



Insightful Exchange With *ChatGPT* on Hyperthyroidism

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In today's rapidly expanding artificial intelligence (AI) world, Chat Generative Pre-Trained Transformer (GPT) emerges as a prominent entity as part of the GPT model lineage, founded upon the transformer architecture and released on 30 November 2022 by *OpenAI*.^{1, 2} *ChatGPT* is a conversational language model that has undergone intensive training on vast data sources. Thus, it demonstrates the capability to generate well-structured, grammatically correct responses resembling human language when provided with prompts or inputs.²

The integration of artificial intelligence (AI) has rapidly gained global attention and revolutionised numerous aspects of the healthcare system. Johnson et al³ conducted a study to assess the accuracy and dependability of *ChatGPT*, particularly in its medical responses. They formulated 284 medical questions categorised by difficulty levels based on subjective assessments by 33 physicians representing 17 specialties. The findings revealed that *ChatGPT* predominantly provided accurate information, affirming its utility in medical contexts.

Utilising natural language processing algorithms,¹ *ChatGPT* addresses a broad spectrum of patient inquiries from simple questions to complex clinical issues. Its adaptability makes it a significant resource for patients seeking information and aid.

Hyperthyroidism, alternatively termed an overactive thyroid, occurs when the thyroid gland produces and releases excessive amounts of thy-

roid hormones. The incidence and prevalence of hyperthyroidism exhibit global variability, with an estimated worldwide prevalence of approximately 1.3 %, although regional discrepancies are evident.⁴ Patients with hyperthyroidism may utilise *ChatGPT* as a reliable source for timely precise information and guidance. By leveraging it patients gain access to information, allowing them to make educated decisions about their health and treatment options.

Table 1 describes a dialogue comprising 10 inquiries exchanged between a patient and *ChatGPT* regarding hyperthyroidism. In my exchange with *ChatGPT*, I found it to be a knowledgeable and accessible resource providing detailed insights on hyperthyroidism without overwhelming medical terminology. Its ability to offer empathy and practical advice for symptom management was particularly noteworthy. For instance, it emphasised the importance of consulting a healthcare professional before implementing any dietary or lifestyle adjustments.

Additionally, *ChatGPT* provides a comprehensive insight into alternative treatment modalities for hyperthyroidism in an informative and unbiased manner. It offers a thorough examination of options, ranging from medications to surgical procedures. However, a significant issue stems from the limitations of *ChatGPT's* training data, which are restricted to information available only up to September 2021.⁵ This constraint may hinder its effectiveness, as the ongoing progress in medical research and advancements requires access to the most up-to-date knowledge.

Table 1: A dialogue comprising 10 inquiries exchanged between a patient and ChatGPT regarding hyperthyroidism

N	Questions	Response by <i>ChatGPT</i>
1	What's hyperthyroidism?	Hyperthyroidism is a medical condition characterized by an overactive thyroid gland, leading to excessive production of thyroid hormones. When the thyroid gland becomes overactive, it releases too much thyroxine (T4) and triiodothyronine (T3) into the bloodstream, which can disrupt the body's normal metabolism.
2	What are the common symptoms of hyperthyroidism?	Common symptoms of hyperthyroidism include rapid heartbeat, weight loss despite increased appetite, excessive sweating, heat intolerance, nervousness, anxiety, and irritability. Fatigue, weakness, tremors (especially in the hands), sleep disturbances, frequent bowel movements, and muscle weakness are also typical. Women may experience menstrual changes, goiter, thinning hair, and skin changes. These symptoms vary in severity, warranting medical evaluation for accurate diagnosis and treatment.
3	What causes hyperthyroidism?	Hyperthyroidism can be caused by various factors, including: Graves' disease: An autoimmune disorder prompting the thyroid gland to overproduce hormones due to immune system-produced antibodies. Thyroid nodules: Abnormal growths that generate excessive thyroid hormones. Thyroiditis: Inflammation leading to temporary hormone level spikes. Excessive iodine intake: Overconsumption prompts hormone overproduction. These are key causes, with additional factors potentially contributing.
4	How is hyperthyroidism diagnosed?	Hyperthyroidism diagnosis involves medical history, physical exam, and blood tests for thyroid hormones (T3, T4) and thyroid-stimulating hormone (TSH). Additionally, imaging like ultrasound or radioactive iodine uptake scans assess thyroid gland size and function.
5	How is hyperthyroidism diagnosed?	Treatment options for hyperthyroidism include: Antithyroid medications like Methimazole and propylthiouracil, which block thyroid hormone production. Radioactive iodine therapy, where a radioactive form of iodine destroys thyroid cells to reduce hormone levels. Beta-blockers like Propranolol alleviate symptoms such as rapid heartbeat and tremors. Surgery (thyroidectomy) may be necessary if other treatments fail or for individuals with certain thyroid conditions.
6	Can hyperthyroidism be cured?	Hyperthyroidism treatment aims to normalize hormone levels and alleviate symptoms. While antithyroid medications, radioactive iodine therapy, and surgery can help control it, complete cure isn't always possible. Remission may occur, but recurrence is possible, especially with autoimmune causes like Graves' disease. Regular monitoring and collaboration with healthcare providers are crucial for effective management.
7	How long does treatment for hyperthyroidism typically last?	Treatment duration for hyperthyroidism varies depending on factors like underlying cause, symptom severity, and treatment response. Some require long-term medication, while others achieve remission quickly. Radioactive iodine therapy or surgery may cause permanent thyroid changes. Collaborating with healthcare providers ensures a personalized treatment plan for optimal management.
8	Are there any lifestyle changes that can help manage hyperthyroidism?	Managing hyperthyroidism involves various lifestyle changes. A balanced diet with fruits, vegetables, proteins, and whole grains is key. Limiting iodine intake, managing stress with techniques like meditation and yoga, and regular exercise are beneficial. Avoiding smoking, limiting caffeine/alcohol, and ensuring sufficient sleep are also crucial. Consulting a healthcare provider before significant lifestyle changes is important, especially with medical conditions like hyperthyroidism.
9	Are there any lifestyle changes that can help manage hyperthyroidism?	Untreated or poorly managed hyperthyroidism can lead to complications like an increased heart rate, high blood pressure, and irregular heart rhythms. It accelerates bone turnover, increasing risk of osteoporosis and fractures. In severe cases of hyperthyroidism, a life-threatening

condition known as thyroid storm can occur, characterized by extremely high levels of thyroid hormones and symptoms such as fever, rapid heartbeat, confusion, and coma. Graves' disease, a common cause of hyperthyroidism, causing bulging eyes (exophthalmos), eye irritation, double vision, and vision loss. Other complications include menstrual irregularities, infertility, and pregnancy complications like preterm birth or preeclampsia.

10 How often should I see my healthcare provider for hyperthyroidism?

Patients with hyperthyroidism require regular follow-up with their healthcare provider to manage and monitor their condition. Appointment frequency depends on severity and treatment. Initially, visits may be every few months, decreasing to every six months to a year once stable. Effective communication and adherence to medical advice are vital for optimal management and preventing complications.

Platforms like *ChatGPT* hold promise in transforming patient education and support, especially for chronic conditions like hyperthyroidism. They provide personalised assistance and interactions empowering individuals to manage their health independently and fostering a sense of autonomy in healthcare decision-making.

Conclusion

To conclude, embracing innovative solutions is crucial for navigating modern healthcare complexities. Platforms such as *ChatGPT* represent progress toward this aim. By leveraging AI, we empower patients, improve healthcare outcomes and enhance lives. Ongoing research and refinement are imperative for unlocking *ChatGPT*'s full potential.

Ethics

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Data access

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