



## Prevalence of Hypothyroidism among Antenatal Mothers

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### Abstract

**Background:** Hypothyroidism in pregnancy is the most prevalent endocrine disorder affecting both mothers and the developing foetus. **Objectives:** The purpose of the study is to assess the prevalence of hypothyroidism among antenatal mothers and to elicit the association with the bio-socio demographic variables. **Methods:** It was a descriptive cross sectional study conducted among 150 antenatal mothers selected by using convenience sampling technique. **Results:** The prevalence of hypothyroidism among 150 antenatal mothers 24(14.86%) were found to have hypothyroidism whereas 126(85.14%) were having normal pregnancy. There was a significant association between prevalence of hypothyroidism and their bio socio demographic variables it has been found that Prevalence of hypothyroidism is more ( $\chi^2=9.94$   $p=0.05$ ) in 36-40 years antenatal mothers, and post graduates ( $\chi^2=7.51$   $p=0.05$ ) having more than other antenatal mothers. Based on the obstetrical variables Prevalence of hypothyroidism is more ( $\chi^2=23.10$   $p=0.001$ ) in 9-12weeks antenatal mothers than others. Prevalence of hypothyroidism is more in > 70 kg antenatal mothers than others. **Conclusion:** Maternal hypothyroidism is a condition that has the potential to be dangerous both the mother and the foetus. It is also linked to a number of other illnesses that can influence maternal and foetal health. Nurses should provide interventions that prevent complications of hypothyroidism during pregnancy.

**Keywords:** Antenatal Mothers, Foetus, Hypothyroidism, Prevalence, Obstetrics.

## INTRODUCTION

Thyroid disorders in pregnancy contribute to the second mostly reported endocrine disorder following diabetes.<sup>[1]</sup> Pregnancy has a significant effect on the thyroid gland and its functioning with an increase in 50% of thyroid hormone production.<sup>[2]</sup> Most of the women's may be asymptomatic while others represent with symptoms. The thyroid function test should be done every 4 to 6 weeks till 20th week and once again in 30th week of gestation. The woman with the pre-existing hypothyroidism develops an increased demand of thyroid hormone during pregnancy to about 30%.<sup>[3]</sup> Hypothyroidism affects 1.5% to 4% of pregnant women worldwide, according to several studies. Among them, 0.3% to 0.5% had overt hypothyroidism (OH), and threshold subclinical hypothyroidism (SCH). In India, reports on the prevalence of maternal hypothyroidism ranged between 1.2% and 67.0% in various studies. A review on 61 articles regarding the prevalence of hypothyroidism among pregnant women in India has revealed that 11.07 % pooled prevalence of hypothyroidism in pregnant women.<sup>[16]</sup>

An increased TSH level in serum contributes to Hypothyroidism in pregnancy. Furthermore, it is classified into overt (lower free T4 levels) and subclinical hypothyroidism depending on free T4 levels (normal free T4 levels). The thyroid gland and its function alter dramatically throughout pregnancy.<sup>[4]</sup>

During pregnancy, the synthesis of thyroid hormone increases by 50%. Daily iodine requirement also increases during pregnancy, leading to increase in thyroid volume of 10% and 20 - 40% in iodine sufficient and deficient areas, respectively. Pathologic or immunologic alterations during pregnancy might induce maternal and foetal complications.<sup>[5]</sup>

Thyroid auto antibodies have an adverse impact on a pregnant woman mainly miscarriage and subsequently the fetus. Both the mother and the foetus are at risk if hyperthyroidism is left untreated throughout pregnancy. The leading cause of hypothyroidism in pregnancy worldwide is iodine deficiency, and in iodine sufficient areas, most common cause is autoimmune thyroiditis. Women with lower thyroid reserves pre conceptually are often unable to cope with increased metabolic demands during pregnancy period and can enter into the hypothyroid state. Due to the inability to create iodothyronines before ten weeks of pregnancy, maternal thyroid hormone levels are crucial for the foetus, especially in the first trimester. This is the period when neurodevelopment of fetus can potentially be hampered due to deficiency of iodothyronines.<sup>[6]</sup>

