

Nurse-Led Educational Intervention and Evidence-Based Nursing Protocol for Optimizing the Identification, Monitoring, and Management of Pregnancy-Induced Hypertension

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Abstract

Hypertensive disorders of pregnancy are important causes of maternal and perinatal morbidity and require early identification, systematic monitoring, and timely management. The present study aimed to evaluate the effectiveness of a nurse-led educational intervention combined with an evidence-based nursing protocol for optimizing the identification, monitoring, and management of pregnancy-induced hypertension among pregnant women in a selected hospital, Coimbatore. A quantitative research approach with a quasi-experimental one-group pre-test and post-test design was adopted. Sixty pregnant women diagnosed with pregnancy-induced hypertension were selected using purposive sampling. Data were collected using a structured demographic and obstetric questionnaire, knowledge questionnaire, maternal monitoring and self-care practice checklist, and clinical assessment record. Following the pre-test assessment, participants received a structured nurse-led educational intervention addressing pregnancy-induced hypertension, risk factors, warning signs, medication adherence, blood pressure monitoring, antenatal follow-up, self-care, and indications for seeking immediate medical attention. An evidence-based nursing protocol was simultaneously implemented to standardize maternal assessment, monitoring, documentation, patient education, and timely escalation of care. The mean knowledge score increased from 12.36 ± 3.18 before the intervention to 22.64 ± 2.71 after the intervention, with a statistically significant difference ($t = 19.42$, $p < 0.001$). The mean maternal monitoring and self-care practice score increased from 16.84 ± 4.26 to 27.18 ± 3.52 ($t = 17.36$, $p < 0.001$). Mean systolic blood pressure decreased from 148.6 ± 8.7 mmHg to 137.8 ± 7.2 mmHg, while mean diastolic blood pressure decreased from 96.4 ± 6.1 mmHg to 88.7 ± 5.4 mmHg ($p < 0.001$). The findings suggest that integrating nurse-led education with a structured evidence-based nursing protocol may improve knowledge, maternal monitoring and self-care practices, and selected clinical parameters among pregnant women with pregnancy-induced hypertension. Controlled studies with larger samples and longer follow-up are recommended to further establish the effectiveness and sustainability of this integrated nursing approach.

Keywords: pregnancy-induced hypertension, nurse-led education, evidence-based nursing protocol, maternal monitoring, self-care, pregnancy, antenatal care, nursing intervention.

Introduction

Hypertensive disorders of pregnancy are among the most important causes of maternal and perinatal morbidity and mortality worldwide. They encompass a spectrum of conditions, including chronic hypertension, gestational hypertension, pre-eclampsia, eclampsia, and chronic hypertension with superimposed pre-eclampsia. These disorders may develop without prominent symptoms and can progress rapidly, making early identification and systematic monitoring essential components of safe antenatal care. Pregnancy-induced hypertension can adversely affect maternal and fetal health through complications such as severe hypertension, neurological

complications, renal and hepatic dysfunction, placental abruption, fetal growth restriction, preterm birth, and adverse perinatal outcomes.

Early recognition of hypertension during pregnancy requires accurate blood pressure measurement, appropriate assessment of maternal symptoms, evaluation of relevant clinical and laboratory parameters, and regular assessment of fetal well-being.

Identification of warning signs such as severe headache, visual disturbances, epigastric or right upper quadrant pain, sudden swelling, reduced urine output, and other manifestations of disease progression is particularly important. Timely recognition of deterioration allows appropriate escalation of care and may reduce the risk of severe maternal and fetal complications.

Nurses have a pivotal role in the prevention, identification, monitoring, and management of hypertensive disorders during pregnancy. Nursing responsibilities include accurate and repeated blood pressure assessment, monitoring maternal and fetal status, identifying clinical deterioration, administering prescribed medications, monitoring treatment response, maintaining appropriate documentation, providing patient education, and facilitating timely communication with the multidisciplinary healthcare team. However, variations in nursing knowledge, clinical practice, assessment techniques, documentation, and escalation of care may affect the consistency and quality of management.

