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The effectiveness of the "Nursing Interventional Package" on the management of pregnancy-induced hypertension for antenatal mothers

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ABSTRACT

Pregnancy is being the most precious and very important time in every woman's life. But sometimes pregnancy is associated with complications. About 7–15 % of all pregnancies are complicated by hypertension. Pregnancy-induced hypertension is one of the leading causes of maternal and neonatal mortality and morbidity. It can be managed by regular monitoring and educating mothers about self-care during pregnancy. Objectives: To develop, implement and assess the effectiveness of "Nursing Interventional Package on the management of pregnancy-induced hypertension" for antenatal mothers. Methods: Experimental research design was used and conducted in ANC OPD.The sample population was antenatal mothers attended ANC OPD. Purposive sampling technique was used to select antenatal mothers. Phase I: initial assessment was done by using an interview schedule and biophysical assessment. The clinical diary was given to each antenatal mother in both groups to record blood pressure, testing of urine for sugar and albumin, the presence of edema, daily fetal movement count. Phase II: Intervention– Experimental group: "Nursing Interventional Package on the management of pregnancy-induced hypertension" was implemented by educating antenatal mother individually with the help of a flash book. Phase III: Evaluation: Evaluation was done at the end of three months of enrollment. After intervention during first follows up, the statistically significant high percentage of subjects in the experimental group had normal blood pressure recording, regular exercise, dietary advice, keeping a record of daily fetal movement count, regular weight recording as compared to control group. During 2nd follow up, the statistically significant high percentage of subjects in the experimental group had regular exercise, dietary advice, keeping a record of daily fetal movement count, weight recording as compared to the control group. At final evaluation follow up, again the statistically significant high percentage of subjects in the experimental group had regular exercise, dietary advice, keeping a record of daily fetal movement count, weight recording and no edema. Results: Higher percent of subjects in the experimental group had gestational age more than 37 weeks, vaginal delivery, less perineal tear and normal blood pressure after delivery. Though, these differences were statistically not significant. There was a consistent improvement in 1st, 2nd and final evaluation follow up in terms of regular exercise, keeping a record of daily fetal movement count, regular weight recording, dietary advice as compared to the control group. A higher percentage of subjects in the experimental group had gestational age more than 37 weeks, better APGAR scores at 1 and 5 minutes, baby weight and healthy babies. Though, these differences were statistically not significant. Conclusion: Higher percent of subjects in the experimental group had gestational age more than 37 weeks, better APGAR scores at 1 and 5 minutes, baby weight and healthy babies.

Keywords— *Antenatal Mother, Pregnancy-Induced Hypertension*

1. INTRODUCTION

Pregnancy brings changes in woman body and its constituents and due to these changes, pregnancy may be complicated by diabetes, thyroid disorders, hydrominos, hypertensive disorders, anemia, infections etc. Among them, 7-10% of pregnancies suffer from hypertensive disorders of pregnancy. Pregnancy-induced hypertension is a global medical problem and complicates pregnancies and is, therefore, requires special attention. Maternal and neonatal outcomes are usually good among pregnant women who have close medical supervision and delivery in safe hands. If PIH is detected early with prompt and effective treatment, the prognosis is favorable, both for the mother and the baby. Management of PIH can be made easy with help of nurses and other healthcare professionals. Self-care during pregnancy contributes to healthy pregnancy in case of pregnancy-induced hypertension. It is very useful to educate and empower mothers about self-care at home.

2. OBJECTIVES

To develop, implement and assess the effectiveness of "Nursing Interventional Package on the management of pregnancy-induced hypertension" for antenatal mothers.

3. MATERIALS AND METHODS

The study design was experimental research design and was conducted among 100 antenatal mothers in ANC OPD, PGIMER Chandigarh, were selected by purposive sampling technique. The data was collected in the period of Aug–Sept 2017 by using an interview scheduled to gather information regarding socio-demographic, clinical and biophysical profile and follow up proforma. Nursing Interventional Package for the management of pregnancy-induced hypertension was prepared for antenatal mothers which included information on pregnancy-induced hypertension ,sign and symptoms, adherence to dietary advice, exercise, drug compliance, weight monitoring, BP recording , urine testing for sugar albumin and ketone, daily fetal movement count, and danger signs of pregnancy-induced hypertension.

