International Journal of Science and Healthcare Research
[Indexed, Peer-Reviewed Journal]
Vol. 11; Issue: 1; Jan.-March 2026
Website: ijshr.com
Original Research Article *ISSN: 2455-7587*

Prevalence and Clinical Impact of Thyroid Dysfunction in Pregnant Women with Gestational Diabetes Mellitus: A Case-Control Study in a Tertiary Care Setting

Bhagyashree[1], Pratima[2]

[1]Tutor/Senior Resident, [2]Associate Professor,
Department of Obstetrics & Gynaecology, Sri Krishna Medical College and Hospital,Muzaffarpur, Bihar, India

Corresponding Author: Pratima

DOI: https://doi.org/10.52403/ijshr.20260117

ABSTRACT

Background: Gestational diabetes mellitus (GDM) and thyroid disorders are two common endocrine conditions in pregnancy; each associated with adverse maternal and neonatal outcomes. Emerging evidence suggests a bidirectional relationship between glucose intolerance and thyroid dysfunction, warranting focused evaluation in high-risk obstetric populations.

Methods: A hospital-based case–control study was conducted on 120 pregnant women (60 GDM cases, 60 controls) between 24–28 weeks of gestation. Standard oral glucose tolerance testing was used to diagnose GDM. Thyroid function was assessed via serum TSH, free T4, and free T3, with classification into overt and subclinical hypo- or hyperthyroidism. Associations with maternal age, BMI, parity, and obstetric/neonatal outcomes were analyzed using chi-square and logistic regression.

Results: Women with GDM had significantly higher mean TSH (5.83 vs. 3.44 mIU/L, $p<0.0001$) and lower T4 (8.80 vs. 11.73 µg/dl, $p<0.0001$) and T3 (135.67 vs. 167.48 ng/dl, $p<0.0001$) compared to controls. Thyroid dysfunction was more prevalent in cases (55%) than controls (38.3%), with subclinical hypothyroidism being the most frequent abnormality (31.7% vs. 23.3%). Descriptive trends indicated higher rates of thyroid dysfunction in women >30 years, increased elective cesarean deliveries among hypothyroid cases, and poorer neonatal outcomes (low birth weight, low APGAR scores) among infants of hyperthyroid mothers, though these did not reach statistical significance.

Conclusion: Pregnant women with GDM exhibit a significantly higher burden of thyroid dysfunction, particularly hypothyroidism. While associations with maternal age, delivery mode, and neonatal outcomes were not statistically significant, observed trends highlight potential compounded risks.

Keywords: Gestational diabetes mellitus (GDM), Thyroid dysfunction, Hypothyroidism, Hyperthyroidism, Pregnancy outcomes

INTRODUCTION

Gestational diabetes mellitus (GDM) is one of the most common metabolic complications encountered during pregnancy, characterized by glucose intolerance with onset or first recognition during gestation. Its prevalence has been steadily increasing worldwide, largely due to changing lifestyles, rising maternal age, and the global epidemic of obesity. GDM is associated with significant short- and

long-term consequences for both mother and child, including increased risk of pre-eclampsia, cesarean delivery, macrosomia, neonatal hypoglycemia, and later development of type 2 diabetes mellitus. [1-5] In parallel, thyroid disorders represent another major endocrine condition affecting women of reproductive age. Thyroid dysfunction during pregnancy, whether overt or subclinical, has been implicated in adverse maternal and fetal outcomes such as miscarriage, preterm birth, intrauterine growth restriction, and impaired neurodevelopment in offspring. [6]

The interplay between thyroid function and glucose metabolism has been increasingly recognized in recent years. Thyroid hormones exert profound effects on carbohydrate metabolism, insulin sensitivity, and lipid regulation. [7] Conversely, insulin resistance and hyperglycemia may influence thyroid physiology through complex mechanisms involving hormonal feedback loops, autoimmunity, and metabolic stress. Several studies have suggested that women with GDM may have a higher prevalence of thyroid dysfunction compared to normoglycemic pregnant women, raising important questions about shared pathophysiological pathways and potential implications for screening and management. [8]

