



**IMPROVED FETAL OUTCOME AMONG HYPERTENSIVE PREGNANT
WOMEN AS A RESULT OF SPECIALIZED PRENATAL PROGRAM-A STUDY**

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Abstract

Hypertension complicating pregnancy is one of the commonest disorders of pregnancy and is a leading cause of maternal and infant morbidity and mortality and contributes significantly to intra-uterine fetal growth retardation and death due to placental insufficiency and abruption placentae as revealed in various studies. Therefore the present study using quasi-experimental time series non-equivalent control group design was conducted at 16 weeks of gestation till 1st week of delivery on 110 hypertensive pregnant women at Maternity Hospital, SKIMS, Srinagar Kashmir (J&K, India) to determine the effectiveness of specialized prenatal program on their fetal outcome. The study revealed a significant difference in fetal outcome of experimental group (55) as compared to control group of hypertensive pregnant women (55).

Key words: Hypertension in pregnancy; fetal outcome; specialized prenatal program

INTRODUCTION

Background and need of the study

Pregnancy may be complicated by a variety of disorders and conditions that can profoundly affect the women and her fetus. These conditions lead to stunted growth due to mechanisms like low fetal oxygen delivery, placental insufficiency, effect of drugs, infections and poor diet.¹ Hypertensive disorders of pregnancy greatly contribute to maternal and perinatal morbidity and mortality. It is estimated that hypertension complicates approximately 7% to 10% of all pregnancies.² Hypertension is defined as an elevation of systolic and diastolic pressures equal to or exceeding 140/90mmHg. Hypertension is a sign of underlying pathology which may be pre-existing or appears for the first time during pregnancy and is one of the maternal factors that may complicate pregnancy and its outcome.³

Due to reduced placental function, maternal hypertension during pregnancy can result in low birth weight, increased incidence of fetal hypoxia during antenatal and intra-natal period, intra-uterine death, preterm birth etc if disease worsens and needs emergency delivery.⁴ Thus the identification of this clinical entity and effective management play a significant role in the outcome of pregnancy, both for the mother and the baby. *Gupta et al*⁵ conducted a study on pregnant women with hypertension to detect fetal growth at two tertiary care centres in India. The study revealed that the babies were born with reduced birth weight which he reported to occur due to decreased placental circulation and insufficiency, depriving the fetus of essential nutrients. *Vigil*⁶ studied perinatal outcome in 154 women with severe chronic hypertension during the first half of pregnancy at Veitnam. They reported that 78 % women developed severe preeclampsia with mean weeks of 34.4 ± 4.6 weeks. The average birth weight was 2329 ± 10.11 gm, 4 mothers had still birth, and there were 6 neonatal deaths which resulted in perinatal mortality of 11.4% ; 38 babies were admitted in NICU with average stay of 14.8 days. The study revealed that preterm deliveries and caesarean sections were common in severe preeclampsia, thus it was concluded that midwives care is important in prevention of complications and keeping blood pressure under control in hypertensive pregnant women.

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In a study conducted to evaluate perinatal care among 100 high risk mothers in a selected hospital of Belgaum (Karnataka), *Raddi*⁷ found that among high risk mothers, 90% had anaemia, 30% had pregnancy induced hypertension and other risks included vaginal bleeding, cephalo-pelvic disproportion and previous LSCS. Preterm delivery was revealed in 14%, and neonatal admissions in NICU in 23%. She also reported that 71% mothers did not receive adequate perinatal care even though they attended antenatal clinic and were not informed about simple measures to prevent high risk conditions like importance of rest and sleep, resting mostly in left lateral position, early admission for care, keeping watch on fetal wellbeing, prior arrangement for emergency transportation and finance, and information about admission of baby in neonatal intensive care unit (NICU) if required.

Once the pregnant woman with hypertension is identified, she needs comprehensive antenatal care, so the appropriate interventions can be instituted to improve fetal outcome. It is therefore imperative to implement and evaluate a specialized prenatal program (SPP) to reduce the incidence of low birth weight, preterm and distressed babies because baby has every right to be born alive, safe and healthy.

*Mathews*⁸ recommended that traditional therapies which include bed rest, low calorie and low salt diet and sedation should be adopted for hypertension which had revealed improved maternal and fetal outcome by 80%. *Gites et al*⁹ reported that in the obstetric centre of California, nurses use variety of skills like listening, educating, counselling, triaging and helping women to change their life style during pregnancy, providing complex teaching and educating over telephone in prevention of preterm birth and low birth weight. In addition, screening of high risk cases and home management of patients improved outcome.

