



## Prevalence of Pregestational Hypertension and Associated Factors

Authors

**Dr Sujatha T L<sup>1</sup>, Dr Anitha M<sup>2</sup>, Dr Renji S R<sup>3</sup>**

<sup>1</sup>Addl. Professor, Dept. of O & G, Sree Avittom Thirunal Hospital, Govt. Medical College, Trivandrum

<sup>2</sup>Asst. Professor, Dept. of O & G, Sree Avittom Thirunal Hospital, Govt. Medical College, Trivandrum

<sup>3</sup>Junior Resident, Dept. of O & G, Sree Avittom Thirunal Hospital, Govt. Medical College, Trivandrum

### Abstract

**Background:** Hypertension in pregnancy is associated with increased incidence of adverse fetal and maternal outcome. The number of women with hypertension predating pregnancy is underestimated. As young women will not check their blood pressure prior to pregnancy, 1<sup>st</sup> trimester booking visit is the ideal time to pick up pre gestational hypertension. Pregestational hypertension is considered as chronic hypertension predating pregnancy.

**Aim:** Aim of the study was to determine the prevalence of pre gestational hypertension among the antenatal women attending a tertiary care center and to assess the associated factors.

**Methodology:** This was a cross sectional study conducted in SAT hospital, Govt. Medical College Trivandrum for one year. 400 women attending the OP in their first trimester for registration were selected after informed consent. BP was checked at the first visit. If Blood pressure was high it was rechecked after six hours. Hypertension was diagnosed if systolic BP > 140mmHg and diastolic BP more than 90 mmHg on two occasions. Socio demographic factors, age, body mass index, family history of hypertension, and history abortion and history of intra uterine death in previous pregnancy noted by a structured questionnaire. Statistical tests used were mean, standard deviation, chi square, odds ratio and multivariate analysis on significant variables derived in univariate analysis.

**Results:** The prevalence of chronic hypertension was 6.8% and main associations were age more than 25 years, body mass index, and Family history of hypertension, history of abortion and history of intrauterine death.

**Conclusion:** Screening of all pregnant women in first trimester itself for hypertension will help in early detection of chronic hypertension in pregnancy so that proper investigations and management can be started at the earliest.

**Keywords:** Pregestational hypertension, Essential hypertension, gestational hypertension.

### Introduction

Hypertension during pregnancy include chronic hypertension, gestational hypertension and Preeclampsia. Gestational hypertension is high blood pressure after 20 weeks of gestation. Preeclampsia include gestational hypertension

with proteinuria. This usually occurs after 20 weeks of gestation. Chronic hypertension is defined as hypertension present prior to the pregnancy or persist longer than 12 weeks postpartum.<sup>(1)</sup> Exposure to antihypertensive medications during first trimester is common and

increasing .Certain class of antihypertensive medication taken during first trimester like bêta blockers and diuretics and angiotensin converting inhibitors have been associated with increased risk of congenital malformations. There is uniform agreement that levels of blood pressure higher than 120/80 mm/Hg are associated with increased cardiovascular risk. Most women with chronic hypertension will have essential (also called primary) hypertension, but as many as 10% may have underlying renal or endocrine disorders,i.e., secondary hypertension.

Effect of chronic hypertension on pregnancy is associated with adverse outcome like IUGR, premature birth, fetal demise, placental abruption and about 25% will develop superimposed preeclampsia. As many as 1/3 rd. of woman with severe chronic hypertension may have SGA infant and 2/3 rd. may have a preterm delivery. A woman with chronic hypertension should be evaluated to ascertain potentially reversible causes and possible end organ involvement (heart and kidney). Clinical testing at the initial evaluation during pregnancy include ECG, ECHO cardiography, ophthalmologic examination and renal evaluation. Young woman in whom hypertension has been diagnosed for the first time in early pregnancy may benefit from further evaluation for the potentially reversible causes.

### Materials and Methods

This was a cross sectional study conducted in O&G OP in the Department of O&G, SAT Hospital, Govt. Medical College, Trivandrum, tertiary care center. The study duration was 1 year. Sample Size (n) is calculated using the formula  $n = 4pq/L^2$ , p = prevalence of pre gestational hypertension. q = 1-p, L = permissible error in estimation of p (usually fixed at 10% of p), substituting the values we get  $n = 4 \times 0.5 \times 0.5 / 0.0025 = 400$ .

