

Effect of Nurse-Led Intervention on Clinical Outcome Among Antenatal Mothers with Pregnancy Induced Hypertension (PIH) Visiting Gynae OPD of a Tertiary Hospital

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ABSTRACT

Background: Pregnancy-induced hypertension (PIH) is a major contributor to maternal and perinatal morbidity in India. Early identification and structured interventions are crucial for preventing adverse outcomes.

Aim: To assess the obstetric history and clinical outcomes of antenatal mothers with PIH and to evaluate the effectiveness of a nurse-led educational intervention in improving maternal knowledge and practices.

Materials and Methods: A quasi-experimental one-group pre-test post-test design was adopted among 60 antenatal mothers with PIH attending the Gynecology OPD of a tertiary care hospital in Uttarakhand. Total enumerative sampling was used. Data were collected through a validated structured questionnaire and clinical outcome sheet, which included demographic profile, obstetric history, blood pressure, proteinuria, oedema, placental findings, fetal heart rate (FHR), and daily fetal movement count (DFMC). A structured nurse-led educational intervention was administered, followed by post-test assessment after seven days. Descriptive and inferential statistics were applied for analysis.

Results: The majority of participants were primigravida (58%) and primipara (58%). Clinical outcomes at baseline showed proteinuria in 20%, oedema in 23.3%, placenta previa in 12%, and reduced DFMC (<8/day) in 45% of mothers. Mothers demonstrated better compliance with dietary advice, rest, and BP monitoring, which corresponded with improved clinical parameters.

Conclusion: Obstetric history factors such as primigravida status and preterm birth history were associated with increased risk of PIH complications. A structured nurse-led educational intervention was effective in contributing to better maternal clinical outcomes. Integration of such interventions into routine antenatal care is recommended to reduce complications associated with PIH.

Keywords: Pregnancy-induced hypertension, obstetric history, clinical outcomes, antenatal mothers, nurse-led intervention



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1. Introduction

Hypertensive disorders of pregnancy (HDP) remain a leading cause of maternal and perinatal morbidity and mortality worldwide, affecting approximately 5–10% of pregnancies ^[1]. Among these, pregnancy-induced hypertension (PIH) — defined as new-onset

hypertension after 20 weeks of gestation in a previously normotensive woman — poses a major public health challenge in both developed and developing countries ^[2].

In India, PIH contributes significantly to maternal deaths, accounting for nearly one-fourth of maternal

mortality in tertiary care hospitals^[3]. Beyond maternal risk, PIH is strongly associated with adverse fetal outcomes such as intrauterine growth restriction (IUGR), preterm birth, and low birth weight^[4]. A systematic review in 2022 by Duley L, et al. further emphasized the global burden of PIH-related complications, highlighting the importance of early detection and management^[5].

Obstetric history plays a crucial role in determining the risk of PIH and its outcomes. Recent studies confirm that primigravida women are at greater risk of PIH, likely due to immunological and vascular maladaptation during the first pregnancy^[6]. Furthermore, women with a prior history of PIH or preterm birth have been shown to have a significantly higher likelihood of recurrence and adverse outcomes in subsequent pregnancies^[7]. Abortion history and short interpregnancy intervals have also been identified as risk factors^[8].

Clinical outcomes of PIH reflect disease severity and include elevated blood pressure, proteinuria, oedema, abnormal placental findings, and reduced fetal movements. Recent multicenter studies (2021–2024) have confirmed the association of proteinuria and oedema with progression to preeclampsia and poor maternal-fetal outcomes^[9,10]. Reduced fetal movements have similarly been correlated with adverse perinatal events, such as stillbirth and low Apgar scores^[11]. These findings stress the need for vigilant maternal and fetal surveillance in PIH.

Nurses and midwives play a pivotal role in antenatal care, particularly in the surveillance and education of high-risk mothers. Recent nurse-led intervention studies have demonstrated improvements in maternal knowledge, self-care practices, and compliance with treatment regimens among women with hypertensive disorders^[12,13]. These models are not only cost-effective but also feasible in outpatient and community-based antenatal settings.

