

**Ministry of Higher Education  
and Scientific Research  
University of Diyala  
College of Medicine**



# **Treatment of hyperthyroidism in pregnancy**

**Submitted to the Council of the College of Medicine, Diyala University, In  
Partial Fulfillment of Requirements for the Bachelor Degree in medicine and  
general surgery.**

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## **Abstract**

Hyperthyroidism in pregnancy is treated with medications that inhibit excessive thyroid hormone synthesis. The antithyroid drugs (ATD) most commonly used in the U.S. are thioamides, propylthiouracil (PTU), and methimazole (MMI).

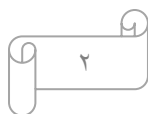
Carbimazole is a prodrug of methimazole that is commonly used outside of North America, with similar efficacy and side effect profile.

**Aim of study:** To discuss the treatment of hyperthyroidism in pregnancy and its modalities.

**Patients and methods:** This cross-sectional study included analysis of the reported cases of clinical hyperthyroidism in pregnancy. The study used the available surveillance database for the disease from the health records of both of the consultatory clinic and general health department which both of them are following Diyala health directorate. Data of current study were collected in the period from (2022-2023).

**Results:** 20 pregnant women were included in this survey. Their mean age was 33. 80% of them took Propylthiouracil as first choice and 20% took methimazole.

**Conclusion:** Propylthiouracil was the most common used drug in our study which could be to the safety profile and the cost which is lower than methimazole.

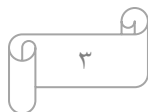


## Introduction

Hyperthyroidism is an uncommon condition that complicates approximately 0.1% to 0.4% of pregnancies [1] The condition is marked by increased levels of circulating thyroid hormones, T4 and T3, as well as a decreased level of thyroid-stimulating hormone (TSH), also known as thyrotropin. Though relatively rare, identification and treatment of overt hyperthyroidism are important to mitigate maternal and fetal complications [2]. Ideally, hyperthyroidism is diagnosed before conception, and treatment is started to achieve euthyroid status. However, up to half of all pregnancies in the United States are unplanned, making an early diagnosis of thyroid dysfunction imperative [3].

Hyperthyroidism in pregnancy requiring treatment is most often caused by Grave disease, which is estimated to account for 85% to 95% of clinically significant cases of hyperthyroidism. This autoimmune condition is marked by the presence of thyrotropin (TSH)-receptor antibodies (TRAb), which can bind to thyroid receptors and cause their activation, leading to increased production of thyroid hormones [4,5].

Throughout pregnancy, multiple physiologic changes contribute to fluctuating levels of thyroid hormones. Due to increased circulating estrogens, pregnancy brings a 50% increase in thyroxine-binding globulin (TBG), which binds circulating T4, causing a decrease in free T4 levels. To compensate, the thyroid grows in size and increases the production of T4 and T3 by 50% [6] Due to TSH's homology with human chorionic gonadotropin (hCG), rising hCG levels in the first trimester lead to stimulation of the thyroid, in turn causing a further elevation in free T4. The hCG levels peak between 8 to 12 weeks of gestation and gradually decrease thereafter [7].

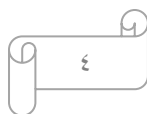


Conversely, the developing placenta contains deiodinase type 3 (DIO3), which deactivates T4 and T3. Excessive function by this enzyme can lead to hypothyroidism. Typically, this effect is outweighed by increased hCG production in early pregnancy, leading to a net increase in free T4 with a decreased median TSH and reference range. This transient increase in free T4 usually resolves by mid-pregnancy as hCG levels plateau and decline [8].

A definitive diagnosis of hyperthyroidism may be difficult due to normally fluctuating levels of thyroid hormone in pregnancy. If the diagnosis is uncertain, it is appropriate to observe the thyroid level trends with further laboratory testing rather than immediately starting antithyroid drug therapy [9] Adverse outcomes have not been demonstrated with subclinical hyperthyroidism [9].

