Research Square

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# 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

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# Abstract

**Background:**

Hypertensive disorders of pregnancy (HDP), gestational diabetes mellitus (GDM), and thyroid dysfunction are major contributors to maternal and perinatal morbidity. This Pan-India multicentric study aimed to determine the prevalence of these disorders, their gestational age at first diagnosis, and variation in prevalence across sociodemographic factors among pregnant women in India.

**Methods:**

This multicentric retrospective cross-sectional observational study was based on antenatal record review of pregnant women attending antenatal care (ANC) clinics across India during any trimester of pregnancy. Maternal sociodemographic characteristics, obstetric details, and gestational age at first diagnosis of medical disorders were recorded. Standard diagnostic criteria were used for HDP, GDM, and thyroid disorders. Data were analysed using descriptive and comparative statistics, and prevalence was assessed across maternal age, parity, residence, educational status, and socioeconomic class.

**Results:**

A total of 8,874 pregnant women were included, with a mean age of 26.32 ± 4.55 years; 55.7% were multigravida. Overall, 49.8% of women had at least one medical disorder during pregnancy. HDP was the most prevalent condition, affecting 28.3% (95% CI: 27.4%–29.3%) of women, followed by thyroid disorders in 18.1% (95% CI: 17.3%–18.9%) and GDM in 11.9% (95% CI: 11.3%–12.6%). Diagnostic categories were not mutually exclusive, and some women had overlapping disorders. The highest burden of HDP and thyroid disorders was observed in Jharkhand. Most affected women were diagnosed during the third trimester. Thyroid disorders were detected earliest (mean 20.2 weeks), followed by GDM (mean 23.7 weeks) and HDP (mean 25.7 weeks). Significant associations were observed between medical disorders and residence, educational status, socioeconomic class, parity, and pregnancy trimester.

**Conclusion:**

Nearly one in two pregnant women in this cohort had at least one medical disorder during pregnancy. Significant regional and sociodemographic disparities were observed, underscoring the need for universal early antenatal screening, strengthened maternal healthcare services, lifestyle counselling, and improved referral systems to optimise maternal and fetal outcomes.


# Introduction

Pregnancy is associated with profound physiological and metabolic changes that support fetal growth and development but may also unmask or exacerbate underlying maternal medical conditions. Among the most important complications encountered during pregnancy are hypertensive disorders of pregnancy (HDP), gestational diabetes mellitus (GDM), and thyroid dysfunction. These disorders are major contributors to maternal and perinatal morbidity and mortality and are associated with adverse outcomes including pre-eclampsia, preterm birth, fetal growth restriction, stillbirth, cesarean delivery, and long-term metabolic and cardiovascular complications in both mother and child. Early diagnosis through routine antenatal screening and timely intervention plays a critical role in reducing these complications and improving pregnancy outcomes, particularly in low- and middle-income countries such as India.

The burden of non-communicable diseases among Indian women of reproductive age has increased substantially over the past decade due to urbanization, sedentary lifestyles, dietary transitions, obesity, and delayed childbearing [1].

Hypertensive disorders of pregnancy remain an important contributor to maternal morbidity and mortality in India. A recent Indian review reported an HDP prevalence of approximately 11% and highlighted the influence of socioeconomic, demographic, and ecological determinants on disease distribution [2]. Similarly, GDM has emerged as a growing public health concern in India. According to the Diabetes in Pregnancy Study Group India (DIPSI) criteria, GDM is diagnosed using a 75 g oral glucose tolerance test (OGTT) with a 2-hour plasma glucose value ≥140 mg/dL. A recent meta-analysis estimated the pooled prevalence of GDM in India to be approximately 13%, with considerable regional and diagnostic variability across states [3]. Women with GDM are at increased risk of HDP, cesarean delivery, macrosomia, neonatal hypoglycemia, and future type 2 diabetes mellitus, emphasizing the need for integrated antenatal screening and management strategies [4].

Thyroid dysfunction during pregnancy is another important but relatively under-recognized medical disorder. It is commonly diagnosed using serum thyroid-stimulating hormone (TSH) levels and is defined as hypothyroidism (TSH >2.5 mIU/L) or hyperthyroidism (TSH <0.25 mIU/L). Thyroid disorders during pregnancy have been associated with recurrent pregnancy loss, anemia, HDP, preterm birth, impaired fetal neurodevelopment, and adverse neonatal outcomes. Previous Indian studies have reported a high prevalence of thyroid dysfunction among pregnant women, with hypothyroidism being the most common abnormality [5]. Recent evidence has further emphasized the importance of early antenatal thyroid screening, particularly in rural and underserved populations where iodine deficiency and limited access to healthcare remain significant concerns [6–8].