The studies indicate that various intervention programmes during the antenatal period have resulted in improvement of neonatal outcome; therefore the researcher felt that specialized prenatal program would come out with better fetal outcome than those who receive routine prenatal care. This specialized prenatal program is a comprehensive interventional package including information about hypertension in pregnancy (audio-visual supported documentary), antenatal and dietary advises, demonstrations (testing and monitoring of weight, blood pressure, pelvic exercises) and an information booklet. The fetal outcome can be improved and there is every possibility for her to reach term

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when a woman is given extra and special care which is more comprehensive than the routine care. Support at home is an important factor which needs to be emphasized thus researcher has decided to call their husbands/significant others and counsel them; give them an information booklet which would help them in taking daily care.

Objectives

1. To compare the fetal outcome of hypertensive pregnant women of experimental group with that of control group of hypertensive pregnant women.
2. To associate fetal outcome with socio-demographic characteristics of hypertensive pregnant women.

Hypotheses

H1. There is significant difference in the fetal outcome of hypertensive pregnant women of experimental group as compared to control group of hypertensive pregnant women.

H2. There is significant association between fetal outcome and selected socio-demographic characteristics of hypertensive pregnant women at 0.05 level of significance.

Review of literature

*Skyes et al*¹⁰ studied fetal outcome in hypertensive pregnant women at Moscow and reported that fetal distress was strongly associated with hypertension during pregnancy ($p < 0.01$). The numbers of the mothers who have undergone premature operation intervention and delivered asphyxiated babies were 12.4%. These babies needed emergency admission and intervention in neonatal intensive care unit.

*Low et al*¹¹ conducted a study in Australia on 600 high risk obstetric patients for evidence of birth asphyxia and reported that intrapartum asphyxia was common in distressed babies born to hypertensive mothers. The asphyxia was found 8 times higher than normal obstetric population. It further added high significant indicator as toxemia of pregnancy.

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*Ananth et al*¹² studied effect of hypertensive disorders in pregnancy on birth weight, gestational duration and small for gestational age births and found these highly significant ($p < 0.001$).

*Ali*¹³ while studying early neonatal complications in low birth weight babies at Srinagar found that 24.5% mothers who delivered low birth weight babies, were toxæmic.

*Al Muhim et al*¹⁴ studied the perinatal outcome in Baghdad among 685 women with preeclampsia. They reported 30.2% premature delivery, 22.8% induced delivery, 14.9% caesarean deliveries and 69.2% spontaneous delivery. Regarding maternal outcome placental abruption was found among 12.6%, oliguria in 7.9% of women and coagulopathy among 6.01% of women.

*Xiao et al*¹⁵ examined the effect of preeclampsia on fetal growth among 155 Chinese women and found that preeclampsia was associated with a 3.8 fold increased risk of low birth weight babies ($p < 0.01$) and 3.6 times increased risk for small for gestational age babies.

*Agarwal, Goswami and Temp*¹⁶ conducted a retrospective study at a tertiary care hospital in New Delhi to find out maternal and perinatal outcome in women with antepartum eclampsia. The mother and baby were followed until discharge or death. They reported that out of 51 eligible women, majority (82%) did not receive antenatal care and 80% were primigravida. At admission systolic and diastolic blood pressure was 156 ± 22 and 104 ± 18 mmHg respectively. 22% mothers delivered by caesarean and 18% by forcep or vacuum and reason for assisted delivery was failed induction, decreased maternal efforts and fetal distress. Blood pressure was persistently high in 33% cases, mean birth weight was 2077 ± 718 and low birth weight was found in 33.12%, asphyxia (Apgar score < 4 at one minute) in 14% and neonatal mortality was 143/1000 live births.

*Coelho et al*¹⁷ conducted a study in Brazil to identify maternal and perinatal outcome among hypertensive syndrome of 131 singleton pregnant women and to assess rate of proteinuria. The presence of proteinuria predicted adverse maternal outcome with increase of complications proportional to its elevation. HELLP syndrome was present among 30.5%, eclampsia among 3.8%, renal insufficiency with 0.7% and one maternal death occurred in women with elevated proteinuria. The perinatal outcome observed in

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comparison with women without proteinuria indicated prematurity (62.2% vs 3.5%), birth weight of less than 2500g (6.5% vs 5%), 5 minute Apgar score <7 (30.4% vs 3.5%), IUGR (41.9% vs 6.5%), still birth was same in both 1.41%.