**Inclusion criteria:** Women in their first trimester of pregnancy

**Exclusion criteria:** Women in their second and third trimesters,

### Methodology

400 women who attended the obstetric OP in their first trimester of pregnancy in SAT hospital were selected after informed consent. They were allowed to take rest for 20 minutes and BP recorded in the right arm in the sitting position using a manual mercury sphygmomanometer. Korotkoff Phase V is taken determine the diastolic blood pressure. If high BP detected it was again rechecked after six hours. Hypertension was diagnosed if systolic BP > 140mmHg and diastolic BP more than 90 mmHg. Sociodemographic factors, age, body mass index, Family history of hypertension, history of abortion and history of intrauterine death in previous pregnancy recorded by a structured questionnaire. These patients were admitted for investigations for associated causes such as renal, cardiacor collagen vascular diseases and an ophthalmic assessment.

### Observation and Analysis

The mean age of the study population was 27 years. The mean BMI of the study population was 24... 20.3% of patients in this study had BMI more than 25kg m<sup>2</sup>. 65.5% of patients belonged to rural area. 69.8% patients were unemployed, 65.3% had higher secondary education.94.2% were belonged to low socio economic status group.47.3% had family history of diabetes.87% did not have the habit of exercise.72.7% were having sedentary lifestyle. 25.3% had family history of hypertension.32.8% were primi gravida and 35.3% were second gravida. 48.3 % had one live child, 8.5% had history of IUD and 1.3% had history of neonatal death.29.5% had history of abortions.41.3% had history of urinary tract infection.46.3% had history of thyroid disease.

Prevalence of chronic hypertension was 6.8 %( Table.1). Among 27 chronic hypertensives 85.2% of patients were having essential hypertension. Among 27 chronic hypertensives 92.6% were in the age group of more than 25 years. Among the normotensive women 55.2% were in the age group of more than 25 years. The observed difference is statistically significant. Women with

more than 25 years have 10 times more chance of having hypertension than those with less than 25 years.

**BMI:** Among chronic hypertension 40.7 % had BMI>25 whereas only 18.85% of normotensives had BMI>25 Women with BMI more than 25 had 2.9 times more chance to get chronic hypertension than those with normal BMI.

There is no significant association with place of residence as rural or urban. Among chronic hypertensives 15% belong to high socio economic group while 5.1% of were in high socio economic group. Observed difference is statistically significant. There was 3.2 times more risk of hypertension in higher socio economic group.

**Family History:** 67% had family history of hypertension compared to 46% innormotensive women. There is significant association between family history of hypertension and chronic hypertension. Patients with family history of hypertension have 2.3 times more risk of developing hypertension than those without family history.

**History of exercise**

14% of normotensives had the habit of exercise where as only 3.7% of chronic hypertensives gave history of exercise but this is not reaching statistical significance.

**History of IUD;-** 26% of chronic hypertensives had history of IUD in previous pregnancy compared to 7% of normotensives. There is significant correlation between hypertension and IUD. Among women with history of IUD there was 4 times more chance of having hypertension.

**Table 3:** Association of age and Hypertension

Chronic HTN						
Age in years	Present		Absent		Total	
	N	%	N	%	N	5
>25	25	92.6	206	55.2	231	57.8
≤ 25	2	7.4	167	44.8	169	42.3
Total	27	100	373	100.0	400	100.0

Women with age > 25 years have 10 times more chance of having chronic hypertension than those with < 25 years.

**History of abortion;** 40.7% of hypertensives gave history of abortion compared to 17.4% of normotensives. The observed difference is statistically significant. Chronic hypertension has 3.2 times more chance of abortion than non-hypertensives.

**History of UTI;** 52% of chronic hypertension gave history of urinary tract infection versus 41% in normotensives. This difference is not statistically significant.

The logistic regression analysis reveals that history of abortion, history of IUD and age of the pregnant women were significantly associated with chronic hypertension.

**Table 1 :** Frequency distribution of Chronic Hypertension

Chronic Hypertension	Frequency	Percent
Present	27	6.8
Absent	373	93.3
Total	400	100.0

Prevalence of chronic hypertension is 6.8% in the study group

**Table 2 –** Distribution of types of hypertension

Chronic Hypertension	Frequency	Percent
Thrombophilia’s (SLE, Sjogrens syndrome) APLA	4	14.8
Essential Hypertension	23	85.2
Total	27	100

85.2% were having essential hypertension

**Table 4:** Association of BMI and chronic hypertension

Chronic HTN						
BMI	Present		Absent		Total	
	N	%	N	%	N	5
>25	11	40.7	70	18.8	81	20.3
≤ 25	16	59.3	303	81.2	319	79.8
Total	27	100.0	373	100.0	400	100

Women with BMI > 25 are 3 times more likely to have chronic hypertension

**Table 5 :** Association of Family history of hypertension

Chronic HTN						
Family history	Present		Absent		Total	
	N	%	N	%	N	5
Yes	18	67	171	46	189	47
No	9	33	202	54	211	53
Total	27	100.0	373	100.0	400	100