Although several regional studies on HDP, GDM, and thyroid dysfunction are available, nationally representative multicentric data evaluating the combined burden and sociodemographic distribution of these disorders remain limited. Most existing studies are either single-center or focused on individual disorders, limiting their generalizability across India's diverse population. Therefore, there is a need for large multicentric studies to better understand the prevalence, timing of diagnosis, and sociodemographic determinants of these medical disorders during pregnancy.

The present Pan-India multicentric study was conducted to determine the prevalence of HDP, GDM, and thyroid dysfunction among pregnant women attending antenatal clinics across India, assess the gestational age at first diagnosis, and evaluate variations in prevalence according to maternal sociodemographic characteristics. The findings are expected to provide evidence to support improved antenatal screening strategies, strengthen maternal healthcare planning, and guide public health policies aimed at reducing maternal and perinatal morbidity in India.

## Methodology

This multicentric retrospective cross-sectional observational study was conducted across multiple healthcare centres in India and was based on antenatal record review of pregnant women attending antenatal care (ANC) clinics. The study was conducted over a 12-month period from 1st October 2024 to 30th September 2025. Ethical approval was obtained from the Institutional Ethics Committees (IECs) of all participating centres prior to study initiation. Written informed consent was obtained from all participants, and confidentiality was strictly maintained throughout the study.

Data were collected using a structured questionnaire administered through a secure Google Forms platform. All participant information was anonymised before analysis. Pregnant women attending ANC clinics during any trimester of pregnancy were eligible for inclusion. Women with pre-existing diabetes mellitus, chronic hypertension diagnosed prior to pregnancy, and known thyroid disorders before conception were excluded from the study.

Data collected included maternal sociodemographic characteristics such as age, state/city, residence, educational status, and socioeconomic class, along with obstetric details including parity and trimester of pregnancy at enrolment. Clinical parameters including maternal weight, blood pressure measurements, blood glucose values, hemoglobin

levels, and relevant laboratory investigations were also recorded. Gestational age at first diagnosis of medical disorders was documented for all affected participants.

Educational status was categorised as illiterate, primary school, high school, graduate, and professional degree. Socioeconomic status was classified into upper, middle, and lower socioeconomic groups based on participant-reported socioeconomic indicators.

Blood pressure measurements were obtained using standardised clinical techniques. Hypertensive disorders of pregnancy (HDP) were diagnosed according to established national and international guidelines. Data recorded for HDP included gestational age at diagnosis, antihypertensive therapy, requirement for hospitalisation or intravenous treatment, and occurrence of seizures/eclampsia.

Screening for gestational diabetes mellitus (GDM) was performed using the Diabetes in Pregnancy Study Group India (DIPSI) criteria, which included a 75 g oral glucose tolerance test (OGTT) with a 2-hour plasma glucose value ≥140 mg/dL. Information collected included gestational age at diagnosis, fasting blood sugar (FBS), postprandial blood sugar (PPBS), random blood sugar (RBS), and treatment modality including medical nutrition therapy (MNT), oral hypoglycaemic agents, or insulin therapy.

Thyroid dysfunction was diagnosed using standard biochemical criteria based on serum thyroid-stimulating hormone (TSH) levels. Hypothyroidism was defined as TSH >2.5 mIU/L and hyperthyroidism as TSH <0.25 mIU/L. Data regarding gestational age at diagnosis, treatment status, and referral to endocrinology or physician services were also recorded.

All data were entered into a pre-designed electronic case record form (eCRF) and verified by site investigators for completeness and accuracy before final analysis. The primary outcomes of the study were the prevalence of HDP, GDM, and thyroid dysfunction, along with the gestational age at diagnosis of each condition. Secondary outcomes included associations between medical disorders and maternal factors such as age, parity, residence, educational status, socioeconomic class, and trimester of pregnancy.

**Statistical Analysis**

Data were analysed using Statistical Package for the Social Sciences (SPSS) software version 24. Descriptive statistics were presented as mean ± standard deviation (SD) for continuous variables and frequencies with percentages for categorical variables. Comparative analyses were performed using the Wilcoxon–Mann–Whitney U test for continuous variables and Chi-squared/Fisher's Exact tests for categorical variables. A p-value of <0.05 was considered statistically significant.

# Results

A total of 8,874 pregnant women were included in the study. The mean maternal age was 26.32 ± 4.55 years, with a median age of 26 years (IQR: 23–30). Most participants were multigravida (55.7%), from urban areas (45.5%), and belonged to the middle socioeconomic class (64.1%). Nearly half of the women (49.1%) had completed high school education. At enrolment, 54.9% of participants were in the third trimester of pregnancy. The baseline demographic and clinical characteristics of the study population are summarized in Table 1.

