smoking, social support, and coping mechanisms, it was discovered that smoking was substantially linked to a woman's likelihood of developing Graves' illness (Chollat-Traquet et al 1992). When comparing women with the highest score to those with the lowest score, the relative risk was 7.7 (95% confidence interval). p for trend < 0.001), range 2.2 to 27. In women, smoking was also found to be independently linked to a higher incidence of Graves' disease (Altay et al., 2018).

**Diagnosis**

Check the patient's eyes first to see if they are inflamed or bulging. To find out if the thyroid is enlarged, an examination is performed. Blood pressure and heart rate are tracked for the patient. Tremors manifest as hand or finger tremors. They are performed to measure thyroxine and TSH (thyroid stimulating hormone) levels (Bhidayasiri et al 2005). The hormone THS is known to activate the thyroid gland. The pituitary gland generated and secretes TSH. Even in situations where TSH levels are low, the thyroid gland overproduces thyroxine due to elevated levels of the antibody TRAb, which mimics TSH. When a patient has high thyroxine levels and low TSH, Graves' illness is identified.Iodine is required by the body to make thyroxine. After a set amount of time, the patient receives a small amount of radioactive iodine, and its level in the thyroid gland is monitored as well as the rate at which the iodine is absorbed by the gland (Kaplan et al 1998). In patients with Graves' disease, the thyroid gland overproduces thyroxine, which is indicated by a high absorption of radioactive iodine. Iodine absorption is low in a few different hyperthyroidism-causing conditions. Patients with painless thyroiditis should have a radioactive iodine uptake study done. It is seen as a potential diagnostic tool for individuals with nodules or irregular thyroid glands. For primary care patients with ophthalmopathy, an ECG is preferable to a CT scan (Bartalena et al., 2013).

**Treatment**

The goals of treatment are to reduce symptoms and reverse the thyrotoxic condition. Beta-adrenergic blockade is used to treat adrenal hyperfunction. Radioactive iodine therapy or antithyroid drugs that prevent thyroid hormone synthesis can both be used to treat high thyroid hormone levels (Kaplan et al 1998). While beta blockers do not stop thyroxine's effects, they do

alleviate symptoms of tremors, high blood pressure, and fast heart rate. Metoprolol, atenolol, and propranolol are the most often prescribed. Still, more treatments are needed to address excessive thyroxine production. Methimazole and propylthiouracil are examples of antithyroid drugs that stop the thyroid gland from making excessive amounts of thyroxine (Bartalena et al 1996). Relapses are frequent even though long-term treatment with these drugs can put the illness into remission. Depending on the severity of their condition and how well they respond to the drug, patients usually take these prescriptions for six months to two years. Generally, these medications are well tolerated. One in eight patients experience mild side effects, including as rash, fever, sore throat, and nausea. Research has been done on the impact of thyroxine-induced inhibition of TSH secretion on TSH receptor antibody levels following methimazole-induced restoration of thyroid hormone production (De Vito et al 2011). Subtotal thyroidectomy is only a suitable course of action for individuals with Graves' hyperthyroidism who refuse radioactive iodine therapy and for a small number of patients with big goiters who exhibit symptoms of compression or cosmetic issues. Numerous therapies can alleviate symptoms and return thyroid hormone levels to normal. The size of the thyroid gland, age, and overall health will all influence the therapy option. Research on conventional and non-conventional treatment options for this illness should be done and addressed with the physician (Tavares et al 2015). If Graves' illness is not treated, there may be detrimental effects. Antithyroid medications, beta blockers, radioactive iodine, and surgery are examples of conventional therapy. Radical thyroid treatments, like surgery, have the drawback of permanently shutting down the thyroid. This necessitates lifetime prescriptions for thyroid hormone, either synthetic or sourced from animals. Typically, the outcome is hypothyroidism symptoms. The fact that there are risk-free natural and alternative therapies accessible should not be overlooked (Genovese et al., 2013)

## Conclusion

There are numerous clinical similarities between Hashimoto's thyroiditis and Graves' illness. For instance, the thyroid gland has lymphocyte infiltrations in both disorders, whether or not the germinal center is present. However, In women, but not in men, smoking and psychological stress are linked to Graves' illness. Various viewpoints regarding Graves' illness have been presented in the current study. Predisposing factors includes genetic, environmental and endogenous factors have been discussed. Radioiodine treatment for Graves' disease is considered a good option. There is relationship between stressful events and Graves' disease and Smoking and Graves' disease respectively

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