

## Original Article

### Prevalence of thyroid Disorders between pregnant and non-pregnant Saudi women in Aljouf, Saudi Arabia, Hospital based study

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#### ABSTRACT

**Background:** Since thyroid hormones are essential to the fetus's general growth, their effect on the outcomes of pregnancy must be carefully taken into account.

**Objective:** The goal of this research is to compare the prevalence of thyroid disorders in Saudi women who are pregnant and those who are not, using a hospital-based approach.

**Methods:** This descriptive hospital-based study conducted at Obstetrics department of Maternity and Children hospital (MCH) over a period of January 2022 to February 2023. A total of 150 women participated among 75 pregnant women and 75 non-pregnant reproductive age women respectively. Thyroid function test was obtained from them.

**Results:** Of the subjects, 46.8% had thyroid disorders, with 35.4% having hypothyroidism and 11.4% having hyperthyroidism. The prevalence of thyroid disorder was substantially greater in pregnant women (73.3.0%) compared to non-pregnant women (20.0%;  $P < 0.001$ ). The odds ratio of hypothyroid disorders was substantially greater in pregnant women than in non-pregnant women (OR 3.85; 6.5 – 19.5(95.0% CI),  $P < 0.001$ ). Thyroid disease risks in pregnant women were considerably greater than in non-pregnant women, even following adjustment for the age biases. effect ( $p = 0.001$ ).

**Conclusion:** Women who are pregnant are more likely than those who are not to have thyroid disorder, particularly hypothyroidism.

**Keywords:** Hospital based, Prevalence, thyroid disorder, pregnant women, non-pregnant women, Saudi Arabia.

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## INTRODUCTION:

The effects of thyroid hormones on the progress of pregnancy must be carefully analyzed, as they are vital for the fetus's general development.<sup>1</sup> Many physiological alterations, such as elevated levels of thyroid hormone-binding globulin, enhanced kidney iodine elimination, and the thyrotropic action of human chorionic gonadotropin, change in thyroid functioning tied to an increased risk of reduced fetal development, birth prematurely, placental incorporation, pregnancy loss, and preeclampsia, both mental and physical, if prompt treatment is neglected.<sup>2</sup> Pregnancy-related thyroid function evaluation is crucial for the health of the mother and the fetus. Thyroid stimulating hormone (TSH), free thyroxine (FT4), and free triiodothyronine (FT3) are all measured in a blood test referred to as a thyroid function test (TFT) or thyroid monitoring. If essential, thyroid antibody tests such as anti-thyroid peroxidase can be carried out as well. Hypothyroidism and hyperthyroidism are two types of thyroid diseases. According to multiple research projects, the prevalence of thyroid problems in pregnant Indians ranges from 2.8% to 18.7%.<sup>3,4</sup> The effects of thyroid disorders on pregnancy outcomes vary. According to Western literature, the prevalence of hypothyroidism during pregnancy is approximately 2.5%.<sup>5</sup> The prevalence of thyroid autoimmunity (TAI) is approximately 5–10%, while that of GD is only 0.1–0.4%.<sup>6</sup> There is a dearth of information on the prevalence of thyroid disorder in Saudi Arabian pregnant women. In order to determine the prevalence of TD and assess the maternal outcome in thyroid disorder patients, this study was designed.

## MATERIAL AND METHODS:

The study was carried out from January 2022 to February 2023 in the Obstetrics Department of the Maternity and Children hospital (MCH), Sakaka, Aljouf, Saudi Arabia. Participants in the study were split into two groups: those who were pregnant and those who weren't. Seventy-five pregnant women between the ages of 19 and 44 who were in their first trimester and seeking prenatal care were chosen, regardless of their parity or gravida status (primigravida or multigravida). TFT was recommended for 75 seemingly healthy non-pregnant women in the same age range who were visiting the MCH

laboratory for a routine examination. Medical and sociodemographic information was gathered from computerized records files, and people who had previously experienced thyroid dysfunction or were taking medication for it were not included. Participants were chosen using a convenience sampling procedure, and the sample size was determined using the formula below:  $N = z^2 p q/d^2$ . All individuals underwent thyroid function test screening in the NMCTH laboratory. The research's applicability was based on the 2017 guidelines published by the American Thyroid Association (ATA), that specify that the maximum allowed level of TSH should be 2.5  $\mu$ I U/L in the first trimester and 3.0  $\mu$ I U/L in the trimester of second and third.<sup>7</sup>

## Statistical analysis

SPSS-21 was used to analyze the data. The variables' normality distribution was examined. Consequently, counts (percentages) were used to express categorical data and medians (IQR) for continuous data. The 95.0% confidence interval (CI) and prevalence of thyroid diseases were computed. Thyroid diseases, hyperthyroidism, and hypothyroidism odds ratios were computed. Binary logistic regression analysis, chi-square analysis, and the Mann-Whitney U test were carried out. At 95.0% confidence intervals, a P value of less than 0.05 was deemed statistically significant.

The Research Ethics committee Jouf university approved by IRB of research project No.18-08-42, Saudi Arabia.