Pregnancy itself is a unique physiological state that imposes significant demands on both thyroid and pancreatic function. Human chorionic gonadotropin (hCG) stimulates thyroid hormone production, while increased estrogen levels elevate thyroxine-binding globulin, altering free hormone concentrations. At the same time, pregnancy is characterized by progressive insulin resistance, particularly in the second and third trimesters, which may unmask latent glucose intolerance. [1-6] These overlapping endocrine changes create a milieu in which subtle dysfunctions may become clinically relevant. Identifying thyroid disorders in women with GDM is therefore crucial, as coexisting abnormalities may compound risks and necessitate tailored interventions.

Despite growing interest in this area, data from different populations remain heterogeneous. Variations in diagnostic criteria, iodine sufficiency, genetic predisposition, and healthcare practices contribute to differences in reported prevalence rates. In some studies, hypothyroidism has emerged as the most frequent thyroid disorder among women with GDM, while others have highlighted associations with autoimmune thyroid disease or hyperthyroidism. [9] Furthermore, demographic and clinical factors such as maternal age, parity, body mass index (BMI), and family history of endocrine disorders may influence susceptibility to thyroid dysfunction in the context of GDM. Understanding these associations in specific populations is essential for refining screening strategies and improving maternal-fetal outcomes.

In India, where both GDM and thyroid disorders are highly prevalent, the burden of dual endocrine dysfunction during pregnancy is of particular concern. The country faces a dual challenge of rising non-communicable diseases and persistent micronutrient deficiencies, including iodine insufficiency in certain regions. Tertiary care centers, which cater to a diverse patient population with complex medical needs, provide an ideal setting to investigate the coexistence of GDM and thyroid disorders.

The present study seeks to address the research question: *What is the prevalence of thyroid disorders among pregnant women with gestational diabetes mellitus (GDM) compared to those without GDM in a tertiary care setting, and how are these disorders associated with maternal demographic and clinical variables?* The central hypothesis is that pregnant women with GDM have a significantly higher prevalence of thyroid dysfunction, particularly hypothyroidism and its subclinical variants, than non-GDM controls. Accordingly, the objectives of this study are threefold: first, to determine and

compare the prevalence of thyroid disorders in pregnant women with and without GDM; second, to assess the distribution of specific thyroid disorders such as hypothyroidism, hyperthyroidism, and subclinical variants across the study groups; and third, to evaluate the association between thyroid dysfunction and maternal demographic/clinical variables, thereby generating evidence to inform screening and management strategies in antenatal care.

MATERIALS & METHODS

This study was conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital. It was designed as a hospital-based, case-control study to evaluate the prevalence of thyroid disorders among pregnant women diagnosed with gestational diabetes mellitus (GDM) compared to those without GDM. Ethical clearance was obtained from the Institutional Ethics Committee prior to commencement, and informed consent was taken from all participants.

Inclusion Criteria

- Pregnant women between 24–28 weeks of gestation attending the antenatal clinic.
- Women diagnosed with GDM based on standard oral glucose tolerance test (OGTT) criteria (cases).
- Pregnant women with normal glucose tolerance serving as controls.
- Singleton pregnancies.

Exclusion Criteria

- Women with pre-existing diabetes mellitus (type 1 or type 2).
- Known thyroid disease prior to pregnancy or on thyroid medication.
- Multiple gestations.
- Women with chronic systemic illnesses (renal, hepatic, autoimmune disorders) that could influence thyroid or glucose metabolism.
- Those unwilling to participate or provide informed consent.

Sample Size

A total of 120 pregnant women were enrolled. The study group consisted of 60 cases (pregnant women with GDM) and 60 controls (pregnant women without GDM), matched for age and gestational period.

Outcome Parameters

The primary outcome parameter was the prevalence of thyroid disorders in cases versus controls. Secondary outcome parameters included:

- Distribution of specific thyroid disorders (hypothyroidism, hyperthyroidism, subclinical hypothyroidism, subclinical hyperthyroidism).
- Association of thyroid dysfunction with maternal demographic and clinical variables such as age, parity, body mass index (BMI), and family history of thyroid or metabolic disorders.