The infant is fully reliant on the mother for thyroid hormone production throughout the first 18-20 weeks of pregnancy. The baby's thyroid begins to manufacture thyroid hormone on its own around mid-pregnancy.<sup>[7]</sup> The newborn, on the other hand, remains reliant on the mother for proper iodine intake, which is required for the production of thyroid hormones. To ensure appropriate thyroid hormone production during pregnancy, the World Health Organization recommends a daily iodine consumption of 250 micrograms.<sup>[8]</sup>

Untreated overt hypothyroidism is linked to gestational hypertension, abruption placenta, anemia, gestational diabetes, and postpartum hemorrhage in women who are pregnant. There's also a higher chance of having a sick baby if you have overt hypothyroidism. Spontaneous miscarriage, low birth weight, early birth, foetal discomfort, perinatal mortality, and stillbirth are all common birth outcomes.<sup>[3]</sup> Overt hypothyroidism has a negative impact on the fetus's neurocognitive development. Although the evidence is ambiguous, subclinical hypothyroidism may have similar negative consequences.<sup>[9]</sup> Furthermore, research has indicated that children born to mothers who have untreated hypothyroidism are at a considerably increased risk of experiencing cognitive developmental abnormalities, which can appear as lower IQ scores and other learning difficulties.<sup>[10]</sup>

Previous research has shown that the majority of these consequences can be avoided by screening high-risk pregnant women for thyroid problems and treating them with levothyroxine (LT4). In order to properly commence such a screening programme in India, a countrywide assessment of the disease's prevalence is required.<sup>[11]</sup>

Because of the potential for serious repercussions, thyroid illness in pregnant women requires clinical and scientific attention. Overt thyroid illness in pregnant women is well-known and should be treated to avoid maternal and foetal problems.<sup>[12]</sup>

Hence, predicting the need to evaluate the prevalence of hypothyroidism in pregnancy to minimize the consequences the researcher conducted this study with an aim to estimate the prevalence of hypothyroidism among pregnant women in our centre.

## **MATERIALS AND METHODS**

### **Study design and setting**

This is a quantitative descriptive cross-sectional study undertaken in the antenatal OPD section at Apollo Women's hospital, Chennai for a period of one month.

### **Sample criteria**

The sampling technique used was non-probability convenience sampling and the sample size was 400. The inclusion criteria were as follows: a) Antenatal mother in all trimester b) Singleton Pregnancy. c) Willing to participate in study. The following criteria were used to exclude antenatal was: a) Mother with known cause of chronic disorder (Diabetes Mellitus, Hypertension) b) Bad obstetrical score.

### **TOOLS FOR DATA COLLECTION**

Demographic data such as Age, education, work, age of marriage, etc. and clinical variable such as T3, T4 and TSH, etc. and obstetrical variable such as gestational weeks and parity were collected from the subjects.

### **Ethical approval**

The Institutional Review Board of Apollo Hospitals, Chennai accepted the protocol for this study under reference number AMH-C-S-008/02-22. Permission to conduct the study was obtained in advance from the competent authority of AMH and HOD of our hospital. The study was explained to participants in their native language, and consent was obtained orally and in writing. Confidentiality will be maintained throughout the study.

### **STATISTICAL ANALYSIS**

Descriptive statistics were used to describe and synthesize data. Frequency, percentage, mean and standard deviation were used under descriptive statistics. Inferential statistics is used derive the association between hypothyroidism and socio demographic variables.

## RESULTS

Hypothyroidism is the major concern of pregnancy and childbirth as it affects the progress of pregnancy as well as labour. The data collected was analysed using descriptive and inferential statistics to identify the prevalence of hypothyroidism and its association with selected demographic variables.

