



Requirement of immediate postnatal resuscitation and outcome in babies of mothers with hypertensive disorders in pregnancy

B. Vijai Anand Babu¹, B. Kishore Kumar², S. Shyamala Devi³

Govt. Medical College, Ananthapuramu, Andhra Pradesh. 1- Associate Professor of Pediatrics, 2- Assistant Professor of Medicine, 3- Associate Professor of Obstetrics & Gynecology

Submission Date: 25-02-2015

Acceptance Date: 11-03-2015

How to cite this article:

Vancouver/ICMJE Style

Babu BVA, Kumar BK, Devi SS. Requirement of immediate postnatal resuscitation and outcome in babies of mothers with hypertensive disorders in pregnancy. *Int J Res Health Sci* [Internet]. 2015;3(1):179-86. Available from <http://www.ijrhs.com/issues.php?val=Volume3&iss=Issue1>

Harvard style

Babu, B.V.A., Kumar, B.K., Devi, S.S. Requirement of immediate postnatal resuscitation and outcome in babies of mothers with hypertensive disorders in pregnancy. *Int J Res Health Sci*. [Online] 3(1). p.179-86 Available from: <http://www.ijrhs.com/issues.php?val=Volume3&iss=Issue1>

Corresponding Author:

Dr. B. Vijai Anand Babu, M. D. H.No- 49-1-7; Maddur Nagar; Kurnool-518002, Andhra Pradesh, India.

E-mail: vijaianandbangi@gmail.com

Abstract:

Background: Hypertensive disorders in pregnancy (HDP) are the common cause of maternal, fetal and neonatal morbidity and mortality world over. Recent global estimates reported that their incidence is on decline, but in developing countries like India they rank second only to anemia. **Objectives:** Study the incidence of Hypertensive disorders in pregnancy and requirement of immediate postnatal resuscitation and outcome in babies born to these mothers. **Materials and methods:** Design: Cross sectional study. Setting: Tertiary care teaching hospital. Patients and methods: 778 neonates with maternal history of hypertensive disorders in pregnancy formed the study group and equal numbers of babies born to normotensive mothers were taken as controls. Relevant maternal and neonatal data was recorded in a structured proforma. Number of neonates who required resuscitation were identified and resuscitated as per neonatal resuscitation protocol by American Heart Association. Type of resuscitation required and outcome in cases and controls was assessed in relation to maternal and neonatal risk factors. **Results:** Overall 75% cases required no resuscitation / basic resuscitation and 25% required advanced resuscitation while from control group only 7% required advanced resuscitation, 93% needed no or basic resuscitation. The difference was statistically significant (P=0.0004). Out of total 778 cases 84% babies survived and 16% died. Among controls 95% survived and only 5% died. **Conclusions:** In general 99% of babies can be saved with basic resuscitation even at peripheral health facility but babies of hypertensive mothers require more of advanced resuscitation and specialist services.

Key words: HDP; Postnatal resuscitation; Requirement; Outcome.

Introduction:

The overall perinatal mortality rate (PMR) in India was still over 50 per 1000 pregnancies (11/1000 in Kerala; 63/1000 in Assam) and has shown virtually little

decline during the past decade. [1] Although infant mortality rate (IMR) has reduced by 50 percent during the past century it was mostly confined to post-neonatal period. As a result, neonatal deaths now account for

over 60 percent of all infant deaths and 70 percent of these neonatal deaths were perinatal. The leading causes of perinatal deaths observed were prematurity, asphyxia and infections. [1,2] Hypertensive disorders in pregnancy (HDP) are the common causes of fetal and neonatal mortality and morbidity as they predispose directly or indirectly to prematurity/intrauterine growth restriction (IUGR), perinatal asphyxia and infections. In India they rank second only to anemia with 7-10 percent of pregnancies complicated by some form of hypertensive disorder, while the incidence of preeclampsia as recorded from hospital statistics vary widely from 5-15 percent. [3, 4] Understanding the presumed risk factors of this group of disorders is critical before any effective preventive strategies can be implemented. Therefore the primary objective of present study was to know the level (basic/advanced) of resuscitation required in babies born to mothers with HDP and the secondary objective was to study various maternal and neonatal risk factors influencing level of resuscitation required and the likely outcome.

