Impact of Diet and Lifestyle Factors on Hypertension

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Abstract: *High blood pressure is a long term medical condition in which the blood pressure in the arteries is persistently elevated. Excess body fat is a predominant cause of hypertension with additive effects of dietary salt, alcohol, and physical inactivity. Long term high blood pressure however, is a major risk factor for coronary artery disease, stroke, heart failure, and chronic kidney disease. Controlled trials in hypertensives show blood pressure lowering effects of supplemental potassium, fibre, n-3 fatty acids, diet rich in fruits and vegetables and low in saturated fats. The objective of this study is to know the dietary pattern of hypertensive persons. A questionnaire was designed to collect the data about dietary information, food frequency table and anthropometric measurements. Sleep apnea and chest pain were commonly observed in the hypertensives. The subjects were counselled and educated to follow a well balanced diet and restrict or lower salt intake, avoid salt at the table and sodium rich foods and to be engaged in daily physical activity.*

Keywords: Dietary Pattern, Risk factor, Counselled, Sodium rich foods, hypertensives

1. Introduction

About 90 – 95% of cases are primary, defined as high blood pressure due to nonspecific lifestyle and genetic factors. Lifestyle factors that increase the risk include excess salt, excess body weight, smoking, and alcohol *(Joshi P, et al., 2007)*. Normal blood pressure at rest is within the range of 100–140 mmHg systolic and 60–90 mmHg diastolic. High blood pressure is present if the resting blood pressure is persistently at or above 140/90 mmHg for most adults *(Chobanian AV, et al., 2003), (Qureshi AI, et al., 2005)* Different numbers apply to children.

Meta-analyses of randomised trials found blood pressure falls of 3–5 mmHg systolic and 1–2 mmHg diastolic for sodium reduction in hypertensives, and reductions half this size in normotensives *(He FJ, 2002), (Alam S. et al., 1999)*. In contrast to animal foods, cereals are not a good source of lysine and contain only 30 mg/g protein *(Williams SR. 1993)*.

Secondary hypertension is elevated blood pressure that results from underline, identifiable, of uncorrectable cause. Obstructive sleep apnea (Pedrosa RP, 2011), chest paint, aldosteronism *(Funder JW, 2016)*, drugs, diet determine secondary hypertension.

The following 5 Non - pharmacological measures are usually recommended within worldwide guidelines, with the aim of preventing and improving the risk of complications related to high BP *(LJ Appel et al., 1997) (Mendis S. 2010)* maintaining or attaining a normal weight, that is, a body mass index (BMI) of $<25 kg/m^2$; increasing physical activity; avoiding alcohol consumption; controlling dietary salt intake at 6g/day; and having a dietary approach to stop hypertension (DASH), that is, a diet rich in fruits, vegetables, and low-fat dairy products and reduced in saturated and total fat *(Lopes HF. et al., 2003)*

2. Materials and Methods

Study Area, Study Design and Sample Size
A community based cross-sectional study was carried out among 100 hypertensive people above 25 years of age, living in Rama Krishna Puram area across Neredmet in Hyderabad. Random sampling procedure was adopted to collect the data. An attempt was made to collect the data.

Sampling Methodology and duration of the study
The hypertensive subjects were selected from the target area and were given questionnaire. The data was then converted into the charts and tables. The content of the questionnaire - General information, anthropometric measurements and dietary information. The questionnaire contains both open ended and close ended questions.

Anthropometric Measurements
All the anthropometric measurements were done by the following standardized technique. Weight was measured by the weighing machine having an accuracy of 0.1 kg and height was measured by using a steel anthropometry rod with accuracy of 0.1 cm using standard techniques. Body Mass Index was calculated using the following formula: BMI = weight (kg)/height (mt)^2. Based on BMI obtained, the subjects were classified into different categories according to the WHO global classification.

Education
The samples were educated to have a heart-healthy diet. They were counselled about dietary and lifestyle changes. Awareness was created to have a well balanced diet with less addition of salt to food preparations and to consume low sodium foods. The importance of physical activity was also explained.

Food Frequency Table: It consists of list of finite foods and beverages with response categories to indicate usual frequency of consumption over the time period queried. The food frequency tables included in the present study are – frequency of consumption of green leafy vegetables, high sodium foods and non - vegetarian foods etc.

