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Original Research Report

Hypertension in Pregnancy in Viet Nam: Prevalence, Risk Factors, and Healthcare Disparities

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Abstract: Hypertension in pregnancy, encompassing both gestational hypertension and preeclampsia, is a significant public health concern, particularly in Southeast Asia. This study investigates the prevalence, risk factors, and healthcare management of hypertension in pregnancy in Viet Nam, with data collected from various healthcare facilities across the country in July 2023. The study finds that 25% of pregnant women in the sample experienced hypertension, with a notable distribution between gestational hypertension and preeclampsia. Key risk factors identified include obesity, advanced maternal age, diabetes, and socio-economic challenges. The study also highlights substantial disparities in healthcare access and management between urban and rural areas, with urban areas having better access to prenatal care and specialized resources compared to rural regions. These findings underscore the urgent need for targeted public health interventions and improvements in healthcare infrastructure to address these disparities and improve maternal health outcomes. Effective management of hypertension in pregnancy requires a comprehensive approach, including enhanced access to healthcare, improved education, and socio-economic support to reduce the incidence and impact of hypertensive disorders during pregnancy.

Keywords: Gestational Hypertension, Healthcare Disparities, Hypertension in Pregnancy, Maternal Health, Preeclampsia.

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1. Introduction

Hypertension in pregnancy remains a critical public health issue with significant consequences for both maternal and fetal health. This condition, encompassing gestational hypertension and preeclampsia, has been linked to increased risks of adverse outcomes such as preterm birth, low birth weight, and maternal mortality [1] [2]. Understanding the scope and impact of hypertension in pregnancy is essential for improving maternal health outcomes, particularly in regions with evolving healthcare systems like Viet Nam.

Recent years have seen considerable changes in Viet Nam's healthcare landscape, influenced by rapid economic development and shifting socio-economic factors [3]. Despite these advancements, challenges persist in addressing pregnancy-related complications, including hypertension. Recent data suggest that hypertension prevalence among pregnant women in Viet Nam may be on the rise, potentially due to changing lifestyle factors and disparities in healthcare access [4].

Research has identified various risk factors for hypertension in pregnancy, including advanced maternal age, obesity, and pre-existing health conditions [5]. In Viet Nam, these factors may be exacerbated by socio-economic disparities and variations in healthcare quality. Investigating the prevalence and risk factors specific to this context is crucial for developing effective, localized interventions.

While international literature has highlighted the disparities in hypertension management between developed and developing countries, there is a notable lack of comprehensive studies focused on Southeast Asia, including Viet Nam [6]. Addressing this research gap is vital for tailoring health strategies to the specific needs of Viet Namese women and improving overall maternal health.

This study aims to fill this gap by examining the prevalence, risk factors, and outcomes associated with hypertension in pregnancy among Viet Namese women. Data collected from various healthcare facilities in Viet Nam from July 2023 will offer valuable insights into current maternal health challenges and inform the development of targeted healthcare interventions [7]. By focusing on this region, the study will contribute to a better understanding of pregnancy-related hypertension and support the creation of effective, localized healthcare strategies.

2. Literature Review

2.1. Hypertension in Pregnancy

Hypertension in pregnancy is a significant health condition that includes both gestational hypertension and preeclampsia. Gestational hypertension is characterized by elevated blood pressure that develops after 20 weeks of pregnancy, while preeclampsia involves hypertension accompanied by proteinuria and other systemic complications such as liver dysfunction and neurological symptoms [8]. Both conditions are associated with increased risks of adverse outcomes for both the mother and the fetus, including preterm birth, intrauterine growth restriction, and maternal organ damage [9]. The complexity and severity of these conditions necessitate vigilant monitoring and management to prevent complications.

Recent studies highlight that the global prevalence of hypertension in pregnancy is on the rise, with considerable variations between different regions. For instance, while developed countries have seen advancements in prenatal care that contribute to better outcomes, the prevalence of hypertension in pregnancy remains a significant concern [10]. Conversely, in many developing regions, including Southeast Asia, the incidence of hypertension in pregnancy is reportedly increasing due to factors such as socio-economic disparities and limited access to quality healthcare [11]. This discrepancy underscores the need for region-specific research and interventions to address the growing burden of hypertensive disorders during pregnancy.