The intervention was divided into three phases. List of antenatal mothers diagnosed with pregnancy-induced hypertension was identified with the help of survey proforma during their visit to the antenatal clinic. In the first (assessment) phase, the initial assessment was done by using an interview schedule, comprised of socio-demographic, clinical and biophysical profiles in both groups.

In the second (implementation) phase, "Nursing Interventional Package on the management of pregnancy-induced hypertension" was implemented in the experimental group by educating the mother regarding self-care. They were educated by one to one basis by using flash book and booklet prepared for this package was also given to them for reference. Weekly telephonic motivation was also done to reinforce the subjects. The clinical diary was given to record their activities like waking time, blood pressure recording, urine testing frequency, weight, exercises done, diet, daily fetal movement count. The control group continued to receive routine care and the clinical diary was also given to them to record daily activities. In both groups, two follow-ups were done at an interval of one month. Their clinical diaries were checked and follow up proforma was filled during every follow-up. In last and third (evaluation) phase, evaluation proforma was filled at the end of three months. It included the assessment of blood pressure, urine analysis for sugar, albumin and ketone, present weight, weight gain and edema (feet, hands, face). Their clinical diaries of daily activities were also checked.

4. RESULTS

Both the groups were homogenous and comparable according to variables age, educational status, occupation, per capita income, religion, family type and habitat ($p>0.05$). But in the experimental group, the significant higher percentage of subjects were nonvegetarians as compared to the control group (4%) ($p<0.05$).

Table 1: Socio-demographic profile of experimental and control groups N =100

Variables	Experimental Group n= 50 (%)	Control Group n= 50 (%)	$\chi 2$ (df) p value
Age (years)			
20-25	11 (22)	07 (14)	
26-30	17 (34)	**23 (56)**	5.40 (3)
31-35	**18 (36)**	11 (22)	0.14
36-45	0 4 (8)	09 (18)	
Educational status of the mothe			
Primary	11 (22)	14 (28)	1.51(2)
Secondary	**23 (46)**	17 (34)	0.46
Graduate and above	16 (32)	**19 (38)**	
Educational status of husband			
Primary	06(12)	08 (16)	
Secondary	19(38)	**22 (44)**	1.06(2)
Graduate and above	**25(50)**	20 (40)	0.58
Occupation of mother			
Professional	02(4)	03(6)	0.57(2)
Skilled worker	01 (2)	02 (4)	0.74
Housewife	**47 (94)**	**45 (90)**	
Occupation of husband			
Professional	08 (16)	09 (18)	6.62(2)
Clerical/shop owner/farmer	18 (36)	07 (14)	0.36
Skilled worker	**24 (48)**	**34 (68)**	
Per capita income (INR)#			
Middle class(1733-2886)	**30(60)**	**29 (58)**	0.16(2)
Lower middle class(866 -1732)	7(34)	17(34)	0.92
Lower class(<866)	03(6)	0 4(8)	
Religion			
Hindu	**29(58)**	**31 (62)**	0.16(1)
Sikh/Muslim	21(42)	19 (38)	0.68
Family type			
Nuclear	**41 (82)**	**45 (90)**	1.32(1)
Joint	9 (18)	5 (10)	0.38
Habitat			
Urban	20 (40)	17 (34)	0.38(1)

Rural	**30 (60)**	**33 (66)**	0.67
Dietary habits			
Vegetarian	**31 (62)**	**48 (96)**	17.42(1)
Non vegetarian	19 (38)	2 (4)	**0.001**

mean ±SD age in yrs-(exp- 29.5±4.67 (20-40) control-(30.6±4.9 (20-43)
#according to BG Prasad scale, 2015

Table 2 depicts 54% of subjects in experimental and 36% in the control group married at age of 21-25 yrs. Half of the subjects in experimental and 54% in the control group were married for 1-5 years. Nearly 26% of subjects in experimental and 32% in the control group were primigravidas. Primipara mothers were 40% in experimental and 48% in the control group. Nearly half (48%) of subjects in experimental and 48% in the control group had one live child.

