ORIGINAL RESEARCH PAPER

Community Medicine

KEY WORDS: HBPM (home blood pressure measurement), ABPM(Ambulatory blood pressure measurement) Masked Hypertension

PREVALENCE OF MASKED HYPERTENSION IN RURAL AND SUBURBAN AREAS OF BIHAR.

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ABSTRACT

Masked hypertension is a variant of hypertension when office measurement of BP is normal but out of office measurement (HBPM- Home blood pressure measurement or ABPM-Ambulatory blood pressure measurement) is high. Masked hypertension is also a strong risk factor as persistent hypertension. Since most of the people having masked hypertension remain usually undiagnosed, it has more dangerous effects.

This study aimed at knowing the prevalence of morning hypertension in the rural and suburban population of Bihar. Morning hypertension is the most common sub-type of masked hypertension. In the present study prevalence of morning- hypertension was found to be 14.02% for the total population (Male 17.64% and female 10.08%).

The concept of the prevalence of masked hypertension in a community is important for the treatment of hypertension and the control of its complications such as cardiovascular events, stroke, renal diseases, and peripheral vascular diseases.

INTRODUCTION:

Hypertension is a common disease as well as a common risk factor for many other serious and fatal diseases such as Ischemic heart diseases, stroke, renal diseases, congestive heart failure, and peripheral vascular diseases. Hypertension is attributed to high mortality and morbidity due to the above diseases. If we succeed to control hypertension we can save a large number of lives and sufferings of the human being at a very low cost. But the reality is quite against this fact. Most of the hypertensive people in our society remain undiagnosed. Out of those who are diagnosed very few people get treatment and out of them who are being treated very few people have their blood pressure controlled. The most difficult section of the hypertensive population is those having "Masked hypertension". Office reading of blood pressure is normal in masked population, whereas it is raised in a home reading of blood pressure and ambulatory blood pressure monitoring. Therefore most of the masked hypertensive people are missed in their diagnosis and they are wrongly labeled as normotensives.[1]

Normally there is a 10-20% dip in the blood pressure of a person in the late stage of sleep during the night and it rises again in the morning.[2] The circadian rhythm which is regulated by hypothalamus and pineal gland secretion 'melatonin' regulates not only sleep but functions of many organs of the body. Rise and fall of blood pressure during night and day also depends upon circadian rhythm. A rise in sympathetic tone, smoking, alcohol addiction, stress, and strain may disturb the circadian rhythm and normal pattern blood pressure.[3] Dipping of blood pressure at night may be lost and there may be a rise in blood pressure more than 140/90 in the morning within two hours of wakening which may become normal in the daytime. This type of blood pressure is always recorded as normal in the chamber of a doctor. This hypertension can only be diagnosed by home measurement of blood pressure within two hours of leaving the bed or by ambulatory monitoring of BP for 24 hours.

Masked hypertension is as important a risk factor as other hypertensions in the development of IHD, Stroke, renal diseases, and heart failure.[4] So control of masked hypertension is as necessary as the control of other hypertension, rather it is more dangerous than other hypertension because it remains undiagnosed even after repeated medical examinations and is usually diagnosed after the development of complications. The concept of the prevalence of masked hypertension is necessary for the control and treatment of hypertension in a community.

AIM AND OBJECTIVES:

Interest in morning Hypertension is gradually increasing because it has a more direct relationship with target organ damage and cardiovascular risk. The aim of this study was to control cardiovascular events more effectively by diagnosing masked hypertension in a community and also to make physicians aware of the frequency of masked hypertension.

METHODS AND PEOPLE:

In a study in Greece, it was found that both home BP monitoring and ambulatory BP monitoring give similar results in diagnosing morning hypertension.[5] Since home BP monitoring is easy, cheap, simple, and acceptable to the people, this method was used to diagnose hypertension in the population who were labeled as normotensives after office BP measurement. Though ambulatory BP monitoring is the gold standard for diagnosis of masked hypertension, the use of ambulatory morning BP measurement is not comfortable for some persons. This study was done in the district of Bhagalpur in Bihar. 483 persons were included in the test selected by a random method. The age group was 40 to 70 years. All of them were normotensives in three readings of office BP measurement without any treatment of antihypertensives. Cut of mark of hypertension was taken as 140/90 mmHg. Morning home BP measurement was done within two hours of arising. Three readings were taken on three different days and the mean of two minimum readings was taken as the BP reading.

