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Research Article

Socio-demographic Profile of Pregnancy Induced Hypertension in a Tertiary Care Centre

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Abstract: Pregnancy induced hypertension complicates approximately 6% of pregnancies globally and is the most important cause of maternal and neonatal morbidity and mortality. In our prospective case-control study, socio-demographic profile was studied in 70 PIH subjects (case) divided into three groups as gestational hypertension, pre-eclampsia and eclampsia, and 70 normotensive pregnant women (control) belonging to age group 18 - 40 years at gestational age of >20 weeks. Women who developed pregnancy induced hypertension after 20 weeks of gestation, majority of them were rural dweller Hindus with lower economic status. PIH women between 21 - 30 years of age constituted the major chunk (77.14%) and majority of the PIH subjects (57.14%) were primigravida. Overall, 54.29% PIH subjects belonged to more than 36 weeks of gestational age. Thus, the development of PIH was more common among the women married and conceived at an early age, and primigravida with higher gestational age. Awareness regarding socio-demographic risk factors for PIH shall be helpful in reducing the PIH related morbidity and mortality.
Keywords: Pregnancy Induced Hypertension, Eclampsia, Primigravida, Gestational age

INTRODUCTION

Pregnancy induced hypertension (PIH) includes a group of hypertensive disorders developed due the gravid state after 20 weeks of pregnancy. It includes gestational hypertension with blood pressure ≥140/90 mm of Hg without proteinuria, pre-eclampsia which is gestational hypertension with proteinuria, and eclampsia defined as pre-eclampsia with convulsions. PIH complicates approximately 6% of pregnancies globally [1] and is the most important cause of maternal and neonatal morbidity and mortality [2].

The incidence of pr-eclampsia in nulliparous population ranges from 3 to 10 per cent worldwide [3]. Incidence of eclampsia in the developed countries is about 1 in 2000 deliveries [4] as compared to developing countries [5-7] where it varies from 1 in 100 to 1 in 1700. The national incidence of PIH is 15.2% in India, while it is four times higher in primipara women than in multipara [8, 9]. 13% of the maternal deaths are in the women with pregnancy induced hypertension and eclampsia, the most terrible form that accounts for major cause of death [10]. The high incidence observed has pointed towards poverty, lack of education and unawareness regarding health care in this part of the world.

PIH is more common in primiparous, women of younger age, high maternal age, multiple pregnancies, obese women and hydatiform mole. Previous history of PIH is also an important risk factor for the development of PIH. In addition, the genetic factor is also involved; patients who have a family history of pregnancy induced hypertension, especially in mother or sister are at higher risk [11]. The age of mother is also important; with increasing age, the risk of pregnancy induced hypertension increases [12].

The present work was conducted to study the socio-demographic profile and to find out the risk factors among antenatal mothers with pregnancy induced hypertension.

MATERIALS AND METHOD

The prospective one year (Jan. 2012 - Dec. 2012) case-control study was conducted in the department of Biochemistry in collaboration with the department of Obstetrics & Gynaecology, Rohilkhand Medical College & Hospital, Bareilly, U.P., after getting approval from Institutional Ethical Committee. Study subjects included 70 women with diagnosed PIH as case and 70 normotensive pregnant women as control belonging to age group 18 - 40 years, at gestational age of >20 weeks. PIH was defined as systolic blood pressure of ≥140 or diastolic blood pressure ≥90 mm Hg for first time during pregnancy with or without proteinuria and/ or edema after 20 weeks of conception.

PIH subjects (n=70) were sub-divided into 3 groups: group I as gestational hypertension (GH, n = 25) with blood pressure ≥140/90 mm of Hg without proteinuria, group II as pre-eclampsia (PE, n = 25) with gestational hypertension with proteinuria, and group III was eclampsia (E, n = 20) as pre-eclampsia with convulsions. Out of 140 pregnant women, 70 diagnosed PIH women were selected as cases from antenatal OPD and from Obstetrics ward. Seventy healthy pregnant women were selected as controls from the same tertiary care hospital without a history of hypertension, diabetes mellitus, and renal/cardiovascular diseases. After explaining aims and objectives, informed consent was taken from each subject for participation in this study.