Table 2: Marital and obstetric profile of experimental and control groups N=100

Variables	Experimental Group n = 50 (%)	Control Group n= 50 (%)	χ 2 (df) p value
Age at marriage (in years)			
15-20			
21-25	09(18)	12(24)	2.69(2)
26-30	**27 (54)**	18 (36)	0.25
	14 (28)	**20 (40)**	
Duration of marriage (in years)			
1-5	**25 (50)**	**27 (54)**	5.06(3)
6-10	17 (34)	14 (28)	0.16
11-15	08 (16)	05 (10)	
16-20	---	04 (8)	
Gravida			
1	**13(26)**	**16(32)**	
2	13(26)	15(30)	2.34(4)
3	12(24)	08(16)	0.672
4	04(8)	06(12)	
5	08(16)	05(10)	
Parity			
1	20(40)	**24(48)**	3.03(2)
2	**25(50)**	17(34)	0.22
3	05(10)	09(18)	
Number of children			
1	19(38)	**24(48)**	5.67(2)
2	**27(54)**	17(34)	0.12
3	04(8)	09(18)	

At the time of enrollment, the majority of subjects in experimental and control group were not adherent to regular exercise, dietary advice, keeping a record of daily fetal movement count, regular weight recording, and medicine. Then after intervention in the experimental group, there was a consistent increase in 1st and 2nd follow up in terms of regular exercise, dietary advice, keeping a record of daily fetal movement count, regular weight recording, and medicine. After three months of intervention in the experimental group, almost all the subjects adhered to all these aspects. None of the subjects had sugar and albumin or edema and blood pressure of 14.2% subjects was normal. It was significantly higher as compared to control group as in control group, adherence was low in regular exercise(31.5%), dietary advice(89.4%), keeping a record of daily fetal movement count(47.3%) medicine(84.2%).Even in few subjects, traces of sugar (5.3%),albumin(10.5%) and edema(57.8%)were observed. 5.2% of subjects had normal blood pressure, at last, follow up.

Table 3: Assessment of subjects of experimental and control groups

Variables	On enrollment			1st follow up			2nd follow up			*Final evaluation follow up*		
	Experimental (50) n =50(%)	Control (50) n=50(%)	Fisher/ χ2(df)p value	Experimental 50 n=50(%)	Control 50 n=50(%)	Fisher /χ2(df) p value	Experimental 50 n=50(%	Control 50 n=36(%)	Fisher /χ2(df)p value	Experimental 50 n=35(%)	Control 50 n=19(%)	Fisher χ2 (df) P value
BP(mm Hg)												
Normal	3(6)	----		1 (2)	1 (20)	13.3(2)	03(6)	2(5.50)	2.77(2)	5(14.20)	1 (5.2)	1.42(2)
PreHTN	19(38)	23(56)	3.39(2)	12 (24)	15 (30)	**0.001**	11(22)	12(33.)	0.24	15(42.8)	10 (52.6)	0.49
Stage I HTN	28(56)	27(54)	0.18	37 (74)	34 (74)		36(72)	22(61.1)		15(42.8)	8(42.1)	
Urine sugar												
Nil	49(98)	48(96)	0.34(1)	50	48 (96)	2.04(1)	50 (100)	35 (97.2)	1.4(1)	35(100)	18 (94.7)	1.87(1)
Traces	1(2)	2(4)	0.55	(100)	2 (4)	0.49	------	1 (2.8)	0.41	---	1 (5.3)	0.17
Urine albumin												
Nil	48(96)	49(98)	0.34(1)	50	47 (94)	3.09(1)	49(98)	34(94.4)	0.78(1)	34(97.1)	17 (89.4)	2.78(1)
Traces	2(4)	1(2)	1.12	(100)	3 (6)	0.24	1(2)	2(5.5)	0.56	1(2.9)	2 (10.5)	0
Edema												
1+	30(60)	30(60)	0	12 (24)	13 (26)	0.05(1) 1	9 (18)	9 (25)	0.62(1) 0.43	------	11 (57.8)	26.8 (1) **0.001**