*Vreeburg et al*¹⁸ conducted a retrospective study in South Australia to find out the risk factors for adverse maternal and perinatal outcome among women with hypertension. The perinatal data on 70386 live births were used in multivariate analysis. The risk for maternal, fetal, neonatal and infant morbidities was increased among women with hypertension as compared with normotensive women. They also revealed that operative deliveries (66.21%) preterm birth (35.7%) and small for gestational age (12.6%) were more common in women with older maternal age (35years) and nulliparity.

*Yocesoy et al*¹⁹ studied maternal and perinatal outcome in 255 pregnancies complicated with hypertensive disorders of pregnancy at Turkey. Their findings revealed that severe preeclampsia was found among 54.11%, mild preeclampsia among 33.3%, IUGR among 29.4% and caesarean delivery among 58.8%. They also reported intra-uterine fetal demise in 24 cases and intrapartum death among 10 cases.

*Sushila*²⁰ studied effectiveness of self-care strategies on pregnancy induced hypertension, maternal and perinatal outcome among primigravidae in Sri Ramachandra Hospital, Chennai from 2003-2007. In study group 8.7% mothers had PIH but in control group 15.3% had PIH with associated complications more than study group. The comparison in the occurrence of PIH between the groups showed significant difference at the level of $p < 0.05$ with a 't' value of 2.391. Maternal complications were higher in control group and overall maternal outcome showed a significant difference between the groups at the level of $p < 0.001$ with a 't' value of 3.516. Though the perinatal outcome between the groups did not show any significant difference but intra-uterine growth retardation (IUGR) incidence was high in control group.

*Xiong et al*²¹ conducted a retrospective cohort study to evaluate the effect of different types of pregnancy induced hypertension on fetal growth of 16,936 births by means of a population-based perinatal database in Suzhou, China. Pregnancy induced hypertension was classified as gestational hypertension, preeclampsia or severe preeclampsia-eclampsia. Preeclampsia and severe preeclampsia increased the risk of intra-uterine growth restriction and low birth weight. The adjusted odds ratio of low birth weight

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was 2.65 (1.73-4.39) for preeclampsia and 2.53 (1.19-4.93) for severe preeclampsia, however low birth weight was not increased significantly for gestational hypertension. Adjusted odds ratio was 1.56 (1.00-2.41).

*Fiscella*²² made a critical review about improvement of birth outcome with prenatal care in Russia. She reviewed that early and regular prenatal visits with advice on diet, immunization, iron and folic acid intake and associated antenatal information with demonstration had shown significantly better pregnancy and birth outcome in women of the intervention group ($p < 0.001$)

*Alexander and Korenbrot*²³ studied the role of prenatal care in preventing low birth weight in Finland on 945 anaemic and hypertensive pregnant women. The prenatal care provided by them was associated with education, verbal and written information, early detection of risk factors and medical care of associated disorders and had resulted in improved birth outcomes.

Materials and Methods

A quasi experimental research approach with time series non-equivalent pre-test-post-test-control group design was used to study 110 pregnant women with hypertension at antenatal clinic (ANC), labour room and postnatal wards of Sheri-Kashmir Institute of Medical Sciences (SKIMS), Srinagar. Sample was selected randomly with 55 subjects in experimental group and 55 subjects in control group. The interview-schedule was used to collect data about socio-demographic characteristics and nutritional status; observation checklist was used to assess fetal outcome. Records were also analyzed by the researcher to collect data. Specialized prenatal program consisted of information about hypertension in pregnancy (audio-visual supported), antenatal and dietary advises and information booklet. The initial/baseline assessment was done for both experimental and control group of study subjects at 16 weeks of gestation. Intervention was administered systematically only on experimental group during 16th weeks of gestation. Each woman was provided with Self Care Activity Compliance Checklist and was advised to fill it up when she performs any activity. Both the experimental and control group subjects were observed for fetal outcome during intrapartum period and within 24 hours of delivery.

RESULTS AND DISCUSSION

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Section 1 Socio-demographic characteristics of subjects.