3. Results and Discussion

Fig.1- The Anthropometric measurements of the subjects were taken and BMI was calculated. The mean BMI of the entire sample is 24.14. It is significantly higher in females than in males. Overall, out of 100 subjects, 24 males and 13 females had a normal nutritional status, while 2 males and 3 females were underweight, and nearly half of the subjects fall under overweight category where 21 were males and 26 were females and 4 males and 7 females were obese
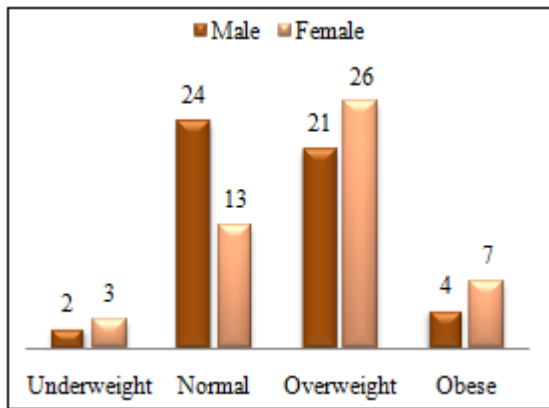

Figure 1: Classification of subjects based on BMI

Conclusion:
The proportions of underweight subjects were nearly similar between males and females; the overweight and obese subjects were greater among females. The prevalence of high blood pressure and mean levels of systolic and diastolic blood pressure increases as BMI increases, the prevalence of high blood cholesterol and mean levels of HDL decrease as BMI increases *(Pi-Sunyer FX., 1993).*

Fig.2- Of the 100 samples, 80% were active and 20% were inactive. Males were significantly more active than females.
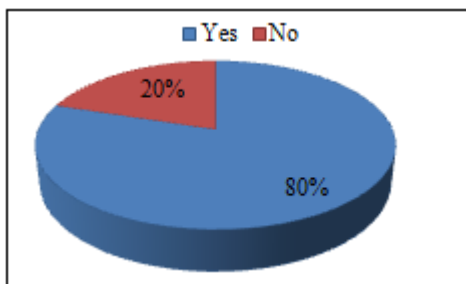

Figure 2: Physical activity

Conclusion:
Most of the time spent in moderate to vigorous intensity activity was at workplace and was overall less than 30mins/day. More frequent or chronic exercise results in more sustained reductions in blood pressure *(Pescatello LS. 2005).*

Fig.3- 81follow a non-vegetarian pattern of diet and 19 were vegetarians. More vegetarian women (n=12) than men (n=7) participated in the survey.
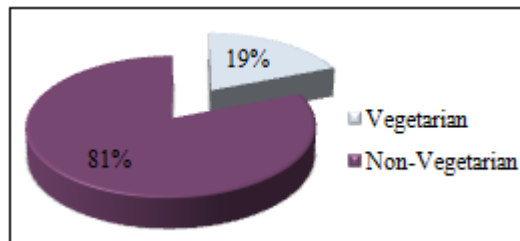

Figure 3: Based on the Diet Pattern

Conclusion:
The consumption of vegetarian diets was associated with a reduction in mean systolic BP (−4.8 mmHg) and diastolic BP (−2.2 mmHg) (*Yokoyama Y, et. al 2014*).The DASH study was partly based on the observation that vegetarian diets are associated with a significantly reduced risk of hypertension (*Sacks FM, et. al., 1995*).

Fig.4- Of the three listed leafy vegetables, spinach is consumed frequently by most of the subjects. It was consumed by 49 subjects twice a week, 39 once a week and 12 consume it occasionally. Amaranth is consumed by 9 subjects twice a week, 48 subjects once a week and 43 occasionally. Fenugreek is consumed by 5 subjects twice a week, 32 subjects once a week and 63 subjects occasionally.
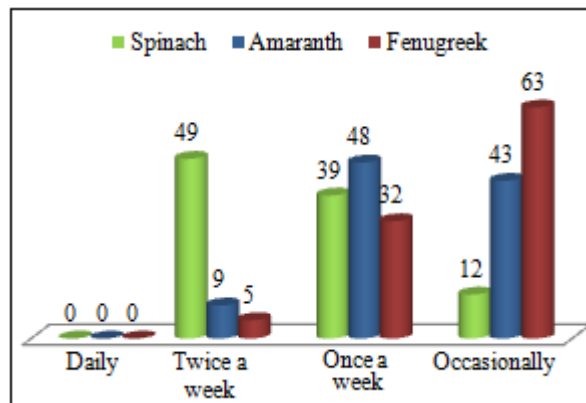

Figure 4: Green leafy vegetables

Conclusion:
DASH diet recommends on consuming vegetables more often among which leafy vegetables are very important. Most of the subjects consume spinach, amaranth and fenugreek leaves more frequently compared to other leafy vegetables.