Materials and Methods

This prospective, cross sectional cohort study was done over a period of one year from November 2013 to October 2014 in the Special care neonatal unit attached to the department of Obstetrics and Gynecology of a tertiary care Medical College Hospital of South India. This institution delivers care to women with high-risk pregnancies and offers specialized care in obstetrics and neonatology. The study was approved by institutional review board.

During the study period 848 babies were delivered to mothers with HDP. Out of these 48 babies were stillborn and 14 were born to mothers with diabetes mellitus, chronic renal disease, chronic liver disease, endocrine diseases, collagen disorders, convulsions due to other causes and / or non-vertex position and were excluded from the study. From among the remaining cases 8 were excluded because of incomplete data and the leftover 778 babies who born to mothers with gestational hypertension, preeclampsia, eclampsia, superimposed preeclampsia and/or chronic hypertension were included in the present study.[Figure 1] Another 778 of babies born to normotensive mothers, matching with study group in maternal and neonatal variables were taken as controls.

Data regarding maternal risk factors viz. age, level of education, socioeconomic status, parity, antenatal checkups and neonatal risk factors viz. gestational age,

mode of delivery, gender, birth weight, single/twins, APGAR and complications like preterm, IUGR, asphyxia, respiratory distress syndrome, sepsis, neonatal Hyperbilirubinemia (NNH) were recorded in a structured proforma.

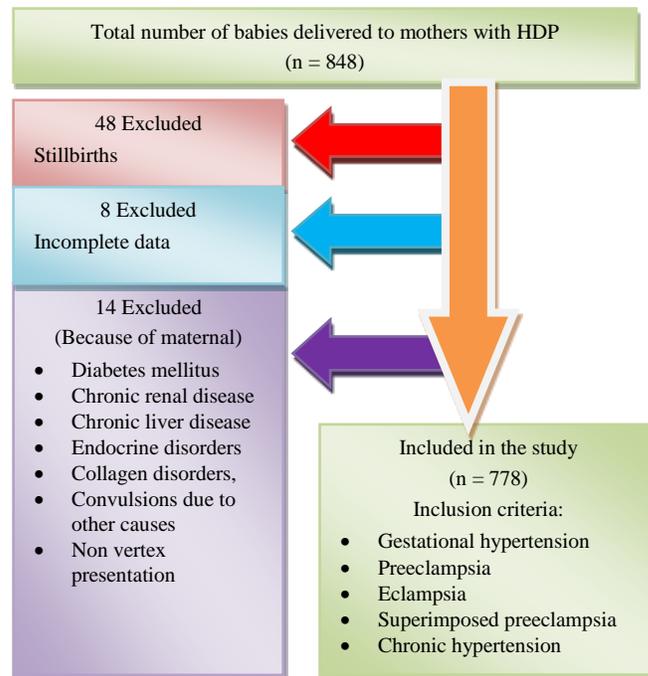


Figure 1: Selection of study population

All the neonates who required immediate postnatal resuscitation were identified and resuscitated as per the neonatal resuscitation protocol by American heart association (AHA). Number of neonates from the study group who required resuscitation were compared to those of control group to find out the risk factors which determined the type of resuscitation needed in the immediate postnatal period and its outcome.

In this study HDP were classified into gestational hypertension (BP > 140/90 mm Hg after 20 wks of gestation), preeclampsia (gestational hypertension + proteinuria > 300 mg/24 hrs), eclampsia (preeclampsia + convulsions), superimposed preeclampsia (preeclampsia in previous hypertensive women) and chronic hypertension (BP > 140/90 mm Hg before pregnancy or before 20 wks of gestation). Again they were sub-classified into mild (BP \geq 140/90 mmHg but < 160/110 mmHg after 20 weeks gestation and proteinuria is \geq 300 mg/24 hours < 2.0 g/24 hours or < 3 + dipstick) and severe (BP \geq 160/110 mmHg, and proteinuria > 2.0 g/24 hours or > 3 + dipstick). Based on gestational age neonates were classified into preterm (< 37 wks), term (\geq 37 to <42 wks) and post term (\geq 42 wks).