Table 1 Distribution of subjects among Experimental Group and Control Group according to Socio-demographic Characteristics N=110

Socio-demographic Characteristics	Experimental Group N=55	Control Group N=55	p-Value
1. Age (mean ± SD)	24.02 ±3.12	25.36 ±4.18	0.124
1.1) Less than 20 years	4 (7.27%)	3(5.45%)	
1.2) 20-30 years	28 (50.90%)	27 (49.09%)	
1.3) More than 30 years	23 (41.81%)	25 (45.45%)	
2. Socio Economic Status			0.332
2.1) High	3 (5.45%)	4 (7.27%)	
2.2) Middle	32 (58.18%)	30 (54.54%)	
2.3) Low	20 (36.36%)	21 (38.18%)	
3. Exposure to Smoke			0.219
3.1) Mild	16 (29.09%)	10 (18.18%)	
3.2) Moderate	37 (67.27%)	43 (78.18%)	
3.3) Severe	02 (3.63%)	02 (3.63%)	
4. Nutritional Status			0.201
4.1) Good	10 (18.18%)	13 (23.63%)	
4.2) Average	30 (54.54%)	32 (58.18%)	
4.3) Fair	15 (27.27%)	10 (18.18%)	
5. Gravidity			0.312
6.1) Primigravida	39 (70.90%)	40 (72.72%)	
6.2) Secondgravida	14 (25.45%)	10 (18.18%)	
6.3) Multigravida	02 (3.63%)	05 (9.09%)	
6.4) Grand multigravida	00 (0.00)	00 (0.00)	

Data presented in table 1 shows that the experimental group and control group were similar in all the socio-demographic characteristics. The mean age of subjects was 24.02±3.12 years in experimental group and 25.36 ±4.18 years in control group. Majority of subjects from both experimental group (50.90%) and control group (49.09%) belonged to age group of 20-30 years. Maximum number of subjects from both groups belonged to age group of 20-30 years, middle socio economic class, had moderate exposure to smoke, average nutritional status, and were primigravidae. *Mufti²⁴ Qadir²⁵* in their studies obtained similar observations. Present study indicated that high percentage of subjects had average nutritional status. *Amin and Imtiyaz²⁶* have studied correlation of maternal factors like age, literacy, income, type of family, Hb level

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and antenatal care on the nutritional status of pregnant women and have found that majority of women had average nutritional status .

Section 2 Comparison of fetal outcome between experimental group and control group of subjects.

Fetal outcome was assessed in terms of:-

1. mode of delivery (vaginal/assisted/caesarean)
2. birth status of baby (live without distress/ live with distress/dead)
3. gestational age (full term/preterm/very preterm)
4. birth weight (normal/low birth weight/ very low birth weight)
5. Apgar score (normal/ mild asphyxia/severe asphyxia)
6. early neonatal condition (good/average/fair)

The variables were categorized in three subcategories and were then compared between experimental and control group of subjects. To test the significance of difference in the fetal outcome between experimental group and control group of subjects, chi square and odds ratio was computed and following null hypothesis was formulated:

HO₂ "There is no significant difference in the fetal outcome of experimental group as compared to control group of hypertensive pregnant women after implementation of specialized prenatal program at 0.05 level of significance."

According to mode of delivery, babies were categorized into: babies born by normal vaginal delivery, babies born by assisted/instrumental delivery and babies born by caesarean delivery. Birth Status was assessed by live status of baby at birth. According to birth status, babies were categorized as: live baby without distress (cried immediately and skin pink), live baby with distress (cry delayed and extremity/extremities yellowish blue) and dead baby/still birth. Gestational age was determined by the gestational weeks of baby at the time of birth and babies were categorized as full term baby (≥ 37 weeks); preterm baby (32-36 weeks); and very preterm baby (<32weeks). According to birth weight, babies were categorized as : normal birth weight baby (2500g-3000g); moderate low birth weight baby (1500-2499g); and very low birth weight baby (<1500g). According to Apgar score, babies were categorized into baby with normal Apgar score (score of 8-10); baby with

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mild/moderate asphyxia (score of 4-7); and baby with severe asphyxia (score of <4). Early neonatal condition was categorized into three categories as per the score they obtained on each outcome variable assessed immediately after birth and during first 24 hours of birth: good outcome (score of 40-48); average outcome (score of 30-39) and fair outcome (score of 16-29). Data related to comparison of fetal outcome between experimental and control group is depicted in the following table 2.