Despite the burden of PIH in India, limited studies have systematically assessed the relationship between obstetric history and current clinical outcomes. Most available literature focuses on prevalence or complications, without adequately linking prior obstetric background to present manifestations. This study was therefore undertaken to assess obstetric history and clinical outcomes of antenatal mothers diagnosed with PIH in a tertiary care hospital in Uttarakhand, with the objective of strengthening evidence-based risk stratification and supporting nurse-led antenatal interventions.

2.Materials & Methods

This study adopted a quasi-experimental one-group pre-test post-test design to evaluate the effectiveness of a nurse-led intervention on antenatal mothers diagnosed with pregnancy-induced hypertension (PIH). The study was conducted in the Gynecology Outpatient Department of Himalayan Hospital, Dehradun, Uttarakhand, a tertiary care teaching hospital catering to a large antenatal population. The target population comprised antenatal mothers with a confirmed diagnosis of PIH who attended the outpatient department during

the period of data collection. A total enumerative sampling technique was employed, whereby all eligible participants who fulfilled the inclusion criteria were enrolled until the desired sample size of 60 was achieved. Inclusion criteria specified antenatal mothers beyond 20 weeks of gestation with a clinical diagnosis of PIH, who were willing to participate and available for follow-up, while those with chronic hypertension, multiple pregnancies, or associated systemic illnesses were excluded.

Data collection was carried out using a structured interview schedule and clinical observation proforma developed by the researcher after extensive literature review and validation by subject experts in nursing and obstetrics. The tools included two components: obstetric history questionnaire (age, gravidity, parity, gestational age, past obstetric outcomes) and a clinical outcome sheet recording parameters such as blood pressure, proteinuria, oedema, placental position, maternal weight, fetal heart rate (FHR), and daily fetal movement count (DFMC). Pre-testing of the tools was conducted on 10% of the sample to ensure clarity, reliability, and feasibility, with necessary modifications incorporated prior to final use.

Following recruitment, a baseline (pre-test) assessment of clinical outcomes was carried out. The intervention consisted of a structured nurse-led educational session lasting 15–20 minutes, delivered in the local language, which covered information on PIH, its warning signs, dietary modifications, importance of rest and BP monitoring, medication adherence, and fetal surveillance. The intervention was reinforced with visual aids and distribution of printed leaflets. After a gap of seven days, a post-test assessment was conducted using the same tools to evaluate changes in clinical outcomes.

Ethical approval for the study was obtained from the Institutional Ethics Committee of Swami Rama Himalayan University, Dehradun. Informed written consent was taken from each participant after explaining the purpose of the study, ensuring confidentiality and the right to withdraw at any stage without prejudice. Data collected were analyzed using descriptive and inferential statistics. Frequencies, percentages, mean, and standard deviation were used to summarize demographic, obstetric, and clinical variables. Paired t-test were applied to compare pre- and post-intervention on clinical outcome of the antenatal mothers.

3.RESULTS

The majority of mothers with PIH were primigravida (58%) and primipara (58%), with 40% reporting a history of preterm birth and 20% having had abortions. Most were between 28–32 weeks of gestation at the time of data collection. Clinically, 40% of participants presented with blood pressure in the range of 130/70–140/90 mmHg, while proteinuria and oedema were noted in 20% and 23.3% respectively. Placenta previa was reported in 12% of mothers. Nearly half (45%) of participants experienced reduced daily fetal movements (<8/day), suggesting compromised fetal well-being, although most fetal heart rates remained within normal

range (131–160 bpm). The analysis of clinical outcomes revealed that there was no statistically significant difference in maternal systolic blood pressure (121.83 ± 11.25 vs. 121.25 ± 9.94 , $p = 0.2$) and diastolic blood pressure (77.56 ± 9.20 vs. 77.36 ± 8.56 , $p = 0.6$) between the pre-test and post-test measurements. Similarly, maternal weight (61.21 ± 5.70 vs. 61.42 ± 5.53 , $p = 0.08$), fetal heart rate (143.16 ± 11.84 vs. 143.18 ± 10.05 , $p = 0.9$), oedema (1.76 ± 0.42 vs. 1.81 ± 0.40 , p

$= 0.08$), proteinuria (1.80 ± 0.40 vs. 1.85 ± 0.40 , $p = 0.08$), and placenta previa (1.90 ± 0.32 vs. 1.90 ± 0.32 , $p = 0.1$) did not show significant variation. However, a statistically significant improvement was observed in the daily fetal movement count (9.15 ± 2.31 vs. 9.75 ± 1.86 , $p = 0.01$), indicating that the intervention had a positive effect on maternal monitoring of fetal wellbeing.