S.no	Parameter (cases/controls)	Requirement of resuscitation (Cases / controls)						P-value
		NR	ISR	BMV	BTV	CC	Drugs	
**	Overall	239/475	222/203	129/43	85/34	58/15	45/8	0.0004
1	Age of mother							
	<35	213/447	205/181	118/11	80/27	55/12	44/6	0.0001
	≥35	26/28	17/22	11/12	5/7	3/3	1/2	0.6920
2	Literacy							
	Illiterate	129/335	118/104	87/25	61/20	48/10	36/6	0.0062
	Literate	110/140	104/99	42/18	24/14	10/5	9/2	0.1750
3	Social status							
	Low	132/334	142/107	89/23	67/24	44/10	36/5	0.0019
	Middle	107/141	80/96	40/20	18/10	14/5	9/3	0.0592
4	Parity							
	Primi	119/285	143/145	75/23	58/20	43/9	36/5	0.0000
	Multi	120/190	79/58	54/20	27/14	15/6	9/3	0.0542
5	Antenatal care							
	Irregular	130/295	100/95	64/25	61/22	45/9	36/6	0.0000
	Regular	109/180	122/108	65/18	24/12	13/6	9/2	0.3659
6	Mode of delivery							
	Vaginal	127/294	12/139	87/20	59/18	43/12	34/7	0.0000
	Cesarean section	90/160	6/50	30/15	20/12	1/2	10/1	0.0089
	Assisted vaginal	22/21	18/14	12/8	6/4	3/1	1/1	0.2070
7	Gestational age							
	Term	76/195	72/63	54/33	22/6	16/5	15/3	0.0007
	Preterm	163/280	150/140	75/33	63/28	42/10	30/5	0.0015
8	Birth weight							
	≥1500 grams	189/413	187/145	103/25	72/20	46/11	39/6	0.0001
	<1500 grams	50/62	35/5	26/18	13/14	12/4	6/2	0.0939
9	Gender							
	Male	119/285	143/145	75/23	58/20	43/9	36/5	0.0000
	Female	120/190	79/58	54/20	27/14	15/6	9/3	0.0542
10	APGAR							
	≥7	129/363	122/18	93/16	59/12	35/5	25/2	0.0000
	<7	110/112	100/75	36/27	26/22	23/10	20/6	0.2023

Table 2: Requirement of resuscitation in relation to demographic parameters:
Cases vs. controls

Based on birth weight they were classified into normal ($\geq 2.5\text{kg}$), low birth weight ($\geq 1.5\text{ kg to } < 2.5\text{ kg}$), very low birth weight ($\geq 1\text{ kg to } < 1.5\text{ kg}$) and extremely low birth weight ($< 1\text{ kg}$). The term intra uterine growth restriction (IUGR) was used for neonates with birth weight of $< 10^{\text{th}}$ percentile for their gestational age.

Results

During the study period a total of 6798 babies were delivered in the Obstetrics and Gynecology department of this institution. Of them perinatal deaths were 252 and still births were 130.

Overall perinatal mortality rate (PMR) and still birth rate (SBR) were 37/1000 and 19/1000 pregnancies respectively. HDP was diagnosed in mothers of 848 babies. The incidence of HDP was 12.5 percent. Among these babies perinatal deaths were 124 and still births were 48 amounting to a PMR and SBR of 148/1000 and 53/1000 pregnancies respectively.

Total of 778 babies who fulfilled inclusion criteria were included in the study group, and equal number of babies with matching demographic parameters but born to normotensive mothers were taken as control group.