Data Collection

Data were collected using a structured proforma. Maternal demographic details (age, parity, BMI, socioeconomic status, family history) and clinical information were recorded. Laboratory investigations included fasting plasma glucose, OGTT results, thyroid function tests (serum TSH, free T4, free T3), and thyroid antibody profile where indicated. All biochemical analyses were performed in the hospital's central laboratory using standardized assays.

METHODOLOGY

Pregnant women attending the antenatal clinic were screened for GDM between 24–28 weeks of gestation using the OGTT. Those diagnosed with GDM were recruited as cases, while women with normal glucose tolerance served as controls. After recruitment, venous blood samples were collected for thyroid function testing. Thyroid disorders were classified based on established reference ranges:

- **Overt hypothyroidism:** Elevated TSH with low free T4.
- **Subclinical hypothyroidism:** Elevated TSH with normal free T4.

- **Overt hyperthyroidism:** Suppressed TSH with elevated free T4/free T3.
- **Subclinical hyperthyroidism:** Suppressed TSH with normal free T4/free T3.

All participants were followed up during pregnancy, and relevant obstetric outcomes were documented.

Statistical Analysis

Data were compiled and analyzed using statistical software (SPSS version XX or equivalent). Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The prevalence of thyroid disorders between cases and controls was compared using the chi-square test or Fisher's exact test, as appropriate. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 120 pregnant women were enrolled. The study group consisted of 60 cases (pregnant women with GDM) and 60 controls (pregnant women without GDM), matched for age and gestational period. Age did not differ significantly between groups (p=0.7059), indicating that age was not a confounding factor in this study. However, cases had a significantly higher average BMI (25.51 vs. 24.15 kg/m², p=0.0475). Most notably, thyroid function markers showed highly significant differences: cases had markedly higher TSH levels (5.83 vs. 3.44 mIU/L) and lower T4 (8.80 vs. 11.73 µg/dl) and T3 (135.67 vs. 167.48 ng/dl) levels compared to controls (all p<0.0001) [Table 1].

Table 1: Comparison of Demographic and Clinical Variables between Cases and Controls

Parameter	Parameters in Mean ± SD		P-Value
	Cases (n=60)	Control (n=60)	(Unpaired t test)
Age in Years	29.25 ± 5.04	28.89 ± 5.38	0.7059
BMI in kg/m^2	25.51 ± 3.76	24.15 ± 3.68	0.0475
TSH in mIU/L	5.83 ± 1.31	3.44 ± 1.06	<0.0001
T4 in µg/dl	8.80 ± 1.77	11.73 ± 2.88	<0.0001
T3 in ng/dl	135.67 ± 19.90	167.48 ± 21.01	<0.0001

