A PILOT STUDY ON DIETARY APPROACHES TO STOP HYPERTENSION

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ABSTRACT

Hypertension is mainly the condition associated with rise in blood pressure to such an extent that one gains benefit by lowering it and is often called as silent killer. Studies had prove that increase levels of serum sodium elevates blood pressure, on the other hand levels of potassium, magnesium, and vitamin and amalgamation edibles which are high in fruits, green vegetables, nuts, low-fat dairy products, fish or poultry product that are less in hydrogenated fat, cholesterol, sugar included in dietary approaches to stop hypertension (DASH) causes beneficial decrease in blood pressure level in patient with hypertension. The study includes 50 patients present with hypertension. The lifestyle risk factors are assessed in the patients including the method of how they come to know about hypertension, their history (medical/surgical), social history, food habits, taking DASH diet or not along with noting down initial blood pressure levels, reduction in blood pressure after starting the treatment or after taking DASH diet. The study concluded that people following the DASH diet achieved reduction of blood pressure as compared to patients with low dietary approaches for adjusting blood pressure. In hypertensive patients, the DASH diet may be a viable alternative to medication therapy.

Keywords: *Hypertension, DASH, Blood Pressure, Dietary Approaches*

INTRODUCTION

Hypertension is a common malady in which the blood's long-drawn drive against the artery walls is extreme to generate health problems like cardiac infarction. The vital sign is littered with the quantity of blood your heart blows up likewise owing to the volume of blood fluid viscosity in your arteries.[1]

The epithet "silent killer" has been used to designate hypertension. Numerous individuals are unsure that they have hypertension because it normally seems to have no caution noticeable symptoms.[2]

High blood pressure, typically known as hypertension, is one of the most well-known substantial predisposing factors for CVD and stroke [1]

In deciding who will develop hypertension, genetics plays a key impact. Genetic factors are thought to be accountable for 20–40% of blood pressure (BP) differences in the universal inhabitants also implicated as grantors to the sustained peak prevalence of high blood pressure are lifestyle factors such as eating patterns [1-2]. There has long been a link between calorie diminution, weight reduction, and a reduced risk of high blood pressure [1].

Blood Pressure Readings

Blood Pressure Category	Systolic mm Hg (upper number)		Diastolic mm Hg (lower number)	What Your Blood Pressure Readings Mean
Normal	Less than 120	and	Less than 80	Keep checking your blood pressure and making healthy lifestyle choices. This will help make sure your blood pressure stays at a normal level.
Elevated	120 to 129	and	Less than 80	You may be at risk for hypertension. Healthy lifestyle changes can help get your blood pressure back to normal and keep it there.
High Blood Pressure (Hypertension Stage 1)	130 to 139	or	80 to 89	Healthy lifestyle changes may be enough to get your blood pressure back to normal. You may need blood pressure medicine if lifestyle changes alone are not enough.
High Blood Pressure (Hypertension Stage 2)	140 or higher	or	90 or higher	You may need both blood pressure medicines and healthy lifestyle changes to get your blood pressure to normal.
Hypertensive Crisis	Higher than 180	and/ or	Higher than 120	Check your blood pressure again after 5 minutes. If it is still at least 180/120, contact your healthcare provider. If you also have chest pain, trouble breathing, or vision problems, seek care immediately. **This is a medical emergency.**

Table 01: Readings of Blood pressure according to various categories [1,11]

DIETARY APPROACHES TO STOP HYPERTENSION

The National Heart, Lung, and Blood Institute (NHLBI) launched the Dietary Approaches to Stop Hypertension (DASH) diet to investigate dietary components that distress blood pressure. It had long been acknowledged that individuals who ate meals high in vegetable foodstuffs had lesser blood pressure and fewer cases of hypertension and stroke than people who ate diets high in animal products[3].The DASH probationary displayed that a diet ironic in fruits, vegetables, and low-fat dairy goods, as well as whole grains, poultry, fish, and nuts, and low in red meat, sweets, and sugar-comprising beverages, drops blood pressure significantly in mutually individuals present and absent with hypertension [4]. Epidemiologic