Most of the babies in the study group were born to mothers of < 35 years (91%), illiterates (62%), belonging to low socioeconomic status (67%), with primiparity (61%) and irregular antenatal care (55%). Neonatal variables commonly associated with HDP were preterm (67%), vaginal delivery (63%), male gender (59%), and low birth weight (47%). Twins were negligible in number (7%) and APGAR was < 7 in 40% and ≥ 7 in 60%. All maternal and neonatal parameters of the study group were matching with control group ($P > 0.05$), except APGAR ($P = 0.0008$). Among the various types of HDP gestational hypertension (GHTN) was noticed in 357 (46%), preeclampsia (PE) in 243(31%), eclampsia (E) in 92(12%), superimposed preeclampsia (SPE) in 44(6%) and chronic hypertension (CHTN) in 42 (5%) cases. [Figure 2]

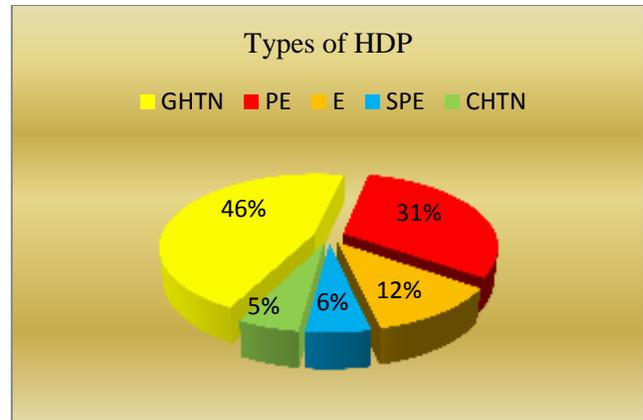


Figure 2: Incidence of various types of HDP

S.no	Parameter	Cases(n=778)		Controls(n=778)	
		No.	%	No.	%
1	NR	239	30.72	475	61.05
2	ISR	222	28.53	203	26.09
3	BMV	129	16.58	43	5.53
4	BTV	85	10.92	34	4.37
5	CC	58	7.46	15	1.93
6	Drugs	45	5.79	8	1.03
Total		778	100	778	100

Table 1: Requirement of resuscitation among cases vs. controls

There was no need of resuscitation in 31% vs. 61% cases and controls. Requirement of other steps of resuscitation was as follows: initial steps of resuscitation (ISR) 28% vs. 26% bag & mask ventilation (BMV) 16% vs. 6%, bag & tube ventilation (BTV) 11% vs. 4%, chest compressions (CC) 8% vs. 2% and Drugs 6% vs. 1%. Overall 75% cases required no resuscitation / basic resuscitation (NR+ISR+MBV) and 25% required advanced resuscitation (BTV+CC+ DRUGS) while from control group only 7% required advanced resuscitation, 93% needed no or basic resuscitation. The difference was statistically significant ($P = 0.0004$). [Table 1]

Requirement of resuscitation among cases were compared with controls in relation to maternal and neonatal variables and results were plotted in Table 2. Among the maternal variables requirement of advanced resuscitation was significantly associated with age <35 years, illiteracy, low socioeconomic status, primiparity and irregular antenatal care. Neonatal variables significantly associated with the requirement of advanced resuscitation were normal / assisted delivery. Advanced resuscitation was equally required in both the cases and controls when the baby was preterm, low birth weight, APGAR <7 and of male gender. The difference was not significant statistically. Comparatively term babies, normal birth weight babies, APGAR ≥ 7 and female babies required less of advanced resuscitation and more of basic resuscitation and the difference were statistically significant.

Babies of mothers with preeclampsia,

eclampsia and superimposed preeclampsia more often required advanced resuscitation compared to those of GHTN/CHTN but the difference was not significant ($P=0.9917$). [Table 3] Out of 778 cases 453 (68%) were born to mothers of mild hypertension and 325 (32%) had severe hypertension. Those with severe hypertension were in PE/E/SPE group and like them required advanced resuscitation and the difference was not significant ($P=0.7328$). [Table 3]

Neonatal complications observed in cases and controls were: preterm 67% vs. 64%; intrauterine growth restriction (IUGR) 21% vs.8%; birth asphyxia (BA) 23% vs. 13%; respiratory distress syndrome (RDS) 19% vs. 10%; sepsis 15% vs. 10%; and neonatal hyper bilirubinemia (NNH) 7% vs. 4%. Difference was not significant ($P=>0.05$), except for intra uterine growth restriction (IUGR) ($P=0.0082$). [Table 4]