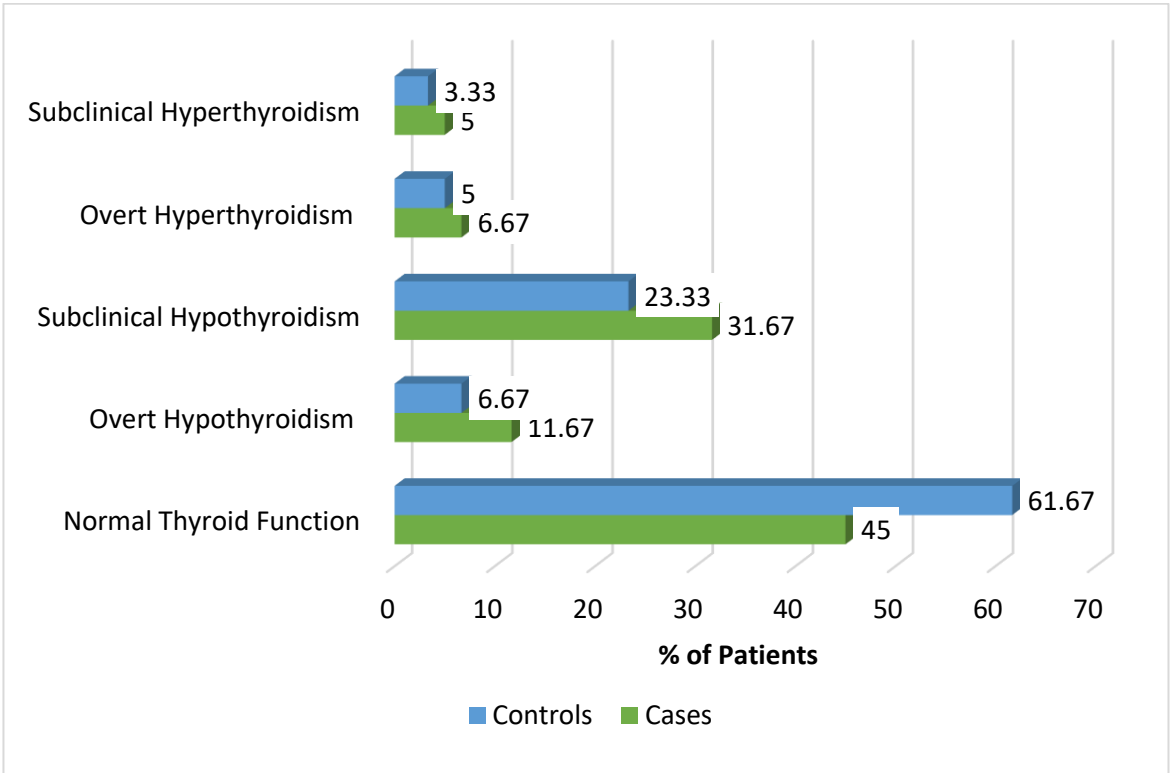

Figure 1: Comparison of Different Thyroid Disorder between Case and Control

Normal thyroid function is more common in controls (61.7%) compared to cases (45%), suggesting a higher burden of thyroid dysfunction among the case group. Both overt and subclinical hypothyroidism are more frequent in cases (11.7% and 31.7%, respectively) than in controls (6.7% and 23.3%), indicating a stronger association of hypothyroid states with the case population. Similarly, overt and subclinical hyperthyroidism show slightly higher proportions in cases (6.7% and 5%) compared to controls (5% and 3.3%). [Figure 1].

While no statistically significant difference was found (p=0.1051), a descriptive trend is observable. The proportion of patients over 30 years old was higher in the hypothyroid (38.46%) and hyperthyroid (57.14%) groups compared to the euthyroid group (14.82%). This may suggest that older age within the case cohort is associated with a higher likelihood of thyroid dysfunction, though this trend did not reach statistical significance in this sample [Table 2].

Table 2: Comparison of Age between Different Thyroid Status in Cases

Age Group in Years	Number of Patients (%)			P-Value (Chi-Square Test)
	Euthyroid (n =27)	Hypothyroid (n = 26)	Hyperthyroid (n=7)	
21-25	6 (22.22)	7 (26.92)	1 (14.29)	0.1051
26-30	17 (62.96)	9 (34.62)	2 (28.57)	
>30	4 (14.82)	10 (38.46)	4 (57.14)	

The differences in delivery methods (Elective LSCS, Emergency LSCS, Vaginal Delivery, Suction & Evacuation) across the euthyroid, hypothyroid, and hyperthyroid groups were not statistically significant (p=0.3406). Descriptively, a higher percentage of hypothyroid cases underwent Elective LSCS (50%) compared to other groups [Table 3].

Table 3: Comparison of Mode of Delivery between Different Thyroid Status in Cases

Mode of Delivery	Number of Patients (%)			P-Value (Chi-Square Test)
	Euthyroid (n =27)	Hypothyroid (n = 26)	Hyperthyroid (n=7)	
Elective LSCS	9 (33.33)	13 (50.0)	3 (42.86)	0.3406
Emergency LSCS	3 (11.11)	4 (15.38)	1 (14.29)	
Vaginal Delivery	15 (55.56)	8 (30.77)	2 (28.57)	
Suction & Evacuation	0	1 (3.85)	1 (14.29)	

Although statistically insignificant, a notable descriptive finding is that a lower proportion of infants born to hyperthyroid mothers had normal birth weight (28.57%) compared to the euthyroid (62.96%) and hypothyroid (50%) groups, with a correspondingly higher proportion in the low-birth-weight category (42.86%) [Table 4].