**Table-1: Demographic Variables of Antenatal Mothers [N=150]**

Demographic variables		Frequency	Percentage
Age group	21 -25 years	25	16.89%
	26 -30 years	78	52.70%
	31 -35 years	34	22.97%
	36 -40 years	11	7.43%
Education status	Plus Two	5	3.38%
	Graduate	118	79.73%
	PG	25	16.89%
Occupation status	Housewife	93	62.84%
	Working	52	35.14%
	Staff nurses/Doctor	3	2.02%
Age at marriage	≤ 25 years	100	67.57%
	26-30 years	41	27.70%
	31-35 years	7	4.73%
Type of family	Joint family	87	58.78%
	Nuclear family	61	41.22%
FAMILY H/O HYPOTHYROIDISM	Father	4	2.70%
	Mother	20	13.52%
	Sister	6	4.05%
	None	118	79.73%

Table 1 reveals that most of the participants (78%) was in the age group of 26 to 30 years, with 118(79.73%) were graduates, and 93(62.84%) were home makers. About 100(67.57%) were married ≤ 25 years, living in a joint family 87(58.78%) and 20(13.52%) had a family history of hypothyroidism.

**Table-2: Obstetrical Data of Antenatal Mothers [N=150]**

OBSTETRICAL DATA		Frequency	Percentage
OBS. SCORE	Primi	86	58.11%
	GI	3	2.03%
	G2	46	31.08%
	G3	15	8.78%
GESTATIONAL WEEKS	9-12 weeks	17	11.49%
	13-24 weeks	42	28.38%
	25-32 weeks	44	28.38%
	33-40 weeks	47	31.75%

Table 2 shows that based on the obstetrical data, about 86(58.11%) were Primi mothers and about 47(31.75%) were between 33 to 40 wks.

**Table-3: Clinical Data of Antenatal Mothers [N=150]**

		Frequency	Percentage
T3	Normal	78	52.70%
	Abnormal	70	47.30%
T4	Normal	140	94.59%
	Abnormal	8	5.41%
HB	Normal	107	72.30%
	Abnormal	41	27.70%

Table 3 explains the clinical characteristics, nearly half 70 (47.30%) of them have abnormal T3 level, majority of their T4 level was normal, with 22(14.86%) has higher level of TSH.

Figure-1: Anthropometric Measurements of Antenatal Mothers [N=150]