The mean weight was 58.33 ± 11.36 kg. Mean systolic and diastolic blood pressures were 121.15 ± 19.04 mmHg and 79.16 ± 12.84 mmHg, respectively. The mean fasting blood sugar (FBS), postprandial blood sugar (PPBS), and random blood sugar (RBS) were 89.81 ± 21.24 mg/dL, 109.85 ± 36.81 mg/dL, and 100.93 ± 28.92 mg/dL, respectively. The mean hemoglobin level was 10.61 ± 2.11 g/dL, indicating a mild degree of anemia among participants.

Out of 8,874 pregnant women screened across all participating sites, hypertensive disorders of pregnancy (HDP) were the most prevalent, affecting 28.3% (95% CI: 27.4%–29.3%). Thyroid dysfunction was observed in 18.1% (95% CI: 17.3%–18.9%), followed by gestational diabetes mellitus (GDM) in 11.9% (95% CI: 11.3%–12.6%). Overall, 49.8% of women had at least one medical disorder during pregnancy. These categories were not mutually exclusive, as some women had more than one condition (Table 1).

Among women with any medical disorder, the mean age was 26.38 ± 4.69 years, which was comparable to 26.27 ± 4.42 years in women without any disorder. Women aged above 35 years showed a relatively higher proportion of medical disorders compared with younger age groups. Primigravida women had a higher prevalence (58.6%) of medical disorders compared to multigravida women. Most affected women were in the third trimester (63.7%), followed by the second trimester (34.1%) and first trimester (29.0%).

A significant variation was observed with respect to residence, with a higher proportion of medical disorders among rural women (76.2%) compared to sub-urban (45.1%) and urban (39.8%) populations. Illiterate women and those with professional degrees showed higher prevalence (69.3% and 74.6%, respectively), whereas women educated up to high school had the lowest prevalence (41.2%). Socioeconomic status was also significantly associated, with higher prevalence observed among both upper class (69.7%) and lower class (55.6%) compared to the middle class (45.4%) (Table 3).

Multicentric data were collected from various states across India (Figure 1). A significant difference ($p < 0.001$) was observed in the prevalence of medical disorders across participating states. The overall burden of any disorder was highest in Jharkhand. HDP was most common in Jharkhand (44.3%) and Bihar (33.9%), while GDM showed higher prevalence in West Bengal (42.7%) and “Other” regions (30.4%). Thyroid dysfunction was also most prevalent in Jharkhand (55.3%) and relatively higher in “Other” states (36.7%) (Table 4).

A significant association ($p < 0.05$) was observed between most maternal parameters and medical disorders during pregnancy. The prevalence of HDP and GDM increased with advancing maternal age, rural residence, lower educational level, and lower socioeconomic status. Thyroid dysfunction was significantly associated with residence, education, socioeconomic status, parity, and trimester, but not with maternal age. Across all three conditions, higher occurrence was observed among primigravida women and during the third trimester (Table 5).

Thyroid disorders were identified earliest (mean 20.23 ± 9.28 weeks), followed by gestational diabetes mellitus (mean 23.69 ± 8.22 weeks), and hypertensive disorders of pregnancy (mean 25.72 ± 7.61 weeks). Among women with HDP, nearly 80% required oral antihypertensive therapy, 43% required hospitalization with intravenous treatment, and 14% developed convulsions. In GDM cases, approximately 80% responded to medical nutrition therapy (MNT), while 44.8% received oral hypoglycaemic agents and 24.8% required insulin therapy. Among women with thyroid dysfunction, the mean TSH level was 5.97 μIU/mL; 86.7% received thyroid hormone replacement, and more than half were referred to endocrinology services for follow-up (Table 6).

## Discussion

In this Pan-India multicentric study of 8,874 pregnant women, nearly half (49.8%) had at least one medical disorder, including hypertensive disorders of pregnancy (HDP), gestational diabetes mellitus (GDM), or thyroid dysfunction. HDP was the most common condition (28.3%), followed by thyroid disorders (18.1%) and GDM (11.9%). These prevalences are higher than several earlier national estimates, suggesting a possible shift in the epidemiology of pregnancy-related medical disorders in India. This higher burden may partly reflect referral bias, as the participating centres included

tertiary care hospitals that manage higher-risk pregnancies. In addition, regional variations in screening practices, healthcare access, and population characteristics across centres may have contributed to the observed differences.

Earlier studies from rural central India reported HDP prevalence of approximately 7.1% [9], whereas our findings are substantially higher (~28%), again likely reflecting differences in study setting and case mix. Similarly, previous authors have reported GDM as the most common condition (20%), followed by HDP (16%) and thyroid dysfunction (12%) [10], which differs from the pattern observed in the present study.