Exercise												
Yes	16(32)	13(26)	0.19(1)	45 (90)	13 (26)	42.0(1)	49(98)	6(16.6)	60.06(1)	35(100)	6 (31.5)	32.8(1)
No	34(68)	37(74)	0.65	5 (10)	37 (74)	**0.001**	1(2)	30(83.3)	**0.001**	-----	13 (68.4)	**0.001**
Adherence to dietary advice												
Yes	5(10)	7(14)	0.37(1)	47 (94)	10 (20)	45.01 (1)	38(76)	11(30.5)	17.63(1)	32 (91.4)	17 (89.4)	0.54(1)
No	45(90)	43(86)	0.76	3 (6)	40 (80)	**0.001**	12(24)	25(69.4)	**0.001**	3 (8.5)	2 (10.5)	0.65
Adherence to medicine												
Yes	25(50)	20(40)	1.01(1)	48 (96)	40 (80)	6.02(1)	49(98)	30(83.3)	6.02(1)	35 (100)	16 (84.2)	7.54(1)
No	25(50)	30(60)	0.42	2 (4)	10 (20)	0.02	1(2)	6(16.6)	0.02	------	3 (15.7)	0.14
Keeping record of daily fetal movement count												
Yes	9(18)	11(22)	0.25(1)	50 (100)	30 (60)	25(1)	50(100)	20(55.5)	26.02(1) **.001**	35 (100) ----	9 (47.3)	24.06(1)
No	41(82)	39(78)	0.80	----	20 (40)	**0.001**	----	16(44.4)			10 (52.6)	**0.001**
Weight Monitoring												
Yes	15(30)	14(28)	0.49(1)	47 (94)	10 (20)	42.4(1)	50(100)	14(38.8)	42.4(1)	35(100)	10(52.6)	21.38(1)
No	35(70)	36(72)	0.82	3 (6)	40 (80)	**0.001**	-----	22(61.1)	**0.001**	------	9(47.3)	**0.001**

In terms of maternal outcomes, a higher percentage of subjects in the experimental group had gestational age more than 37 weeks, no perineal tear and normal blood pressure after delivery as compared to control group. Though these differences were statistically not significant. Similarly, in neonatal outcomes, all newborns had good APGAR score (>7) at1 and 5 minutes in both groups. In the experimental group, a higher percent of newborns had normal weight(2.5kg), did not need to admit in NICU, born in gestational age>37 weeks. Though these differences were statistically not significant. Significantly high percent of newborns were labeled healthy (gestational age>37 weeks, APGAR score> 7, birth weight >2.5 kgs, did not admit in (NICU) in the experimental group as compared to the experimental group. In both groups, there was no significant difference in maternal and neonatal outcomes.

Table 4: Comparison of maternal outcomes among experimental and control group N=53

Variables	Experimental Group n=22 (%)	Control Group n=31 (%)	χ 2 (df) p value
Gestational age at delivery(weeks)			
33-36	07 (31.8)	11(35.4)	5.09 (2)
37-40	**15 (68.1)**	**20 (64.5)**	0.07
Mode of delivery			
Vaginal Delivery	08 (36.3)	11 (35.4)	4.94(2)
Cesarean Section	**14 (63.6)**	**20 (64.5)**	0.08
Perineal tear (1st degree)			
Yes	02(9.1)	03 (9.7)	0.05 (1)0.94
BP after delivery			
Normal	**16(72.7)**	**19 (61.2)**	6.53 (7)
Pre hypertension	06(27.2)	12(38.7)	0.47

Table 5: Comparison of fetal outcomes among experimental and control groups N=53

Variables	Experimental Group n= 22 (%)	Control Group n = 31 (%)	χ 2 (df) p value
Gestational age of newborn (weeks)			7.72 (3) 0.05
<37	7 (31.8)	11(35.4)	
>37	**15 (68.1)**	**20 (64.5)**	
Sex of Newborn			3.25 (2) 0.19
Male	**14 (63.6)**	**20 (64.5)**	
Female	08 (36.3)	11 (35.4)	
APGAR at 1 min			
7	04 (18.1)	10 (32.2)	2.063(4) 0.72
8	**12 (54.5)**	**15(48.3)**	
9	06 (27.2)	6 (19.3)	
APGAR at 5 min			
7	02 (9.02)	02 (6.4)	2.86 (4) 0.58
8	05 (22.7)	11 (35.4)	
9	**15 (68.1)**	**18 (58.06)**	
Initiation of breast feeding: (within)			
Half an hour	04 (18.1)	06 (19.3)	
6 hours	**12 (54.5)**	**17 (54.8)**	4.96 (5) 0.42
24 hours	06 (27.2)	08 (25.8)	
Baby weight (kg)			
1.5-2.0	03 (13.6)	05 (16.1)	40.6 (41) 0.48

2.1-2.5	07 (31.8)	**16 (51.6)**	
>2.5	**12 (54.5)**	10 (32.2)	
Admission in NICU			3.65 (2) 0.16
YES	09 (40.9)	**21 (67.7)**	
NO	**13 (59.0)**	10 (32.2)	
Neonatal outcome			
Healthy	**10 (45.4)**	**10 (32.5)**	13.89 (5 **) 0.01**
IUGR	01 (4.5)	04 (22.5)	
LBW	10 (45.4)	15 (38.7)	
Death	01 (4.5)	02 (6.4)	