Evidence-based nursing protocols can provide a standardized framework for clinical assessment and decision-making. A structured protocol can guide nurses in blood pressure measurement, symptom assessment, maternal and fetal monitoring, medication administration, recognition of danger signs, patient education, documentation, and referral or escalation when required. Standardized approaches may promote consistency in nursing practice and support timely recognition of women who require further obstetric assessment or intervention.

Patient education is an equally important component of managing hypertension during pregnancy. Pregnant women require clear information regarding the importance of antenatal follow-up, medication adherence, blood pressure monitoring, appropriate self-care, recognition of warning signs, and the need to seek immediate medical attention when concerning symptoms occur. Nurse-led educational interventions provide an opportunity to address individual knowledge gaps, clarify misconceptions, reinforce treatment recommendations, and encourage active participation in maternal healthcare.

Although evidence-based approaches to hypertensive disorders of pregnancy are well established, their consistent application within routine nursing practice remains important for optimizing maternal surveillance and early intervention. Integrating structured nurse-led education with an evidence-based nursing protocol may strengthen nurses' clinical practices while improving pregnant women's knowledge and engagement in the management of hypertension.

Therefore, the present study was undertaken to evaluate the effectiveness of a nurse-led educational intervention combined with an evidence-based nursing protocol for optimizing the identification, monitoring, and management of pregnancy-induced hypertension among pregnant women in a selected hospital in Coimbatore. The study aims to generate evidence regarding the role of standardized nursing interventions in strengthening antenatal surveillance and promoting safer maternal and fetal outcomes.

Statement of the Problem



A study to assess the effectiveness of a nurse-led educational intervention and evidence-based nursing protocol for optimizing the identification, monitoring, and management of pregnancy-induced hypertension among pregnant women in a selected hospital, Coimbatore.

Objectives of the Study

1. To assess the baseline knowledge of pregnant women regarding pregnancy-induced hypertension, its risk factors, warning signs, prevention, and management.
2. To assess the baseline maternal monitoring and self-care practices of pregnant women with pregnancy-induced hypertension.
3. To assess the effectiveness of a nurse-led educational intervention and evidence-based nursing protocol in improving knowledge regarding the identification, monitoring, and management of pregnancy-induced hypertension.
4. To assess the effectiveness of the nurse-led educational intervention and evidence-based nursing protocol in improving maternal monitoring and self-care practices related to pregnancy-induced hypertension.
5. To compare the pre-intervention and post-intervention maternal clinical parameters, including blood pressure and other relevant monitoring parameters, among pregnant women with pregnancy-induced hypertension.
6. To determine the association between pre-intervention knowledge and selected demographic and obstetric variables among pregnant women with pregnancy-induced hypertension.
7. To determine the association between pre-intervention maternal monitoring and self-care practices and selected demographic and obstetric variables among pregnant women with pregnancy-induced hypertension.

Research Hypotheses

H₁: There will be a statistically significant difference between the pre-intervention and post-intervention knowledge scores regarding pregnancy-induced hypertension among pregnant women following the nurse-led educational intervention.

H₂: There will be a statistically significant difference between the pre-intervention and post-intervention maternal monitoring and self-care practice scores among pregnant women following the implementation of the nurse-led educational intervention and evidence-based nursing protocol.

H₃: There will be a statistically significant difference in selected maternal clinical parameters, including blood pressure, between the pre-intervention and post-intervention assessments following the implementation of the nurse-led educational intervention and evidence-based nursing protocol.

H₄: There will be a statistically significant association between pre-intervention knowledge regarding pregnancy-induced hypertension and selected demographic and obstetric variables among pregnant women.

H₅: There will be a statistically significant association between pre-intervention maternal monitoring and self-care practices and selected demographic and obstetric variables among pregnant women.

Methods

A quantitative research approach with a quasi-experimental one-group pre-test and post-test design was adopted to evaluate the effectiveness of a nurse-led educational intervention and evidence-based nursing protocol for optimizing the identification, monitoring, and management of pregnancy-induced hypertension. The

study was conducted in a selected hospital in Coimbatore, Tamil Nadu, among pregnant women diagnosed with pregnancy-induced hypertension. A sample of 60 pregnant women who fulfilled the predefined eligibility criteria was selected using purposive sampling.

