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Original Research Article

Prevalence of white coat hypertension amongst pregnant women admitted with high BP recordings in ante-natal clinic

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ABSTRACT

Background: White coat hypertension (WCH) is a common and well recognized phenomenon with significant prevalence amongst all age groups. This is also quite prevalent in the pregnant women with an intermediate long term prognosis between hypertensive and normo-tensive individuals. It is important to assess the true prevalence WCH in pregnant women and to prevent unnecessary medications to them during pregnancy but at the same time to keep a timely follow up and a watchful eye on these patients to identify complications at the earliest. Study was conducted at a peripheral secondary level hospital with a small obstetrics and gynecology OPD and ward. 54 patients were diagnosed to be hypertensive in Antenatal Clinic.

Methods: All pregnant women who presented to the ANC were screened for hypertension. Those who were diagnosed to be hypertensive in antenatal clinic and these patients were then admitted for Ambulatory Blood Pressure Monitoring (ABPM) for 24 hours.

Results: The ABPM tracings were checked and tabulated to arrive at the final diagnosis after 24 hrs. The prevalence of 'WCH' in this study was 48.15% as 26/54 patients were found to have their average BP < 140/90 mmHg after measurement by ABPM over 24 hours so they were diagnosed as 'White Coat Hypertension' patients.

Conclusions: Many women who come to ANC in the early pregnancy are diagnosed to have hypertension. WCH is a well known phenomenon in pregnancy. WCH must be ruled out prior to starting these patients on anti-hypertensive medications.

Keywords: Ante-natal clinic, Essential hypertension, Pregnancy, Pre-eclampsia, White coat hypertension

INTRODUCTION

Hypertension, either de novo or pre-existing, is the most common medical diseases complicating the pregnancy. It affects around 6 to 10 % of all gestations. Gestational HTN is defined when BP of $\geq 140/90$ mmHg is detected for the first time during pregnancy.¹⁻³ Hypertension is often diagnosed during antenatal visit based on blood pressure measurement of more than 140/90 mmHg.⁴⁻⁷ There is a wide array of adverse outcomes associated with gestational hypertension, pre-eclampsia and

ecclampsia.⁷⁻⁹ In recent years, there is recognition of the phenomenon called "White Coat Hypertension", which has added a level of uncertainty in the diagnosis and management of hypertension in pregnant women with apparent pre-existing hypertension^{10,11}. It can reasonably be assumed that about one in five such women have white coat hypertension.² In some countries the prevalence of white coat hypertension in pregnant women is found to be as high as 30-35%.¹⁰⁻¹² These patients are usually started on pharmacological treatment of essential hypertension or gestational hypertension and they keep

on taking anti-hypertensive medications throughout pregnancy. It is very important to identify such women who suffer from “White Coat Hypertension” and are wrongly diagnosed as essential hypertension or gestational hypertension. The diagnosis of White Coat Hypertension requires a ‘gold standard’ measurement of awake and sleep BP by standard sphygmomanometer after admitting the patient to the hospital.¹²⁻¹⁴ To avoid prolonged admission of such patients with suspected “white coat hypertension” and measuring mean blood pressure over 24 hours ABPM (Ambulatory BP Monitoring) can be used to diagnose hypertension in antenatal patients. If the blood pressure of a pregnant woman which was earlier found to be high during antenatal visit but her ambulatory blood pressure is less <135/85 mmHg at daytime and <125/75 at night and her average ambulatory in 24 hours is <130/80 mmHg, her high blood pressure at clinic is considered “White Coat Hypertension”. Therefore, it is important to find out the prevalence of this entity to prevent misdiagnosis and a needed treatment to a normal patient.

Aim of the study was to assess the prevalence of “White Coat Hypertension” amongst pregnant patients admitted with high BP recordings in ante-natal clinic.

METHODS

This was a prospective observational study was done to assess the prevalence of “White Coat Hypertension” amongst pregnant patients admitted with High BP recordings in Ante-Natal Clinic. A study protocol delineating the various steps of the study was designed before the commencement of the study. All steps of the study were explained to all the team members and the staff for proper implementation of all steps. Study was done over a period of one year (from August 2018-August 2019). Total 54 women participated in the study, out of them 30 were primi-gravida and 24 were multigravida. All were between 18 years to 30 years of age. The age distribution of the participants was as shown in Figure 2.

Statistical analysis

The prevalence of WCH was assumed to be around 30 - 50% with 95% confidence interval (CI), alpha (a) error of 5 % and with beta (b) error of 20%. The estimated minimum sample size for the study using the standard formulas was found out to be 48. However, the maximum number of patients who were available during the study duration was included in the study. The data obtained will be filled in MS Excel sheets and statistical analysis was done using SPSS Software.

