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## Review Article

### A REVIEW ON PREVENTIVE MEASURES IN HYPERTENSIVE CHILDREN

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#### ABSTRACT

Considerable advances have been made in detection, evaluation, and management of high blood pressure, or hypertension, in children and adolescents. Because of the development of a large national database on normative blood pressure (BP) levels throughout childhood, the ability to identify children who have abnormally elevated BP has improved. Still perusal to *Ayurvedic* texts provides no straight reference to hypertension but on tunneling down the texts and arranging the scattered references from different texts, this is evident that *Hridaya* and process of *Rasa Vikshepa* or *Anudhavana* by *Vyana vayu* has become helpful to understand the hypertension. Based on developing evidence, it is now apparent that primary hypertension is detectable in the young and occurs commonly. The long-term health risks for hypertensive children and adolescents can be substantial; therefore, it is important that preventive measures be taken to reduce these risks and optimize health outcomes, which are discussed in this paper.

**Key Words:** Hypertension, Blood pressure (BP), *Rasa Vikshepa*, *Vyan Vayu*.

#### INTRODUCTION

Every individual of this universe want to spend longevity & disease free life pattern and same hope for their children. But their changed lifestyle as well as feeding habits along with not practicing *Ayurvedic* principles such as regular exercise, avoidance of junked food items, oily spicy foods, polluted foods, *Veerya virudha* foods (dietetic incompatibility) and *Ahara vidhi vidhan* (dietary principles) create a lot of health related disorders. Hypertension is one of them. Hypertension in children and adolescents continues to be defined as systolic BP (SBP) and/or diastolic BP (DBP) that is, on repeated measurement, at or above the 95<sup>th</sup> percentile. BP between the 90<sup>th</sup> and 95<sup>th</sup> percentile in childhood had been designated "high normal."<sup>[1]</sup> To be consistent with the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC), this level of BP will now be termed "prehypertensive".<sup>[1]</sup> Neonatal hypertension is very rare, only seen in less than 0.2 to 3% neonates and can be overlooked several times due to blood pressure not measured routinely in the healthy newborn. Hypertension is more common in high

risk newborns. A variety of factors, such as gestational age, post conceptional age and birth weight needs to be taken into account when deciding if a blood pressure is normal in a neonate.<sup>[2]</sup>

Hypertension is classified as either primary or essential hypertension and secondary hypertension, about 90–95% of cases are categorized as "essential/idiopathic/primary hypertension" which means high blood pressure with no obvious underlying medical cause. The remaining 5–10% of cases (secondary hypertension) is caused by other conditions such as coarctation of aorta, renal artery stenosis, vesiculo-ureteral reflux nephropathy, Cushing syndrome and hemorrhage etc.<sup>[3-5]</sup>

*Ayurvedic* classics have been supposed to be the oldest medical literatures available so far in the world. It is astonishing that no discussion has been found to be included in those literatures which exactly simulate essential hypertension. It does not mean that the ailment was not there in those days. This is evident that the change in social and economic conditions, life style, dietary habits and an increasing stress and strain in their

academics increases the frequency of this disease many folds and this increase necessitates the scientists to describe it in detail. Different condition like *Dhamani paripurana*, *Vyanbala vaishmya*, *Dhamani pratichaya*, *Siragata vata*, *Raktavurit vata* can be correlated with hypertension. *Hridaya* (heart) and process of *Rasa Vikshepa* or *Anudhavana* (blood circulation) by *Vyana vayu* has become helpful to understand the hypertension. Vitiated *Vata dosha* (bodily humors) was thought to be chief culprit, as the *Dhatu gati* (*Ras gati* or *Vikshepa*) is performed by *Vayu* itself. *Pitta* and *Kapha* (bodily humors) compliment the effect of vitiated *Vata* and aid the process of disease progression, with *Rasarakta* (whole blood) being the chief mediator of vitiation. This proves that hypertension is *Tridosaja vyadhi*.