Data were collected using a structured tool comprising demographic and obstetric characteristics, a knowledge questionnaire, a maternal monitoring and self-care practice checklist, and a clinical assessment record. The demographic and obstetric variables included age, educational status, occupation, gravida, gestational age, parity, previous history of hypertension, family history of hypertension, and relevant antenatal characteristics. The knowledge questionnaire assessed understanding of pregnancy-induced hypertension, risk factors, warning signs, complications, medication adherence, antenatal follow-up, monitoring requirements, and management. The maternal monitoring and self-care checklist assessed practices related to blood pressure monitoring, medication adherence, dietary measures, rest, antenatal follow-up, recognition of warning signs, and timely healthcare seeking. Clinical assessment included blood pressure and other relevant maternal and fetal monitoring parameters.

Following the baseline assessment, a structured nurse-led educational intervention was provided. The intervention covered the nature of pregnancy-induced hypertension, risk factors, early warning signs, importance of regular blood pressure monitoring, medication adherence, dietary and lifestyle measures, antenatal follow-up, recognition of complications, and indications for immediate medical attention. Education was delivered using interactive teaching, discussion, demonstration, and appropriate educational materials.

An evidence-based nursing protocol was implemented alongside the educational intervention to standardize nursing care. The protocol included systematic assessment of blood pressure, maternal symptoms, urine output, relevant laboratory parameters, fetal well-being, medication administration and response to treatment, identification of danger signs, documentation, patient education, and timely communication or escalation to the obstetric team when clinically indicated. The protocol was used to guide nursing assessment and monitoring throughout the intervention period.

A post-intervention assessment was conducted using the same study instruments after the predetermined intervention period. The pre- and post-intervention findings were compared to determine changes in knowledge, maternal monitoring and self-care practices, and selected clinical parameters.

The content validity of the study instruments, educational materials, and evidence-based nursing protocol was established through expert evaluation by specialists in obstetric nursing, obstetrics and gynecology, nursing education, and research methodology. Reliability of the study instruments was established using appropriate reliability-testing procedures before the commencement of the main study.

Ethical approval was obtained from the Institutional Ethics Committee, and permission was obtained from the concerned hospital authority. Written informed consent was obtained from all participants after explaining the purpose and procedures of the study. Participation was voluntary, and confidentiality and anonymity were maintained throughout the study.

Data were analyzed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation were used to summarize the study variables. A paired t-test was used to compare pre-intervention and post-intervention knowledge, practice, and clinical parameter scores where the assumptions for parametric testing were satisfied. The chi-square test or Fisher's exact test was used to determine associations between selected demographic and obstetric variables and baseline study outcomes. Statistical significance was considered at $p < 0.05$.

Results

A total of 60 pregnant women with pregnancy-induced hypertension participated in the study. The mean age of the participants was 27.8 ± 4.3 years, and the mean gestational age was 31.6 ± 3.8 weeks. Among the participants, 34 (56.7%) were primigravida and 26 (43.3%) were multigravida. The majority of participants were between 26 and 30 years of age, and most were in the third trimester of pregnancy.

Distribution of Participants According to Knowledge Level (N = 60)

Knowledge level	Pre-intervention n (%)	Post-intervention n (%)
Inadequate	36 (60.0)	3 (5.0)
Moderately adequate	20 (33.3)	12 (20.0)
Adequate	4 (6.7)	45 (75.0)
Total	60 (100)	60 (100)

Distribution of Participants According to Maternal Monitoring and Self-Care Practice Level (N = 60)

Practice level	Pre-intervention n (%)	Post-intervention n (%)
Poor	35 (58.3)	4 (6.7)
Moderate	20 (33.3)	14 (23.3)
Good	5 (8.4)	42 (70.0)
Total	60 (100)	60 (100)

Comparison of Knowledge Scores Before and After the Intervention (N = 60)

Knowledge assessment	Mean $\pm$ SD	Mean difference	t-value	p-value
Pre-intervention	12.36 $\pm$ 3.18			
Post-intervention	22.64 $\pm$ 2.71	10.28	19.42	<0.001

The baseline assessment revealed inadequate knowledge regarding pregnancy-induced hypertension among the majority of participants. The mean pre-intervention knowledge score was 12.36 ± 3.18 , which increased to 22.64 ± 2.71 following the nurse-led educational intervention. The mean improvement was 10.28 points, and the difference was statistically significant ($t = 19.42$, $p < 0.001$).