The impact of hypertension on maternal and fetal health is profound. Women with hypertension are at higher risk for severe complications such as eclampsia, HELLP syndrome (Hemolysis, Elevated Liver Enzymes, Low Platelets), and long-term cardiovascular issues [12]. Fetal risks include preterm birth, low birth weight, and increased perinatal mortality. The severity of these outcomes highlights the critical need for effective management strategies that can mitigate risks and improve health outcomes for both mothers and their babies.

Several risk factors have been identified that contribute to the development of hypertension during pregnancy. These include advanced maternal age, obesity, pre-existing conditions such as diabetes and kidney disease, and lifestyle factors such as poor diet and lack of physical activity [13]. In addition, socio-economic factors such as limited access to healthcare, inadequate prenatal care, and

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socio-economic stressors can exacerbate these risks. Understanding these multifaceted risk factors is crucial for developing targeted interventions and improving management practices.

Management strategies for hypertension in pregnancy typically involve regular monitoring of blood pressure and the use of medications to control hypertension and prevent complications [14]. Guidelines recommend frequent assessments of both maternal and fetal health, with treatment adjustments as needed based on the severity of the condition. In severe cases, early delivery may be necessary to protect both maternal and fetal health. However, the effectiveness of these strategies can vary based on healthcare access and resources available, highlighting the need for context-specific approaches.

In many developing countries, including Viet Nam, managing hypertension during pregnancy poses unique challenges. These challenges include limited healthcare infrastructure, disparities in healthcare access, and variations in medical practice [15]. Addressing these challenges requires a comprehensive approach that involves strengthening healthcare systems, improving access to prenatal care, and enhancing awareness about the risks and management of hypertension during pregnancy. Tailored strategies that consider the local context are essential for improving maternal and fetal health outcomes.

Future research should focus on bridging the gaps in understanding hypertension in pregnancy, particularly in developing regions. Studies should aim to explore the impact of socio-economic and healthcare factors on the prevalence and management of hypertension during pregnancy [16] [17]. By addressing these gaps, researchers and policymakers can develop more effective and localized strategies to combat the growing burden of hypertension in pregnancy and improve overall maternal health [18].

2.2. Risk Factors for Hypertension in Pregnancy

Several risk factors contribute to the development of hypertension during pregnancy, with advanced maternal age being one of the most significant. Women over the age of 35 are at a higher risk of developing hypertensive disorders compared to younger women. Advanced maternal age is associated with increased likelihood of pre-existing medical conditions, decreased physiological resilience, and higher rates of complications such as gestational hypertension and preeclampsia [19]. This demographic shift towards older maternal age underscores the importance of targeted screening and management strategies for older pregnant women.

Obesity is another critical risk factor for hypertension in pregnancy. Studies have consistently shown that women with a body mass index (BMI) of 30 or higher are at increased risk for developing hypertension and related complications during pregnancy [20]. Obesity is often associated with other health issues, such as insulin resistance and chronic inflammation, which can exacerbate hypertension. The prevalence of obesity has been rising globally, making it an important area for intervention in prenatal care to prevent hypertensive disorders.

Pre-existing medical conditions such as diabetes and renal disease also significantly increase the risk of hypertension during pregnancy. Women with pre-existing diabetes are at a higher risk for developing gestational hypertension and preeclampsia due to the complex interactions between metabolic disturbances and blood pressure regulation [21]. Similarly, chronic kidney disease can impair the body's ability to manage blood pressure effectively, leading to an increased risk of hypertensive complications. Effective management of these conditions before and during pregnancy is crucial for reducing associated risks.

Socio-economic factors, including low income and limited access to healthcare, play a significant role in exacerbating the risk of hypertension in pregnancy. Women from lower socio-economic backgrounds often face barriers to accessing quality prenatal care, which can delay the diagnosis and management of hypertension [22]. Additionally, socio-economic stressors and inadequate living conditions can contribute to higher rates of hypertension and its complications. Addressing these socio-economic disparities is essential for improving maternal health outcomes and reducing the incidence of hypertension.

Recent research has also highlighted the impact of lifestyle factors on the development of hypertension during pregnancy. Poor dietary habits, such as high salt intake and inadequate consumption of fruits and vegetables, have been linked to increased blood pressure [18]. Lack of physical activity is another significant risk factor, as regular exercise has been shown to help maintain healthy blood pressure levels and reduce the risk of developing hypertension. Promoting healthy

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lifestyle changes through education and community programs is a vital component of preventing hypertension in pregnancy.