lessons initiate that mineral such as potassium, calcium, magnesium, fibre, and dietary body fat had relations with hypertension or blood pressure [3-6]. The DASH scheduling assembly hypothesized that the influence of diet on blood pressure could be attributable to the whole combination or connections of nutrients, or some unknown fundamentals. DASH's persistence was to treasure a dietary outline that could subordinate blood pressure while still being acceptable to the general public [4-8]. The DASH diet contains a lot of antioxidants fiber, unsaturated fatty acids, and low-fat dairy, which might help with insulin resistance and hyperglycemia, as well as lowering the risk of type 2 diabetes. Patients with type 2 diabetes may assistance by the DASH eating pattern since it can help them manage their risk factors. [9]

FACTORS IN THE DIET THAT HELP LOWERS BLOOD PRESSURE: -

Alterations in one's lifestyle	Guidance
Weight Loss	Lose weight if you're overweight or obese, aiming for a BMI of 25 kg/m2; if you're not overweight, keep your BMI at 25 kg/m2.
Reduced Salt consumption	Reduce your salt (sodium chloride) consumption as much as possible, aiming for a sodium intake of 65 mmol/d sodium (comparable to 1.5 g sodium or 3.8 g sodium chloride).
Dietary patterns similar to DASH	Consume a diet that is high in fruits and vegetables (8–10 servings per day), low in saturated fat and cholesterol (2–3 servings per day), and low in saturated fat and cholesterol
Increase Potassium intake	Rise in potassium consumption to 120 mmol/d (4.7 g/d), the smooth recommended in DASH diets.
Moderation of alcohol intake	Consume 2 alcoholic drinks each day (men) and 1 alcoholic drink each day (women) for people who use alcohol (women

TABLE 02: Diet-Related Lifestyle Changes That Effectively Subordinate Blood Pressure [10]

DIETARY FACTORS THAT HAVE A MINOR OR UNDEFINED CONSEQUENCE ON BLOOD PRESSURE: -

1. FISH OIL SUPLLEMENTATION

Elevated-dose omega-3 polyunsaturated fatty acid (frequently known as fish oil) enhancements can help hypertensive people subordinate their blood pressure. BP reductions in non-hypertensive people are usually minor or nonexistent. Fish oil seems to have a dose-reliant impact, with blood pressure decreases happening at quite elevated dosages—specifically, 3 g/d. The normal systolic and diastolic blood pressure decreases in hypertensive people were 4.0- and 2.5-mm Hg, correspondingly. The frequent adverse effects include burping and a fishy palate. Fish oil enhancements cannot stay consistently suggested as a resource for lowering blood pressure due to the extraordinary amount necessary to dewdrop blood pressure and the adverse-effect outlined [11,13]

2. FIBER

Dietary fiber is made up of the indigestible components of plant-based foods. Increased fiber consumption may lower blood pressure, according to an indication from observational research and clinical tribunals [14]. There have been over 40 randomized hearings on dietary fiber supplementation. Supplementary fiber (regular rise, 14 g/d) was linked with remaining systolic and diastolic BP decreases of 1.6- and 2.0-mm Hg, individually, according to a meta-investigation of these trials, which was limited to the 20 trials that augmented just fiber ingestion. Supplementary fiber did not reduce blood pressure in a major riffled trial. Overall, the evidence is insufficient to support increasing fiber consumption alone as a method of lowering blood pressure[15].

3. CALCIUM & MAGNESIUM

According to animal studies, surveys, clinical trials, and meta-analyses, calcium consumption affects blood pressure. Regarding that, meta-analyses of clinical researchers showed that calcium fortification (400 to 2000 mg/d) reduced systolic and diastolic blood pressures by 0.9 to 1.4 mm Hg and 0.2 to 0.8 mm Hg, respectively. [16].

The evidence linking magnesium to high blood pressure is mixed. An adverse relationship between dietary magnesium and blood pressure is frequently seen in observational studies, which are commonly cross-sectional in design. There was a negative relationship between dietary magnesium and BP in a systematic review of 29 observational studies [17].