## RESULT:

The study included 150 people, 75 of whom were pregnant and 75 of whom were not, all between the ages of 19 and 44 years old. Participants' median age was 27 years old. Of the subjects, 46.8% had thyroid problems, with 11.4% having hyperthyroidism and 35.4% having hypothyroidism. Thyroid disorders' prevalence was substantially higher in pregnant individuals (73.3%;  $P < 0.001$ ) versus in non-pregnant individuals (20.0%;  $P < 0.001$ ). The odds ratio of hypothyroid disorders was substantially higher in pregnant women than in non-pregnant women (OR 3.85;  $P < 0.001$ ). All pertinent data is displayed in [Tables 1 ,2](#) and [figure 1](#).

Table .1. Thyroid disorder prevalence in Pregnant and Non pregnant women.

Factors	Prevalence % (95.0% CI) thyroid disorder	Number	Prevalence % (95.0% CI) Euthyroid	Number	P-Value
Total number (150)	46.8 (26.5 – 37.5)	70	53.2 (60.5 – 73.5)	80	
Pregnant (n=75)	73.3(36.1 – 55.9)	55	26.7 (11.3-19.4)	20	<0.001
Non pregnant (n=75)	20 (9.1 – 21.6)	15	80 (72.4 -88.6)	60	

Table .2. Participants' prevalence of hyperthyroid and hypothyroid disorders.

Factors	95.0% confidence interval for the prevalence of hypothyroidism	95.0% confidence interval for the prevalence of hyperthyroidism	Hypothyroidism (Ratio of odd) OR		Hyperthyroidism (Ratio of odd) OR	
			OR	P value	OR	P value
Total number (150)	35.4 (19.6 – 31.6)	11.4 (7.5 – 15.5)	N/A		N/A	0.211
Pregnant (n=75)	49 (35.5 – 44.5)	24 (4.8 – 17.2)	3.85	0.0002	1.94	
Non pregnant (n=75)	13 (6.5 – 19.5)	7 (2.3 – 11.7)				

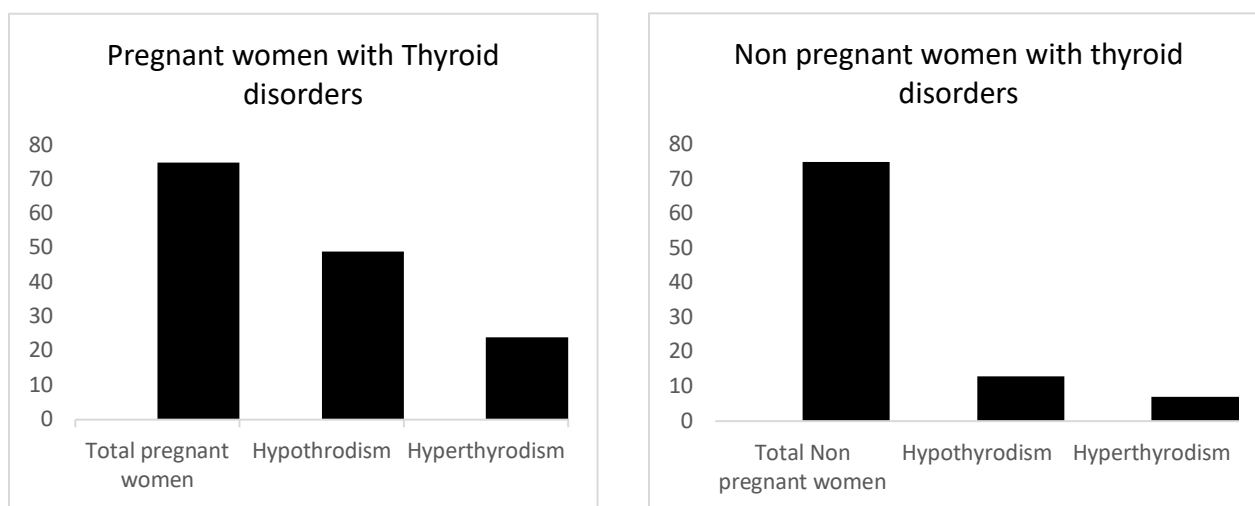


Figure 1. Both figures shown the evaluation of thyroid disorder among all participants.

However, there was no discernible difference in the study groups' median FT3, FT4, and TSH level values which represented in the table.3.

Table .3. The study groups' Median age and thyroid function parameter values.

Factors	Median Pregnancy (IQR)	Median Non-Pregnancy (IQR)	P value
FT3 (pg/ml)	3.48 (3.24 - 3.82)	3.77 (3.23 – 4.27)	0.154
FT4 (ng/dl)	1.09 (0.88 - 1.27)	1.16 (0.96 – 1.29)	0.209
TSH (IU/ml)	1.76 (1.12 – 3.99)	2.21 (1.22 – 3.43)	0.362
Age	28 (25-33.77)	39 (29- 38)	< 0.001
FT3= free triiodothyronine, FT4= free thyroxine, TSH= Thyroid stimulating hormone			

The age difference among pregnant and non-pregnant women was significantly less ( $P < 0.001$ ). Table.4 displayed that even after controlling for the confounding effect of age,

pregnant women had considerably greater risks of thyroid problems than non-pregnant women at  $p$  value 0.001.