Fig.5- Egg is consumed by half of the subjects every day, and 16 on alternate days, 6 twice a week. Chicken is consumed by 2 subject's everyday, 12 on alternate days, 22 two times a week and 44 consume it occasionally. Only 1 consumes meat on alternate days, 6 consume it twice a week and half of the subjects consume meat occasionally. Fish is consumed by 2 subjects on alternate days, 11 twice a week and 67 occasionally.
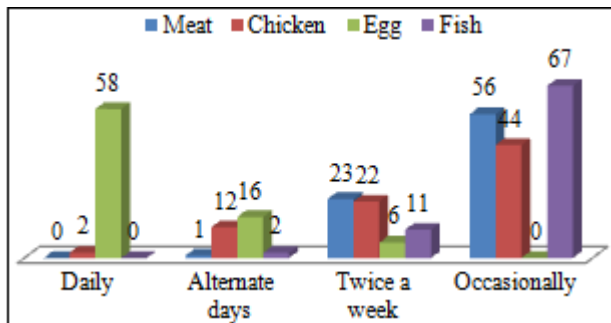
Figure 5: Frequency of consumption of Non- vegetarian (n=80)

Conclusion:

Animal foods on an average contain 85mg lysine per gram protein and are a very rich sources of Iron. *(Brathwaite et.al., 2003)* found that vegetarians have a lower prevalence of lifestyle diseases like Obesity, Diabetes and Hypertension than non- vegetarians.

Fig.6- 6% of the study subjects have the habit of using salt at the table always and 49% add salt to the food sometimes, 40% adds it rarely and 5% never use salt at the table
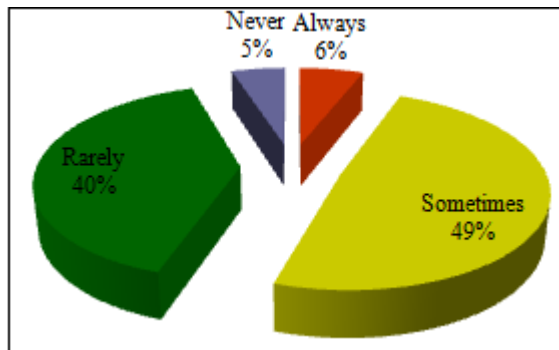

Figure 6: Addition of salt at the table

Conclusion:

Ingestion of sodium is essential to health but excess is a risk factor for Hypertension *(Meneton P. et al., 2005).* Clinical trials evaluating the effect of sodium reduction on blood pressure has shown blood pressure lowering effects down to sodium intake of less than 1.5 grams per day *(smith.SC 2007).*

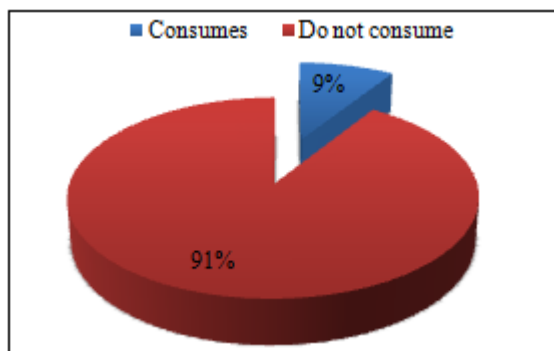Fig.7- Of the 100subjects, 9 were alcoholics and consume it once a week.

Figure 7: Consumption of alcohol

Conclusion

Excessive consumption of alcohol is often cited as one of the most common reversible causes of hypertension *(O'Keefe JH, 2007).*

4. Discussion

It can be concluded from the data collected that dietary, Lifestyle factors are mainly responsible for the prevalence of hypertension. They are educated and counselled to follow a well balanced diet with less consumption of salt and sodium rich foods and to be engaged in any moderate to vigorous physical activity for at least 30 to 45 minutes per day, at least 5 days a week.

5. Acknowledgement

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[20] **BMI CLASSIFICATION (WHO)**- <18.5 (Underweight), 18.5-24.9 (Normal), ≥ 25 (Overweight), ≥ 30 (Obese)