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Improvement in Cardiovascular Status by Addition of Minimal amount of Raw Vegetables, Fruits and Sprouts in the Daily Diet

Shobha Kini[1], Rohini Bhadre[2]

[1]Professor and Head, Department of Physiology, [2]Professor , Department of Biochemistry, K.J. Somaiya Medical College, Sion, Mumbai

Abstracts

Background and Objective: The aim of our study is to determine whether a small and sustainable increase in fruits, sprouts and raw vegetables in the daily diet can help to lower weight, blood pressure and improve physical endurance.

Method: Thirty members participated in this nutritional interventional study. BMI, blood pressure and distance covered in six minute walk test was measured and compared before and after the intervention of diet. The change in diet was acceptable and sustainable for twelve weeks.

Results: After a minimal change in diet the BMI and blood pressure decreased significantly. The distance covered in 6MWT also increased significantly.

Interpretation and Conclusion: An acceptable and sustainable increase of fruits, sprouts and raw vegetables in our daily diet reduces weight, blood pressure and improves physical endurance. Hence the risk of cardiovascular diseases reduces.

Keywords: *Raw Diet, BMI, blood pressure,6MWT (six minute walk test).*

Introduction

Cardiovascular diseases(CVD) are on the rise. In India the rates of coronary disease has increased from 4% to 11% among urban populations[1].CVD affects not only the older but also the younger population and hence is responsible for reducing the productivity. It is also affecting people in various economic stratii. It is now a leading cause of death in India responsible for approximately quarter of all mortality[1,2]. Industrialization has caused reduction in physical labour. Urbanisation and modernization has increased people's needs and demands and decreased physical labour. People are under high level of stress and strain[3].Changing food habits due to modernization may be responsible for low intake of fruits and vegetables in daily diet. All of these factors may be contributing to increase of CVD.

The aim of our study is to determine whether a small and sustainable increase in fruits, sprouts and raw vegetables in the daily diet can help to lower weight, blood pressure and improve physical endurance.

Material and Method: Institutional ethical committee clearance was taken. Thirty three staff members of our Medical College and Hospital volunteered to participate in the study. The subjects were between the age group of 25 to 60 years. Three subjects could not adhere to the dietary changes and hence only thirty subjects were included. Those suffering from diabetes mellitus, hypertension and/or endocrine abnormalities based on history were excluded. Detailed dietary history was obtained from the subjects. Height and weight were measured and BMI was calculated as weight in kilograms divided by the square of height in meters. After 10 minutes of rest the blood pressure was

Correspondence Author:
Dr. Rohini Bhadre
Professor, Department of Biochemistry, K.J. Somaiya Medical College, Sion, Mumbai 400 022
e-mail: bhadre@somaiya.edu

recorded with the help of mercury sphygmomanometer. The first Korotkoff sound was recorded as systolic blood pressure (SBP) and fifth Korotkoff sound as diastolic blood pressure (DBP). All the subjects were then subjected to the six minute walk test (6MWT). The subjects walked at their own comfortable pace along a long hallway in the college building. The turnaround points were marked at a distance of 30 meters with cones. The total distance covered in six minutes was measured in meters. At the end of six minutes the subjects rated their dyspnoea and level of fatigue using BORG's scale. Depending on their daily diet, modifications were made in their diet for 12 weeks. Approximately 250gms of raw vegetables, fruits and sprouts were added to their daily diet. 100 gms of any seasonal fruit for breakfast, during lunch and dinner 50 gms of raw vegetable salad which was either tomato, cucumber, carrot, cabbage, green, red or yellow capsicum and in the evening 50 gms of sprouts was included in their diet. Weekly follow up was done regarding their diet. After 12 weeks the weight was measured and BMI calculated. The systolic and diastolic blood pressure after 10 minutes of rest was measured. The subjects underwent six minutes walk test in the same hallway and again the distance covered in meters was measured. Fatigue and dyspnoea according to BORG's scale was assessed. The statistical analysis was done using statistical software Primer by students paired "t" test and for BORG's scale Wilcoxon Signed Ranks test was applied.

The Borg Scale

0	Nothing at all
0.5	Very, Very slight (Just noticeable)
1	Very Slight
2	Slight (Light)
3	Moderate
4	Somewhat severe
5	Severe (Heavy)
6, 7	Very Severe
8, 9, 10	Very, Very severe (Maximal)

Result

Our study group consisted of thirty subjects between age group 25 to 60 years

Table No 1: Changes observed in BMI, Blood pressure and distance covered in 6MWT.