4. CARBOHYDRATE & PROTEIN INTAKE

A growing body of research demonstrates that a carbohydrate diet, both in terms of quantity and type, affects blood pressure [18].

A broad and largely consistent body of data from observational research has indicated significant negative associations between protein consumption and blood pressure. In a recent major experiment in China, substituting carbs with more protein from soy supplements reduced blood pressure [19].

5. VITAMIN C

In laboratory investigations, consumption studies, and epidemiological studies, enhanced vitamin C ingestion or status has been associated with lower blood pressure. 10 of 14 cross-sectional studies indicated an inverse connection between both serum vitamin C and blood pressure, while 3 of 4 studies found an inverse link involving vitamin C ingestion and blood pressure, thus according to Ness et al.102[20].

Following the DASH Eating Plan

Use this chart to help you plan your menus—or take it with you when you go to the store.

Food Group	Servings Per Day			Serving Sizes	Examples and Notes	Significance of Each Food Group to the DASH Eating Plan
	1,600 Calories	2,000 Calories	2,600 Calories			
Grains*	6	6–8	10–11	1 slice bread 1 oz dry cereal† ½ cup cooked rice, pasta, or cereal	Whole wheat bread and rolls, whole wheat pasta, English muffin, pita bread, bagel, cereals, grits, oatmeal, brown rice, unsalted pretzels and popcorn	Major sources of energy and fiber
Vegetables	3–4	4–5	5–6	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice	Broccoli, carrots, collards, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fiber
Fruits	4	4–5	5–6	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Important sources of potassium, magnesium, and fiber
Fat-free or low-fat milk and milk products	2–3	2–3	3	1 cup milk or yogurt 1½ oz cheese	Fat-free (skim) or low-fat (1%) milk or buttermilk; fat-free, low-fat, or reduced-fat cheese; fat-free or low-fat regular or frozen yogurt	Major sources of calcium and protein
Lean meats, poultry, and fish	3–6	6 or less	6	1 oz cooked meats, poultry, or fish 1 egg‡	Select only lean; trim away visible fats; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and legumes	3 per week	4–5 per week	1	⅓ cup or 1½ oz nuts 2 Tbsp peanut butter 2 Tbsp or ½ oz seeds	Almonds, hazelnuts, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas	Rich sources of energy, magnesium, protein, and fiber

TABLE 03: A DASH diet plan chart [3]

SCOPE OF STUDY:

The present study may help in the determination of many different daily life style modifications associated with the prevention and treatment of hypertension. This study may also assist in selection of optimum therapy for treatment of hypertension by decreasing the cost of treatment and increasing the efficacy of treatment with antihypertensive drugs, which in turn may leads to decrease in the number of cases of non-medication adherence hence, minimizing the risk of mortality and morbidity related to the hypertension.

MATERIALS AND METHODS

Study Design:

The present study is observational. All patients presenting with hypertension and taking antihypertensive medications are included in the study. The lifestyle risk factors are assessed in the patients including the method of how they come to know about hypertension, their history (medical/surgical), social history (alcoholic / smoking, etc.), food habits (vegetarian, non-vegetarian, taking DASH diet or not along with noting initial blood pressure levels, reduction in blood pressure after starting the treatment or after taking DASH diet.

Study Site:

The study was carried out through a survey.

Study Population:

Inclusion criteria:

1. Patients of either gender.
2. Patients above 18 years of age.
3. Patients on the treatment of hypertension.
4. Patients on the intake of the DASH diet

Exclusion criteria:

1. Patients who refused to take part in a study.
2. Patients below 18 years of age.
3. Patients who are pregnant
4. Patients requires critical care

.

Study Document:

Self-designed questionnaires is used for data collection of patients including medical, history, social history, food habits and DASH diet.

Sources of Data:

Filling self-designed Questionnaires for the DASH diet.