Table 6.a shows a comparison of mean score systolic BP between subjects during follow-ups. At the initial stage, the experimental group had to mean score 133.20 and control group had 135.40. After one month, the experimental group had mean 136.60 and control group had 133.80 after two months, the experimental group had to mean score 135.40 and control group had 136.9. After three months, the experimental group decreased to 130

Table 6 (a): Comparison of the mean score of systolic BP between subjects during follow-ups

Group	Mean ±SD Initial follow up	Mean ±SD After 1 month	Mean ±SD After 2 months	Mean ±SD After 3 months
Experimental	133.20± 12.02	136.60±8.11	135.40±9.94	130±13.28
Control	135.40± 5.035	133.80±16.39	136.9±4.67	132.50±9.10
t (df)p	-1.19(98)0.23	1.10(98)0.27	-0.86(84)0.39	-0.74(53)0.45

Table 6 (b): Comparison of the mean score of systolic BP within experimental subjects during follow-ups

(I) protocol	(J)Protocol	Mean Difference (I-J)	Std. Error	P value
Initial BP	**1ST follow up**	-0.545	2.254	0.013
	2nd follow up	-2.182	1.550	0.030
	3rd follow up	2.364	1.701	**0.002**
1st follow up				
	2nd follow up	-1.636	1.812	0.020
	3rd follow up	2.909	1.810	**0.001**
2nd follow up				
	3rd follow up	-4.545	1.658	**0.001**

Table 6 (c): Comparison of the mean score of systolic BP within control subjects during follow-ups

(I) protocol	(J)Protocol	Mean Difference (I-J)	Std. Error	P value
Initial BP	**1ST follow up**	0.964	2.234	1.000
	2nd follow up	-1.929	1.622	1.000
	3rd follow up	2.714	1.776	0.794
1st follow up				
	2nd follow up	-2.893	1.793	0.675
	3rd follow up	1.750	1.807	1.000
2nd follow up				
	3rd follow up	4.643	1.739	0.060

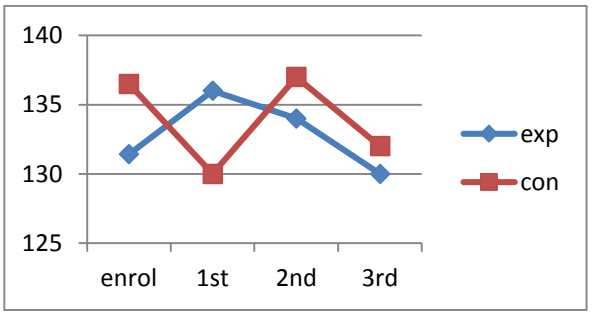

Fig. 1: Mean score of systolic BP

Table 7.a shows a comparison of mean score diastolic BP between subjects during follow-ups. At the initial stage, the experimental group had to mean score 85 and control group had 85.40. After one month, the experimental group had mean 88.04 and control group had 87.40. After two months, the experimental group had to mean score of 86.60 and control group had 86.94 After three months, the experimental group decreased to 82.86.

Table 7 (a): Comparison of the mean score of diastolic BP between subjects during follow-ups

Group	Mean ±SD Initial follow up	Mean ±SD After 1 month	Mean ±SD After 2 months	Mean ±SD After 3 months
Experimental	85±6.14	88.04±3.94	86.60±5.92	82.86±7.10
Control	85.40±5.03	87.40±6.64	86.94±4.67	83.50±5.87
t (df)p	-0.35(98)0.72	0.58(98)0.55	-0.29(84)0.77	-0.34(53)0.733

Table 7 (b): Comparison of the mean score of diastolic BP within experimental subjects during follow-ups

(I) protocol	(J)Protocol	Mean Difference (I-J)	Std. Error	P value
Initial DBP	**1st follow up**	1.650	1.130	0.013
	2nd follow up	1.500	0.970	0.030
	3rd follow up	2.071	1.118	**0.002**
1st follow up				
	2nd follow up	0.150	0.797	0.020
	3rd follow up	-3.721	0.965	**0.002**
2nd follow up				
	3rd follow up	-3.571	0.988	**0.004**

Table 7 (c): Comparison of the mean score of diastolic BP within control subjects during follow-ups