Comparison of Maternal Monitoring and Self-Care Practice Scores (N = 60)

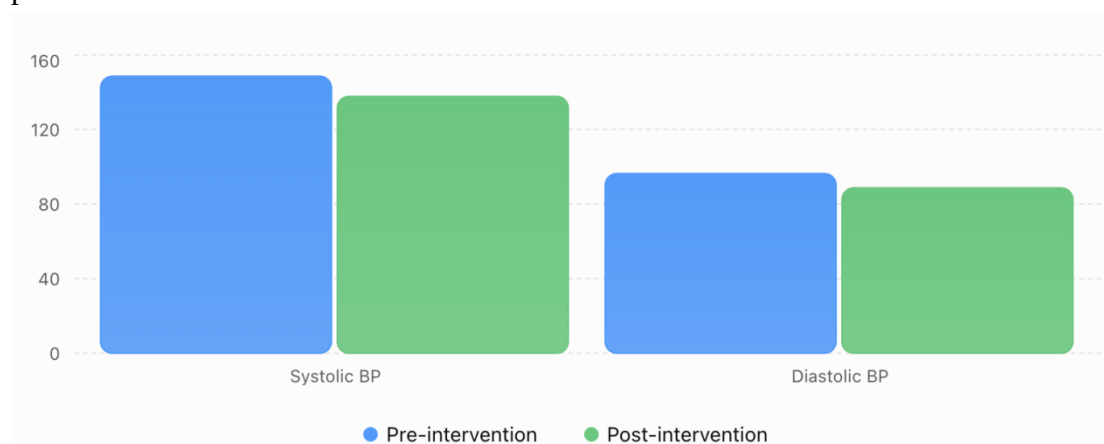
Practice assessment	Mean $\pm$ SD	Mean difference	t-value	p-value
Pre-intervention	16.84 $\pm$ 4.26			
Post-intervention	27.18 $\pm$ 3.52	10.34	17.36	<0.001

Maternal monitoring and self-care practices also demonstrated significant improvement following implementation of the nurse-led educational intervention and evidence-based nursing protocol. The mean pre-intervention practice score was 16.84

± 4.26 , which increased to 27.18 ± 3.52 during the post-intervention assessment. The mean difference was 10.34 points, and the improvement was statistically significant ($t = 17.36$, $p < 0.001$).

Comparison of Maternal Blood Pressure Before and After the Intervention (N = 60)

Clinical parameter	Pre-intervention Mean $\pm$ SD (mmHg)	Post-intervention Mean $\pm$ SD (mmHg)	Mean reduction	p-value
Systolic blood pressure	148.6 ± 8.7	137.8 ± 7.2	10.8	<0.001
Diastolic blood pressure	96.4 ± 6.1	88.7 ± 5.4	7.7	<0.001



A significant improvement was also observed in maternal blood pressure parameters. The mean systolic blood pressure decreased from 148.6 ± 8.7 mmHg before implementation of the intervention to 137.8 ± 7.2 mmHg after the intervention. Similarly, the mean diastolic blood pressure decreased from 96.4 ± 6.1 mmHg to 88.7 ± 5.4 mmHg. The observed reductions were statistically significant ($p < 0.001$).

Following the intervention, the proportion of participants demonstrating adequate knowledge increased substantially, while the proportion with inadequate knowledge decreased. Similarly, participants demonstrating satisfactory maternal monitoring and self-care practices increased considerably after implementation of the protocol.

Overall, the findings demonstrated statistically significant improvements in knowledge, maternal monitoring and self-care practices, and selected clinical parameters following the nurse-led educational intervention and evidence-based nursing protocol. These findings suggest that a structured nursing approach may strengthen the early identification, systematic monitoring, and management of pregnancy-induced hypertension.

Discussion

The present study evaluated the effectiveness of a nurse-led educational intervention combined with an evidence-based nursing protocol for optimizing the identification, monitoring, and management of pregnancy-induced hypertension among pregnant women. The findings demonstrated improvement in participants' knowledge, maternal monitoring and self-care practices, and selected clinical parameters following the intervention.

