

EPIDEMIOLOGY OF HYPERTENSIVE DISORDERS OF PREGNANCY IN INDIA

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ABSTRACT

Objective: Hypertensive disorders of pregnancy (HDP), including gestational hypertension, preeclampsia, and eclampsia, are a global concern due to their impact on maternal and fetal health. The epidemiological landscape of HDP in India, a diverse and populous nation, presents unique challenges influenced by healthcare disparities and cultural factors.

Methods: This cross-sectional study, conducted from Jul 1, 2018, to Jun 30, 2019, aimed to compare the spot urinary protein/creatinine ratio with the conventional 24 h urine protein collection method for proteinuria estimation in preeclamptic pregnant women. Ninety inpatients were included, adhering to specific inclusion and exclusion criteria. Data on demographics, blood pressure, liver function, and 24 h urine protein excretion were collected and analyzed statistically.

Results: The mean age of pregnant women with preeclampsia in India was 28.9 y (range: 18-33), with 45.55% primigravida and 65.55% multigravida. Diastolic blood pressure at admission was 94.98 mmHg±8.54, displaying variations compared to other studies, potentially influenced by genetic, dietary, and healthcare factors. Liver function test results indicated abnormal findings in 90% of cases for total bilirubin, 60% for alanine transaminase (ALT), and 60% for aspartate transaminase (AST), highlighting disparities in liver function when compared to prior research. Proteinuria levels demonstrated substantial variation, with the present study reporting a mean 24 h urine protein excretion of 1884 mg/d±2562, reflecting the complexity of proteinuria assessment across different populations and methodologies.

Conclusion: The epidemiology of HDP in India is intricate and multifactorial, influenced by diverse demographic factors, blood pressure levels, liver function, and proteinuria. Findings underscore the need for region-specific research and tailored healthcare interventions. Further investigations are essential to unravel the contributing factors to HDP in India and guide effective preventive measures and management strategies in this populous and diverse nation.

Keywords: Hypertensive disorders of pregnancy, Preeclampsia, Epidemiology, India, Proteinuria, Liver function, Blood pressure

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INTRODUCTION

Hypertensive disorders of pregnancy (HDP), comprising conditions such as gestational hypertension, preeclampsia, and eclampsia, represent a significant global health concern, contributing to maternal and fetal morbidity and mortality [1]. These disorders manifest as elevated blood pressure during pregnancy and are characterized by a spectrum of clinical manifestations, ranging from mild hypertension to severe complications that can be life-threatening. While the etiology and management of HDP have been extensively studied worldwide, the epidemiological landscape of these conditions in India presents a unique and complex challenge [2].

India, a diverse and populous nation, faces distinctive healthcare disparities, socioeconomic factors, and cultural influences that contribute to variations in the prevalence and outcomes of hypertensive disorders of pregnancy. Understanding the epidemiology of HDP in India is crucial not only for providing optimal maternal and fetal care but also for guiding public health policies and interventions [3]. This manuscript endeavors to comprehensively explore and analyze the epidemiological aspects of hypertensive disorders of pregnancy in India, shedding light on the prevalence, risk factors, regional variations, maternal and fetal outcomes, and healthcare disparities associated with this pressing health issue [4].

Through a rigorous examination of existing literature, clinical data, and research findings, this manuscript aims to provide a comprehensive overview of the epidemiology of HDP in India, offering insights that can inform healthcare strategies, improve maternal and neonatal outcomes, and drive further research efforts in this vital area of women's health [5]. By addressing the unique challenges and opportunities presented by India's diverse

healthcare landscape, this manuscript seeks to contribute to the global understanding of hypertensive disorders of pregnancy while highlighting the importance of tailoring interventions to the specific needs of this populous and vibrant nation [6].

MATERIALS AND METHODS

Study design

This study employed a cross-sectional design to compare the utility of the spot urinary protein/creatinine ratio with the conventional 24 h urine protein collection method for the estimation of proteinuria in pregnant women with preeclampsia. The study was conducted in the Department of Obstetrics and Gynecology at Kamla Nehru State Hospital for Mother and Child, spanning from Jul 1, 2018, to Jun 30, 2019.

Study design and subjects

The study involved a total of 90 in patients who were admitted to the antenatal ward or the labor room of the Department of Obstetric and Gynecology. Selection criteria for the participants were defined as follows:

Inclusion criteria

1. Age ranging between 18 and 40 y.
2. Gestational age greater than 20 w, calculated from either the first day of the last menstrual period or 1st trimester ultrasonography.
3. Diagnosis of blood pressure (BP) greater than or equal to 140/90 mmHg on at least two separate occasions, with a minimum 4 h interval between measurements, all taken in the sitting position,

using an appropriately sized cuff, and with Korotkoff phase V (disappearance of sound as diastolic blood pressure).

4. Presence of proteinuria.

Exclusion criteria

1. History of chronic hypertension and proteinuria before conception or the development of hypertension before 20 w of gestation.

2. Patients with known chronic renal disease.

3. Patients with a history of recurrent urinary tract infections.

4. Patients who required delivery before completing the collection of the 24 h urine sample.

Method of study

Patients provided informed consent, and their medical history was documented, including preeclampsia symptoms. Anthropometric data and general physical exams were conducted. Pregnancy and hypertension tests were performed. Patients collected 24 h urine samples, and a single voided urine sample for the spot urinary protein/creatinine ratio was obtained. Urine protein and creatinine levels were measured via spectrophotometry, and the ratio was calculated using an automated spectrophotometry analyzer. This comprehensive approach ensured accurate data collection for comparing proteinuria assessment methods.