History of pregnant women was recorded on a structured questionnaire, which included information regarding age, religion, habitat (urban/rural), education, occupation, husband's occupation, monthly income, obstetric history, past history along with family history and personal history related to exclusion criterion, general & systemic examination, gestational age in weeks, and any present obstetric/medical complication. The case and control subjects with the history of obesity, chronic hypertension, coronary heart disease, impaired renal function, smoking, tobacco addiction and alcoholism were excluded from the study.

The data was processed and appropriate statistical analysis was done by using Microsoft Excel 2010 and Statistical Package for Social Science (SPSS) software version 17. All values of analyzed parameters were expressed as mean ± S.D. (standard deviation). Independent student's t-test was applied to see the statistical significance of the variables between PIH and the control group. Epidemiological variables of the four groups were compared by F-test from analysis of variances (ANOVA). A p-value <0.05 was considered to be statistically significant.

RESULTS

The total of the study subjects were divided into PIH cases which were further subdivided into three groups of PIH subjects, and one group of control subjects, overall into four groups as follows:

Group I: Women with gestational hypertension (n = 25)

Group II: Women with pre-eclampsia (n = 25)

Group III: Women with eclampsia (n = 20)

Group IV: Healthy pregnant women without hypertension (n = 70).

Majority of the study subjects were rural dweller out of which the PIH subjects ranked higher (68.57%) as compared to the control (60%). Overall Hindu constituted the major chunk of the study subjects and Muslim ranked the second. We observed the higher incidence of PIH among literate women (60%) and there was a decreasing trend of incidence among the women with higher education level. A higher incidence of PIH was also noted among the women of low income group. Monthly income among PIH group subjects was lower as compared to the control subjects though statistically non-significant (p >0.05) (Table 1).

Table 1: Socio-demographic profile of PIH & control subjects

Variables	Parameters	PIH subjects		Control subjects	
		N = 70	%	N = 70	%
Dweller	Urban	22	31.43	28	40.00
	Rural	48	68.57	42	60.00
Religion	Hindu	47	67.14	51	72.86
	Muslim	22	31.43	19	27.14
	Sikh	01	01.43	-	-
	Christian	-	-	-	-
Educational Status	Illiterate	28	40.00	15	21.43
	Up to 8^{th} Standard	23	32.86	27	38.57
	$9^{th} – 10^{th}$	04	05.71	07	10.00
	$11^{th} – 12^{th}$	08	11.43	04	05.71
	Graduation	05	07.14	08	11.43
	Post-graduation	02	02.86	09	12.86
Monthly Income (INR/Month)	<5000	43	61.43	33	47.14
	≥5000	27	38.57	37	52.86

The age of the PIH and control subjects was almost similar, but in the PIH group I it was lower as compared to the group II and group III. There was no significant difference of monthly income within the PIH groups and between the PIH and control subjects. There was no significant difference in gestational age between PIH and control subjects. The gestational age in PIH group III was significantly lower (p-value <0.05) than group I. Gestational age in control subjects was almost similar to the PIH group I and group II but it was significantly higher (p-value <0.01)) when compared with the PIH group III (Table 2).

Table 2: Socio-demographic comparison between PIH & control subjects

Variables	PIH group (N= 70)				Group IV (N = 70) (Mean±S.D.)
	Group I (n = 25) (Mean±S.D.)	Group II (n = 25) (Mean±S.D.)	Group III (n = 20) (Mean±S.D.)	PIH subjects (N = 70) (Mean±S.D.)	
Age (Years)	24.44 ± 2.87	26.6 ± 5.90	25.35 ± 5.49	25.47 ± 4.91	24.98 ± 3.65
Income (INR/Month)	7620 ± 6394	5500 ± 4237	3975 ± 1230	5821.43±4804.16	7321.4 ± 6231.0
Garvidity	1.72 ± 0.94	2.16 ± 1.99	1.8 ± 1.24	1.9 ± 1.47	1.97 ± 1.08
Gestational Age (Weeks)	36.62 ± 2.01	36.04 ± 2.89	34.15 ± 3.92	35.70 ± 3.10	36.34 ± 2.37

Majority of the PIH women (77.14%) belonged to 21 - 30 years of age group when compared with the control women (82.86%). Least number of women were recorded (PIH 2.86%; Control 1.43%) in 36 - 40 years age group. It is obvious from the Table-3 that the chance of development of pregnancy induced hypertension was more common among the women married and conceived at an early age. Among the PIH subjects, maximum numbers of women were represented by 21 - 25 years of age in all groups which was noted to be the maximum in PIH group I (64%) followed by group II (48%) and group III (30%) whereas age group 36 - 40 years was represented by PIH group II (4%) and III (5%) (Table 3).