In this study, thyroid disorders were detected earliest (mean 20.2 weeks), followed by GDM (mean 23.7 weeks), while HDP manifested later in pregnancy. This pattern is consistent with the physiological progression of these conditions during pregnancy. The higher prevalence of HDP, GDM, and thyroid dysfunction among rural women contrasts with some earlier reports showing higher urban prevalence, suggesting changing epidemiological trends and widening rural health vulnerabilities.

Advanced maternal age (>35 years), lower educational status, and higher body weight were associated with increased prevalence of all three conditions. This finding is consistent with established evidence identifying maternal age and obesity as major risk factors for hypertensive and metabolic disorders in pregnancy. However, some earlier studies have reported limited or no significant associations between broader sociodemographic variables and HDP, except for extreme maternal age (>40 years) [1], highlighting heterogeneity in reported risk profiles across populations.

Regional disparities were also evident in the present study. The highest prevalence of HDP and thyroid disorders was observed in Jharkhand, while GDM was most common in West Bengal. These findings are consistent with earlier reports describing geographic clustering of pregnancy-related multimorbidity in specific Indian regions, particularly in under-resourced or nutritionally vulnerable populations [11].

An interesting observation in this study was the bimodal association with socioeconomic status, where both upper and lower socioeconomic groups showed higher prevalence of medical disorders compared to the middle class. This suggests a dual burden pattern, where undernutrition, anemia, and limited healthcare access may contribute to risk in lower socioeconomic groups, while sedentary lifestyle and dietary excess may contribute in higher socioeconomic groups [12].

The observed GDM prevalence of 11.9% is comparable to a recent Indian meta-analysis reporting a pooled prevalence of approximately 13% (95% CI: 9–16%) [12], reinforcing the growing burden of GDM in India. The prevalence of thyroid dysfunction (18.1%) is higher than earlier Indian estimates reporting hypothyroidism around 11–13% and hyperthyroidism around 4% [13,14]. This variation may be due to broader screening practices, regional differences, and changing iodine and nutritional status among pregnant women.

**Drivers of High Burden**

The high overall burden of medical disorders in pregnancy observed in this study is likely multifactorial [15]. Increasing maternal age, higher body weight, and lifestyle transitions are important contributors, with a progressive increase in HDP, GDM, and thyroid dysfunction observed with advancing age. Regional and socioeconomic heterogeneity also plays a critical role [16]. The disproportionately high prevalence in Jharkhand may reflect limited screening coverage, delayed antenatal registration, healthcare access barriers, and nutritional deficiencies [17]. The findings also highlight a dual burden of disease, with HDP and thyroid dysfunction more prevalent among lower socioeconomic groups, while metabolic disorders such as GDM are relatively more common in higher socioeconomic groups, reflecting contrasting pathways of risk [18,19].

**Timing and Clinical Implications**

The mean gestational age at diagnosis—thyroid disorders (~20 weeks), GDM (~24 weeks), and HDP (~26 weeks)—reflects expected physiological patterns during pregnancy and underscores the importance of appropriately timed screening strategies. The substantial proportion of women requiring pharmacological therapy, including antihypertensives, insulin, and endocrine referral, highlights the clinical significance of early detection and timely management to prevent adverse maternal and fetal outcomes [20].

**Public Health and Policy Implications**

The findings of this large multicentric study have important implications for maternal health policy in India. The high prevalence and overlapping nature of HDP, GDM, and thyroid dysfunction support the need for universal and integrated antenatal screening strategies rather than selective testing approaches [21].

Marked regional differences, particularly higher burdens in Jharkhand (HDP and thyroid disorders) and West Bengal (GDM), highlight the need for state-specific maternal health strategies, including early antenatal registration, improved referral systems, and strengthened diagnostic capacity in high-burden regions [22].

Improving access to antenatal care in rural and socioeconomically disadvantaged populations is essential, as these groups demonstrated higher prevalence of HDP and thyroid dysfunction. Strengthening primary healthcare systems, improving diagnostic availability, and training frontline healthcare providers in early risk detection will be critical to reducing disparities [23].

Furthermore, the substantial need for pharmacological treatment and specialist referral underscores the importance of adequate resource allocation, medication availability, and integrated multidisciplinary care pathways within maternal health services. These findings strongly support strengthening national antenatal screening policies and ensuring equitable access to maternal healthcare services across India.

**Strengths and Limitations**

The strengths of this study include its large multicentric design, inclusion of diverse geographic regions across India, and comprehensive assessment of sociodemographic determinants of pregnancy-related medical disorders. The standardized data collection approach allowed meaningful comparisons across varied populations and healthcare settings.