Study Procedure:

The answers given by patients will be noted in self-designed Questionnaires' for the DASH diet and evaluated by using digits or numbers.For analyses of dietary approaches to stop hypertension (DASH), the scores are given below in the table: -

S.NO.	DASH diet	Score
A.	Low sodium in diet (Rock Salt)	7
B.	Fruits (all)	6
C.	Vegetables (all)	5
D.	Grains (all)	4
E.	Fat-free or Low-fat dairy products	3
F.	Fats and oils (Olive Oil)	2
G.	Poultry and Fish Products	1

The scores for dietary habits of a person are taking any of the diets in their daily life routine, which is responsible for increasing blood pressure and causes hypertension are given below in table:

S.NO.	Diet Responsible for Hypertension	Score
A.	Sweetened beverages and sweets	1
B.	Pickles	2
C.	Consumption of Alcohol	3
D.	High Sodium intake	4
E.	Fried foods or Canned food products	5
F.	Fatty meals	6
G.	Full-fat dairy products	7

Data Analysis:

The data collected is analysed by comparing the above two scores of hypertensive patients with initial and present blood pressure levels using Microsoft Word, Xcel, and other statistical tools as per needed.

RESULT & DISCUSSION

The study population consists of 50 patients above 18 years of age. The below graph (Fig.01) shows that the percentage of males (66%) with hypertension is higher as compared to the percentage of females (34%). Thus, this shows that Males are more prone to hypertension than Females