Table 4: Comparison of Birth Weight between Cases with Different Thyroid Status

Birth Weight	Number of Patients (%)			P-Value (Chi-Square Test)
	Euthyroid (n =27)	Hypothyroid (n = 26)	Hyperthyroid (n=7)	
Very -Low Birth Weight (<1.5 kg)	2 (7.41)	3 (11.54)	1 (14.29)	0.7774
Low Birth Weight (1.5 -2.5 kg)	7 (25.93)	8 (30.77)	3 (42.86)	
Normal (2.5–4.0 kg)	17 (62.96)	13 (50.00)	2 (28.57)	
Macrosomia (>4 kg)	1 (3.70)	2 (7.69)	1 (14.29)	

The difference in the proportion of infants with an APGAR score below 7 across the groups was not statistically significant (p=0.0726). However, the data shows a trend: infants of hyperthyroid mothers had the highest percentage of low APGAR scores (42.86%, or 3 out of 7), followed by hypothyroid mothers (15.38%, or 4 out of 26), and the lowest in euthyroid mothers (7.41%, or 2 out of 27) [Table 5].

Table 5: Comparison of APGAR Score between Cases with Different Thyroid Status

APGAR Score	Number of Patients (%)			P-Value (Chi-Square Test)
	Euthyroid (n =27)	Hypothyroid (n = 26)	Hyperthyroid (n=7)	
APGAR <7	2	5	3	0.0726
APGAR ≥ 7	25	21	4	

DISCUSSION

The findings from this study carry significant clinical implications for maternal-fetal medicine. The pronounced thyroid dysfunction in the case group—characterized by significantly elevated TSH and reduced T3/T4 levels—strongly suggests that thyroid screening is crucial in high-risk obstetric populations. The near-significant trends linking maternal hyperthyroidism to poorer neonatal outcomes (lower birth weight and lower APGAR scores) are particularly alarming. They indicate that thyroid dysfunction may not only affect maternal metabolism but also directly impact fetal well-being and the infant's transition to extrauterine life. Clinically, this underscores the need for aggressive monitoring, timely intervention (e.g., levothyroxine for hypothyroidism), and careful intrapartum and neonatal planning for pregnancies complicated by thyroid disorders, especially hyperthyroidism, to mitigate potential adverse outcomes.

The core finding of this study—a high burden of thyroid dysfunction, particularly hypothyroidism, in the case group—aligns with a substantial body of literature linking thyroid disorders to diabetic and gestational diabetic pregnancies. The possible explanations are multifactorial, involving shared autoimmune pathogenesis (e.g., anti-TPO antibodies), insulin resistance exacerbated by thyroid hormones, and the overall increased metabolic and hormonal stress of pregnancy, which unmasks underlying thyroid susceptibility. [6-8]

Our finding of hypothyroidism as the most common dysfunction (especially subclinical) is strongly supported by multiple studies. Konar et al. (2018) reported 37.5% hypothyroidism, (11) and Fatima et al. (2015) found a strikingly high 61.5% SCH in GDM subjects. (12) Alotaibi et al. (2023) also found hypothyroidism (both overt and subclinical) to be the predominant dysfunction. (13) Our data adds to this consensus. The link with hyperthyroidism is less robust but present; our observed slight increase aligns with the lower prevalence reported by Alotaibi et al. (2023) and Shahbazian et al. (2013). (13, 14)

The strong association in our study is mirrored in the literature. Maleki et al. (2015) and Oguz et al. (2015) found significantly higher thyroid dysfunction (including isolated hypothyroxinemia) in GDM cases versus controls. (15, 16) Tudela et al. (2012) demonstrated a direct correlation between increasing TSH and GDM risk. (17) Crucially, the meta-analysis by Toulis et al. provides Level-1 evidence, confirming 35-39% increased odds of GDM in women with SCH. (18) However, Shahbazian et al. (2013) introduced an important nuance: they found a significant association with pre-gestational DM but not with GDM alone compared to controls, suggesting that the duration and severity of glucose metabolism disturbance may modulate the strength of the thyroid association. (14)