Table .4. Thyroid disorder odds ratios among study groups, both unadjusted and adjusted.

Factor	Coefficient ( $\beta$ )	Rate of Unadjusted Odds		Rate of adjusted Odds	
		OR	$P$ -value	OR (exp $\beta$ )	$P$ – value
State of pregnancy	1.179	3.87	<0.001	3.23	0.001

## DISUSSION:

One of the most prevalent endocrine disorders observed during pregnancy is thyroid disorders. Although pregnancy causes significant alterations in thyroid gland function, thyroid problems are a common clinical problem in women of reproductive years, and pregnant women are considerably more likely to experience it. The majority of research on thyroid problems focuses exclusively on pregnant women. There are regional and study-specific variations in the prevalence of thyroid problems during pregnancy. According to the results of the present research, 73.3% of pregnant women have thyroid disorders that are not currently recognized. Thyroid diseases had a somewhat decreasing prevalences of 24.62% and 29%, accordingly, in Nepal care facilities.<sup>8</sup> Another study reported corresponding prevalence rates of 20.6% and 44.0%.<sup>9</sup> Applying TSH cutoff levels unique to each trimester for expectant mothers and laboratory-specific TSH cutoff values for women who are not pregnant may also have contributed to the significant differences in thyroid rates of problems between our study's pregnant and non-pregnant female participants. There has long been discussion about the normal upper limit of TSH during pregnancy. Trimester-specific cutoffs were used in the current investigation in accordance with the most recent ATA diagnostic standards. In the general community, hypothyroidism is more prevalent than hyperthyroidism, and pregnant women are no exception.<sup>10</sup> Nonetheless, some labs have acknowledged that the following TSH reference ranges are widely used based on the trimester reference ranges. According to numerous studies, the prevalence of hypothyroidism during

pregnancy is between 12% and 15 %, using these reference levels.<sup>11</sup> As was previously indicated, the noted differences might be connected to the various TSH cut-off values used to diagnose hyperthyroidism. However, another study reported 11.6% of pregnant women had a hyperthyroidism, which is nearest to the 10.2% identified in a study by Weiwei Wang et al.<sup>12</sup> There have been several studies that found prevalence 10.2%, Taghavi et al.<sup>13</sup>, and 14.6%, Ajmani et al.<sup>14</sup> respectively. While present study found 24% of hyperthyroidism in pregnancy group. Subclinical hyperthyroidism was observed in about 4.2%, 3.5%, and 3.3% of cases in numerous researches.<sup>15</sup> It is true that prior studies have found that the prevalence of hypothyroidism during pregnancy is between 0.3% and 0.5% for overt hypothyroidism and between 2% and 3% for subclinical hypothyroidism.<sup>16</sup> Identification and treatment of subclinical hyperthyroidism during pregnancy are not deemed required at this time because there is no proven correlation between the disease and pregnancy outcomes. Pregnant women in our sample had considerably higher odds ratio of thyroid abnormalities than their counterparts non-pregnant (adjusted OR 3.23;  $p = 0.001$ ). The particularly noticeable in cases of hypothyroidism (OR = 3.85;  $P = 0.0002$ ). On the other hand, it has been shown that hypothyroidism is widespread during pregnancy, with numerous studies suggesting that between 2 and 3% of pregnant women will have undetected hypothyroidism.<sup>17,18</sup> Several studies have estimated the prevalence of overt maternal hypothyroidism (defined as an increased TSH concentration of 10 mU/l or above, with free T4 below the standard range) [52] in pregnancy to be

between 0.3% and 1.5.<sup>19,20</sup> A cut-off of 4.2 mIU/l was used to characterize elevated TSH levels in most studies that assessed the connection between thyroid diseases and pregnancy.<sup>21</sup> However, approximately 0.2% of pregnant women have hyperthyroidism, which is less frequent than hypothyroidism.<sup>22</sup>

The significance of screening for thyroid dysfunction in the early stages of pregnancy is clearly supported by these findings. Nonetheless, thyroid disorders can equally impact women prior to, during, or just after pregnancy. Thyroid dysfunction is common among patients in a Aljouf area, according to our data, and this finding can be extrapolated to populations in similar settings across Saudi Arabia

## CONCLUSION:

Pregnant women are more likely than their non-pregnant counterparts to have thyroid disorders

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particularly hypothyroidism. Additionally, this highlights the necessity of making prenatal thyroid monitoring a requirement of health coverage.

## Limitation

This study may not be representative of the general population because it was limited to a single central hospital and only included a small sample.

## Authors contribution

Umme Salma: Conception and design; drafting of the article. Md Sayed Sheikh: Analysis and interpretation of the data and final approval of the article.

## Conflicts of Interest: Nil

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