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Assessing Hypertensive Disorders in Pregnancy and Associated Outcomes: A Cross-Sectional Study in Pakistan

Asifa Sattar[1], Dr. Farah Sattar[2], Maham khaliq[3], Fizza Fatima[4], Tayyaba[5], Dr. Hafiza Hira Sattar[6], Dr.Iqra Sattar[7]

Miss Asifa Sattar is currently pursuing a masters degree program in Radiology Imaging Technology in Times Institute, Pakistan, E-mail: Asifamehar6@gmail.com
Dr.Farah Sattar is currently serving as Medical officer in Gynecology department Gujranwala Medical College , Pakistan
Miss Maham Khaliq is a public health graduate from Al Shifa trust eye hospital,Rawalpindi,Pakistan,Email:mahamkhaliq55@gmail.com

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ABSTRACT

This cross-sectional study investigates the prevalence and outcomes of hypertensive disorders during pregnancy in Pakistan. Data were collected from pregnant women attending antenatal clinics in various regions. The study revealed a significant prevalence of hypertensive disorders, including gestational hypertension, preeclampsia, and eclampsia. Maternal complications, such as severe preeclampsia and eclampsia, were identified, contributing to adverse outcomes such as maternal mortality and severe morbidity. Fetal complications, including intrauterine growth restriction (IUGR) and preterm birth, were also observed among women with hypertensive disorders. Statistical analysis unveiled associations between demographic factors and the risk of developing hypertensive disorders during pregnancy, highlighting the importance of timely detection and management. These findings underscore the urgent need for comprehensive maternal healthcare strategies and targeted interventions to mitigate the adverse effects of hypertensive disorders on maternal and fetal health in Pakistan. Strengthening antenatal care services and implementing evidence-based practices are crucial steps toward improving pregnancy outcomes and reducing maternal morbidity and mortality rates associated with hypertensive disorders during pregnancy in Pakistan.

1. Introduction

Hypertensive disorders during pregnancy (HDP) encompass a spectrum of conditions, including chronic hypertension, gestational hypertension, preeclampsia, and eclampsia. These disorders significantly contribute to maternal and perinatal morbidity and mortality worldwide. In low- and middle-income countries (LMICs) like Pakistan, the burden is disproportionately high due to inadequate prenatal care and limited access to healthcare facilities (World Health Organization, 2013; National Institute for Health and Care Excellence, 2019).

1.1 Significance of the Study

Assessing the prevalence and outcomes of HDP is crucial for developing targeted interventions. This study aims to provide a comprehensive analysis of HDP in Pakistan, highlighting the associated maternal and fetal outcomes and identifying gaps in current healthcare practices (American College of Obstetricians and Gynecologists, 2020).

1.2 Objectives

- To determine the prevalence of HDP in a selected population in Pakistan.
- To analyze maternal outcomes associated with HDP.
- To evaluate fetal outcomes linked to HDP.
- To identify risk factors contributing to HDP in the studied population.

1.3 Research Questions

- What is the prevalence of hypertensive disorders in pregnancy among the studied population?
- What maternal complications are associated with HDP?
- What fetal outcomes are linked to HDP?
- What are the significant risk factors for developing HDP in the studied population?

1.4 Hypothesis

- The prevalence of HDP in the studied population is higher than in developed countries.
- HDP is associated with significant adverse maternal outcomes, including increased rates of cesarean delivery and maternal mortality.
- HDP leads to adverse fetal outcomes, such as low birth weight and preterm birth.
- Socioeconomic factors, such as low income and limited access to healthcare, are significant risk factors for HDP.

1.5 Scope and Limitations

This cross-sectional study focuses on pregnant women attending antenatal clinics in selected hospitals in Pakistan. Limitations include potential recall bias and the inability to establish causality due to the study design.

2. Literature Review

2.1 Overview of Hypertensive Disorders in Pregnancy

Hypertensive disorders in pregnancy range from mild to severe forms and are a leading cause of maternal and perinatal morbidity and mortality. These conditions require early detection and management to prevent complications (Sibai, Dekker, & Kupferminc, 2005).

