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Original Research Article

Prevalence of pregnancy induced hypertension and associated factors in Kashmiri women attending a tertiary care hospital at Srinagar: a cross-sectional study

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ABSTRACT

Background: Pregnancy induced hypertension (PIH) is a significant cause of morbidity among pregnant females and also affects the foetal outcome. Numerous risk factors have been identified. This study was conducted to estimate the prevalence of PIH and the factors associated with PIH.

Methods: This was a cross-sectional hospital-based study. Pregnant women admitted for delivery in the gynaecology and obstetrics department of SKIMS Soura formed the study participants. Patients with chronic hypertension were excluded. A minimum sample size of 295 was calculated but finally a sample of 402 was achieved. The data was collected over a 3-month period from July to September 2021 using convenient sampling. Data was entered in Microsoft excel and analysed using IBM SPSS version 23.

Results: A total of 402 pregnant women were included. Majority (61%) of the participants were up to 30 years of age, majority (97.8%) were up to para 3 and 89% were literate. The prevalence of PIH was 6.5%. Hypertension was more frequent among the women with age more than 30 years ($p=0.041$) and women with higher pre-pregnancy BMI ($p=0.010$). Maternal education, occupation and parity were not associated with hypertension in pregnancy.

Conclusions: In our study older women and women with higher body mass index (BMI) were more at risk of having PIH in pregnancy. Therefore, we would recommend earlier age at marriage and lifestyle modification for maintaining normal BMI.

Keywords: Hypertension, Pregnancy, Risk factor, Prevalence, BMI

INTRODUCTION

Pregnancy induced hypertension (PIH) is the systolic blood pressure of ≥ 140 mmHg and diastolic blood pressure ≥ 80 mmHg that occurs after 20 weeks of gestation in women with previously normal blood pressure.¹ The broad classification of pregnancy-induced hypertension during pregnancy is gestational hypertension, pre-eclampsia and eclampsia.² It is a significant cause of morbidity and mortality among pregnant females and also affects the foetal outcome. Numerous risk factors have been identified which result in PIH. However, the research

is still going on. Severe hypertension increases the mother's risk of cardiac failure, heart attack, renal failure and cerebral vascular accidents. In addition, the fetus is at increased risk from complications like poor placental transfer of oxygen, growth restriction, preterm birth, placental abruption, stillbirth and neonatal death.² A study has found that the women who delivered low birth weight babies are 5 times more likely to have had pregnancy-induced hypertension.³

The world health organization estimates that at least one woman dies every seven minutes from complications of

PIH disorders. Pregnancy complicated with hypertensive disorder is related with increased risk of adverse fetal, neonatal and maternal outcome.⁴ Hypertensive disorders represent the most common medical complications of pregnancy with a reported incidence of 5-10%.^{5,6} PIH is one of the most common causes of referral of pregnant women from peripheral to central health centers.⁷

Objective

This study was conducted to estimate the prevalence of PIH and the factors associated with PIH.

METHODS

Study design

This was a cross-sectional hospital-based study.

Inclusion criteria

Pregnant women admitted for delivery in the gynaecology and obstetrics department of SKIMS Soura and women providing written consent for participating in the study were included in the study.

Exclusion criteria

Patients with chronic hypertension were excluded.

Sample size

Based on a prevalence of 20% as per a study conducted in Block Hazratbal, and taking a non response rate of 20%, a minimum sample size of 295 was calculated but finally a sample of 402 was achieved.⁸

Data collection

The data was collected over a 3-month period from July to September 2021 using convenient sampling. Data was collected on 2 days a week. Information was obtained regarding socio-demographic characteristics, pregnancy related details and medical history. Pregnant women with documented hypertension after evaluation by the resident gynaecologists were considered to have outcome of interest.

Ethical clearance was sought from the ethical committee of the institute.

Statistical analysis

Data was entered in Microsoft excel and analysed using IBM SPSS version 23. Statistical tests were applied based on the type of variable and normality of the data.

RESULTS

A total of 402 pregnant women were included.

About 61% (246) of the participants were up to 30 years of age. Majority (55.2%, 222) of the females belonged to the urban areas. A total of 185 females (46%) were primiparous. About 89% (357 patients) were literate and about 96% of the patients were housewives (Table 1).

Table 1: General characteristics of the study participants.

Characteristics	Groups	N	Percentage (%)
Age (Years)	≤30	246	61.2
	>30	156	38.8
Residence	Urban	222	55.2
	Rural	180	44.8
Parity	1	185	46.0
	2	160	39.8
	3	48	11.9
	4	8	2.0
	5	1	0.2
Education	Illiterate	45	11.2
	Literate	357	88.8
Occupation	Housewife	384	95.5
	Working	18	4.5

The prevalence of PIH among our study participants was 6.5% (26 patients) (Table 2). The prevalence of GDM was 9.5% (38 patients). Hypothyroidism was present in 18.7% (75 patients) and depression was present in 0.75% (3 patients). History of PIH in previous pregnancy was given by 4.1% (9 patients) out of 217 patients with parity >1. None of the patients were themselves smokers but the history of smoking in partner was given by 20.4% (82 patients). The pre-pregnancy weight was more than 60 kgs in about 51% of the participants whereas the pre-pregnancy BMI was ≥25 in about 48% of the study participants.

Table 2: Medical history of the study participants.