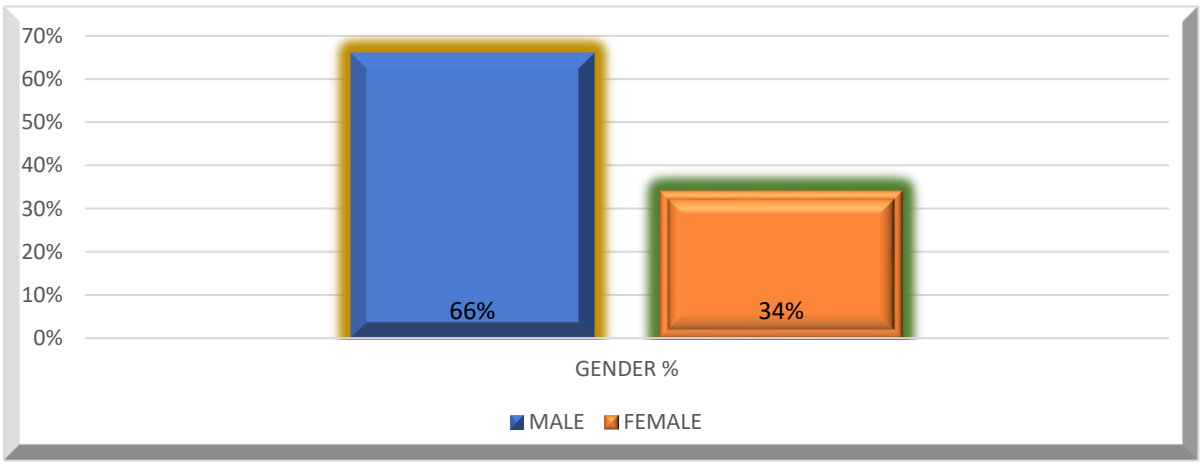

Figure 01: Percentage of males and females

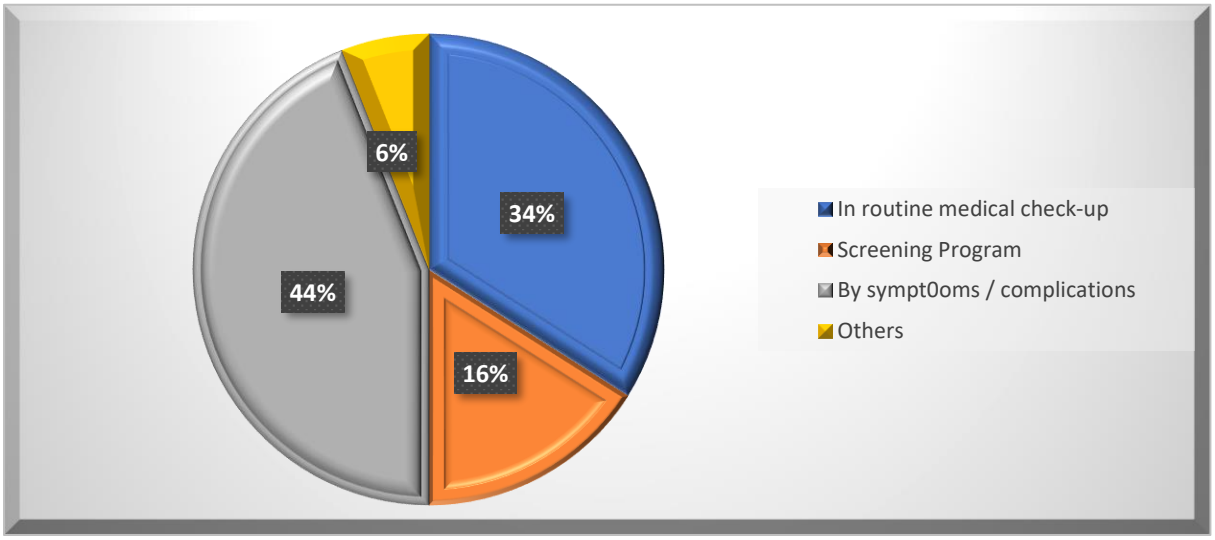

Figure 02: Percentage of how the patients came to know about hypertension

The data represented through pie chart (Fig.02), reflects that mostly patients (44%) acquired knowledge about having hypertension after having symptoms/complications associated with hypertension as compared to population that prefer to pursue routine medical check-up (34%)

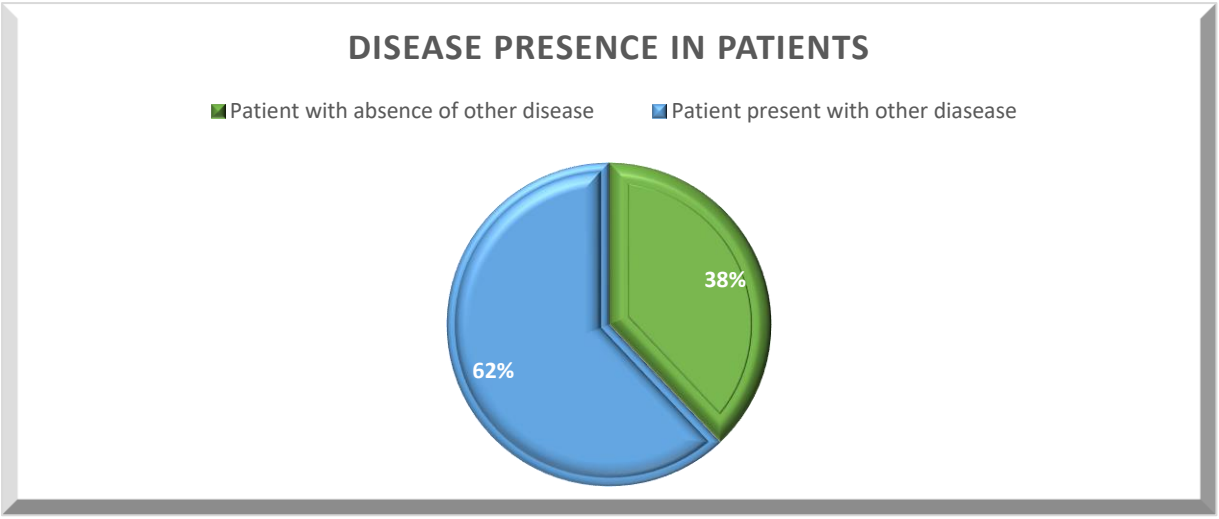

Figure 03: Percentage of patients with absence or presence of Co morbidities

The data collected further represents higher percentage of the hypertensive patients with co morbidities (62%) in comparison with patients presents without another disease state such as arthritis, metabolic disorder like diabetes and other cardiovascular diseases, etc. Thus, reflecting more chances of having hypertension in person with co morbid conditions and hence more focus should be given on dietary approaches in addition to pharmacological therapy in planning the goal of treatment

