

**PRE-HYPERTENSION INDEPENDENT DELETERIOUS EFFECTS IN BODY SYSTEM**

**NIRAJ KHATRI SAPKOTA\***

Department of Physiology, Chitwan Medical College, Bharatpur, Chitwan, Nepal. Email: nirajkhatri78@gmail.com

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**ABSTRACT**

There is clear indication that prehypertension is the state of persistent blood pressure of being (120-139 mmHg/80-89 mmHg) or named pseudohypertension is a significant marker that certainly progresses to develop incident hypertension >140-159/80-89 that causes cardiovascular risk. Therefore, it became essential to prevent this progression so that incident hypertension is precluded, but it is brainy if we research on the independent harmful effects of this pre-hypertension on the body system and therefore be aware of possible interventional impingement salvage effectively to the body system in the absence of cardiovascular or other secondary disease. Thus, this mini review will explore all the relevant literature evolved to help independently associated harmful effect of pre-hypertension in body functioning in the absence of comorbid status.

**Keywords:** Pre-hypertension, Independent effect, Cardiovascular risk.

**INTRODUCTION**

Seventh Report of the Joint National Committee (JNC-7) included the term pre-hypertension by giving the range of blood pressure (BP) 120-139/80-89, but it is very necessary to do operation in that whether this BP does have independent harmful effects in the body system as Huang *et al.*[1] challenged the guideline system by documenting that pre-hypertension (even at lower levels of 120-129/80-84 mmHg) is a significant cardiovascular risk factor [2].

**PRE-HYPERTENSION DEREGULATES AUTONOMIC NERVOUS SYSTEM**

One literature gave the categorized proposition of pre-hypertension into stage 1 pre-hypertension BP ranging from 120 to 129 mmHg/80-84, and diastolic BP (DBP), also stage 2 pre-hypertension with BP 130-139/85-89 mmHg [3]. Peak heart rate subtracted heart rate measured after 2 minutes of respite is called heart rate recovery (HRR), one of the simple non-invasive measurement technique for investigation of integrity of autonomic nervous system and its effect on cardiovascular system, this measure has shown to predict the mortality of cardiovascular risk, report has documented that delayed HRR is independently associated with pre-hypertension [3], the measure of autonomic nervous system activity that plays a crucial role in regulation of BP [4].

**MECHANISM OF DELAYED HRR ASSOCIATED CARDIOVASCULAR DISEASE (CVD) MORTALITY**

Genesis of cardiac autonomic regulatory dysfunction is one of the primary causes linked to CVD and mainstay of mortality in CVD patient; the assessment of cardiac autonomic dysfunction gives an idea to have cardiac autonomic activity and is carried out by HRR, a noninvasive quantification method of heart rate decrement after exercise, a powerful index of predicting mortality. The HRR phase comprises two components fast and slow, earlier is dictated by parasympathetic reactivation possibly invoked by the deactivation of central command and mechanoreflex inputs immediate after stopping of exercise. On the other hand, the slow phase of HRR may be set by cardiac sympathetic withdrawal, possibly through the inactivation of muscle afferent signaling that increased sympathetic discharge and thermoregulatory mechanisms. All these pathways look impaired in CVD, bolstering to explain the slower HRR in these patients, and the raise the rate of mortality in individuals who present a slower HRR [5,6].

**PRE-HYPERTENSION IS INDEPENDENTLY ASSOCIATED WITH MICROALBUMINURIA LESS TO HYPERURICEMIA**

Pre-hypertension (BP: Systolic, 130-139 mmHg or diastolic, 85-89 mmHg) has higher cardiovascular risks compared with normal BP (systolic BP [SBP], 120-129 mmHg or DBP, 80-84 mmHg). Albumin in urine indicates leakage from blood vessel possibly due to generalized vascular damage, many clinical condition measures the concentration of urinary albumin excretion and termed as microalbuminuria if excretion is in the range of 30-300 mg/24 hrs and is the prognostic indicator of cardiovascular risk and progression of kidney damage [7-9], this index that investigation of urine albumin should be done even in pre-hypertensive. A study conducted in Chinese women after excluding patient with diabetes, hyperuricemia, or under hypertensive medication, and the assessment is made by comparing pre-hypertensive with microalbuminuria with normotensive found that pre-hypertensive were more likely to have microalbuminuria and concluded that microalbuminuria is independently associated with pre-hypertension among Chinese women [10]. Multiple logistic regression analysis showed that the high normal BP category had an independently significant association with microalbuminuria [11], considered to be the reflection of endothelial dysfunction. Epidemiological reports that revealed serum uric acid level is linked with CVD more strongly in hypertension stage, a study has demonstrated that pre-hypertension is less relatively associated with hyperuricemia 1.4% versus 1.7%, but microalbuminuria 4.0% versus 7.9% in normotensive group and pre-hypertensive group [12-15].

Cardiovascular event is one of the life-threatening fatal conditions, the marker of which is essential to recognize, as pre-hypertension does cause cardiovascular risk and microalbuminuria, the identified marker of cardiovascular event which can direct intensive therapy [16,17].

A study documented that prehypertension is even not associated hyperuricemia but associated with purine-rich food [18], but other study presented *vice versa* report elucidating that the association of serum uric acid increases risk of prehypertension [17].

**PRE-HYPERTENSION CAUSES CARDIAC AND VASCULAR PATHOLOGY**

The JNC-7 on Prevention, Detection, Evaluation, and Treatment of High BP (JNC-7), introduced the terms pre-hypertension and defined the terminology as a condition persistent sustained remnant of BP at the range of 120-139/80-89 SBP and DBP, respectively [18]. Chronically, it

has effect in different body system, and one study made in Southern China reported that in middle and elderly aged people levied independently with carotid atherosclerotic plaque generation, that causes ischemic stroke, Further to say, pre-hypertension is a warning status of CVD; therefore, it should be carefully monitored and strategy of lifestyle modification should adopted to minimize a predisposing factor of CVD and stroke [19]; the detrimental effects are on functional and anatomical structure cardiovascular integrity bringing it into 2-fold risk compared to normotensive individual, this observatory conclusion is made on the basis of a study that involved 375 participants that exhibited higher left ventricular wall thickness (pre-hypertensive, 0.78 and normotensive 0.72 cm), left ventricular mass 161 versus 137 g, and relative wall thickness 0.29 versus 0.28 cm thickness [20].

## CONCLUSION

Pre-hypertension has a greater risk of CVD including microalbuminuria hyperuricemia to a lesser extent and autonomic dysfunction, indulge in hemodynamic and cardiac functioning than those with normal BP. Further investigations are needed to ascertain whether more deleterious effects are independently linked besides aforementioned.

Moreover, the participants with increased BPs should get medical treatment to prevent the effects on different body system such as vascular structure and myocardium even in pre-hypertensive phase.

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