2.2 Epidemiology of Hypertensive Disorders in Pregnancy

The prevalence of HDP varies globally, with higher rates reported in LMICs. Factors contributing to this variation include differences in healthcare systems, socioeconomic status, and genetic predispositions (Duley, 2009).

2.3 Pathophysiology of Hypertensive Disorders in Pregnancy

HDP results from complex interactions between maternal, fetal, and placental factors. Abnormal placentation and immune maladaptation play critical roles in the pathogenesis of conditions like preeclampsia (Redman & Sargent, 2005).

2.4 Risk Factors for Hypertensive Disorders in Pregnancy

Key risk factors include advanced maternal age, obesity, history of hypertension, and genetic predisposition. Socioeconomic factors, such as limited access to prenatal care, also contribute to the risk (Bartsch *et al.,* 2016).

2.5 Maternal and Fetal Outcomes

Associated with Hypertensive Disorders,Maternal outcomes include increased risk of cesarean delivery, postpartum hemorrhage, and maternal mortality. Fetal outcomes include intrauterine growth restriction (IUGR), preterm birth, and stillbirth (Steegers *et al.,* 2010).

2.6 Management and Treatment of Hypertensive Disorders in Pregnancy

Management strategies involve early diagnosis, blood pressure control, and timely delivery. Pharmacological treatments and lifestyle modifications are critical components of management (American College of Obstetricians and Gynecologists, 2020).

2.7 Global Perspective on Hypertensive Disorders in Pregnancy

HDP is a global health concern with varying prevalence and outcomes. Developed countries have implemented effective screening and management protocols, resulting in better outcomes compared to LMICs (World Health Organization, 2013).

2.8 Hypertensive Disorders in Pregnancy in Pakistan

Pakistan faces a high burden of HDP due to factors such as inadequate healthcare infrastructure and socioeconomic challenges. There is a need for improved prenatal care services and public health interventions (Nishtar et al., 2013).

2.9 Public Health Implications

HDP has significant public health implications, including increased healthcare costs and long-term health consequences for mothers and offspring. Addressing HDP requires a multifaceted approach involving healthcare providers, policymakers, and the community (Roberts & Hubel, 2009).

2.10 Research Gap

Despite extensive research on hypertensive disorders in pregnancy globally, there is a lack of comprehensive data from Pakistan. The available studies often focus on small populations or specific regions, leading to fragmented information. This study aims to fill this gap by providing a detailed analysis of HDP prevalence, maternal and fetal outcomes, and associated risk factors in a broader Pakistani context (Saleem *et al.,* 2020).

3. Methodology

3.1 Study Design:

This cross-sectional study was designed to assess the prevalence of hypertensive disorders in pregnancy and their associated outcomes in a selected population in Pakistan.

3.2 Study Setting:

The study was conducted in three major hospitals in urban and rural areas of Pakistan, providing a comprehensive overview of different healthcare settings.

3.4 Population and Sample:

The study population included pregnant women attending antenatal clinics in the selected hospitals. A sample size of 500 participants was determined based on the prevalence of HDP reported in previous studies and statistical power calculations.

3.5 Data Collection Instruments:

Data was collected using structured questionnaires and medical records. The questionnaire included sections on demographic information, obstetric history, and clinical features of hypertensive disorders.

3.6 Data Collection Procedure:

Data collection was carried out by trained healthcare professionals. Participants were recruited during their antenatal visits, and informed consent was obtained. Blood pressure measurements and relevant clinical information were recorded.

3.7 Ethical Considerations:

Ethical approval was obtained from the Institutional Review Board (IRB) of each participating hospital. Participants were assured of the confidentiality and anonymity of their data. Written informed consent was obtained from all participants prior to data collection.

3.8 Data Analysis:

Data were analyzed using SPSS version 26.0. Descriptive statistics were used to summarize demographic characteristics and prevalence rates. Inferential statistics, including chi-square tests and logistic regression, were used to assess associations between HDP and maternal and fetal outcomes.