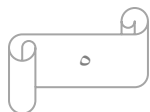
Hyperthyroidism in pregnancy is treated with medications that inhibit excessive thyroid hormone synthesis. The antithyroid drugs (ATD) most commonly used in the U.S. are thioamides, propylthiouracil (PTU), and methimazole (MMI). Carbimazole is a prodrug of methimazole that is commonly used outside of North America, with similar efficacy and side effect profile [10].

Surgery is optimally performed outside of pregnancy. In women who do not attain adequate control of hyperthyroidism with high doses of ATDs, who have an allergy to ATDs, or are poorly compliant with therapy, surgery can be considered. Surgery is also an option in patients who have a large goiter causing compression issues. Total or subtotal thyroidectomy can be performed in pregnancy, preferably in the second trimester, when the risk of fetal loss and complications is lowest [11].



## **Aim of study**

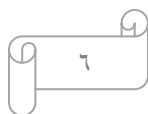
To discuss the treatment of hyperthyroidism in pregnancy and its modalities.



## **Patients and methods**

This cross-sectional study included analysis of the reported cases of clinical hyperthyroidism in pregnancy. The study was used the available surveillance database for the disease from the health records of both of the consultatory clinic and general health department which both of them are following Diyala health directorate. Data of current study were collected for the period (2022-2023). The diagnosis of cases achieved by physicians' works in these health associations. The privacy of the patients was preserved by coding their data into number to prevent bias. We collected information about age, treatment and the response.

The data analysis was done by Statistical Package for Social Sciences (SPSS) version 26. We expressed the qualitative data by frequencies and the quantitative data such as weight and length by arithmetic mean.



## Results

20 pregnant women were included in this survey. Their mean age was 33 years with age groups demonstrated in table 1.

Table 1. age groups

Age groups	Frequency
20-30 years	7
31-40 years	10
More than 40 years	3

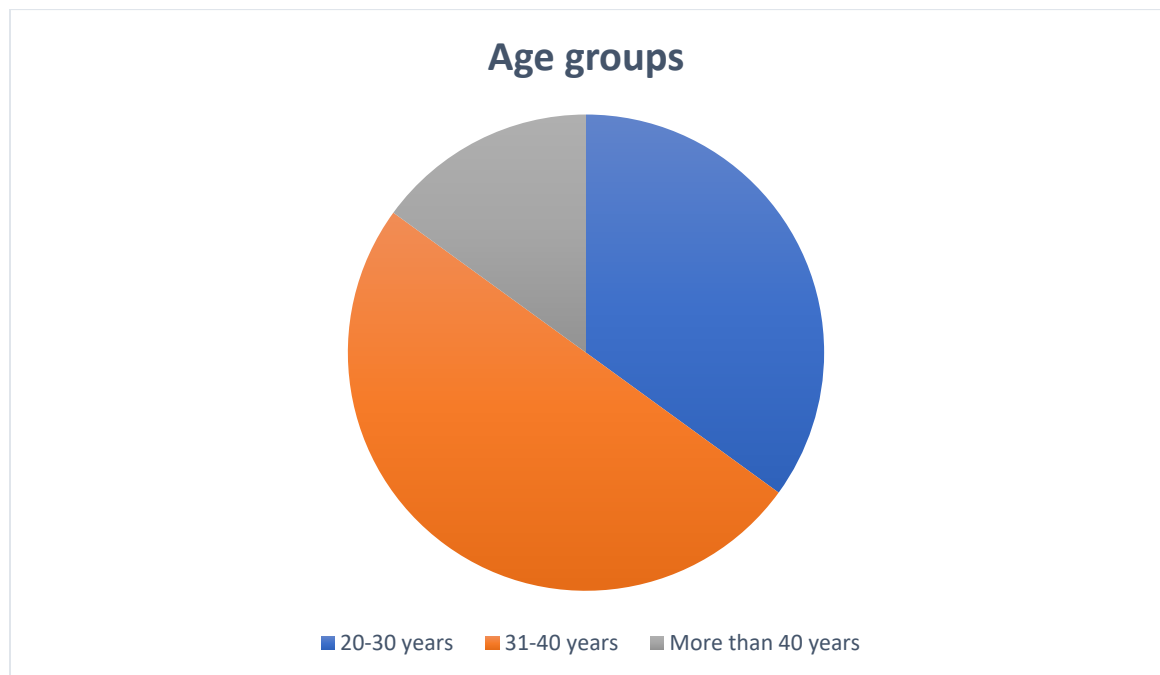
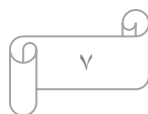


Figure 1. age groups.