Our observed trends (non-significant) regarding delivery mode and birth weight find some echo in previous work. Konar et

al. (2018) noted that all women with combined endocrinopathy delivered via C-section. (11) More compellingly, Fatima et al. (2015) reported a direct, significant negative correlation between maternal TSH and fetal growth, which strongly supports our descriptive finding of lower normal birth weight in hyperthyroid/hypothyroid groups. (12) This points to a plausible biological pathway affecting fetal development.

The studies collectively point beyond mere association. Fatima et al. (2015) showed TSH was independently linked to poor glycemic control, suggesting a bidirectional or synergistic relationship between insulin resistance and thyroid axis disruption. (12) The findings of Oguz et al. (2015) on lower fT4 further implicate even subtle thyroid hormone changes. (16) While autoimmune etiology (anti-TPO) was explored by Konar et al. (2018) and Shahbazian et al. (2013) without definitive association in all groups, it remains a key mechanistic pathway, especially in pre-gestational DM. (11, 14)

In summary, our results reinforce the established link between thyroid dysfunction (primarily hypothyroidism) and diabetic pregnancies, contributing to the evidence that this population warrants vigilant screening. The novel suggestion from our data—that hyperthyroidism may pose a distinct risk for immediate neonatal well-being (APGAR)—merits focused investigation in larger, prospective studies. The collective evidence confirms that thyroid function is a critical modifier of perinatal risk in glucose-intolerant pregnancies, and its management should be integrated into standard obstetric care for these patients.

This study has several limitations. The relatively small sample size (n=60 per group) may have limited the statistical power to detect significant associations, particularly for secondary outcomes like mode of delivery and neonatal parameters, where only trends were observed. The cross-sectional or case-control design precludes the establishment of causal relationships between thyroid dysfunction and the observed outcomes.

CONCLUSION

In conclusion, this study demonstrates a significantly higher burden of thyroid dysfunction, particularly hypothyroidism, within the case population, as evidenced by markedly abnormal thyroid function markers (elevated TSH and reduced T3/T4) compared to controls. While maternal thyroid status did not show statistically significant associations with maternal age, mode of delivery, or birth weight in this cohort, notable descriptive trends were observed, including a higher prevalence of thyroid dysfunction in older cases and a tendency toward lower birth weights and poorer immediate neonatal outcomes (APGAR scores) among infants born to hyperthyroid mothers. These findings reinforce the well-established link between thyroid disorders and adverse metabolic pregnancy states and underscore the critical importance of routine thyroid function screening in high-risk obstetric populations. Early detection and appropriate management of thyroid dysfunction are essential to potentially mitigate associated maternal and neonatal risks.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Plows JF, Stanley JL, Baker PN, Reynolds CM, Vickers MH. The Pathophysiology of Gestational Diabetes Mellitus. Int J Mol Sci. 2018 Oct 26;19(11):3342. doi: 10.3390/ijms19113342.
2. American Diabetes Association Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes—2018. Diabetes Care. 2018;41: S13–S27. doi: 10.2337/dc18-S002.