4. Results

4.1 Demographic Characteristics

Table 1 :

Presents the demographic characteristics of the study population. The majority of participants were aged between 20 and 35 years, with a mean age of 28.4 years.		
Characteristic	**Frequency (n)**	**Percentage (%)**
Age:		
<20 years	50	10.0
20-35 years	350	70.0
>35 years	100	20.0
Education:		
No formal education	100	20.0
Primary education	150	30.0
Secondary education	200	40.0
Higher education	50	10.0

4.2 Prevalence of Hypertensive Disorders:

The overall prevalence of HDP in the study population was 15%.

Table 2:

shows the distribution of different types of hypertensive disorders.		
Disorder	Frequency (n)	Percentage (%)
Chronic hypertension	30	6.0
Gestational hypertension	50	10.0
Preeclampsia	35	7.0
Eclampsia	10	2.0

4.3 Maternal Outcomes:

Table 3:

presents the maternal outcomes associated with HDP. There was a significant increase in cesarean delivery rates among women with HDP.			
Outcome	**HDP (n=75)**	**No HDP (n=425)**	**p-value**
Cesarean delivery	40 (53.3%)	85 (20.0%)	<0.001

Postpartum hemorrhage	15 (20.0%)	30 (7.1%)	0.002
Maternal mortality	5 (6.7%)	5 (1.2%)	0.01

4.4 Fetal Outcomes:

Table 4:

shows the fetal outcomes associated with HDP. There was a significant increase in preterm births and low birth weight among pregnancies complicated by HDP.			
Outcome	HDP (n=75)	No HDP (n=425)	p-value
Preterm birth	30 (40.0%)	50 (11.8%)	<0.001
Low birth weight	25 (33.3%)	60 (14.1%)	0.001
Stillbirth	10 (13.3%)	15 (3.5%)	0.004

4.5 Statistical Analysis:

Logistic regression analysis identified several significant risk factors for HDP, including advanced maternal age, obesity, and a history of hypertension.

Table 5:

summarizes the logistic regression results.			
Variable	**Adjusted Odds Ratio**	**95% Confidence Interval (CI)**	**p-value**
Age>35years	2.5	1.4 - 4.5	0.002
Obesity (BMI > 30)	3.0	1.7 - 5.2	<0.001
History of hypertension	2.8	1.5 - 5.0	0.001

5. Discussion

5.1 Interpretation of Findings

The study found a high prevalence of HDP in the studied population, with significant adverse maternal and fetal outcomes. These findings underscore the need for improved prenatal care and targeted interventions to manage and prevent HDP.

5.2 Comparison with Existing Literature

The prevalence and outcomes observed in this study are consistent with global trends reported in LMICs. However, the prevalence in Pakistan appears to be higher than in some other regions, likely due to differences in healthcare access and socioeconomic factors (Duley, 2009; Bartsch *et al.,* 2016).

5.3 Implications for Practice

Healthcare providers should prioritize early screening and management of hypertensive disorders in pregnancy. Policymakers need to invest in healthcare infrastructure and training to improve maternal and fetal outcomes.

5.4 Recommendations for Future Research

Future studies should focus on longitudinal designs to establish causal relationships and explore the impact of interventions on reducing the burden of HDP.

6. Conclusion

This study on hypertensive disorders in pregnancy in Pakistan provides valuable insights into their prevalence, associated maternal and fetal outcomes, and risk factors. The findings highlight the urgent need for improved prenatal care and targeted public health interventions to manage and prevent HDP. Addressing these challenges requires collaborative efforts from healthcare providers, policymakers, and communities to ensure better maternal and fetal health outcomes in Pakistan.

7. Ethical Approval:

Ethical approval for this study was obtained from the Institutional Review Boards (IRB) of the participating hospitals. The ethical considerations included ensuring the confidentiality and anonymity of participants' data, obtaining informed consent from all participants, and following the ethical guidelines outlined by the Declaration of Helsinki.

8. References

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Appendices

Data Collection Tools:

The structured questionnaire used for data collection included sections on:

- Demographic information
- Obstetric history
- Clinical features of hypertensive disorders

Tables 1:

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