However, certain limitations should be acknowledged. The retrospective cross-sectional design limits causal inference. The hospital-based sampling from predominantly tertiary care centres may have introduced referral bias, potentially overestimating prevalence compared to community-based populations. Additionally, variation in screening practices and healthcare access across centres may have influenced detection rates.

# Conclusion

This Pan-India multicentric study demonstrates a high burden of hypertensive disorders of pregnancy, gestational diabetes mellitus, and thyroid dysfunction, with significant regional and socioeconomic variation. The findings highlight the need for early, universal, and integrated antenatal screening, along with strengthened and equitable maternal healthcare systems to address the growing burden of pregnancy-related medical disorders in India.

# Declarations

**Ethics approval and consent to participate**

This multicentric retrospective cross-sectional observational study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi (Approval No. IEC/VMMC/SJH/CERT/2025-October/104). Written informed consent was obtained from all participants before inclusion in the study. Participant confidentiality and anonymity were maintained throughout the study, and all data were analysed in de-identified form.

**Consent for publication**

Not applicable.

**Competing interests**

The authors declare that they have no competing interests.

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**Availability of data and materials**

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

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Not applicable.

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# Tables

**Table 1. Baseline Characteristics of the Study Population (n = 8,874)**

| Variable | Parameter | Total |
|---|---|---|
| **Age (Years)** | Mean ± SD | 26.32 ± 4.55 |
| | Median (IQR) | 26 (23–30) |
| **Age Group** | 18–25 years | 3678 (46.5%) |
| | 26–30 years | 2791 (35.3%) |
| | 31–35 years | 1181 (14.9%) |
| | >35 years | 262 (3.3%) |
| **Residence** | Urban | 3978 (45.5%) |
| | Sub-urban | 2845 (32.5%) |
| | Rural | 1926 (22.0%) |
| **Educational Status** | Illiterate | 687 (7.9%) |
| | Primary School | 2792 (32.0%) |
| | High School | 4276 (49.1%) |
| | Graduate | 901 (10.3%) |
| | Professional Degree | 59 (0.7%) |
| **Socioeconomic Status** | Upper Class | 353 (4.0%) |
| | Middle Class | 5597 (64.1%) |
| | Lower Class | 2777 (31.8%) |
| **Parity** | Primigravida | 3877 (44.3%) |
| | Multigravida | 4876 (55.7%) |
| **Pregnancy Trimester at Enrolment** | 1st Trimester | 1145 (13.0%) |
| | 2nd Trimester | 2812 (32.0%) |
| | 3rd Trimester | 4826 (54.9%) |
| **Clinical Parameters** | Weight (kg), Mean ± SD | 58.33 ± 11.36 |
| | Systolic BP (mmHg), Mean ± SD | 121.15 ± 19.04 |
| | Diastolic BP (mmHg), Mean ± SD | 79.16 ± 12.84 |
| | Fasting Blood Sugar (mg/dL), Mean ± SD | 89.81 ± 21.24 |
| | Postprandial Blood Sugar (mg/dL), Mean ± SD | 109.85 ± 36.81 |
| | Random Blood Sugar (mg/dL), Mean ± SD | 100.93 ± 28.92 |
| | Hemoglobin (g/dL), Mean ± SD | 10.61 ± 2.11 |

**Table 2. Overall Prevalence of Medical Disorders During Pregnancy (n = 8,874)**

| Diagnosis | Yes | 95% CI | No |
|---|---|---|---|
| **Hypertensive Disorders of Pregnancy (HDP)** | 2513 (28.3%) | 27.4%–29.3% | 6361 (71.7%) |
| **Gestational Diabetes Mellitus (GDM)** | 1058 (11.9%) | 11.3%–12.6% | 7816 (88.1%) |
| **Thyroid Disorders** | 1607 (18.1%) | 17.3%–18.9% | 7267 (81.9%) |
| **At least one Medical Disorder*** | 4418 (49.8%) | 48.7%–50.8% | 4456 (50.2%) |