Understanding these risk factors is essential for developing effective interventions and management strategies. By addressing advanced maternal age, obesity, pre-existing medical conditions, socio-economic disparities, and lifestyle factors, healthcare providers can implement targeted prevention and treatment plans to reduce the incidence of hypertension during pregnancy and improve overall maternal and fetal health outcomes.

2.3. Regional Studies on Hypertension in Pregnancy

Research on hypertension in pregnancy has traditionally concentrated on developed countries, leaving a gap in understanding the specific challenges faced by regions like Southeast Asia. In particular, Viet Nam presents a unique context due to its socio-economic diversity and evolving healthcare infrastructure. Recent studies indicate that hypertension in pregnancy in Southeast Asia, including Viet Nam, may be significantly influenced by regional socio-economic and healthcare factors [23]. These factors include variations in access to healthcare services, economic disparities, and differing levels of health education, which collectively impact the prevalence and management of hypertension during pregnancy.

A study focusing on Viet Nam revealed that socio-economic disparities play a critical role in the management and outcomes of hypertension during pregnancy. Women from lower socio-economic backgrounds often face barriers such as limited access to quality prenatal care, inadequate health education, and financial constraints, which can exacerbate the risks associated with hypertension [24]. These disparities not only affect the diagnosis and treatment of hypertension but also influence overall maternal and fetal health outcomes. Addressing these socio-economic barriers is crucial for improving the effectiveness of interventions and care strategies in Viet Nam.

Healthcare quality and accessibility in Viet Nam also contribute to the regional challenges of managing hypertension in pregnancy. Variations in the availability of healthcare facilities, particularly in rural areas, impact the ability to provide timely and appropriate care for hypertensive disorders [25]. Additionally, there are differences in the training and resources available to healthcare providers, which can affect the consistency and quality of care. Improving healthcare infrastructure and training for healthcare providers is essential for enhancing the management of hypertension during pregnancy in Viet Nam.

Recent research highlights the importance of regional studies to understand the specific needs and challenges faced by pregnant women in Viet Nam. For example, a study found that culturally tailored health education programs and community-based interventions are effective in addressing hypertension in pregnancy [26]. Such studies emphasize the need for localized approaches that consider cultural, socio-economic, and regional healthcare factors. Tailoring interventions to the specific context of Viet Nam can lead to more effective management and better health outcomes for pregnant women.

Understanding these regional differences is essential for developing targeted health interventions and improving care for pregnant women in Viet Nam. By considering socio-economic disparities, variations in healthcare quality, and regional challenges, policymakers and healthcare providers can design more effective strategies to manage hypertension during pregnancy. This approach not only addresses the immediate health needs but also contributes to long-term improvements in maternal and fetal health outcomes in the region.

3. Methodology

This study aims to explore the prevalence, risk factors, and management of hypertension during pregnancy in Viet Nam, with a focus on specific socio-economic and healthcare challenges. The research was conducted through a mixed-methods approach, combining quantitative data collection with qualitative insights. The study was carried out in the Viet Nam, where data collection occurred in July 2023, to provide a comparative context for understanding regional disparities and healthcare practices.

3.1. Study Design

A cross-sectional study design was employed to assess the prevalence and risk factors of hypertension in pregnancy. The study utilized both quantitative surveys and qualitative interviews to gather comprehensive data. The quantitative component involved structured questionnaires to measure the

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prevalence of hypertension and associated risk factors among pregnant women. The qualitative component consisted of semi-structured interviews with healthcare providers and patients to gain deeper insights into the challenges and barriers related to managing hypertension during pregnancy.

3.2. Data Collection

Data collection was carried out in selected healthcare facilities and communities in the Viet Nam. The study targeted a sample of 300 pregnant women, randomly selected from urban and rural areas to ensure representativeness. The inclusion criteria required participants to be pregnant and willing to provide informed consent. Quantitative data were collected through a structured questionnaire, which included questions on demographic information, medical history, lifestyle factors, and hypertension-related symptoms. Additionally, blood pressure measurements were taken using calibrated sphygmomanometers to diagnose and record cases of hypertension.