The study findings showed a marked improvement in knowledge regarding pregnancy-induced hypertension. The mean knowledge score increased from 12.36 ± 3.18 before the intervention to 22.64 ± 2.71 after the intervention, with a mean difference of 10.28 points. The observed improvement indicates that structured nurse-led education may effectively strengthen understanding of risk factors, warning signs, medication adherence, antenatal follow-up, monitoring requirements, and management of pregnancy-induced hypertension. The shift from predominantly inadequate or moderately adequate knowledge before the intervention toward adequate knowledge after the intervention further supports the value of systematic and structured patient education.

A significant improvement was also observed in maternal monitoring and self-care practices. The mean practice score increased from 16.84 ± 4.26 in the pre-intervention assessment to 27.18 ± 3.52 in the post-intervention assessment. This improvement may reflect the combined effect of repeated health education, demonstration, reinforcement of recommended practices, and use of a standardized nursing protocol. Education regarding regular blood pressure monitoring, medication adherence, dietary measures, adequate rest, antenatal follow-up, recognition of danger signs, and timely healthcare seeking may have contributed to better participation in self-care activities.

The study also demonstrated a reduction in mean systolic and diastolic blood pressure following implementation of the intervention. Mean systolic blood pressure decreased from 148.6 ± 8.7 mmHg to 137.8 ± 7.2 mmHg, while mean diastolic blood pressure decreased from 96.4 ± 6.1 mmHg to 88.7 ± 5.4 mmHg. These changes were statistically significant. However, the observed reduction in blood pressure should be interpreted cautiously because blood pressure among pregnant women with hypertension can be influenced by prescribed antihypertensive treatment, ongoing obstetric management, rest, gestational changes, and other clinical factors. Therefore, the one-group pre-test and post-test design does not permit the reduction in blood pressure to be attributed exclusively to the educational intervention or nursing protocol.

The improvement in outcomes may also be related to the standardized nature of the evidence-based nursing protocol. A structured protocol provides nurses with a systematic approach to assessment, monitoring, documentation, patient education, recognition of warning signs, and communication with the obstetric team. Standardization can reduce variation in routine nursing practices and facilitate timely identification of clinical deterioration. The integration of education with a clinical protocol may therefore provide a comprehensive approach that addresses both patient participation and nursing practice.

The findings further emphasize the important role of nurses in the management of pregnancy-induced hypertension. Nurses are frequently involved in repeated blood pressure assessment, monitoring maternal symptoms and fetal well-being, medication administration, patient counselling, documentation, and escalation of care. Strengthening nurses' adherence to standardized assessment and monitoring procedures, together with effective patient education, may support safer antenatal care and promote early recognition of complications.

Overall, the findings indicate that the nurse-led educational intervention combined with an evidence-based nursing protocol was associated with significant

improvements in knowledge, maternal monitoring and self-care practices, and selected clinical parameters among the participants. Nevertheless, interpretation should consider the study's single-group design, purposive sampling, limited sample size, and potential influence of concurrent medical management. Future controlled and multicentre studies with larger samples and longer follow-up are warranted to establish the effectiveness and sustainability of such integrated nursing interventions.

Conclusion

The present study demonstrated that a nurse-led educational intervention combined with an evidence-based nursing protocol was associated with improvement in knowledge, maternal monitoring and self-care practices, and selected clinical parameters among pregnant women with pregnancy-induced hypertension. Structured education enhanced participants' understanding of risk factors, warning signs, medication adherence, blood pressure monitoring, antenatal follow-up, and appropriate healthcare-seeking practices. The standardized nursing protocol provided a systematic framework for maternal assessment, monitoring, documentation, patient education, recognition of danger signs, and timely communication with the obstetric team. The observed improvement in blood pressure following the intervention further indicates the potential value of comprehensive nursing support, although clinical changes may also have been influenced by concurrent medical management. Integrating structured patient education with evidence-based nursing protocols may therefore strengthen antenatal nursing care and support early identification and appropriate management of pregnancy-induced hypertension. Further studies using larger samples, control groups, and longer follow-up are recommended to establish the effectiveness and sustainability of this approach.

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Conflict of Interest

The authors declare that there is no conflict of interest associated with the conduct, analysis, interpretation, or publication of this study.

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