Literature Review:

Many studies show that Blood pressure in a normal individual is not uniform but it varies in 24 hours, and abnormal diurnal variation is related to target organ damage(TOD) and CV events. Zakopoulos et al. suggested that the rate of variation in BP is more closely related to TOD than the size of variation.[6]

Dipping Pattern And Morning Surge:

Normally there is a decrease in blood pressure by 10 to 20% in the late-night while sleeping and marked surge in BP occurs in the morning coinciding with the transition from sleep to wakefulness. If the decrease is less than 10% then it is called a non dipping pattern and it is associated with high TOD risk. Polonia et al. showed that morning BP surge is strongly correlated with TOD severity.[7] A study by Marfella et al. provided evidence that controlling the morning hypertension can reduce carotid atherosclerosis. However, both BP elevation and BP variability should be considered to evaluate the individual risk.[8]

Risk In Morning Hypertension-

Elliot suggested that morning hypertension is associated with

a 49% higher risk of stroke, a 40% higher risk of MI, and a 29% higher risk of cardiac death.[9] In another study in Japan showed that the relative risk of stroke events was 2.7 times higher with those with morning surge >55 mmHg versus those with morning surge <55 mmHg.[10]

Prevalence Of Masked Hypertension-

Pugliese et al. in a study found the prevalence of any masked hypertension was 37.5% in women and 60.6% in men when people of high-risk groups were included in the study.[11] In a study in the USA in 2005-10 prevalence of masked hypertension was found to be 12.3% in the adult population whereas it was higher in the older male population. In a study done in Africa masked hypertension was found to be 11% by home blood pressure monitoring and 14% by ambulatory BP monitoring. Cumulative Incidence of masked hypertension was 10.3% and was associated with male gender, older age, higher education, high body mass index, smoking, and alcohol intake.[12] In another study in Spain prevalence of MHT was 23.9% and it was associated with cardiovascular risk factors such as smoking, dyslipidemia, family history, and obesity. It was also associated with male sex (Odd ratio 1.7) and prehypertension (Odd ratio 4.5).[13] Barochiner et al. in a study found a prevalence of 12.4% masked hypertension in the whole population and 20.9% in an office controlled hypertension. Factors associated were age (OR=1.8), high normal office BP(OR=5.6), history of peripheral artery disease(OR=8.8), and alcohol consumption.[14]

Observation And Results:

483 persons of 40-70 years of age group were selected for the study by random method. Their mean age was 53 years with a standard deviation of 7 years. Out of 483 persons, 255 persons (52.8%) were male and 228 persons (47.2%) were female. All selected persons were those who had normal blood pressure in their office blood pressure measurements without getting any treatment for hypertension. Morning blood pressure measurement within two hours of awakening in all 483 persons was done with the help of volunteers. Three readings were taken on three different days and an average of two minimum readings was recorded as measured blood pressure. Reading more than 140 systolic and 90 diastolic was taken as hypertension (Masked hypertension). Out of 483 persons 68 persons (14.02%) were diagnosed as hypertensives, 45 persons (17.64%) were male and 23 persons (10.08%) were female. Prevalence in males was 17.64%, in females it was 10.08% and the total prevalence was 14.02%.

Table No. 1: Prevalence Of Masked Hypertension

	Hypertension in Home Measurement	Normal Blood Pressure	Total
Male	45 (17.64% of Male)	210 (82.35% of Male)	255 (52.8% of Total)
Female	23 (10.08% of Female)	205 (89.92% of Female)	228 (47.2% of Total)
Total	68 (14.02% of Total)	415 (85.98% of Total)	483 (Total)

Odd Ratio = 1.93

DISCUSSION:

"Masked hypertension" term was used for the first time by Thomas Pickering in 2002 and since then it has become very popular among the scientist. Development of out of office BP measurement techniques like HBPM (home blood pressure measurement and ABPM (ambulatory blood pressure measurement) brought many variants of hypertensions in the light. These are masked hypertension, white coat hypertension, and sustained hypertension.[15] All these hypertensions are equally strong risk factors for cardiovascular complications and TOD but masked hypertension is more problematic because most of these remain undiagnosed. Morning hypertension is the most common subtype of masked hypertension and this depends upon circadian rhythm, renin system activation, and sympathetic activation in the morning. Morning hypertension is an important reason behind most cardiac events and strokes. These strokes and cardiac events occur more frequently in the early mornings.

In a community where cardiovascular risk factors are comparatively low in comparison to developed countries', the prevalence of masked (morning) hypertension seems to be very relevant (14%) and mind-blowing. A high male prevalence of 17% may be due to more smoking, more alcohol addiction, and a more stressful lifestyle of the male population. In the present study age group taken for the study was a high-risk group for age. The prevalence of hypertension in India is 25-30% and it becomes 40 -50% when the study is restricted to the age of more than 40 years.[16] Therefore if any study is done taking the entire population into consideration then the prevalence of masked hypertension would be certainly lower.

The prevalence of masked hypertension varies widely in different countries as shown by different studies ranging from 10 to 60%. In a study in Spain, the masked hypertension was found to be about 23.9% and it was strongly related to smoking, dyslipidemia, family history of premature cardiovascular diseases, and obesity.[17] A meta-analysis of 11 studies in Africa revealed a pooled prevalence of 11% for white coat hypertension and 14.8% prevalence for masked hypertension.[18] The results of African studies are more comparable to the present study.

CONCLUSION:

Masked hypertension is a variant of hypertension which is difficult to diagnose because office reading is normal and it can only be detected by home BP measurement or ambulatory BP measurement. In the present study, the morning blood pressure of people was recorded to know the prevalence. Prevalence was 17.64% in males and 10.08% in females and the overall prevalence was 14.02%. Masked hypertension is an equally dangerous risk factor for cardiovascular diseases and TOD (target organ damage) so this finding is important for the prevention and control of cardiovascular diseases.

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