Table 2 Comparison of fetal outcome variables between Experimental and Control Group of Subjects. N=110.

Fetal outcome variables	Categories	Experimental Group(N=55)	Control Group (N=55)	Odds Ratio (OR)	P Value
Mode of Delivery	Normal vaginal	43 (78.19%)	28 (50.91%)	3.45	0.003**
	Assisted	0	0		
	Caesarean	12 (21.81%)	27 (49.09%)		
Birth status Live/dead	without distress	45 (81.82%)	28 (50.91%)	Reference 5.52	0.001**
	with distress	10 (18.18%)	27 (49.09%)		
	Still birth	0	0		
Gestational Age	Full term	47 (85.45%)	32 (58.18%)	4.2	0.03*
	Preterm	8 (14.55%)	23 (41.82%)		
	Very preterm	0	0		
Birth Weight	Normal	45 (81.82%)	29 (52.73%)	Reference 3.87 4.65	0.004**
	Moderate LBW	8 (14.55%)	20 (36.36%)		
	Very LBW	2 (3.64%)	6 (10.91%)		
Apgar Score	Normal	45 (81.82%)	32(58.18%)	Reference 3.52	0.020*
	Mild Asphyxia	10 (18.18%)	23 (41.82%)		
	Severe Asphyxia	0	0		
Early Neonatal Condition	Good	45 (81.82%)	35 (63.63%)	Reference 3.78	0.064*
	Average	10 (18.18%)	10 (18.17%)		
	Poor	0	0		

** significant at 0.01 level

* significant at 0.05 level

Table 2 indicates that majority of subjects in experimental group (78.19%) delivered babies by normal vaginal delivery as compared to subjects in control group (50.91%). The estimated odds ratio (OR=3.45) indicate that experimental group of subjects delivered babies by normal vaginal delivery 3.45 times higher than by caesarean delivery as compared to control group of subjects (p<0.01). Majority of subjects in

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experimental group (81.82%) delivered live babies without distress whereas in control group almost equal number of subjects delivered live babies without distress (50.91%) and with distress (49.09%; $p < 0.001$). Majority of subjects in experimental group (85.45%) delivered full term babies whereas in control group almost equal number of subjects delivered full term babies (58.18%), and preterm babies (41.82%; $p < 0.05$). Majority of subjects in experimental group (81.82%) delivered normal birth weight babies as compared to subjects in control group (52.73%), whereas majority of subjects in control group delivered low birth weight (36.36%) and very low birth weight babies (10.91%). Majority of subjects in experimental group (81.82%) delivered babies with normal Apgar score as compared to subjects in control group (58.18%), whereas majority of subjects in control group delivered babies with mild asphyxia (41.82%). Majority of babies of experimental group subjects (81.82%) had good condition during early neonatal period of first 24 hours as compared to babies of control group subjects (63.63%). Thus intervention was effective on experimental subjects. As these findings indicate that there is difference in fetal outcome between experimental group and control group subjects, thus the researcher rejects the null hypothesis and accepts research hypothesis showing that there is difference in fetal outcome variables between experimental group and control group subjects.

*Patroci et al*²⁷ studied number of antenatal visits and perinatal outcome and reported a significant association between the number of antenatal visits and delivery by caesarean section and low birth weight ($p < 0.001$). The more the mother made antenatal visits, the less was the incidence of operative deliveries, low birth weight, distressed and asphyxiated baby

Experimental group subjects delivered full term babies more than control group subjects. And subjects in control group delivered both preterm and very preterm babies respectively. *Mani*²⁸ studied the effects of relaxation technique on maternal and neonatal outcome in a selected group of antenatal primipara mothers and reported more number of normal deliveries among experimental group whose babies had higher mean Apgar score at birth as compared to control group. *Xiao et al*¹⁵ while examining the effect of preeclampsia on fetal growth among 155 women and found that it was associated with a 3.8 fold increase in the risk of low birth weight babies ($p < 0.01$) and it increased the risk of small for gestational age by 3.6 times. *Thailamlong*²⁹ who made a

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systematic review of nursing interventions to prevent preterm birth, found that pregnancy was prolonged among high risk group of women belonging to intervention group and their neonates had better neonatal period than neonates of non-intervention group.

Section 3 Association of fetal outcome with socio-demographic characteristics of subjects.