Family history of hypertension in 67% of cases

**Table 6:** Association of History of IUD in previous pregnancy and hypertension

History of IUD						
IUD	Present		Absent		Total	
	N	%	N	%	N	5
Present	7	26	26	7	33	8.3
Absent	20	74	347	93	367	92
Total	27	100.0	373	100.0	400	100

P=0.001: OR=4.671 95% CI for OR = 1.81 – 12.06

There is significant correlation between chronic hypertension and history of IUD in previous pregnancy

**Table 7:** History of abortion in pregestational hypertension

Abortions	Present		Absent		Total	
	N	%	N	%	N	5
Present	11	40.7	65	17.4	76	19.0
Absent	16	59.3	308	82.6	324	81.0
Total	27	100.0	373	100.0	400	100

OR = 3.258

The observed difference is statistically significant, chronic hypertensives had 3.2 times more chance of having abortion than normotensives.

**Table 8:** Multi variate analysis of variables

	B	S.E.	P	OR	95% CI for OR	
					L	U
Age	1.971	.756	.009	7.175	1.629	31.594
BMI	.632	.445	.156	1.882	.786	4.503
SES	.745	.633	.239	2.107	.610	7.284
Family History	.364	.448	.417	1.439	.598	3.465
IUD	1.116	.529	.035	3.053	1.083	8.609
Abortions	.882	.445	.048	2.417	1.009	5.786
Constant	-6.397	1.847	.001	.002		

History of abortion and IUD in previous pregnancy and age of the pregnant women were having significant association with chronic hypertension.

## Discussion

According to Chesleyetal<sup>(2)</sup> chronic hypertension complicating pregnancy is diagnosed by high blood pressure known to predate conception. Chronic hypertension is associated with a high incidence of adverse pregnancy outcomes compared with general population.<sup>(3)</sup> Chronic hypertension if not detected early may be masked by physiological midtrimester fall in BP and later classified as gestational hypertension or preeclampsia

Chronic hypertension occurs in upto 5% pregnant woman and this complication may result in significant maternal, foetal and neonatal morbidity and mortality. The rates vary according to the population studied. Prevalence of chronic hypertension varies in black and whites and more in black.<sup>(4,5)</sup> Prevalence of Chronic hypertension in our study is 6.8%. This is comparable to a population based Indian study done at Hyderabad which was 6.9 %.<sup>(6)</sup>

Chronic hypertension may be essential hypertension in 90 % of cases and secondary to other causes in 10 %. Among the 27 patients in our study 85.2 % were having essential hypertension. 14.8 % of patients had collagen disease like SLE and thrombophilias. The increased incidence of secondary hypertension in our study may be because of the high number of referral cases.

## Associations

**Age-** Chronic hypertension is a common medical condition in pregnancy and its prevalence is rising because a larger number of parturient are obese and of advanced maternal age<sup>(7)</sup>. In our study 92% of women with chronic hypertension were in the age group of more than 25 years. Women with age more than 25 years had 10 times more chance of having hypertension than women less than 25 years. Risk factors such as higher body mass index, and older age may increase the risk of developing hypertension in people within varied socioeconomic and racial backgrounds.<sup>(8)</sup>

**BMI :** Obesity is an important factor predisposing to chronic hypertension, specifically prevalence of hypertension as much as 10 fold in obese woman<sup>(8)</sup>. There is an increased association between BMI more than 25 and chronic hypertension in our study.

**Family history of hypertension;** 67% of patients with Chronic hypertension gave family history of hypertension which is statistically significant. This is comparable to other studies.<sup>(9)</sup>

**Socioeconomic status-** There was 3.2 times more risk of hypertension in higher socio economic group which is comparable to other studies. High prevalence of hypertension reported in positive family history and when overweight it increases by 3-4 times.<sup>(10)</sup>

**History of IUD in previous pregnancy;** 26% of patients with Chronic hypertension gave history of IUD in previous pregnancy compared to 7% in the normotensive group which was statistically significant. There are increased incidence of perinatal mortality which is more in secondary hyper tension with end organ damage

**History of abortion;** Chronic hypertensives had an increased risk of abortion. There was significant association between history of abortion and chronic hypertension in our study. Though history of one abortion is protective in development of preeclampsia more than one abortion may be associated with collagen diseases like SLE which lead to secondary hypertension.<sup>(11)</sup>

## Conclusion

The pre gestational hypertension among the antenatal women attended in our tertiary care centre was 6.8% . Age > 25 Years, BMI, Family h/o hyper tension, h/o abortion, and h/o intra uterine death in previous pregnancy were found to have significant association with pre gestational hypertension. But multi variate analysis showed that history of abortion, history of IUD, and age of pregnant women were only having significant association with chronic hypertension.



**Recommendation**

Chronic hypertension predating pregnancy should be diagnosed in the first trimester so that proper investigation and management can be done to improve pregnancy outcome as well as future maternal health.

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