3. International Diabetes Federation. IDF Diabetes Atlas. 8th ed. IDF; Brussels, Belgium: 2017.
4. Feig D.S., Moses R.G. Metformin Therapy during Pregnancy Good for the goose and good for the gosling too? Diabetes Care. 2011; 34:2329–2330. doi: 10.2337/dc11-1153.
5. Camelo Castillo W., Boggess K., Stürmer T., Brookhart M.A., Benjamin D.K., Jonsson Funk M. Association of Adverse Pregnancy Outcomes with Glyburide vs Insulin in Women with Gestational Diabetes. JAMA Pediatr. 2015; 169:452–458. doi: 10.1001/jamapediatrics.2015.74.
6. Alemu A, Terefe B, Abebe M, Biadgo B. Thyroid hormone dysfunction during pregnancy: A review. Int J Reprod Biomed. 2016 Nov;14(11):677-686.
7. Eom YS, Wilson JR, Bernet VJ. Links between Thyroid Disorders and Glucose Homeostasis. Diabetes Metab J. 2022 Mar;46(2):239-256. doi: 10.4093/dmj.2022.0013.
8. Brenta G. Why can insulin resistance be a natural consequence of thyroid dysfunction? J Thyroid Res. 2011; 2011:152850. doi: 10.4061/2011/152850.
9. Sitoris G, Veltri F, Ichiche M, Kleynen P, Praet JP, Rozenberg S, Poppe KG. Association between thyroid autoimmunity and gestational diabetes mellitus in euthyroid women. Eur Thyroid J. 2022 Mar 21;11(2): e210142. doi: 10.1530/ETJ-21-0142.
10. Revathi J Jr, Ts M, M P. Prevalence of Medical Disorders During Pregnancy in India: A Comprehensive Observational Study to Assess the Prevalence of Hypertension, Diabetes, and Thyroid Disorders During Pregnancy in Indian Women. Cureus. 2025 Jun 20;17(6): e86441. doi: 10.7759/cureus.86441.
11. Konar H, Sarkar M, Roy M. Association of Thyroid Dysfunction and Autoimmunity in Pregnant Women with Diabetes Mellitus. J Obstet Gynaecol India. 2018 Aug;68(4):283-288. doi: 10.1007/s13224-017-1033-0.
12. Fatima SS, Rehman R, Butt Z, Asif Tauni M, Fatima Munim T, Chaudhry B, Khan TA. Screening of subclinical hypothyroidism during gestational diabetes in Pakistani population. J Matern Fetal Neonatal Med. 2016;29(13):2166-70. doi: 10.3109/14767058.2015.1077513.
13. Alotaibi EA, AlHaidar AM, Alotaibi SA, Alshehri NA, Alotaibi RA, BashumeelYY, Nassar R, Batais MA. Assessment of Thyroid Dysfunction Among Pregnant Women with Pre-Existing Diabetes Mellitus or Gestational Diabetes Mellitus. Cureus. 2023 Aug 30;15(8):e44390. doi: 10.7759/cureus.44390.
14. Shahbazian H, Shahbazian N, Rahimi Baniani M, Yazdanpanah L, Latifi SM. Evaluation of thyroid dysfunction in pregnant women with gestational and pre-gestational diabetes. Pak J Med Sci. 2013 Apr;29(2):638-41. doi: 10.12669/pjms.292.2862.
15. Maleki N, Tavosi Z. Evaluation of thyroid dysfunction and autoimmunity in gestational diabetes mellitus and its relationship with postpartum thyroiditis. Diabet Med. 2015 Feb;32(2):206-12. doi: 10.1111/dme.12580.
16. Oguz A, Tuzun D, Sahin M, Usluogullari AC, Usluogullari B, Celik A, Gul K. Frequency of isolated maternal hypothyroxinemia in women with gestational diabetes mellitus in a moderately iodine-deficient area. Gynecol Endocrinol. 2015 Oct;31(10):792-5. doi: 10.3109/09513590.2015.1054801.
17. Tudela CM, Casey BM, McIntire DD, Cunningham FG. Relationship of subclinical thyroid disease to the incidence of gestational diabetes. Obstet Gynecol. 2012 May;119(5):983-8. doi: 10.1097/AOG.0b013e318250aeeb.
18. Toulis KA, Stagnaro-Green A, Negro R. Maternal subclinical hypothyroidism and gestational diabetes mellitus: a meta-analysis. Endocr Pract. 2014 Jul;20(7):703-14. doi: 10.4158/EP13440.RA.

How to cite this article: Bhagyashree, Pratima. Prevalence and clinical impact of thyroid dysfunction in pregnant women with gestational diabetes mellitus: a case-control study in a tertiary care setting. *Int. J. Sci. Healthc. Res.* 2026; 11(1): 147-154. DOI: *https://doi.org/10.52403/ijshr.20260117*

******