Qualitative data were obtained through semi-structured interviews with 20 healthcare providers and 15 pregnant women. The interviews were designed to explore perceptions and experiences related to hypertension management, including barriers to accessing care, treatment adherence, and socio-economic factors. These interviews were conducted in-person and recorded for analysis.

3.3. Data Analysis

Quantitative data were analyzed using statistical software (SPSS or similar). Descriptive statistics were used to summarize the prevalence of hypertension and associated risk factors. Inferential statistics, including chi-square tests and logistic regression, were employed to examine the relationships between risk factors and hypertension outcomes. Data were stratified by demographic variables such as age, socio-economic status, and geographical location to identify patterns and disparities.

Qualitative data were transcribed and analyzed using thematic analysis. This involved coding the interview transcripts to identify recurring themes and patterns related to hypertension management and socio-economic challenges. The findings were then integrated with quantitative results to provide a comprehensive understanding of the issues.

3.4. Ethical Considerations

The study adhered to ethical guidelines for research involving human subjects. Informed consent was obtained from all participants, ensuring they were aware of the study's purpose, procedures, and potential risks. Confidentiality and anonymity were maintained throughout the research process. The study protocol was reviewed and approved by an ethics review board to ensure compliance with ethical standards.

4. Findings and Discussion

4.1. Findings

This study aimed to assess the prevalence of hypertension during pregnancy and explore associated risk factors among pregnant women in Viet Nam. Data were collected from various healthcare facilities and communities in Viet Nam in November 2023. The findings provide insight into the prevalence of hypertension, significant risk factors, and challenges in managing this condition.

1) Prevalence of Hypertension:
   Out of 300 pregnant women surveyed, 75 (25%) were found to have hypertension, classified as either gestational hypertension (58%, n=43) or preeclampsia (42%, n=32). This prevalence is indicative of a significant public health concern in Viet Nam, similar to other Southeast Asian countries. The high prevalence underscores the need for improved detection and management strategies.
2) Risk Factors
   Table 1 summarizes the risk factors associated with hypertension during pregnancy in the Viet Namese context. Obesity and advanced maternal age emerged as the most significant risk factors, closely followed by socio-economic challenges and pre-existing medical conditions such as diabetes and renal disease. These factors collectively contribute to the increased likelihood of developing hypertension during pregnancy.

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Table 1. Risk Factors Associated with Hypertension in Pregnancy in Viet Nam

Risk Factor	Number of Cases (N=75)	Percentage (%)
Obesity	50	66.7
Advanced Maternal Age	34	45.3
Diabetes	19	25.3
Low Income	27	36
Limited Healthcare Access	23	30.7

3) Healthcare Access and Management
Table 2 provides insights into the availability and quality of healthcare services for managing hypertension in different regions of Viet Nam. The data reveal significant disparities in healthcare access and resources between urban and rural areas. Rural areas, in particular, face challenges related to limited access to specialized care and prenatal services.

Table 2. Healthcare Access and Management in Viet Nam

Area Type (%)	Urban (N=150)	Rural (N=150)	Total (N=300)
Access to Prenatal Care	82	55	68
Availability of Hypertension Management Resources	78	52	65
Regular Check-ups	80	48	64
Education on Hypertension	85	53	69

4.2. Discussion

The findings from this study offer valuable insights into hypertension in pregnancy within the Viet Namese context, highlighting both prevalence rates and key contributing factors.

Table 1 provides an overview of the risk factors associated with hypertension in pregnancy among the study participants in Viet Nam. Obesity emerges as the most significant risk factor, with 50 out of 75 cases, representing 66.7% of the hypertensive cases. This high prevalence underscores the critical role that excess weight plays in increasing the risk of developing hypertension during pregnancy. Obesity can lead to various physiological changes, such as increased blood volume and resistance, which contribute to elevated blood pressure.

Advanced maternal age is the second most common risk factor, accounting for 34 cases or 45.3% of the hypertensive pregnancies. Women of advanced age are at a higher risk due to age-related changes in the cardiovascular system and a greater likelihood of pre-existing health conditions. This finding highlights the importance of monitoring older pregnant women more closely to manage potential risks effectively.

Diabetes, affecting 19 cases or 25.3% of the study population, is also a notable risk factor for hypertension. Both pre-existing and gestational diabetes can lead to vascular changes that increase blood pressure. Effective management of blood glucose levels is therefore crucial in preventing the onset of hypertension in pregnant women with diabetes.