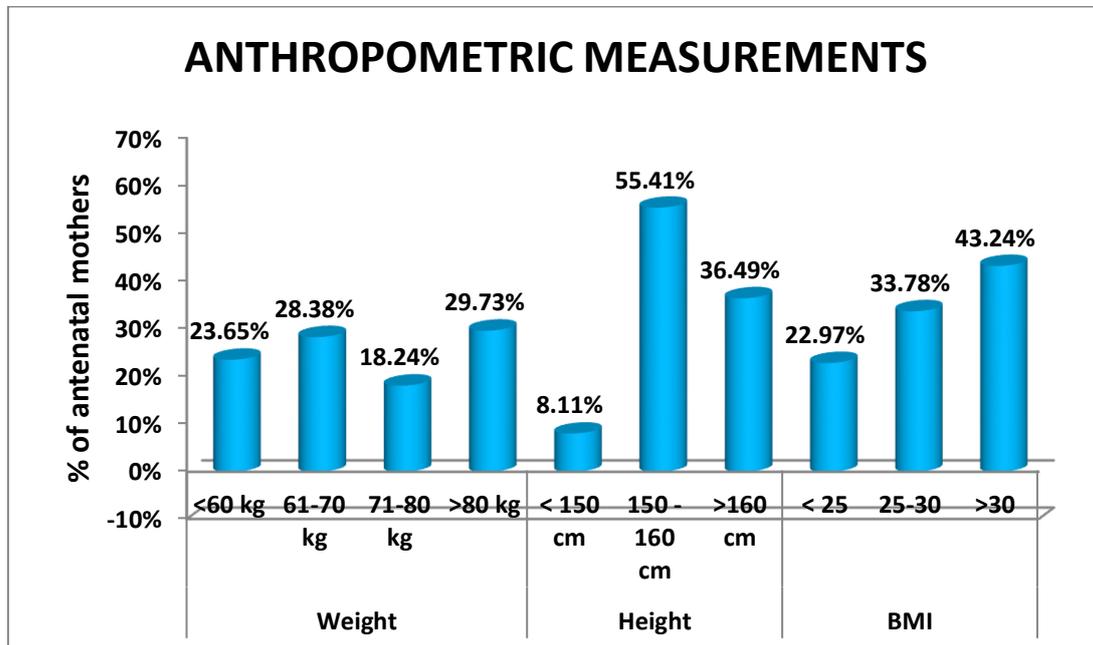


Figure 1 shows that mostly 42(28.38%) of them were between weight of 61-70 kg, with 82(55.41%) of them were between 150-160 cm and the BMI was > 30 among 64(43.24%).

Table 4: Prevalence of Hypothyroidism among Antenatal Mothers [N=150]

	Total Antenatal Mothers	Hypothyroid Antenatal Mothers	% Of Hypothyroid	95% Confidence Interval
Prevalence of hypothyroid	150	24	14.86%	10.03% -21.48%
Prevalence of Normal	150	126	85.14%	78.52% -89.97%

Table 4 depicts that the prevalence of hypothyroidism among 150 antenatal mothers. 24(14.86%) were found to have hypothyroidism whereas 126(85.14%) were having normal pregnancy.

Table 5: Association between Prevalence of Hypothyroidism and Antenatal Mothers Demographic Variables [N=150]

Demographic variables	TSH				n	Chi square test	Significance	
	Normal		Abnormal					
	n	%	n	%				
Age group	21 -25 years	23	92.00%	2	8.00%	25	$\chi^2=9.94$	p=0.05* (S)
	26 -30 years	63	80.77%	15	19.23%			
	31 -35 years	33	97.06%	1	2.94%			
	36 -40 years	7	63.64%	4	36.36%			
Education status	Plus Two	5	100.00%	0	0.00%	5	$\chi^2=7.51$	p=0.05* (S)
	Graduate	10	88.14%	1	11.86%			
	PG	17	68.00%	8	32.00%			

<b>Occupation status</b>	Housewife	77	82.80%	16	17.20%	93	$\chi^2=1.38$ p=0.50	p=0.10 (NS)
	Working	46	88.46%	6	11.54%	52		
	Staff nurses/Doctor	3	100.00%	0	0.00%	3		
<b>Age at marriage</b>	< 25 years	89	89.00%	11	11.00%	100	$\chi^2=4.12$ p=0.13	p=0.10 (NS)
	26-30 years	31	75.61%	10	24.39%	41		
	31-35 years	6	85.71%	1	14.29%	7		
<b>Type of family</b>	Joint family	76	87.36%	11	12.64%	87	$\chi^2=0.82$ p=0.36	p=0.10 (NS)
	Nuclear family	50	81.97%	11	18.03%	61		
<b>FAMILY H/O HYPOTHYROIDISM</b>	Father	3	75.00%	1	25.00%	4	$\chi^2=4.68$	p=0.10(NS)
	Mother	18	90.00%	2	10.00%	20		
	Sister	3	50.00%	3	50.00%	6		
	None	102	86.44%	16	13.56%	118		

Table 5 elicit the association between prevalence of hypothyroidism and their demographic variables it has been found that Prevalence of hypothyroidism is more ( $\chi^2=9.94$  p=0.05\*) in 36-40 years ante mothers, and post graduates ( $\chi^2=7.51$  p=0.05\*) having more than other ante natal mothers.