Characteristic	N	Percentage (%)	
PIH	26	6.5	
GDM	38	9.5	
Hypothyroidism	75	18.7	
Depression	3	0.75	
History of PIH in previous pregnancy	9	4.1	
Smoking in partner	82	20.4	
Pre-pregnancy weight (kg)	≤60	198	49.3
	>60	204	50.7
Pre-pregnancy BMI (kg/m ²)	≤24.99	211	52.5
	≥25	191	47.5

PIH=Pregnancy induced hypertension, GDM=Gestational diabetes mellitus.

The prevalence of PIH was more in the women older than 30 years of age (9.6%) compared to the women up to 30

years of age (4.5%) and this relationship was statistically significant ($p=0.041$) (Table 3). There was no relationship between residence, parity, pre-pregnancy weight, education, occupation, smoking in spouse and GDM. The relationship between smoking in spouse and PIH was near significant ($p=0.063$) with more prevalence in those women whose partners were smokers (11%) compared to those whose partners were non-smokers (5.3%). Prevalence of PIH was more in the women with higher BMI (≥ 25) with a prevalence of about 10% than the women with lower BMI with a prevalence of 3.3% and this relationship was statistically significant ($p=0.007$). There was a statistically significant relationship between history of PIH in previous pregnancy and the occurrence of PIH in present pregnancy ($p<0.001$).

Table 3: Association of PIH with general characteristics of study participants.

Characteristic	Groups	PIH, n (%)	X ² (p)
Age (Years)	≤30	11 (4.5)	4.175 (0.041)
	>30	15 (9.6)	
Residence	Urban	16 (7.2)	0.448 (0.503)
	Rural	10 (5.6)	
Parity	≤2	20 (5.8)	1.809 (0.179)
	>2	6 (10.5)	
BMI (kg/m ²)	≤24.99	7 (3.3)	7.285 (0.007)
	≥25	19 (9.9)	
Pre-pregnancy weight (kg)	≤60	6 (3)	7.621 (0.006)
	≥61	20 (9.8)	
Education	Illiterate	1 (2.2)	1.51 (0.219)
	Literate	25 (7)	
Occupation	Non-working	24 (6.3)	0.672 (0.412)
	Working	2 (11.1)	
Smoking in spouse	No	17 (5.3)	3.46 (0.063)
	Yes	9 (11)	
History of PIH	Yes	7 (77.8)	<0.001 (FE test)
	No	9 (4.3)	
GDM	Yes	4 (10.5)	0.292 (FE test)
	No	22 (6)	

DISCUSSION

The prevalence of PIH found in our study was 6.5% (26 patients). A study conducted in block Hazratbal of district Srinagar in Kashmir valley found out the prevalence to be 20%.⁸ Another study conducted in block Hajin of district Bandipora of Kashmir valley found out the prevalence to be 7.4%.⁹ A systematic review by Dhinwa et al which included a total of 18 studies with 92,220 study participants found that the pooled prevalence of PIH in India was 11%.¹⁰

This study found that the prevalence of PIH was more in the women older than 30 years of age (9.6%) compared to the women up to 30 years of age (4.5%) and this relationship was statistically significant ($p=0.041$). Our findings are supported by a study conducted by Liu et al who concluded that the risk of PIH increases with the age of the woman.¹¹ A research study suggests that the risk of pre-eclampsia increases by 4% for every year more than 32 years of age.¹² Similar findings have been reported in a study published in “BMC pregnancy and childbirth” that advanced maternal age is associated with pre-eclampsia.¹³

The relationship between smoking in spouse and PIH was near significant ($p=0.063$) with more prevalence in those women whose partners were smokers (11%) compared to those whose partners were non-smokers (5.3%). None of the women in our study were smokers. The literature gives variable results in different studies on the relationship between smoking in pregnancy and hypertensive disorders of pregnancy. The women in our study were not smokers themselves but they were exposed to second hand smoke. A systematic review based on 13 studies revealed that in Asia smoking is a risk factor for hypertensive disorders of pregnancy.¹⁴

Prevalence of PIH was more in the women with higher pre-pregnancy BMI (≥ 25) with a prevalence of about 10% than the women with lower BMI with a prevalence of 3.3% and this relationship was statistically significant ($p=0.007$). Similar findings have been noted in most of the studies. A study conducted by Kazemian et al found that women obese before pregnancy were more likely to develop gestational hypertension than the women who were not obese with and odds ratio of 4.4.¹⁵ A systematic review and meta-analysis by Motedayen et al concluded that BMI may be one of the ways for diagnosing pre-eclampsia.¹⁶

There was a statistically significant relationship between history of PIH in previous pregnancy and the occurrence of PIH in present pregnancy ($p<0.001$). A study conducted by Yitagesu et al showed that the history of PIH was associated with the increased occurrence of hypertensive disorders in the current pregnancy with an adjusted odds ratio of 6.62.¹⁷ A study conducted by Bernardes et al found that there is 10.5% chance of recurrence of pre-eclampsia in the second pregnancy if there is a history of it in the first pregnancy.¹⁸

CONCLUSION

In our study older women and women with higher BMI were more at risk of having PIH in pregnancy. PIH frequency was higher among the females whose husbands were smokers (the relationship was near significant). Previous history of PIH was associated with PIH in current pregnancy. We would recommend earlier age at marriage and lifestyle modification for maintaining normal BMI. Particular attention should be paid to the women having history of PIH so that PIH in present pregnancy is detected. Partners of pregnant females should restrict smoking in

front of them and around in the house so as not to expose these females to second-hand and third-hand smoke.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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