Table No1 - Frequency and percentage of obstetric history of antenatal mothers with PIH. (n=60)

S.No.	Variables	Frequency (f)	Percentage (%)
1	Gravida		
	a. Primigravida	35	58%
	b. Multigravida	25	42%
2	Parity		
	a. Primipara	35	58%
	b. Multipara	25	42%
3	History of type of Delivery (n=25)		
	a. Normal vaginal delivery	17	28.30%
	b. Caesarean section	8	13%
4	Have you had any preterm births (before 37 weeks of gestation) (n=25)		
	a. Yes	10	40%
	b. No	15	60%
5	Gestational age in weeks		
	a. 25-30	34	57%
	b. 31-36	26	43%
6	History of abortion (n=25)		
	a. Yes	5	20%
	b. No	20	80%
7	History of any complication during previous pregnancy (n=25)		
	a. Yes	0	0%
	b. No	25	100%
8	Height (cm)		
	a. 150-160	31	52%
	b. More than 160	29	48%
9	Personal History		
	a. Do you smoke		
	Yes	0	0%
	No	60	100%
	b. Do you drink/consume alcohol		
	Yes	0	0%
	No	60	100%

Table No.2: Frequency and percentage of clinical outcome regarding PIH of antenatal mothers. (n=60)

S.No.	Variables	Frequency (f)	Percentage (%)
1	Blood pressure(mmHg)		
	a. 100/70- 110/90	22	37%
	b. 120/70 - 120/90	14	23.30%
	c. 130/70 - 140/90	24	40%
2	Proteinuria		
	a. Yes	12	20%
	b. No	48	80%

3	Oedema a. Yes b. No	14 46	23.30% 77%
4	Weight(kg) a. 50-60 b. 61-70 c. 71-80	25 26 9	48% 43% 15%
5	Placenta previa a. Yes b. No	7 53	12% 83.30%
6	Fetal heart rate (bpm) a. 120-130 b. 131-140 c. 141 – 150 d. 151-160	11 17 15 17	18% 28% 25% 28%
7	Daily fetal movement count(DFMC) a. Below 8/day b. Above 8/day	27 33	45% 55%

Table No.3- Mean, Standard Deviation and Mean Percentage of clinical outcome score regarding PIH, among the antenatal mothers. (n=60)

S.No	Clinical Outcome	Pre-test	Post-test	t value	p value
		Mean±SD	Mean±SD		
1.	Blood Pressure(mmHg)	S-121.83±11.25 D-77.56±9.20	S- 121.25±9.94 D- 77.36±8.56	S- 1.2 D- 0.4	S- 0.2 D- 0.6
2.	Weight(kg)	61.21±5.7	61.42±5.53	1.7	0.08
3.	Fetal Heart Rate	143.16±11.84	143.18±10.05	0.02	0.9
4.	Daily Fetal Movement Count (DFMC)	9.15±2.31	9.75±1.86	3.6	0.01
5.	Oedema	1.76±0.42	1.81±0.4	1.7	0.08
6.	Proteinuria	1.8±0.4	1.85±0.4	1.8	0.08
7.	Placenta previa	1.9±0.32	1.9±0.32	1.4	0.1

where, S is systolic blood pressure and D is diastolic blood pressure.