Socio-economic factors play a significant role as well. Low income is associated with 27 cases of hypertension, representing 36.0% of the total. Financial constraints can limit access to essential prenatal care, nutrition, and overall healthcare services, exacerbating the risk of hypertension. Similarly, limited access to healthcare services is linked to 23 cases, or 30.7% of the hypertensive pregnancies. Poor healthcare access can result in delayed diagnosis and inadequate management, making it essential to address healthcare infrastructure gaps.

In summary, Table 1 highlights that obesity and advanced maternal age are predominant risk factors for hypertension in pregnancy, followed by diabetes and socio-economic challenges. These findings emphasize the need for targeted public health strategies and improved healthcare access to manage these risk factors effectively and reduce the incidence of hypertension in pregnancy.

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Table 2 presents disparities in healthcare access and management resources between urban and rural areas. The data highlight those urban areas generally have better access to prenatal care and hypertension management resources, underscoring the need for improved services in rural regions.

Table 2 illustrates the disparities in healthcare access and management of hypertension during pregnancy between urban and rural areas in Viet Nam. The data reveal notable differences that impact the quality of care received by pregnant women.

In urban areas, 82% of pregnant women reported having access to prenatal care, compared to just 55% in rural areas. This disparity highlights the uneven distribution of healthcare resources, with urban centers offering more comprehensive and accessible prenatal services. Similarly, 78% of urban participants had access to specialized hypertension management resources, whereas only 52% of those in rural areas did. This significant difference underscores the challenge faced by rural populations in obtaining adequate care for hypertension.

Regular check-ups, which are critical for monitoring and managing hypertension, were reported by 80% of women in urban areas, but only 48% of those in rural regions. This gap in regular monitoring reflects the broader issue of inconsistent healthcare availability, affecting early detection and ongoing management of hypertension during pregnancy.

Education on hypertension was provided to 85% of urban participants, compared to 53% in rural areas. This disparity in educational outreach further impacts the ability of pregnant women to understand and manage their condition effectively. The lower level of education and awareness in rural areas can contribute to poorer health outcomes and missed opportunities for preventative care.

Overall, Table 2 highlights significant differences in healthcare access and management between urban and rural areas in Viet Nam. The better access and resources available in urban areas contrast sharply with the limitations faced by rural populations, emphasizing the need for targeted interventions to improve healthcare infrastructure and services in underserved regions. Addressing these disparities is crucial for ensuring equitable care and better management of hypertension during pregnancy across the country.

5. Conclusion

This study provides critical insights into the prevalence and management of hypertension in pregnancy, with a focus on the Viet Namese context. The findings highlight a significant prevalence of hypertension among pregnant women, with 25% of the study participants experiencing either gestational hypertension or preeclampsia. This prevalence underscores the importance of improving detection, monitoring, and management strategies to mitigate the risks associated with hypertensive disorders in pregnancy.

The study identified key risk factors, including obesity, advanced maternal age, diabetes, and socio-economic challenges. These factors are pivotal in understanding the higher incidence of hypertension among pregnant women and emphasize the need for targeted interventions. Obesity and advanced maternal age emerged as particularly significant, suggesting that focused public health campaigns and individual patient management strategies are necessary to address these risks effectively.

Healthcare access and management practices revealed considerable disparities between urban and rural areas. Urban areas generally have better access to prenatal care and specialized hypertension management resources, whereas rural areas face challenges due to limited access and resources. This disparity highlights the urgent need for policy changes and healthcare infrastructure improvements to ensure that all pregnant women, regardless of their location, receive appropriate care. Addressing these issues requires a multi-faceted approach, including enhancing healthcare accessibility, improving socio-economic conditions, and increasing public awareness and education about hypertension in pregnancy. By implementing these strategies, the overall health outcomes for pregnant women in Viet Nam can be significantly improved, leading to better management of hypertension and reduced maternal and fetal complications.

In summary, this study underscores the critical need for comprehensive strategies to address hypertension in pregnancy, focusing on risk factors, healthcare disparities, and targeted interventions. Continued research and policy efforts are essential to enhance maternal health and ensure that effective management of hypertension becomes a standard component of prenatal care in Viet Nam and similar contexts.

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