In pathogenesis of hypertension (*Uccharaktachapa*), *Vata* (*Vyana & Prana*), *Pitta* (*Sadhaka*), *Kapha* (*Avalambaka*) (bodily humors) and *Manovaha srotas* (psyche channels) involving *Hridaya*, *Rasa-Rakta samvahana* and *Oja* are main responsible factors. They are vitiated due to disturbed *Manasika Bhavas* (psychological factors) like *Chinta* (Anxiety), *Tanav* (Stress), *Krodha* (Anger) etc. producing hypertensive state. That's why *Acharya Charaka* has advised to control *Manasika Bhavas* (psychological factors)<sup>[6]</sup> so those type of drugs/therapy should be given which affects these *Manasika Bhavas* and other responsible factors. *Vata dosha* (bodily humors) is the prime driving force to manage all kinds of movements in the body.<sup>[7]</sup> In normal healthy person; it maintains pressure and normal flow of blood inside the channels. But when *Vata dosha* (bodily humors) is vitiated, it results into abnormal pressure (i.e. high/low blood pressure). In the pathogenesis of hypertension, *Vyan vayu* along with *Prana* and *Apana vayu* gets affected. In normalcy, the waste products of the body are expelled out from body by *Apana vayu* in the form of urine and feces.<sup>[8]</sup> As we know *Vrikka* (kidney) is the organ which participates in the formation of urine and when functioning properly, it maintains *Sharirika kleda* (bodily wetness) in physiological proportion. While in pathological condition, this *Sharirika kleda* accumulates in the body and causes different type of disorders related to the formation and excretion. Vitiating of *Vyana vayu* leads to disturbance of *rasa Samvahana* to *Vrikka*

(reduced blood flow) which further leads to reduced formation of urine leading to accumulation of *Kleda* (*Mala sanchaya*).<sup>[9]</sup> This accumulation has some relation with formation of *Ama* which has capability to obstruct the small channels of the body at cellular and capillary level.

However number of drugs has been advocated in the treatment of hypertension in modern science but untoward effects restrict their use. At this point whole universe look towards *Ayurved* with a hope of providing safe and effective method for its prevention. Eminent *Ayurvedic* scientists described it in *Uttar sthan* of *Susruta samhita* that etiological factor to generate a disease should be avoided <sup>[10]</sup> or we can say that we should adopt such type of diet & life style which keep us away from these disorders.

### AIMS & OBJECTIVE

- What are the preventive measures of excess or abnormal weight gain?
- What is the evidence based methods of life style modification?
- What are dietary modification that should be strongly encouraged in children and adolescents who have BP levels in the prehypertensive range as well as in those with hypertension?
- How family-based intervention improves success?

### MATERIAL & METHODS

In the presenting paper author discussed & highlighted such evidence based reviews which were collected from published research articles, clinical and experimental studies from 1980 to till date through Google scholar, pubmed and medlar search engine.

### EVIDENCE BASED PREVENTIVE MEASURES

Evidence is limited that supports the efficacy of nonpharmacological interventions for BP reduction in the treatment of hypertension in children and adolescents. Data that demonstrate a relationship of lifestyle with BP can be used as the basis for recommendations. On the basis of large randomized controlled trials, the following lifestyle modifications are recommended in adults: weight reduction in overweight or obese individuals; <sup>[11]</sup> increased intake of fresh vegetables, fruits, and low fat dairy (the Dietary

Approaches to Stop Hypertension Study [DASH eating plan];<sup>[12]</sup> dietary sodium reduction <sup>[12,13]</sup> increased physical activity <sup>[14]</sup> and moderation of alcohol consumption.<sup>[15]</sup> As information on chronic sleep problems evolves, interventions to improve sleep quality may also have a beneficial effect on BP. <sup>[16]</sup> The potential for control of BP in children through weight reduction is supported by BP tracking and weight-reduction studies. BP levels track from childhood through adolescence and into adulthood <sup>[17-19]</sup> in association with weight.<sup>[20,21]</sup> Because of the strong correlation between weight and BP, excessive weight gain is likely to be associated with elevated BP over time. Therefore, maintenance of normal weight gain in childhood should lead to less hypertension in adulthood. Weight loss in overweight adolescents is associated with a decrease in BP.<sup>[22-26]</sup> Weight control not only decreases BP, it also decreases BP sensitivity to salt <sup>[24]</sup> and decreases other cardiovascular risk factors, such as dyslipidemia and insulin resistance. In studies that achieve a reduction in BMI of about 10 percent, short-term reductions in BP were in the range of 8–12 mmHg. Although difficult, weight loss, if successful, is extremely effective.<sup>[27-29]</sup> Identifying a complication of overweight, such as hypertension, can be a helpful motivator for patients and families to make changes. Weight control can render pharmacological treatment unnecessary but should not delay drug use when indicated. Emphasis on the management of complications rather than on overweight shifts the aim of weight management from an aesthetic to a health goal. In motivated families, education or simple behavior modification can be successful in achieving moderate weight loss or preventing further weight gain. Steps can be implemented in the primary care setting even with limited staff and time resources.<sup>[27]</sup> The patient should be encouraged to self-monitor time spent in sedentary activity, including watching television and playing video or computer games, and to set goals to progressively decrease these activities to less than 2 hours per day.<sup>[28]</sup> The family and patient should identify physical activities that the child enjoys, engage in them regularly, and self-monitor time spent in physical activities (30–60 minutes per day should be achieved).<sup>[28-30]</sup>