Table 3: Age wise distribution among the study groups

Age Group (Years)	PIH group (N = 70)								Group IV (N = 70)	
	Group I (n = 25)		Group II (n = 25)		Group III (n = 20)		PIH subjects (N= 70)			
	n	%	n	%	n	%	N	%	N	%
<20	01	04.00	02	08.00	05	25.00	08	11.43	07	10.00
21 – 25	16	64.00	12	48.00	06	30.00	34	48.57	33	47.14
26 – 30	08	32.00	04	16.00	08	40.00	20	28.57	25	35.72
04	05.71	-	06	24.00	-	-	06	08.57		
36 – 40	-	-	01	04.00	01	05.00	02	02.86	01	01.43
Total	25	100.00	25	100.00	20	100.00	70	100	70	100

Our study pointed out that majority (57.14%) of the PIH subjects were primigravida. We noted decreasing trend in incidence of PIH with increasing number of gravidity. When we analyzed distribution of gravidity among the subjects of various PIH groups and control group, 52% primigravida belonged to PIH group I whereas 60% each to PIH group II and III. Among the control group maximum number of women (n = 28, 40%) represented with second gravida followed by primigrava (n = 26, 37.14%) (Table 4).

Table 4: Gravidity index of PIH and control groups

Gravidity	PIH group (N = 70)								Group IV (N = 70)	
	Group I		Group II		Group III		PIH subjects			
	n	%	n	%	n	%	N = 70	%	N	%
1	13	52	15	60	12	60	40	57.14	26	37.14
2	08	32	03	12	04	20	15	21.43	28	40.00
3	02	08	03	12	01	05	06	08.57	12	17.14
4	02	08	01	04	02	10	05	07.14	02	02.86
≥ 5	-	-	03	12	01	05	04	05.72	02	02.86
Total	25	100	25	100	20	100	70	100	70	100

Maximum number of subjects presented with more than 36 weeks of gestational age among all PIH sub-groups and control group. Overall, majority of the PIH subjects belonged to more than 36 weeks of gestational age (54.29%) followed by the gestational age of 28 - 36 weeks (38.57%). Thus, we noted more incidence of PIH in women with higher gestational age. Similarly among controls, maximum number of women presented with gestational age more than 36 weeks (58.57%) followed only by the gestational age of 28 to 36 weeks (Table 5).

Table 5: Comparison of Gestational age in PIH and control groups

Gestational Age (weeks)	PIH subjects								Control subjects	
	Group I		Group II		Group III		PIH subjects		Group IV	
	n	%	n	%	n	%	N = 70	%	N = 70	%
20 – 28	-	-	01	04	04	20	05	07.14	-	-
>28 – 36	09	36	10	40	08	40	27	38.57	29	41.43
>36	16	64	14	56	08	40	38	54.29	41	58.57
Total	25	100	25	100	20	100	70	100	70	100

DISCUSSION

Pregnancy induced hypertension (PIH) continues to be a major health care related problem in pregnant women even after advancement in the field of medical sciences. The aetiology of PIH probably may have relation with background, literacy and economic status of pregnant women. A report states that living in a rural area may increase a woman's chance of developing pre-eclampsia [13]. In another study conducted by Sachdeva *et al*. [14] the incidence of PIH was found to be higher in rural women, though the difference was not significant. In our study also majority of the study subjects were rural dweller and the PIH subjects ranked the highest when compared with the control. The reasons for higher incidence among rural pregnant women are that as per 2011 census, 64.74 % population of Bareilly district lives in rural areas[15] and our tertiary care hospital is catering a larger rural population as compared to the urban population. Other factors like poverty, unawarness lack of ante-natal care seeking behaviour and poor availability of health care services in rural areas are also responsible for the same. Whereas for urban population, the financial constraints may not be a limiting factor and there is better availability of health care services as well. Hindu predominance in our study was because Hindu population is more than Muslim population in this region. Poverty and lower literacy rate in Muslims may also be the contributing factors.