**Table 6: Association between Prevalence of Hypothyroidism and Antenatal Mothers Obstetric Variables [N=150]**

Obstetrical Variables		TSH				N=150	Chi Square Test	Significance
		Normal		Abnormal				
		n	%	n	%			
<b>OBS. SCORE</b>	<b>Primi</b>	74	86.05%	12	13.95%	86	$\chi^2=1.68$	p=0.64 (NS)
	GI	2	66.67%	1	33.33%	3		
	G2	40	86.96%	6	13.04%	46		
	G3	10	76.92%	3	23.08%	13		
<b>Gestational weeks</b>	9-12 weeks	8	47.06%	9	52.94%	17	$\chi^2=23.10$	p=0.001***(S)
	13-24 weeks	38	90.48%	4	9.52%	42		
	25-32 weeks	36	85.71%	6	14.29%	42		
	33-40 weeks	44	93.62%	3	6.38%	47		

Table 6 Shows the Association between Gestational Weeks and Prevalence of hypothyroidism is more ( $\chi^2=23.10$ ) in 9-12weeks ante mothers than others.

**Table 7: Association between Prevalence of Hypothyroidism and Antenatal Mothers Clinical Variables [N=150]**

clinical variable		TSH				N=150	Chi square test	Significance
		Normal		Abnormal				
		n	%	n	%			
<b>T3</b>	Normal	64	82.05%	14	17.95%	78	$\chi^2=1.24$	p=0.27 (NS)
	Abnormal	62	88.57%	8	11.43%	70		
<b>T4</b>	Normal	118	84.29%	22	15.71%	140	$\chi^2=1.48$	p=0.22 (NS)
	Abnormal	8	100.00%	0	0.00%	8		
<b>HB</b>	Normal	92	85.98%	15	14.02%	107	$\chi^2=0.22$	p=0.64 (NS)
	Abnormal	34	82.93%	7	17.07%	41		
<b>Weight</b>	<60 kg	33	94.29%	2	5.79%	35	$\chi^2=10.03$	p=0.05* (S)

	61-70 kg	39	92.86%	3	7.14%	42		
	71-80 kg	19	70.37%	8	29.73%	27		
	>80 kg	35	79.55%	9	20.45%	44		
<b>HT</b>	< 150 cm	10	83.33%	2	16.67%	12	$\chi^2=0.25$	p=0.88 (NS)
	150 -160 cm	69	84.15%	13	15.85%	82		
	>160 cm	47	87.04%	7	12.96%	54		
<b>BMI</b>	< 25	32	73.53%	2	26.47%	34	$\chi^2=6.75$	p=0.05* (S)
	25-30	45	94.00%	5	6.00%	50		
	>30	49	84.38%	15	15.63%	64		

Table 7 Shows the Association between Prevalence of hypothyroidism is more in > 70 kg and the increased BMI of antenatal mothers than others.

## DISCUSSION

The study findings of the prevalence of hypothyroidism among 150 antenatal mothers 24(14.86%) were found to have hypothyroidism whereas 126(85.14%) were having normal pregnancy correlate with the similar study of Gupta A which showed 10.8% prevalence of hypothyroidism<sup>[14]</sup>, and Lin T results showed 10.4% of thyroid disorders<sup>[15]</sup>. These results corroborated with the similar study by Nancy which showed an association with the age and the weight of the mother<sup>[13]</sup> and a study of Gupta A with significant association between parity, BMI, and education and maternal age which is of a major concern<sup>[14]</sup>. Similar studies by Lin T have confirmed that mother in first trimester has high thyroxin level<sup>[15]</sup>

Thyroid problems that arise during pregnancy can be treated, and the treatment may produce excellent outcomes. Otherwise, it is highly probable that this disease may have serious health consequences for both the mother and the newborn.