S.no	Parameter	Cases (N=778)				
		GHTN No (%)	PE No (%)	Eclampsia No (%)	S.PE No (%)	Ch.HTN No (%)
1	NR	125(35.01)	87(35.80)	32(34.78)	15(34.09)	14(33.33)
2	ISR	83(23.25)	56(23.06)	21(22.83)	10(22.73)	10(23.80)
3	BMV	68(19.05)	45(18.52)	17(18.48)	8(18.18)	9(21.42)
4	BTV	41(11.49)	28(11.52)	12(13.04)	5(11.36)	6(14.28)
5	CC	23(6.44)	17(6.99)	8(8.70)	4(9.09)	2(4.75)
6	Drugs	17(4.6)	10(4.11)	2(2.17)	2(4.55)	1(2.22)
Total		357(100)	243	92	44	42

Table 3: Types of HDP and requirement of resuscitation

S no	Parameter	Cases (n=778)		Controls (n=778)		P-Value
		No.	%	No.	%	
1	PRETERM	523	67.22	496	63.75	0.6554
2	IUGR	164	21.08	65	8.35	0.0082
3	BA	178	22.88	100	12.85	0.0656
4	RDS	147	18.89	80	10.28	0.0706
5	SEPSIS	117	15.01	74	9.51	0.2850
6	NNH	54	6.94	29	3.73	0.3521

Table 4: Incidence of neonatal complications: Cases vs. controls.

S no	Parameter	Cases (n=778)		Controls(n=778)		P-value
		No	%	No	%	
1	Deaths	124	15.93	42	5.40	0.0000
2	Survivals	654	84.07	736	94.60	
3	Total	778	100.00	778	100.00	

Table 5: Overall outcome: cases vs. controls.

S.no	Hypertensive disorder (number of cases)	Survivals		Deaths		P-value
		No.	%	No	%	
1	Gestational hypertension (357)	338	94.68	19	5.32	0.0000
2	Preeclampsia (243)	201	82.72	42	17.28	
3	Eclampsia (92)	46	50.00	46	50.00	
4	Superimposed preeclampsia (44)	36	81.82	8	18.18	
5	Chronic hypertension (42)	33	78.57	9	21.43	

Table 6: Types of HDP and outcome

Sno	Hypertensive disorder	Survivals		Deaths		P-value
		No.	%	No	%	
1	Mild ($\geq 140/90$ mm of Hg) (453)	406	62.07	47	37.90	0.0006
2	Severe ($\geq 160/110$ mm of Hg) (325)	248	37.93	77	62.10	
Total	778	654	-	124	-	

Table 7: Severity of HDP and outcome

Out of total 778 cases 654 (84%) babies survived and 124 (16%) died. (Table 5) Among controls 736 (95%) survived while 47 (5%) died. [Table 5] Outcome of cases vs. controls in relation to type and severity of HDP and neonatal complications were shown in Table 6 to 8. Statistically significant number ($P < 0.05$) of deaths was noticed in preeclampsia and eclampsia; severe hypertension; birth asphyxia and respiratory distress syndrome; while outcome in sepsis and neonatal hyperbilirubinemia was not significant statistically. ($P = 0.1082$ and 0.2223 respectively)

Discussion

Hypertensive disorders in pregnancy are common occurrence and were responsible for high

perinatal /neonatal mortality and morbidity. According to NFHS 3 report 2005-06 the neonatal mortality rate (NMR) was 39/1000 live births, accounting for 77 percent of all infant deaths and nearly 50 percent of under five children deaths. [5] If the present infant mortality rate (IMR) and under 5 children mortality rate (U5MR) are to be reduced from 57/1000 and 74/1000 live births to the Millennium Development Goal (MDG-4) of IMR 30/1000 and U5MR 38/1000 live births by 2015 there is an urgent need to focus on perinatal period where more than 50 percent of deaths take place. Achieving MDG-4 is unlikely without reducing perinatal/neonatal deaths. The present study was done to know the level (basic/advanced) of resuscitation requirement in babies born to mothers with HDP, in relation to maternal and neonatal risk factors influencing the immediate postnatal

outcome. Identifying risk factors associated with requirement of advanced resuscitation helps the health personnel at the periphery to plan referral in time, saving both mother and the baby.