This study was done at a in a peripheral hospital with small ANC. All pregnant women who attended our Ante-Natal OPD underwent blood pressure measurement by using a well calibrated aneroid sphygmomanometer as part of general medical examination. The precautions

were taken before measuring BP in all women. Those patients who were found to have blood pressure (BP) values more than 140/90 mmHg were made to rest for 5 min and BP was measured again. Out of 600 women, 54 patients were diagnosed to be hypertensive in antenatal clinic and these patients were then admitted to the obstetrics ward for further monitoring. All admitted patients were put on ABPM for 24 hrs. The ABPM device measures blood pressure every 20 minutes irrespective of the activity of the patient. After ambulatory blood pressure monitoring for 24 hours the results of ambulatory blood pressure monitoring tracings were checked and tabulated to arrive at the final diagnosis. All the admitted patients were also investigated for onset of pre-eclampsia with blood investigations (complete haemogram), urine tests (for proteinuria), liver and renal function test. Screening for fetal growth restriction was also carried out with Ultrasonography (USG).

Inclusion criteria

- All pregnant women who presented to the antenatal Clinic and who were found to have raised BP on measurement were included in the study after getting their willing consent.

Exclusion criteria

- Those women who didn't gave consent for the study
- Women with age < 18 years and > 30 years
- Patient already having any other systemic or psy illness.
- Patient on medications (other than the routine medications prescribed in pregnancy) for any other illness.

Precautions to taken before measuring BP

The following precautions were taken before measuring blood pressure in ANC:

- Allow the patient to sit for at least five minutes in a quiet room before beginning blood pressure measurement
- Patients should be asked to refrain from smoking or drinking tea/coffee, exercise for at least 30 minutes before measuring the BP
- Measurement should be done preferably in a sitting or supine position
- Patient's arm should be fully bared and supported at the level of the heart.

Blood pressure is measuring the both arms at the first visit and the higher of the two readings is taken as BP.

Study protocol

The study protocol delineates the various steps which were followed in the study in a sequential manner.

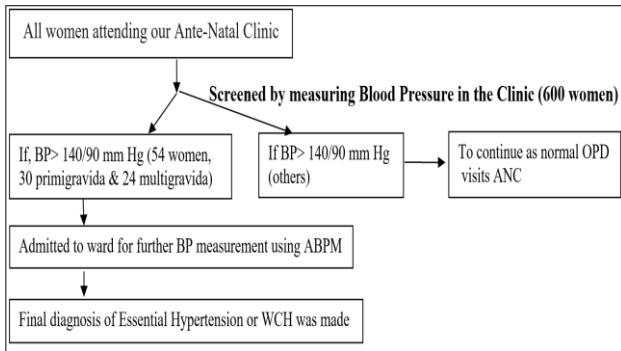


Figure 1: Study protocol showing the steps of the study in a sequential manner.

RESULTS

The prevalence of ‘White Coat Hypertension’ in this study was 48.15% (Figure 3) as 26/54 patients were found to have their average BP <140/90 mmHg after measurement by ABPM over 24 hours so they were diagnosed as ‘White Coat Hypertension’ patients. Rest 28 (51.85%) patients were found to have average BP >140/90 mmHg over the 24 hour period.

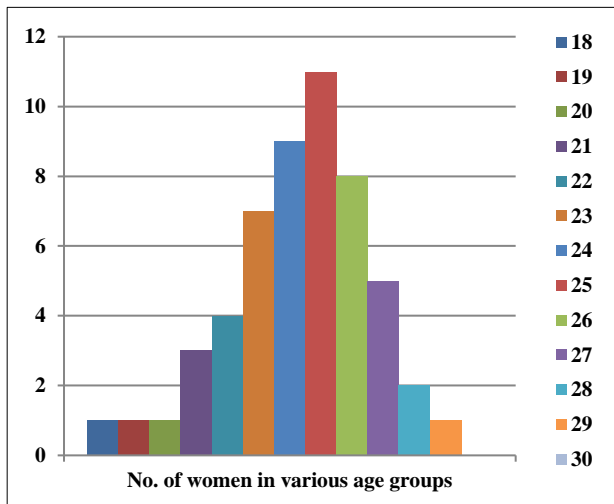


Figure 2: No. of women in various age group in the study.

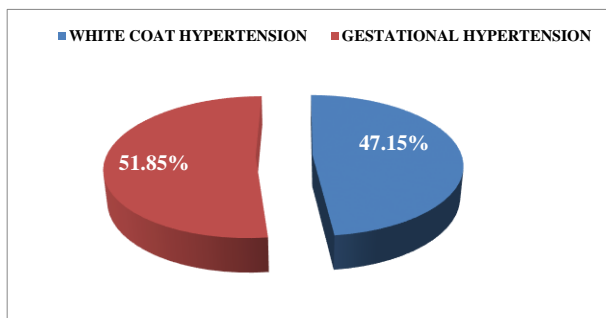


Figure 3: Prevalence of WCH and EH as found in this study.

These patient were diagnosed as hypertension, two patients were detected to have mean blood pressure >150/100 mmHg and >160/110 mmHg by ABPM which was higher than the mean of the manual BP measurements, which helped in prognosticating the outcome of pregnancy. These patients had mean BP of 140/100 mmHg by manual blood pressure measurement. These two patients had abruptio placenta and fetal growth restriction on follow up.