Sr. No.		Mean	SD	'p' Value
1.	BMI Before Diet	26.8 kg/mts ^{2}	$\pm$ 3.21	0.001
	BMI After Diet	25.9 kg/mts ^{2}	$\pm$ 3.17	
2.	Basal SBP Before Diet	121.07 mm of Hg	$\pm$ 11.33	0.001
	Basal SBP After Diet	116.67 mm of Hg	$\pm$ 10.55	
3.	Basal DBP Before Diet	79.87 mm of Hg	$\pm$ 7.79	0.001
	Basal DBP After Diet	76.53 mm of Hg	$\pm$ 6.50	
4.	Distance Covered in MTS in 6MWT Before Diet	503.7 mts	$\pm$ 59.18	0.001
	Distance Covered in MTS in 6MWT After Diet	552.0 mts	$\pm$ 61.16	

Table 2: Borg's Scale for Fatigue and Dyspnoea

	Fatigue Pre Diet	Fatigue Post Diet	Dyspnoea Pre Diet	Dyspnoea Post Diet
Mean	.2667	.1000	.3000	.0500
SD	.61214	.40258	.59596	.20129
ASYMP. SIG. (2-TAILED)	.015		.014	

Discussion

Obesity and hypertension are two important risks factors predisposing to cardiovascular diseases[1]. Increase in body weight since many years has been associated with an increased risk of hypertension[4,5].

Dietary factors influence these risks of CVD[6] and the change in dietary habits have accelerated over the past few decades. In a study by Barry M Popkin changes in diet mostly involved reductions in fiber and whole grain intakes and increase in intake of animal and partially hydrogenated fats along with addition of caloric sweeteners[7]. In a study by Soumya Deb to assess the prevalence of risk factors for cardiovascular disease it was found that the high-risk dietary pattern was practiced more by the younger people as compared with the elders[1].

A change towards healthy diet is a need of the hour. It is difficult to change one's diet to a healthier option especially if it is for a long period. Dietary changes need to take into account a persons habits, taste preference and sociocultural background[8]. Adherence to a diet depends on its acceptability[9]. The benefits of treating cardiovascular risk factors like obesity and high blood pressure are also well known. Increase in intake of fast food like burgers, ready to eat food and decrease intake of fruits and raw vegetables is responsible for increasing weight. In a study by Vioque J et al it was observed that increasing intake of fruits and vegetables was associated with lowering the risk of weight gain among Mediterranean population[10].Similar finding were observed in our study where the BMI decreased from mean of 26.8 + 3.21 to 25.9 + 3.17 kg/mts ^{2} after dietary intervention. This was also observed in a study done in Northern Indians by R.B.Singh et al where they found that greater the intake of fruits and vegetables greater was the improvement in central obesity[11]. In another similar study by PK Newby et al it was concluded that diet high in fruits, vegetables, whole grains and reduced-fat dairy resulted in smaller gains in BMI over a period of few years[12].

Certain risk factors are known to affect blood pressure like increasing age, gender, central obesity, sedentary lifestyle, excess salt intake[13] and also change in eating habits .Fruits and vegetables provide important vitamins, minerals like potassium, magnesium, fiber, and complex carbohydrates[14,15,16] and are low in salt[5] which may help to lower blood pressure[17]. The rate of consumption of fruit and vegetables is low in India though a large percent of the population is vegetarians[2]. In a study by C Kalaivani Ashok**,** S Karunanidhi in young female college students in Chennai city the intake of fruits and vegetables was lower than the recommended requirement.[18].So in our study we introduced four serving of fruits, salads and sprouts in the daily routine. Any fruit/vegetable was allowed depending on the financial capability of the subject. After change in diet we noted average drop in the systolic and diastolic blood pressure of 4 mm of Hg and 3 mm of Hg respectively. This is comparable with a study by Q Chan et al where the systolic and diastolic blood pressure was found to be inversely related to intake of both raw and cooked vegetables and this relation was more with raw vegetables[19].In a meta analysis it was concluded that reduced sodium intake and increased potassium intake could make a contribution to the prevention of hypertension, especially when blood pressure is already elevated[20].

The six minute walk test (6MWT) is a simple, inexpensive and safe test which measures the distance that a subject can walk on a flat hard surface in six minutes. It is a well tolerated and acceptable test to patient. The 6MWT as a sub-maximal exercise test, evaluates the global and integrated responses of the pulmonary, cardiovascular and muscular components and reflects the functional exercise level for daily physical activities[21]. Most daily activities are of sub maximal level. The 6MWT has also been used as a one-time measure of functional status of patients and aids in determining the morbidity and mortality in lung and heart disease.[21]. It is most commonly used as a baseline and follow-up assessment after a specific intervention or in monitoring disease progression. The change in the distance walked in the 6-minute walk can be used to trace the change in exercise capacity over time[22].In our study the subjects showed an improvement in the distance covered in 6 MWT from a mean of 503.7 + 59.18 mts to 552 + 61.16 mts after the dietary intervention. In our study after the 6MWT we also found improvement in level of fatigue and dyspnoea which was significant.

Conclusion

An acceptable and sustainable increase of fruits, sprouts and raw vegetables in our daily diet reduces weight, blood pressure and improve physical endurance. Hence the risk of cardiovascular diseases reduces.

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Conflict of Interest: Nil

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