They were treated with propylthiouracil (PTU) in the first trimester as first choice and methimazole as alternative as in table 2.

Table 2. treatment modalities

Treatment	Frequency
PTU	16
Methimazole	4

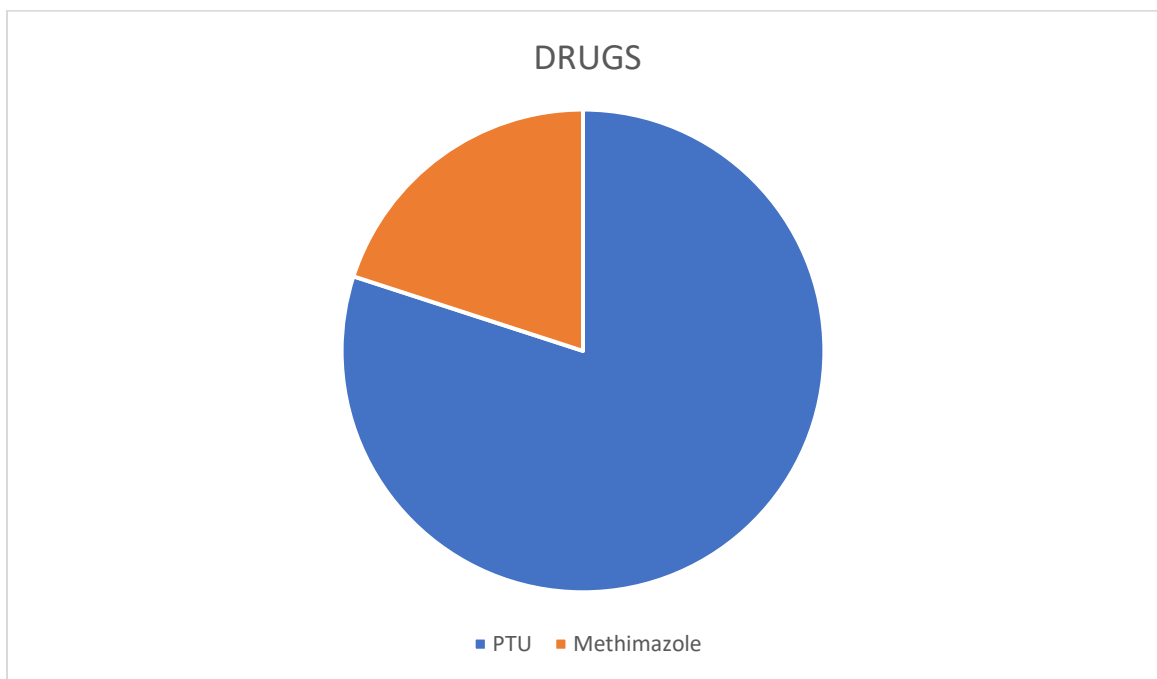
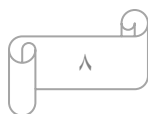


Figure 2. treatment modalities.





The distribution among the age groups is demonstrated in table 3.