***Diagnostic categories were not mutually exclusive; some women had more than one medical disorder during pregnancy.

**Table 3. Association Between Presence of Any Medical Disorder and Maternal Parameters (n = 8,874)**

| Variable | Parameter | Total | Diagnosis: Any Disorder | | Difference (95% CI) | Significance |
|---|---|---|---|---|---|---|
| | | | Yes | No | | |
| **Age (Years)** | Mean ± SD | 26.32 ± 4.55 | 26.38 ± 4.69 | 26.27 ± 4.42 | 0.11 (-0.09 to 0.31) | W = 7839494.000, p = 0.771 |
| | Median (IQR) | 26.00 (23.00 - 30.00) | 26.00 (23.00 - 30.00) | 26.00 (23.00 - 29.00) | | |
| **Age Group** | 18-25 Years | 3678 (46.49%) | 1773 (46.87%) | 1905 (46.14%) | 0.73% (-1.47% to 2.93%) | $\chi^2$ = 0.395, p = 0.528 |
| | 26-30 Years | 2791 (35.28%) | 1298 (34.31%) | 1493 (36.16%) | -1.85% (-3.95% to 0.26%) | $\chi^2$ = 2.871, p = 0.090 |
| | 31-35 Years | 1181 (14.93%) | 562 (14.86%) | 619 (14.99%) | -0.14% (-1.71% to 1.44%) | $\chi^2$ = 0.019, p = 0.875 |
| | >35 Years | 262 (3.31%) | 150 (3.97%) | 112 (2.71%) | 1.25% (0.46% to 2.05%) | $\chi^2$ = 9.287, p = 0.002 |
| **Residence** | Urban | 3978 (45.47%) | 1585 (36.55%) | 2393 (54.23%) | -17.67% (-19.72% to -15.62%) | $\chi^2$ = 274.752, p = <0.001 |
| | Sub-Urban | 2845 (32.52%) | 1284 (29.61%) | 1561 (35.37%) | -5.76% (-7.72% to -3.80%) | $\chi^2$ = 32.808, p = <0.001 |
| | Rural | 1926 (22.01%) | 1467 (33.83%) | 459 (10.40%) | 23.43% (21.76% to 25.10%) | $\chi^2$ = 698.101, p = <0.001 |
| **Education** | Illiterate | 687 (7.88%) | 476 (11.05%) | 211 (4.79%) | 6.26% (5.13% to 7.39%) | $\chi^2$ = 116.754, p = <0.001 |
| | Primary School | 2792 (32.04%) | 1471 (34.15%) | 1321 (29.98%) | 4.17% (2.21% to 6.13%) | $\chi^2$ = 17.213, p = <0.001 |
| | High School | 4276 (49.06%) | 1761 (40.88%) | 2515 (57.07%) | -16.19% (-18.26% to -14.12%) | $\chi^2$ = 227.862, p = <0.001 |
| | Graduate | 901 (10.34%) | 556 (12.91%) | 345 (7.83%) | 5.08% (3.80% to 6.36%) | $\chi^2$ = 60.048, p = <0.001 |
| | Professional Degree | 59 (0.68%) | 44 (1.02%) | 15 (0.34%) | 0.68% (0.33% to 1.03%) | $\chi^2$ = 14.029, p = <0.001 |
| **Socioeconomic Status** | Upper Class | 353 (4.04%) | 246 (5.68%) | 107 (2.43%) | 3.25% (2.42% to 4.08%) | $\chi^2$ = 58.524, p = <0.001 |
| | Middle Class | 5597 (64.13%) | 2539 (58.65%) | 3058 (69.53%) | -10.88% (-12.88% to -8.88%) | $\chi^2$ = 111.811, p = <0.001 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Lower Class | 2777 (31.82%) | 1544 (35.67%) | 1233 (28.04%) | 7.63% (5.68% to 9.58%) | $\chi^2$ = 58.205, p = <0.001 |
| **Parity** | Primigravida | 3877 (44.29%) | 2271 (52.21%) | 1606 (36.48%) | 15.73% (13.68% to 17.79%) | $\chi^2$ = 218.841, p = <0.001 |
| | Multigravida | 4876 (55.71%) | 2079 (47.79%) | 2797 (63.52%) | -15.73% (-17.79% to -13.68%) | $\chi^2$ = 218.841, p = <0.001 |
| **Pregnancy Trimester** | 1st | 1145 (13.04%) | 332 (7.60%) | 813 (18.41%) | -10.81% (-12.20% to -9.42%) | $\chi^2$ = 225.277, p = <0.001 |
| | 2nd | 2812 (32.02%) | 959 (21.96%) | 1853 (41.96%) | -20.00% (-21.91% to -18.10%) | $\chi^2$ = 402.626, p = <0.001 |
| | 3rd | 4826 (54.95%) | 3076 (70.44%) | 1750 (39.63%) | 30.81% (28.83% to 32.79%) | $\chi^2$ = 840.635, p = <0.001 |
| ***  = t test,  = Mann-Whitney U Test,  = Fisher's Exact Test*** | | | | | | |