We noted no significant difference of monthly income within PIH groups. Higher incidence of PIH among literate women in our study was in conformity with a report [13] in which similar higher incidence was observed in literate women. The report states that women with college education had 19% greater chances of having PIH [13] which was due to the reason that these women were more aware about their health problems as compared to illiterate women. Women with low income group usually have tendency to ignore ailments/symptoms associated with pregnancy and cannot afford to utilize the available health care services at nearby clinics/hospitals. Therefore, their visit to the hospital is not as frequent as those of literate women with higher income group.

Maternal age is considered as one of the essential risk factors as with increasing age of mother, the risk of PIH increases [12]. We noted almost equal age of the women between PIH and control subjects. Our finding was well supported by the other workers [16-22] in the field who also observed a non-significant difference of the age between case and control subjects. But in contrast to our findings, Sahu *et al*. [23] reported the maternal age to be significantly higher ($p < 0.01$) in cases as compared to controls. Our study showed that younger age of pregnant women might have contributed to a greater frequency of PIH in this region. The US nationwide data proposed that the danger of PIH increases by 30% for each additional year of age past 34 [24]. Young age of pregnant women did not appear to influence the danger of developing PIH, whichever cut off age was used. This was in contrast to our finding. Another study conducted by Yadav *et al*. [25] concluded that the threat of PIH was greater when the age of pregnant women was less than 25 years, and this observation was in conformity with ours. A study [26] reported that primiparous patients with PIH below 20 years of age were 26% while only 15% of the controls were less than 20 years, signifying that younger age of pregnant women was a causative feature to PIH. Therefore, it can be assumed from the results of these studies that younger maternal age is a significant risk factor for higher occurrence of PIH. In this part of country especially in rural areas, girls get married and conceive at an early age and therefore the incidence of pregnancy and its related complication PIH is higher in early reproductive age group.

Sibai and Cunningham [3] reviewed a number of worldwide studies and concluded that the incidence of pre-eclampsia in nulliparous populations was more than that for multiparous. The rate of gestational hypertension ranged between 6% and 17% in healthy nulliparous women and between 2% and 4% in multiparous women [27]. In our study, 57.14% of PIH cases were primigravida and showed decreasing trend

with increasing gravidity. But the difference of gravidity between the PIH and control subjects and within the PIH groups was not statistically significant. Our study correlates with the report of other studies by Sandhya *et al*. [28] carried out in India, which stated that 60% of total cases of PIH were primipara; and Irinyenikan *et al*. [29] who reported that most of the gestational hypertensive participants belonged to primigravida. Sharma *et al*. [18] noted 14 primigravida and 36 multigravida in PIH group as compared to 31 primigravidas and 19 multigravidas in the control group ($p = 0.001$) in variance to our observation. Similarly, in another study conducted by Cüneyt Evrüke *et al*. [17] most of the hypertensive patients were multigravida, which could be explained by the higher age of their patients. However, Abubakar *et al* [21] noted no difference between the pregnant non hypertensive and pre-eclamptic groups in respect to gravidity which is in conformity with our finding.

We noted almost similar gestational age between the PIH and the control subjects. Other workers [16, 18, 20, 23, 30, 31] in the field also noted almost similar range of mean gestational age. Abubakar *et al* [21] recorded no difference in gestational age among pregnant non-hypertensive and pre-eclamptic group which was in conformity with our finding. When gestational age between GH and control subjects was compared it was noted to be almost equal which is well supported by Latha and Ganesan [22]. A significant lower gestational age in eclamptic women when compared with normotensive and GH women was noted which could be because of the fact that due to its obvious clinical symptoms, the patient's attendants rush to the clinic/hospital without any further delay.

CONCLUSION

To conclude, incidence of PIH is more common among lower socioeconomic strata of rural primigravida Hindu women in early age group during later weeks of gestation. Awareness regarding PIH and availability of easily accessible and affordable health care services to rural population and poor people is important which shall be helpful in reducing the PIH related morbidity and mortality. Although this being a hospital based study; the results may not be applicable to the general population at large. Therefore, there is further need to elaborate the study using larger population including more study subjects and socio-demographic parameters to establish better statistical correlation in this Rohilkhand region.

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