

Prevalence of Hypothyroidism in Mothers Attending Antenatal Care in Provincial Hospital at Janakpur

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ABSTRACT

Introduction: Numerous physiological changes associated with pregnancy can result in hypothyroidism. Due to increased renal loss and increased iodine transfer to the growing foetus, there is a relative iodine deficiency during pregnancy.

Methods: 331 patients who visited the gynaecology and obstetrics outpatient department (OPD) of the Provincial Hospital of Janakpur between July 1, 2023, and December 31, 2023, were the subjects of an observational, descriptive cross-sectional study. The pregnant women more than 18 years of age and less than 45 years irrespective of their gestational age and gravida status (primi gravida or multigravida) were included in the study. The pregnant women with diagnosed thyroid disease, thyroid medication usage, diabetes mellitus and hypertension were excluded from the study.

Results: among 331 samples studied, 235 participants were found to have normal thyroid levels, 28 participants had hypothyroidism and 6 participants had hyperthyroidism. The minimum age was 15 years to a maximum of 45 years. Maximum sample; 41.4% were of the age group 15-25 while only 27.2% were of the age group 26-35 years.

Discussion: Thyroid dysfunctions during pregnancy have the potential to be fatal for the mother and the foetus

Conclusion: The prevalence of thyroid disorder in our study was 31%. Therefore, the prevalence of hypothyroidism among pregnant women was found to be higher and few cases of hyperthyroidism were detected.

Keywords: *prevalence; thyroid; hypothyroidism; dysfunction; hyperthyroidism; gestational age.*

INTRODUCTION

Numerous physiological changes associated with pregnancy can result in hypothyroidism. Due to increased renal loss and increased iodine transfer to the growing foetus, there is a relative iodine deficiency during pregnancy. Thyroxine-binding globulin (TBG) levels rise as a result of the elevated oestrogen levels experienced during pregnancy. However, because of the effects of human chorionic gonadotrophin (HCG), serum thyrotropin levels decline during the early stages of pregnancy and the thyroid is stimulated by thyroid stimulating hormone (TSH). Moreover, it results in lower TSH and higher FT4.¹

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Pregnancy-related thyroid disorders (TD) are the second most prevalent endocrine illnesses that are linked to poor outcomes for both the mother and the foetus. Due to the nebulous complaints and elevated metabolic state associated with pregnancy, this occurrence is underappreciated.²

Nepal is a landlocked country with mountains and a significant annual rainfall, which puts it geographically far from the sea and lowers the iodine concentration of its soil. The extremely high prevalence of iodine deficiency illnesses is caused by these reasons. In Nepal's Terai, Himalayan, and mountainous regions, iodine deficiency is frequent.

At least 2-3% of expectant mothers experience thyroid problems. Between 0.2 and 0.4 percent of pregnant women have hyperthyroidism, which is most frequently linked to Grave's disease. Pregnancy-related hypothyroidism affects 0.5–3.5 percent of cases. Its most common cause is Hashimoto's thyroiditis, although it can also occur in areas where iodine deficit is prevalent.⁴

Thyroid problems during pregnancy can cause challenges for both the mother and the foetus. Premature birth, foetal cardiac problems, low birth weight, higher frequency of caesarean delivery, placental problems, preeclampsia and gestational hypertension, perinatal morbidity-mortality, and cognitive impairment are only a few of the difficulties that result from hypothyroidism during pregnancy. complications from hyperthyroidism during childbirth include thyroid storm, preeclampsia, stillbirth, abortion, and premature birth.⁴⁻⁷

MATERIALS AND METHODS:

331 patients who visited the gynaecology and obstetrics outpatient department (OPD) of the Provincial Hospital of Janakpur between July 1, 2023, and December 31, 2023, were the subjects of an observational, descriptive cross-sectional study. For signed, informed consent, they were requested. Age, parity, obstetric history, gestational age, past and current medical history, personal history, and family history of the expectant mother were recorded. The study included all pregnant women who were over the age of fifteen (15) and under the age of fifty, regardless of gestational age or gravida status (primi gravida or multigravida). The study excluded pregnant women with diabetes mellitus, hypertension, thyroid medication use, and thyroid condition diagnoses.