**Table 4. Prevalence of medical disorders in Pregnancy Across Different Indian States**

| **Parameters** | **Site** | | | | | **p value** |
|---|---|---|---|---|---|---|
| | **Delhi (n = 3862)** | **Bihar (n = 3255)** | **Jharkhand (n = 628)** | **West Bengal (n = 267)** | **Others (n = 862)** | |
| **Diagnosis: Hypertensive Disorder of Pregnancy (Yes)*** ** | 768 (19.9%) | 1102 (33.9%) | 278 (44.3%) | 9 (3.4%) | 356 (41.3%) | <0.001[1] |
| **Diagnosis: GDM (Yes)*** ** | 462 (12.0%) | 186 (5.7%) | 34 (5.4%) | 114 (42.7%) | 262 (30.4%) | <0.001[1] |
| **Diagnosis: Thyroid Disorder (Yes)*** ** | 597 (15.5%) | 290 (8.9%) | 347 (55.3%) | 57 (21.3%) | 316 (36.7%) | <0.001[1] |
| **More than one Disorder (Yes)*** ** | 1584 (41.0%) | 1453 (44.6%) | 620 (98.7%) | 147 (55.1%) | 614 (71.2%) | <0.001[1] |

******Significant at p<0.05, 1: Chi-Squared Test***

**Table 5. Association between Maternal Parameters and Medical Disorders (n = 8,874)**

| Parameters | HDP Yes (n = 2513) | HDP No (n = 6361) | p value | GDM Yes (n = 1058) | GDM No (n = 7816) | p value | Thyroid Yes (n = 1607) | Thyroid No (n = 7267) | p value |
|---|---|---|---|---|---|---|---|---|---|
| **Age Group**[***] | | | <0.001[2] | | | 0.003[2] | | | 0.216[2] |
| 18–25 years | 975 (26.5%) | 2703 (73.5%) | | 458 (12.5%) | 3220 (87.5%) | | 649 (17.6%) | 3029 (82.4%) | |
| 26–30 years | 707 (25.3%) | 2084 (74.7%) | | 325 (11.6%) | 2466 (88.4%) | | 520 (18.6%) | 2271 (81.4%) | |
| 31–35 years | 334 (28.3%) | 847 (71.7%) | | 106 (9.0%) | 1075 (91.0%) | | 220 (18.6%) | 961 (81.4%) | |
| >35 years | 104 (39.7%) | 158 (60.3%) | | 40 (15.3%) | 222 (84.7%) | | 59 (22.5%) | 203 (77.5%) | |
| **Residence**[***] | | | <0.001[2] | | | <0.001[2] | | | <0.001[2] |
| Urban | 825 (20.7%) | 3153 (79.3%) | | 345 (8.7%) | 3633 (91.3%) | | 644 (16.2%) | 3334 (83.8%) | |
| Sub-Urban | 744 (26.2%) | 2101 (73.8%) | | 349 (12.3%) | 2496 (87.7%) | | 514 (18.1%) | 2331 (81.9%) | |
| Rural | 904 (46.9%) | 1022 (53.1%) | | 345 (17.9%) | 1581 (82.1%) | | 426 (22.1%) | 1500 (77.9%) | |
| **Education**[***] | | | <0.001[2] | | | <0.001[2] | | | <0.001[2] |
| Illiterate | 332 (48.3%) | 355 (51.7%) | | 69 (10.0%) | 618 (90.0%) | | 97 (14.1%) | 590 (85.9%) | |
| Primary School | 924 (33.1%) | 1868 (66.9%) | | 292 (10.5%) | 2500 (89.5%) | | 449 (16.1%) | 2343 (83.9%) | |
| High School | 890 (20.8%) | 3386 (79.2%) | | 453 (10.6%) | 3823 (89.4%) | | 702 (16.4%) | 3574 (83.6%) | |
| Graduate | 294 (32.6%) | 607 (67.4%) | | 181 (20.1%) | 720 (79.9%) | | 280 (31.1%) | 621 (68.9%) | |
| Professional Degree | 32 (54.2%) | 27 (45.8%) | | 39 (66.1%) | 20 (33.9%) | | 34 (57.6%) | 25 (42.4%) | |
| **Socioeconomic Status**[***] | | | <0.001[2] | | | <0.001[2] | | | <0.001[2] |
| Upper Class | 132 (37.4%) | 221 (62.6%) | | 67 (19.0%) | 286 (81.0%) | | 94 (26.6%) | 259 (73.4%) | |
| Middle Class | 1347 (24.1%) | 4250 (75.9%) | | 670 (12.0%) | 4927 (88.0%) | | 1057 (18.9%) | 4540 (81.1%) | |
| Lower Class | 991 (35.7%) | 1786 (64.3%) | | 296 (10.7%) | 2481 (89.3%) | | 434 (15.6%) | 2343 (84.4%) | |
| **Parity**[***] | | | <0.001[2] | | | <0.001[2] | | | <0.001[2] |
| Primigravida | 1279 (33.0%) | 2598 (67.0%) | | 583 (15.0%) | 3294 (85.0%) | | 857 (22.1%) | 3020 (77.9%) | |