Dietary changes can involve portion-size control, decrease in consumption of sugar-

containing beverages and energy-dense snacks, increase in consumption of fresh fruits and vegetables, and regular meals including a healthy breakfast.<sup>[25,27,31,32]</sup> Consultation with a nutritionist can be useful and provide customized recommendations. During regular office visits, the primary care provider can supervise the child's progress in self-monitoring and accomplishing goals and can provide support and positive feedback to the family. Some patients will benefit from a more intense and comprehensive approach to weight management from a multidisciplinary and specialized team if available.<sup>[25-27]</sup> Despite the lack of firm evidence about dietary intervention in children, it is generally accepted that hypertensive individuals can benefit from a dietary increase in fresh vegetables, fresh fruits, fiber, and nonfat dairy, as well as a reduction of sodium. Despite some suggestion that calcium supplements may decrease BP in children <sup>[33,34]</sup> so far the evidence is too limited to support a clinical recommendation.<sup>[35]</sup> Lower BP has been associated in children and adolescents with an increased intake of potassium,<sup>[34-37]</sup> magnesium,<sup>[34,35]</sup> folic acid,<sup>[35,38]</sup> unsaturated fat,<sup>[34,39,40]</sup> and fiber <sup>[34,35,38]</sup> and lower dietary intake of total fat.<sup>[34,35]</sup> However, these associations are small and insufficient to support dietary recommendations for specific, individual nutrients. Sodium reduction in children and adolescents has been associated with small reductions in BP, in the range of 1–3 mmHg.<sup>[35,37,41-44]</sup> Data from one randomized trial suggest that sodium intake in infancy may affect BP in adolescence.<sup>[45]</sup> Similarly, some evidence indicates that breastfeeding may be associated with lower BP in childhood.<sup>[46,47]</sup> The current recommendation for adequate daily sodium intake is only 1.2 g/day for 4 to 8 year old children and 1.5 g/day for older children.<sup>[48]</sup> Since this amount of sodium is substantially lower than current dietary intakes, lowering dietary sodium from the current usual intake may have future benefit. Reduced sodium intake, with calorie restriction, may account for some of the BP improvement associated with weight loss.

Regular physical activity has cardiovascular benefits. A recent meta-analysis that combined 12 randomized trials, for a total of 1,266 children and adolescents, concluded that physical activity leads to a small, but not statistically significant, decrease in BP.<sup>[49]</sup>

However, both regular physical activity and decreasing sedentary activity such as watching television and playing video or electronic games are important components of pediatric obesity treatment and prevention.<sup>[25-27]</sup> Weight-reduction trials consistently report better results when physical activity and prevention of sedentary activity are included in the treatment protocol. Therefore, regular aerobic physical activity (30–60 minutes of moderate physical activity on most days) and limitation of sedentary activities to less than 2 hours per day are recommended for the prevention of obesity, hypertension, and other cardiovascular risk factors.<sup>[28-30]</sup> With the exception of power lifting, resistance training is also helpful. Competitive sports participation should be limited only in the presence of uncontrolled Stage 2 hypertension.<sup>[50,51]</sup> The scope of hypertension as a public health problem in adults is substantial. Poor health related behaviors such as physical inactivity, unfavorable dietary patterns, and excessive weight gain raise the risk for future hypertension.

## CONCLUSION

Hypertension is a *Vata-pitta* predominant *Tridoshaja vyadhi* and the *Rasa rakta* is the chief culprits. Essential Hypertension is a psychosomatic hemodynamic disease with a multifactorial pathology originating from several dietary, environmental and genetic factors. Preventive measures play an important role to keep away such disorder. The therapeutic lifestyle changes discussed above may have benefit for all children in prevention of future disease, including primary hypertension. Accordingly, appropriate health recommendations for all children and adolescents are regular physical activity; a diet with limited sodium but rich in fresh fruits, fresh vegetables, fiber, and low fat dairy; and avoiding excess weight gain.

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