It is concluded from the findings that there is significant association ($p < 0.05$) of:

- Mode of delivery and birth status with socio-economic status.
- Gestational age with socio-economic status and gravidity.
- Birth weight with gravidity.
- Early neonatal condition with nutritional status

The study indicated significant association of mode of delivery with subjects of high socio economic status who delivered babies more by caesarean section than low socio economic subjects ($p < 0.05$) which may be related to their sedentary life style. The present study findings are also endorsed by *Qadir*.²⁵ *Prabha et al*³⁰ had conducted a study to find out the effect of antenatal care on maternal and fetal outcome. It was found that antenatal care was influenced by the literacy level and socio-economic status of women. The mothers with less formal education and low socio-economic status had poor perinatal outcome than mothers with high education and better socio-economic conditions ($p < 0.001$). Thus there is need for vigilant antenatal care for all pregnant women.

Regarding birth Status there was highest association of live babies in subjects with middle socio economic status in comparison to low socio economic status. Similar results were observed by *Mori et al*³¹ who studied predictive value of Apgar score in infants with very low birth weight and reported that babies born with distress belonged to either low middle socio-economic class or low socio-economic class.

Regarding gestational Age Subjects with middle socio economic status delivered more full term babies than low socio economic subjects ($p < 0.05$) which may be probably due to good nutritional status in middle class. Primigravida subjects delivered 2.296 times more full term babies than multigravida subjects ($p < 0.05$) and second gravida was significantly associated with low birth weight which indicates that high parity leads to

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delivery of baby who is preterm and has low birth weight. There was highest association of normal *birth weight* with subjects who were second gravida ($p < 0.05$). The study indicates no significant association of birth weight of baby with age, socio economic status and nutritional status of subjects. The study conducted by *AlMuhim et al*¹⁴ had revealed that mother's high parity was associated with low birth weight and preterm delivery of baby. The study indicates no significant association of *Apgar score* with age, socio economic status, nutritional status and gravidity of subjects. Similar observations were obtained in the studies conducted by *Xiaong et al*²¹ who reported mean birth weight of babies born to high risk pregnant mothers was 2071g; Apgar score < 4 at 1 minute in 14% babies. Present study indicates that the neonates born to subjects with good nutritional status had good condition during early *neonatal period* of 24 hours than neonates born to subjects with fair nutritional status. The data revealed no significant association of early neonatal outcome with age, socio economic status and gravidity of subjects. These findings are consistent with the findings of *Martin et al*.³²

Conclusion

The burden of hypertension in pregnant population is alarmingly high. Severe hypertension in pregnancy is associated with preterm birth, low birth weight and small for gestational age infants, as well as low APGAR score and high perinatal mortality. Primigravida subjects delivered more full term babies than multigravida subjects and second gravida was significantly associated with low birth weight which indicates that high parity leads to delivery of baby who is preterm and has low birth weight. It is found that pharmacological regimes lonely do not improve the birth outcome but should be supported with verbal information, discussion, and written information.

Implications

The findings of the present study revealed that fetal outcome of hypertensive pregnant women were improved by intervention program. Continuous assessment, reinforcement of care and counselling of hypertensive pregnant women during antenatal period motivated them to comply with better and therapeutic dietary regimes, follow health promoting antenatal advises and avoid health inhibiting points so that they give birth to a healthy and full term baby who enjoys the healthful life ahead. Nurses working in antenatal OPD'S can intensify their efforts to inform hypertensive pregnant women and motivate them to modify their practices during crucial antenatal

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period. They can use this intervention package at different gestational weeks and can assess them at every visit so that pregnant women is further reinforced for adopting better antenatal practices. This needs commitment on part of nurses and calls for orientation and in- service education programmes where nurses are reoriented to new strategies in teaching mothers and prepare learning resource material to be used effectively so that quality care is provided in maternity units.

In our health care settings, there is no protocol for antenatal education programmes, only women are provided incidental teaching during their follow up visits. Therefore, it is imperative to impart antenatal education in antenatal high risk clinics to curb the maternal and neonatal mortality rates associated with these risks and have optimum birth outcomes. It may necessitate appointment of nurse educators at high risk antenatal centres. Further the educative counselling roles of nurses need to be stressed so that mothers are motivated to be consistent in practicing self care management. Separate budget should be planned for conducting different educational and informative programmes for the high risk group of women.

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