(I) protocol	(J)Protocol	Mean Difference (I-J)	Std. Error	P value
Initial DBP	**1st follow up**	-2.236	1.087	0.267
	2nd follow up	-1.636	0.933	0.512
	3rd follow up	1.818	1.076	0.582
1st follow up				
	2nd follow up	0.600	0.767	1.000
	3rd follow up	4.055	0.928	0.267
2nd follow up				
	3rd follow up	3.455	0.951	0.004

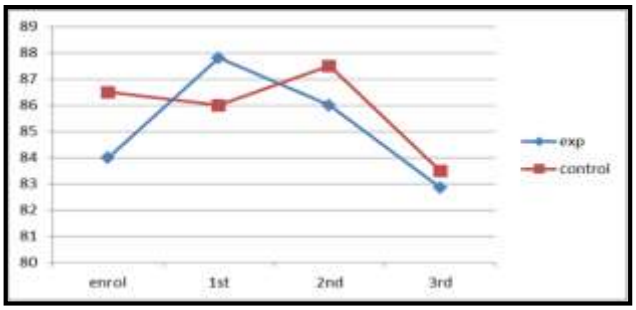

Fig. 2: Mean score of diastolic BP

5. DISCUSSION

A study by Lamminpaa et al stated that maternal age is also an important factor. Pregnancy-induced hypertension is common in the first pregnancy (primipara 40% as compared with 10 % in multipara) and women over the age of 30 years because of associated multiparty.[2] According to the present study, one third in experimental and nearly one-fourth of subjects in control groups had an age range 31 to 35 years.[2]

A statistically significant improvement in blood pressure monitoring was found among mothers in the experiment group. Similar results were reported by Magee (2008), attributed results to mothers compliance with health instructions which given by the nurses throughout nursing intervention.[3.] Edema is common in normal pregnancy, but generalized edema is a sign of preeclampsia. Pregnant women were taught to recognize generalized edema as a danger sign. The present study results showed that only a few subjects had +1 pedal edema which was reduced to nil after implementation of Nursing Interventional Package on the management of pregnancy-induced hypertension. A similar study by Al-Ghamdi et al. showed that 59% of mothers with PIH had reduced their edema after taking bed rest.[4]In present study, improvement in proteinuria (from traces to nil) was observed in the majority of mothers after implementation of Nursing Interventional Package on the management of pregnancy-induced hypertension. A similar study by Conrad who found a decrease in proteinuria among women with pregnancy-induced hypertension, over a month after intervention.[5]

A study by Begum reported that cesarean sections (cases with PIH) were 3.8 times more in the control group, and also revealed PIH was associated with the increased cesarean section.[6] The greater the severity of HTN, the more are the complications associated with it during pregnancy. Zibaeenezhad et al. reported a 45.8% rate.[7] In the present study, more than half of pregnancies in experimental (63.6%) and control group (64.5%) had been terminated by cesarean section and it was higher than Begam's study results.

6. CONCLUSION

From the results of the study, it was found that Nursing Interventional Package on the management of pregnancy-induced hypertension was effective in improving the adherence to regular exercise, dietary advice, keeping a record of daily fetal movement count, regular weight recording, and medicine which helped in improving maternal and neonatal outcomes. Maternal and neonatal outcomes were better in the experimental group as compared to the control group, though the difference was not statistically significant. It may be because antenatal mothers in both groups were registered, supervised and delivered in a tertiary care institution under the supervision of expert obstetricians, neonatologists and nurses. Hence resulted in healthy mothers and neonates. The findings of this study can be utilized by nurses while caring for antenatal mothers with PIH. This study gives evidence of the effectiveness of Nursing Interventional Package on the management of pregnancy-induced hypertension. Nurse educators can make use of the findings of study and protocol while educating student nurses on the care of antenatal mothers with hypertensive disorders

of pregnancy. A document on "Nursing Interventional Package on the management of pregnancy-induced hypertension" is generated that can be utilized by nurses while caring mothers with hypertensive disorders of pregnancy. Nursing researchers can take the findings of the study as a base while planning research on this topic in the future.

Nurses should be incorporated the findings of the study into daily teaching plan of antenatal mothers with hypertensive disorders of pregnancy which help to prevent complications. The protocol on Nursing Interventional Package on the management of pregnancy-induced hypertension can be utilized and tested in other settings for its feasibility and effectiveness. The similar study can be planned on larger samples in different settings for a longer duration.

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