## CONCLUSION

Maternal hypothyroidism is a condition that has the potential to be dangerous both the mother and the fetus. It is also linked to a number of other illnesses that can influence maternal and fetal health. Prevalence of thyroid disorders is high. To prevent adverse effects on maternal and fetal outcome, we are emphasizing the importance of routine antenatal thyroid screening to detect the thyroid dysfunction at an early stage.

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## REFERENCES

1. Singh, S., Sandhu, S. (2022). Thyroid Disease And Pregnancy. Stat Pearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK538485/>
2. Chung, H.G.(2020). Recent Issues Related to Thyroid Disease in Pregnancy. Int J Thyroidol, 13(2), 85-94.
3. Erik, K., Alexander., Elizabeth, N., et al.(2017). 2017 Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and the Postpartum. Thyroid, 315-389.
4. Neeliyara, A.M., and Kumari, K.S.(2015). Reproductive Health and Nutritional Profile of Women in the Coastal Areas of Alleppey District Kerala. Medicine.
5. Freddy, J. K. (2020). Toloza Consequences of Severe Iodine Deficiency in Pregnancy: Evidence in Humans, Frontiers in endocrinology. | <https://doi.org/10.3389/fendo.2020.00409>
6. Alemu, A., Terefe, B., Abebe, M., & Biadgo, B. (2016). Thyroid hormone dysfunction during pregnancy: A review. International journal of reproductive biomedicine, 14(11), 677–686.
7. Moog, N. K., Entringer, S., Heim, C., Wadhwa, P. D., Kathmann, N., & Buss, C. (2017). Influence of maternal thyroid hormones during gestation on fetal brain development. Neuroscience, 342, 68–100. <https://doi.org/10.1016/j.neuroscience>.

8. Pandey, S.K., Pandey, H.S., and Kalra, V.(2018) Study of prevalence of thyroid disorders in pregnant females of a tertiary care hospital of Garhwal region of Uttarakhand. *Annals of International Medical and Dental Research*, 4(4),25–27.
9. Yadav, V., Dabar,D., Akhil, D.,et al.(2021).Prevalence of Hypothyroidism in Pregnant Women in India: A Meta-Analysis of Observational Studies. *Journal of Thyroid Research*, 2021, 19. <https://doi.org/10.1155/2021/5515831>
10. Stagnaro, G.A.(2011).Thyroid antibodies and miscarriage: Where are we at a generation later?. *J Thyroid Res*, 2011,841949.
11. Le Beau, S.O., Mandel, S.J.(2006).Thyroid disorders during pregnancy. *Endocrinol Metab Clin North Am*,35,117-36
12. Nambiar, V., Jagtap, V.S., Sarathi, V.,et al.(2011).Prevalence and impact of thyroid disorders on maternal outcome in Asian Indian pregnant women. *J Thyroid Res*, 2011, 4290-7.
13. Nancy, S.P., and Bennet,J.(2018).Prevalence of hypothyroidism amongst pregnant women: a study done in rural set up. *International Journal Of Reproduction, Contraception, Obstetrics And Gynaecology*,7(4) [.http://dx.doi.org/10.18203/2320-1770.ijrcog20181360](http://dx.doi.org/10.18203/2320-1770.ijrcog20181360)
14. Gupta, P., Jain, M., Verma, V., et al. (2021).The Study of Prevalence and Pattern of Thyroid Disorder in Pregnant Women: A Prospective Study. *Cureus*, 13(7): e16457. DOI 10.7759/cureus.16457
15. Lin.T., and Chen, Z. (2020). Thyroid Hormone Changes in Early Pregnancy Along with the COVID-19 Pandemic *Front. Endocrinol*. <https://doi.org/10.3389/fendo.2020.606723>
16. Sahu, M.T., Das, V., Mittal, S., Agarwal, A., et al. (2010).Overt and subclinical thyroid dysfunction among Indian pregnant women and its effect on maternal and fetal outcome. *Arch Gynecol Obstet*, 281, 215-20