Table 3. distribution of drugs among age groups

Age groups	PTU	Methimazole	Total
20-30 years	7	0	7
31-40 years	8	2	10
More than 40 years	1	2	3

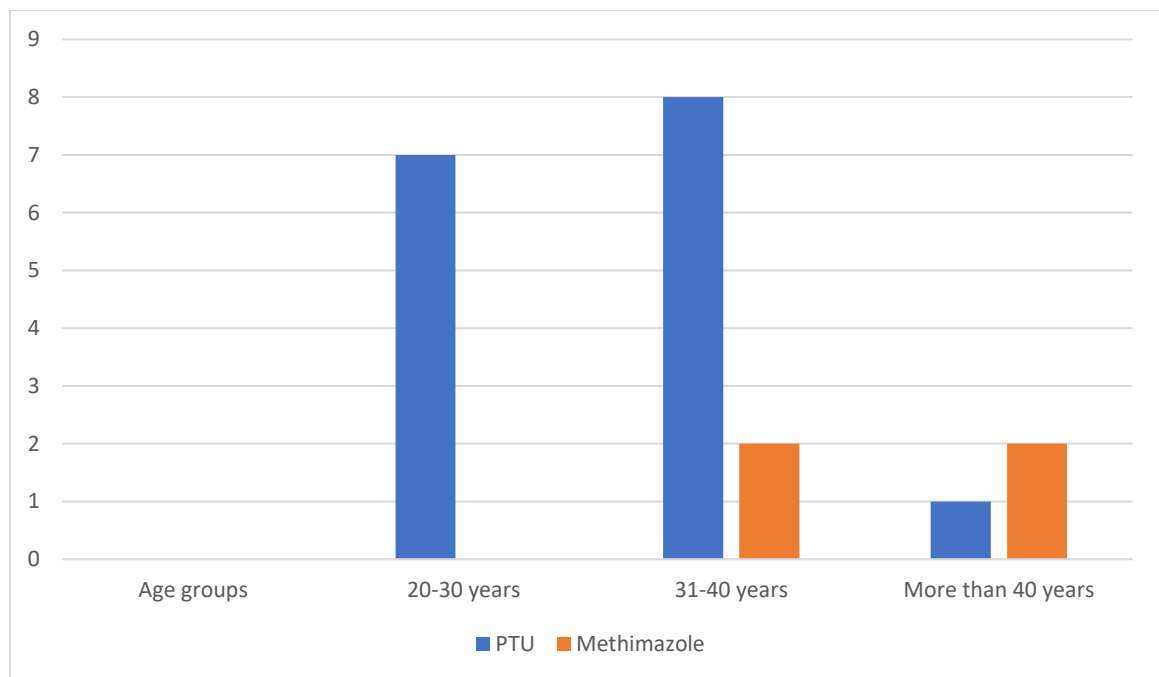


Figure 3. distribution of drugs among age groups.

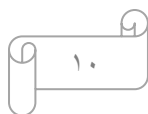
## Discussion

The diagnosis and management of hyperthyroidism in pregnancy requires a systematic approach. Early detection and appropriate therapy are imperative for optimal pregnancy outcomes. Preconception goals should include delaying pregnancy until hyperthyroidism is well controlled and transitioning to PTU in preparation for the first trimester of pregnancy. Women should be counseled on risks of thioamides in pregnancy and lowest possible doses should be used to maintain FT4 in the upper limit of normal and avoid fetal hypothyroidism. Laboratory tests should be repeated every 2 to 4 weeks as medically indicated and ATD can often be carefully tapered in the third trimester [12].

There is compelling evidence that pregnant women should be treated for hyperthyroidism. However, the therapy for hyperthyroidism is limited because all available treatments have reported adverse effects on pregnancy. The option is ultimately dependent on the balance of undesirable side effect burden associated with these medications. PTU is commonly used in the first trimester of pregnancy, but the risks of propylthiouracil-related pregnancy outcomes are debatable [13].

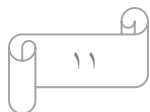
Hyperthyroidism during pregnancy may induce maternal, fetal, obstetrical, and neonatal complications. Other than maternal hyperthyroxinemia, transplacental transfer of TRAb can induce fetal and neonatal hyperthyroidism.

In our study 80% of the participant took PTU as first choice and only 20% took methimazole and this could be due to the safety profile and availability and cost of PTU compared to methimazole. The main limitation to our study was the little number of the cases because high percentage of pregnant women refuse to take medication during their pregnancy.



## **Conclusion**

Propylthiouracil was the most common used drug in our study which could be to the safety profile and the cost which is lower than methimazole.



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