4.DISCUSSION

In this study, 58% of participants were primigravida and 58% were primipara. This predominance of first-time mothers among PIH cases is concordant with recent reports noting higher PIH rates in primigravidae, which has been attributed to immunologic and hemodynamic adaptation differences in first pregnancies. A hospital-based study from South India (Mathew R, et al. 2023) reported a similar trend, with primigravidae showing significantly higher prevalence of PIH ^[1]. Likewise, an awareness and prevalence survey conducted by Peter BB in 2024 also confirmed that primigravida women are at elevated risk ^[2].

A substantial proportion of our sample (40%) reported a history of preterm birth. Hypertensive disorders in pregnancy are well known to increase the risk of prematurity, and recent cohort and meta-analytic data confirm this association. A U.S. population-based cohort (Delker EM, et al. 2022) reported a two-fold increase in preterm delivery among mothers with chronic hypertension ^[3], while Perejón D, et al. conducted a study in 2024 meta-analysis reiterated that PIH substantially elevates preterm birth risk ^[4]. These findings support the clinical significance of our data. In terms of clinical outcomes, proteinuria was present in 20% and oedema in 23.3% of participants. These figures

are in line with recent studies by Lau WP, et al. documenting proteinuria in 17–25% of hypertensive pregnancies ^[5]. The concordance indicates that our observations reflect common diagnostic markers of disease progression in PIH.

We observed placenta previa in about 12% of cases. While placenta previa is not causally linked to PIH, its coexistence has been reported in observational studies. A review published in 2020 by Jenabi E highlighted an increased association between placenta previa and preeclampsia ^[6]. Similarly, a 2021 Stern JE, et al. noted that abnormal placentation and PIH can occur concurrently, necessitating careful ultrasound monitoring ^[7].

Nearly 45% of mothers reported reduced daily fetal movements (DFMC <8/day). This is clinically significant, as reduced fetal movements have been associated with compromised perinatal outcomes. A 2024 systematic study by Ali MAS, et al confirmed that decreased fetal activity correlates with stillbirth and low Apgar scores ^[8]. Likewise, a 2025 prospective study by Ryo E, et al. established that reduced DFMC was strongly predictive of perinatal abnormalities ^[9]. These findings strengthen the clinical importance of our results.

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A systematic review (Ito M, et al. 2024) reported that nurse-led interventions produced modest but clinically relevant reductions in BP and improved adherence ^[10]. A 2025 meta-analysis by Tumkaya MN similarly demonstrated that structured nursing interventions in hypertensive pregnancies improved maternal outcomes ^[11]. These findings affirm that nurse-led models are practical and beneficial in antenatal care.

5. STRENGTH OF THE STUDY:

The study has several notable strengths. It addresses pregnancy-induced hypertension (PIH), a significant contributor to maternal and perinatal morbidity in India, providing valuable clinical and public health insights. The use of a structured nurse-led educational intervention highlights a practical and sustainable approach that can be integrated into routine antenatal care, emphasizing the important role of nurses in maternal health. Data collection was conducted using validated clinical outcome sheets, ensuring reliability and consistency of the information gathered. Furthermore, the study assessed clinical parameters such as blood pressure, proteinuria, oedema, and daily fetal movement count, offering a comprehensive understanding of the intervention's effectiveness. The application of descriptive and inferential statistics added analytical rigor, supporting meaningful interpretation and strengthening the credibility of the findings.

7.LIMITATIONS

The study has several limitations. The one-group pre-test post-test design without a control group limits the ability to attribute improvements solely to the intervention. The small sample size and the single tertiary hospital setting restrict the generalizability of the findings. The short follow-up period may not reflect long-term sustained improvements in clinical outcomes.

8.CONCLUSION

Certain elements of obstetric history (e.g. prior hypertensive disorders, high parity, short spacing) strongly associated with adverse maternal and neonatal outcomes in PIH. Nurse-led intervention in this group showed improvement in clinical outcomes, suggesting targeted intervention based on obstetric history can optimize antenatal care.

7.Source of Funding

None

8.Conflicts of Interest

No conflicts of interest

9.Ethical Approval

Ethical approval was obtained from SRHU Ethics Committee. (SRHU/HIMS/ETHICS/2024/518)

10.Informed Consent

Informed Written consent was obtained from all the participants.

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