Statistical analysis

Statistical analysis evaluated the spot urinary protein/creatinine ratio's diagnostic accuracy compared to the 24 h urine method. Sensitivity, specificity, predictive values, ROC curves, and Pearson correlation were employed. SPSS software was used for statistical analyses.

RESULTS

Demographic Characteristics and Parity Distribution The present study included 100 pregnant women with preeclampsia, with a mean age of 28.9 y (range: 18-33). Among them, 45.55% were primigravida, while 59.55% were multigravida. Comparative data from previous studies showed varying age ranges and parity distributions.

This table compares the mean diastolic blood pressure at the time of admission across different studies, including your own. It provides insight into the variations in diastolic blood pressure among pregnant women with preeclampsia.

This table displays the results of liver function tests, including total bilirubin, alanine transaminase (ALT), and aspartate transaminase (AST) levels. It highlights the differences in liver function between your study and Hanumant *et al.*'s study.

This table provides data on the mean 24 h urine protein excretion in different studies, including your own. It helps compare the protein excretion levels among pregnant women with preeclampsia in various research settings.

Table 1: Demographic characteristics and parity distribution

| Study | Age (y) | Primigravida (%) | Multigravida (%) |
|-----------------------------|---------------------|------------------|------------------|
| Hanumant <i>et al.</i> 2017 | 25.09 (20-30 y) | - | - |
| Umran <i>et al.</i> 2017 | 30.1±7.4 | - | - |
| Jan S <i>et al.</i> 2017 | 27.8±4.6 (25-29) | - | - |
| Sapna <i>et al.</i> 2014 | 27.4±4.3 (20-41) | - | - |
| Hossain <i>et al.</i> 2013 | 28±4.62 (18-35) | - | - |
| Amita <i>et al.</i> 2013 | 25.15±3.769 (20-40) | - | - |
| Present study | 28.9±5 (18-33) | 41 (45.55%) | 59 (65.55%) |

Table 2: Mean diastolic blood pressure at the time of admission

| Study | Mean diastolic blood pressure (mmHg) |
|----------------------------------|--------------------------------------|
| Sapna <i>et al.</i> 2014 | 96.4±11.3 |
| Amita <i>et al.</i> 2013 | 104.37±13 |
| Jung hwa park <i>et al.</i> 2013 | 97.5±9.4 |
| Present study | 94.98±8.54 |

Table 3: Liver function test results

| Study | Total bilirubin (mg/dl) | Alamine transaminase (U/l) | Aspartate transaminase (U/l) |
|-----------------------------|-------------------------|----------------------------|------------------------------|
| Hanumant <i>et al.</i> 2017 | Normal | Normal | Normal |
| Present study | 81 (90%) | 54 (60%) | 54 (60%) |

Table 4: Mean 24 H urine protein excretion

| Study | Mean 24 H urine protein (mg/day) |
|----------------------------------|----------------------------------|
| Umran <i>et al.</i> 2017 | 1425±1544 |
| Jan S <i>et al.</i> 2017 | 1700±800 |
| Sapna <i>et al.</i> 2014 | 1446±1242 |
| Jung hwa park <i>et al.</i> 2013 | 2713±2903 |
| Present study | 1884±2562 |

DISCUSSION

The epidemiological exploration of hypertensive disorders of pregnancy (HDP) in India is essential due to its unique healthcare disparities and the immense population diversity. This study aimed to comprehensively analyze the epidemiological aspects of HDP, focusing on prevalence, risk factors, regional variations, maternal and fetal outcomes, and healthcare disparities in India [1].

Demographic characteristics and parity distribution

The study's demographic findings reveal a mean age of 28.9 y among pregnant women with preeclampsia in India. This age distribution aligns with previous studies but emphasizes the need to consider the maternal age factor in assessing HDP risk [2]. Primigravida and multigravida distribution varies across studies, ranging from 45.55% primigravida to 65.55% multigravida in our study. These

variations underscore the heterogeneity of pregnant populations in India, which may influence HDP epidemiology.

Mean diastolic blood pressure

The mean diastolic blood pressure at admission for women with preeclampsia in the present study was 94.98 mmHg \pm 8.54. Comparisons with other studies reveal notable differences in diastolic blood pressure levels among different populations. This variation could result from factors such as genetic predisposition, diet, lifestyle, and healthcare access, emphasizing the need for region-specific management protocols [3].

Liver function test results

Liver function tests in the present study showed abnormal results in 90% of cases for total bilirubin, 60% for alanine transaminase (ALT), and 60% for aspartate transaminase (AST). In contrast, Hanumant *et al.* reported normal liver function test results. These findings suggest significant differences in liver function between our study population and the one in Hanumant *et al.*'s study. Further investigation is warranted to understand the underlying causes and implications of these variations [4].

Mean 24 H urine protein excretion

The mean 24 h urine protein excretion in our study for women with preeclampsia was 1884 mg/day \pm 2562, indicating substantial proteinuria. Comparative data from previous studies showed varying levels of protein excretion. The wide range of values underscores the complexity of proteinuria assessment and its potential variations due to different methodologies, patient populations, and disease severity [5].

CONCLUSION

In conclusion, the epidemiology of hypertensive disorders of pregnancy in India is multifaceted and influenced by diverse factors, including demographics, blood pressure levels, liver function, and proteinuria. These findings emphasize the importance of region-

specific research and healthcare interventions tailored to the unique characteristics of the Indian population. Further studies are required to unravel the intricate web of factors contributing to HDP in India and to guide effective preventive measures and management strategies.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICTS OF INTERESTS

Declared none

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