During the study period a total of 6798 mothers were delivered in this institution. Mothers of 778 babies had HDP. The incidence of HDP was 12.5%. Similar incidence was reported in studies from Karnataka (13%), Madhya Pradesh (11%) and Maharashtra (8.9%). [6-8] In India, as per NFHS 3, PMR was estimated to be 49/1000 pregnancies. Though overall PMR noticed in our study was 37/1000 pregnancies, it was unacceptably high in babies of HDP mothers at 148/1000. Similarly, Nadkarni et al reported 86/1000 in booked cases compared to 185/1000 births in mothers with emergency admission [9], while Shweta Anand et al. Vidyadhar et al. reported higher PMR (265/1000 and 416/1000 respectively). [7, 8] Hassan from Bangladesh also reported a PMR of 123/1000. [10] Our Still birth rate (SBR) among babies of HDP mothers was 68/1000 which was same as reported by Hassan et al and Shweta Anand et al (60/1000 and 54/1000 respectively). [10, 7] As observed in other studies, gestational hypertension (46%) was the major hypertensive disorder observed followed by preeclampsia (31%), eclampsia (12%) superimposed preeclampsia (6%) and chronic hypertension (5%). [10]

In our study majority of the hypertensive mothers were in the age group of 20 to 35 years. Number Indian authors noticed similar age incidence [7, 9-11], this could be because the majority of conceptions take place in this age group in our country. However, some other studies observed higher incidence in the younger mothers of 15-25 years. [6, 8] It was observed in our study that HDP were high in illiterate mothers from lower socioeconomic status having poor access to antenatal care. This is in consistent with the literature by Hassan et al [10] and Mehul T Parmar et al. [12] Incidence of HDP was more common among primigravida who constituted 67% of the total cases as reported by different authors: Nadkarni et al (65%) Vidyadhar et al. (65%) and Suguna S et al (57%). [9, 8, 6] Hassan et al reported higher incidence in multipara. [10]

In the present study, most of the women delivered vaginally (63%) and Caesarean delivery (31%) was more among severe HDP, which are similar to other studies. [7, 12] C-section rate was 57% in a study done by Suguna S et.al. [6] In our

study preterm/ term delivery was 67% vs. 33% and low birth weight babies/normal birth weight 47% vs.35%. VLBW /ELBW were 13% vs. 5%. In different studies prematurity and low birth weight was the major cause of NICU admission among the babies with maternal history of HDP. [9] In the present study IUGR was 21%. Overall there was male preponderance with male to female ratio was 1.5: 1 and preterm to term ratio was 2: 1. Twins were of negligible number (8%). APGAR was <7 at one minute in 41% and ≥ 7 in 59% of babies in our study. All the demographic variables of the study group were matched with control group except APGAR.

Overall 75% cases required no resuscitation / basic resuscitation (NR+ISR+ MBV) and 25% required advanced resuscitation (BTV+CC+ Drugs) compared to control group the difference was statistically significant ($P=0.0004$). Among the maternal variables requirement of advanced resuscitation was significantly associated with age <35 years, illiteracy, low socioeconomic status, primiparity and irregular antenatal care. Neonatal variables significantly effecting the requirement of advanced resuscitation were normal/assisted delivery. Advanced resuscitation was equally required in both the cases and controls when the baby was preterm, low birth weight, APGAR <7 and of male gender. The difference was not significant statistically. Comparatively term babies, normal birth weight babies, APGAR ≥ 7 and female babies required less of advanced resuscitation and more of basic resuscitation and the deference were statistically significant. Babies of mothers with preeclampsia, eclampsia and superimposed preeclampsia more often required advanced resuscitation compared to those of GHTN/CHTN as the former group present with severe hypertension, but the difference was not significant.