Sample size:

$$n = Z^2 p (1-p) / e^2$$

$$= (1.96)^2 \times (0.31) \times (1-0.69) / (0.05)^2$$

$$= 329$$

Where,

- n = sample size
- p = prevalence from previous study, 31%.⁸
- e = margin of error (5%).
- Z = 1.96 at 95% CI.

The participants were screened for serum-free triiodothyronine (FT3), free thyroxine (FT4), and thyroid-stimulating hormone (TSH). Thyroid function tests (TFT) were performed by using Maglumi Chemiluminescence Analyzer. The reference ranges of the test values which were used in this study are as per the laboratory values used in this hospital (Janakpur). The following normal reference ranges were recommended: TSH= 0.30 to 4.50 uIU/ml, FT3= 2-4.20 pg/ml, FT4=8.90 to 17.20pg/ml. According to the American Thyroid Association (ATA) guideline, pregnant women were classified into five groups:¹²

1. Subclinical hypothyroidism: High serum TSH level with normal fT4, fT3 level.
2. Overt hypothyroidism: High serum TSH level with fT4, fT3 level less than the normal range
3. Normal
4. Subclinical hyperthyroidism: Low serum TSH level with normal fT3, fT4 level.
5. Overt hyperthyroidism: Low serum TSH level with fT3 and fT4 more than the normal range

RESULTS

Table 1: Frequency of thyroid status

Thyroid status	Frequency	Percent
Subclinical Hypothyroidism	46	13.9
Overt Hypothyroidism	28	8.5
Normal	235	71.0
Subclinical Hyperthyroidism	5	1.5
Overt Hyperthyroidism	6	1.8
Others*	11	3.3
Total	331	100.0

* - samples which cannot be included with the category

Among the sample studied, 235 subjects were found to have normal thyroid level, 28 subjects had hypothyroidism while six subjects had hyperthyroidism. Frequencies of the thyroid status are represented by a pie-chart.

Figure 1: Showing the percentage of thyroid status

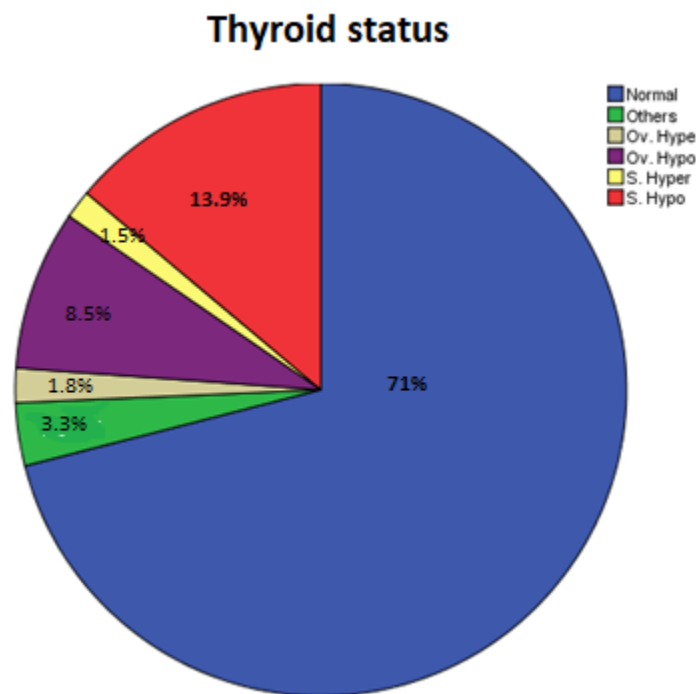


Table 2: Frequency table for age group

Age Group	Frequency	Percent
15-25	137	41.4
26-35	90	27.2
36-45	104	31.4
Total	331	100.0