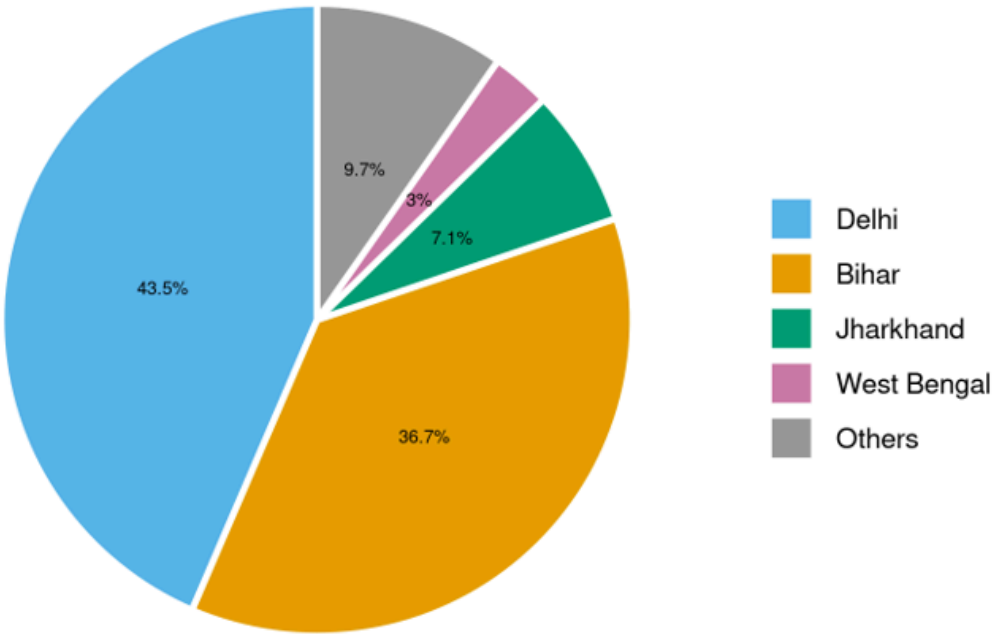
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Multigravida | 1201 (24.6%) | 3675 (75.4%) | | 454 (9.3%) | 4422 (90.7%) | 735 (15.1%) | 4141 (84.9%) | |
| **Pregnancy Trimester*** ** | | | <0.001[2] | | | | | <0.001[2] |
| 1st Trimester | 157 (13.7%) | 988 (86.3%) | | 100 (8.7%) | 1045 (91.3%) | 143 (12.5%) | 1002 (87.5%) | |
| 2nd Trimester | 566 (20.1%) | 2246 (79.9%) | | 252 (9.0%) | 2560 (91.0%) | 321 (11.4%) | 2491 (88.6%) | |
| 3rd Trimester | 1770 (36.7%) | 3056 (63.3%) | | 690 (14.3%) | 4136 (85.7%) | 1128 (23.4%) | 3698 (76.6%) | |

****Significant at p<0.05, 1: Wilcoxon-Mann-Whitney U Test, 2: Chi-Squared Test*

**Table 6. Comparative Clinical Profile of Women with Hypertensive Disorders of Pregnancy, Gestational Diabetes Mellitus, and Thyroid Disorders**

| Parameter | Hypertensive Disorders of Pregnancy (n = 2513) | Gestational Diabetes Mellitus (n = 1058) | Thyroid Disorders (n = 1607) |
|---|---|---|---|
| **POG at Diagnosis (weeks)** | 25.72 ± 7.61 Median 26 (22–32) Range 0–43.3 | 23.69 ± 8.22 Median 26 (19–29) Range 0–42 | 20.23 ± 9.28 Median 21 (12–28) Range 0–56 |
| **Key Diagnostic Value** | Systolic BP 121.15 ± 19.04 Diastolic BP 79.16 ± 12.84 Range 58–220/50–160 | 2-h Plasma Glucose 162.69 ± 38.79 Median 156 (144–177) Range 60–356 | TSH 5.97 ± 4.71 Median 5.50 (4.10–7.00) Range 0–89 |
| **Primary Medical Management** | Oral antihypertensives 1995 (79.7%) | Medical nutrition therapy 841 (79.6%) | Thyroid medication 1391 (86.7%) |
| **Advanced/Adjunctive Therapy** | IV therapy required 1076 (43.0%) | Oral hypoglycemics 473 (44.8%) | Endocrine referral 941 (58.9%) |
| **Severe/Complicated Cases** | Convulsions 353 (14.1%) | Insulin therapy 260 (24.8%) | – |

# Figures




Others: Andhra Pradesh, Assam, Chhattisgarh, Madhya Pradesh, Tripura, Uttar Pradesh, Karnataka

**Figure 1**

**Distribution of States from which data collected**