Neonatal complications observed in cases were: preterm, intrauterine growth restriction (IUGR) birth asphyxia, respiratory distress syndrome, sepsis and neonatal hyper bilirubinemia (NNH). Compared to controls difference was not significant, except for IUGR ($P=0.0082$). Out of total 778 cases 654 (84%) babies survived and 124 (16%) died. Among controls 736 (95%) survived while 47 (5%) died. Statistically significant number of deaths was noticed in preeclampsia and Eclampsia; severe hypertension; birth asphyxia; respiratory distress syndrome; sepsis; while neonatal

hyper bilirubinemia was not significant statistically. Shweta Anand et al. reported similar observation. [7]

Conclusions

In general 1% of the babies at birth need advanced resuscitation while 25% of babies of HDP mothers require advanced resuscitation at birth. If delivery is planned staff should anticipate the need of advanced resuscitation by identifying risk factors and refer those mothers with risk factors to higher centers. Creating awareness among the public regarding HDP and its complications in both the mother and baby motivate them to seek early care and intern helps in reducing PMR/SBR in the community.

Acknowledgements

We are deeply indebted to the pregnant mothers and their babies, without whom this study would not have been possible. We profusely thank them for their extreme cooperation throughout the study. Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

Source of Funding: Nil

Conflicts of Interest: Nil

References

1. International institute for population sciences (IIPS) and ORC Macro. National Family Health Survey (NFHS-3), India, 2005-06. Mumbai: IIPS; and Maryland, USA: ORC Macro. 2008.
2. Lawn, J.E., Cousens, S., Zupan, J. Four million neonatal deaths: When? Where? Why? *The Lancet*. 2005; 365: 891-900.
3. Barrilleaux PS, Martin JN. Hypertensive therapy during pregnancy. *Clin Obstet Gynecol.*, 2002; 45(1): 22-34.
4. Dutta DC. Hypertensive disorders in pregnancy. In *Text book of Obstetrics including perinatology and contraception*. 6th edition, Calcutta: New central book agency, 2004: 221-242.
5. NFHS 3 Ministry of health and family welfare, Govt. of India. Available at URL; <http://www.mohfw.nic.in/NFHS-PRESENTATION.htm>. Accessed on 3rd September 2011.

6. Suguna S, Suman Fathima, R. Raghavendra, Nisarga. Perinatal outcome in hypertensive mothers: A prospective study in a rural tertiary hospital. *International Journal of Recent Trends in Science and Technology*, 2014; 10 (1): 124-129.
7. Shweta Anand, Kirshnanand. Perinatal Outcome in Growth Retarded Babies Born to Normo-tensive and Hypertensive Mothers: A Prospective Study, *People's Journal of Scientific Research*. Jan. 2012; 5(1): 24-28.
8. Vidyadhar B. Bangal, Purushottam A. Giri, Aditi S. Mahajan. Maternal and foetal outcome in pregnancy induced hypertension: a study from rural tertiary care teaching hospital in india, *IJBR*: 2011; 2(12): 595-99.
9. J. Nadkarni, J. Bahl, P. Parekh. Perinatal outcome in pregnancy associated hypertension, *Indian Pediatrics* 2001; 38: 174-178.
10. Hassan M, Choudhury F, Begum M, Rahman H. Akhter S. Immediate perinatal outcome of neonates with maternal Hypertensive Disorders in Pregnanc *J. Nepal Paediatr. Soc.* 2013; 33(3):190-195.
11. G. B. Doddamani1, Usha. G. Doddamani. Perinatal Outcome in Pre-Eclampsia: A Prospective Study. *Sch. J. App. Med. Sci.*, 2014; 2(1C): 291-293.
12. Mehul T parmar, Harsha M Solanki, Vibha V Gosalia. Study of risk factors of perinatal death in pregnancy induced hypertension (PIH), *NJCM*, 2012; 3 (4): 703-07.

- What is already known?

1% of babies at birth need advanced resuscitation

- What this study adds?

25% of babies at birth need advanced resuscitation if there is history of maternal hypertensive disorders in pregnancy disorders.