Out of 331 total samples, the minimum age was of 15 years to a maximum of 45 years, mean age being 30.64 years. These samples were grouped into three divisions, each group including samples of 10 years of age difference. Maximum sample; 41.4% were of the age group 15-25 while only 27.2% were of the age group 26-35 years. (Table 2)

Table 3: Thyroid status according to age group

Age Group	Thyroid Status					
	Subclinical Hypothyroidism	Overt Hypothyroidism	Normal	Subclinical Hyperthyroidism	Overt Hyperthyroidism	Others
15-25	14	7	105	2	4	5
26-35	10	9	66	2	1	2
36-45	22	12	64	1	1	4
Total	46	28	235	5	6	11

Chi square test: $p = 0.19$

Table 3 shows the subjects thyroid status of different age group. Within the age group of 15 to 25 years, 105 had normal thyroid status, 7 had hypothyroidism and 4 had hyperthyroidism. Second age group had 66 subject with normal thyroid status, 9 hypothyroid and 1 with hyperthyroidism. Third age group had 64 normal, 12 hypothyroid and 1 hyperthyroid subjects.

DISCUSSION

Thyroid dysfunctions during pregnancy have the potential to be fatal for the mother and the foetus.⁸ Because of the intense symptoms and high metabolism associated with pregnancy, it frequently results in miscarried babies.⁹ Timely identification of thyroid dysfunction and prompt initiation of treatment enhance the result for the foetus and mother.¹⁰ The study conducted by Shrestha B et al.¹¹ in Kathmandu revealed an almost equal prevalence of 29% for thyroid disorders, based on trimester-specific TSH readings, compared to the 31% reported in our study. Similarly, a study conducted in 2012 by Dhanwal et al. found a low prevalence rate of 20.74%. The study conducted by Shrestha B et al.¹¹ in Kathmandu revealed an almost equal prevalence of 29% for thyroid disorders, based on trimester-specific TSH readings, compared to the 31% reported in our study. Similarly, a study by Dhanwal et al. conducted in several tertiary regions of India shows a low prevalence percentage of 20.74%. Using a TSH cutoff of 4.5 $\mu\text{IU/ml}$, they demonstrated that 13.13% of pregnant women have hypothyroidism ($n = 388$). This frequency was significantly greater.¹²

A study by Khukurel et al. was conducted on 329 pregnant women at the Kathmandu Medical College. Twenty-six percent of the participants in this study had thyroid problems. Subclinical hypothyroidism, which accounted for 65 (19.75%) of the thyroid disorders detected, was the most common, followed by overt hypothyroidism in 8 (2.43%) cases.⁸

A distinct investigation was conducted in 50 cases of pregnancy with thyroid disorders by Joshi K, Bhatt M, and Saxena R. The study's overall proportion was 15.97%, of which 74% were subclinical—that is, without any symptoms—and just 26% experienced symptoms. The rate of caesarean sections was 30% compared to 0%, and 18% of patients had subclinical hypothyroidism. Nine percent of the controls had subclinical hypothyroidism. Abortion (14%) and postpartum hemorrhage (PIH; 16% v/s 56%), as well as hyperemesis gravidarum (9% v/s 3%), were the most frequent complications linked to hypothyroidism. Additionally, even in cases where hypothyroidism is subclinical, 42% of cases are linked to increased difficulties.¹³

Our research provides insight into the pregnant patients who visit the obstetrics and gynaecology outpatient department. It was discovered that 235 individuals had normal thyroid function, 28 had hypothyroidism, and 6 had hyperthyroidism.

CONCLUSION

Our study's findings emphasize routine monitoring of thyroid hormone in pregnant women to minimize the fetus-maternal complications during pregnancy and after birth, including the provision of free checkup services and awareness by the Nepalese government for thyroid-related dysfunctions as we are away from conception. The prevalence of thyroid disorder in our study was 31%. Therefore, the prevalence of hypothyroidism among pregnant women was found to be higher and few cases of hyperthyroidism were detected. Complications like miscarriage rate, history of infertility treatment, and maternal and foetal complications were also found to be higher in this study.

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