DISCUSSION

Hypertensive disorders are among the most common medical complications of pregnancy and a leading cause of maternal and perinatal morbidity and mortality worldwide. Hypertension in pregnancy is associated with increased risk of adverse fetal, neonatal, and maternal outcomes, including preterm birth, intrauterine growth restriction, perinatal death, acute renal or hepatic failure, antepartum hemorrhage, postpartum hemorrhage, and maternal death³. Factors that increase risk include nulliparity, advanced maternal age, multiple births, diabetes, chronic hypertension, obesity, previous preeclampsia, family history of preeclampsia, different paternity, gestation ≥10 years since last pregnancy, renal disease, and presence of antiphospholipid antibodies.⁴⁻⁶ Because an elevated BP after 20 weeks of gestation in a previously normotensive woman is common to the definition of both gestational hypertension and pre Eclampsia.^{7,8} The issue of whether the development of these complications can be predicted on the basis of clinic BP alone is an enigma. Blood pressure measured during conventional antenatal visits has been addressed in several retrospective and some prospective studies.⁹⁻¹¹

Office BP values have several shortcomings, they provide a measurement that represents only a fraction of the 24 hour BP profile, usually under circumstances that may have pressor effect, and the technique is fraught with potential errors, including instrument defects and examiner technique.¹²⁻¹⁴ In addition, maternal posture can significantly affect clinic BP measurements in pregnant women. Therefore, office BP readings are neither diagnostic nor sufficiently predictive of the development of hypertension in pregnancy. The reported sensitivity and specificity of clinic BP measurements vary greatly between studies, with sensitivity being as low as 9% and positive predictive value being as low as 8%.¹⁵⁻¹⁷ Nonetheless, the diagnosis of gestational hypertension primarily relies on conventional clinic BP measurements and the use of constant threshold values, i.e., 140/90 mmHg for systolic/diastolic BP after 20 weeks of gestation in a previously normo-tensive woman.

BP exhibits predictable 24-hour variation as a result of both cyclic day-night alterations in behavior (e.g., physical activity, mental stress, and posture), environmental changes (e.g., ambient temperature, noise, etc.), and endogenous circadian (~24-hr) rhythms due to neural, endocrine, endothelial, and hemodynamic

variables (e.g., plasma noradrenaline and adrenaline [autonomic nervous system] and renin, angiotensin, and aldosterone (renin-angiotensin-aldosterone system)).¹⁷⁻¹⁹ Such 24-hour BP variability also characterizes clinically healthy pregnant women as well as women who develop gestational hypertension or preeclampsia. Changes in the circadian pattern of BP could be used either to predict preeclampsia or to assess its severity.¹⁹⁻²¹ However, few studies have reported on the normal.

24-hour BP pattern determined by ABPM in uncomplicated pregnancies, most of them without comparison with the circadian BP pattern in complicated pregnancies, an issue addressed in our study where we compared blood pressure reading by the ABPM and by conventional methods simultaneously. Normal values for 24-hour ABPM have been determined from several trials, including two of the most extensive studies done thus far in pregnancy, the first involving a primigravid population of 98 women sampled at five different gestational ages, and the second involving the 235 normotensive pregnant women who were systematically sampled every 4 weeks from early in the first trimester of pregnancy until delivery.^{22,23} The study also provides comparison of the 24-hour BP pattern and blood pressure measured by conventional methods in the same group of patients simultaneously in all patients who were admitted with high BP recording in OPD.

Bellomo et al, also evaluated the prognostic value of ABPM in pregnancy using reference thresholds of 125/74 mm Hg for the 24-hour SBP/DBP means, 128/78 mmHg for awake SBP/DBP means, and 121/70 mmHg for asleep SBP/DBP means in women sampled on just one occasion during their third trimester of pregnancy.²⁴ These investigators indicated that the 24-hour BP mean is superior to clinic BP measurements for prediction of pregnancy outcome. ABPM should ideally be the first mode of investigation to an OPD patient which can help us rule out 'white coat hypertension', provided patient's blood pressure is not more than 150/100 and urine proteinuria is negative. It would help in avoiding unnecessary admissions to the ward which would further increase anxiety to the patient. Also, ABPM can also prognosticate the patient with gestational hypertension better in terms of mean BP of 24 hours.

Limitations

The sample size of the study has been small, owing to the fact that the study was done at a peripheral hospital. Further larger trials need to be conducted to reinforce these facts.

CONCLUSION

Detecting gestational hypertension accurately is very important for good antenatal care. 'White coat hypertension' is also a very well known entity in this clientele as patients are extremely anxious about their

well being. 48.15% patients in the study who were initially diagnosed as gestational hypertension were later found to have 'White Coat Hypertension' by ABPM. Hence, we recommend all patients found to be having raised BP recording in OPD should be further evaluated using ABPM which can be used in ward or at their home and then interpret the results. It would avoid unnecessary admission and medication to the patients.

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Conflict of interest: None declared

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

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