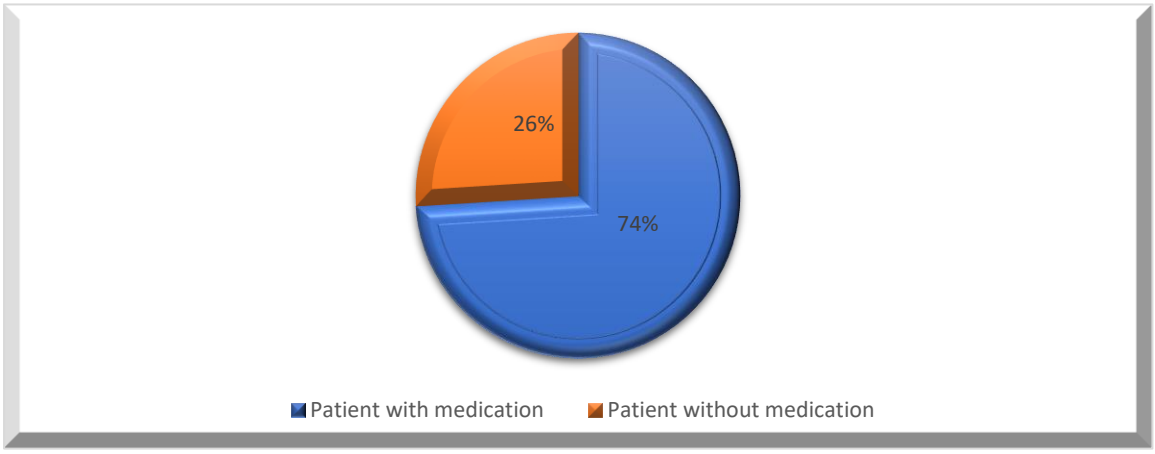

Figure 04: Percentage of patient's presence or absence with medication

The data in above pie diagram (Fig.04) indicating that the patients with hypertension on pharmacological treatment is of high in number (74%) as compared to patients without medication.

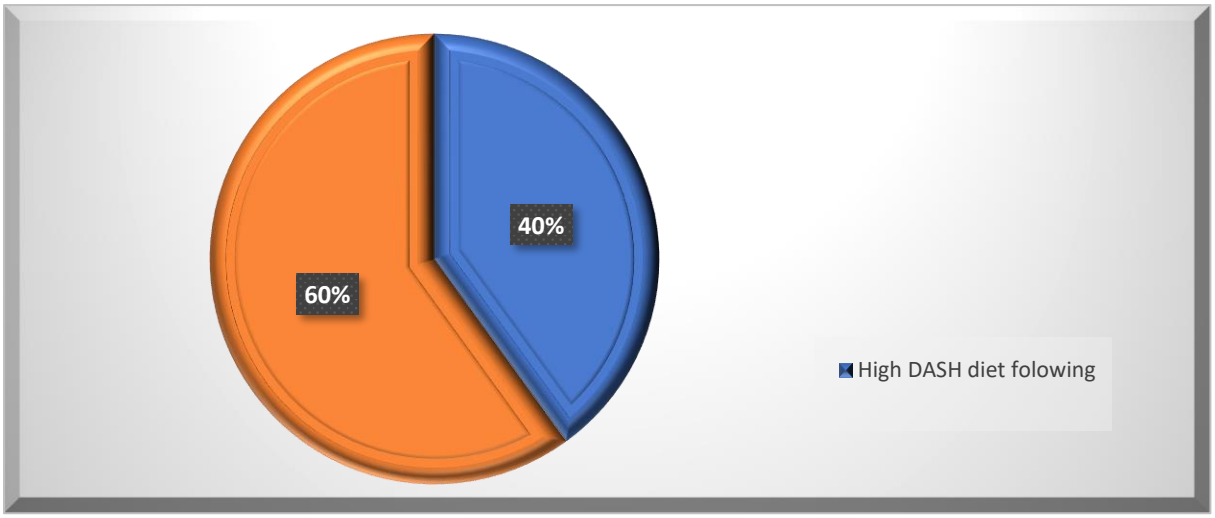

Figure 05: Comparison between patient following DASH diet

The pie chart (Fig.05) is the comparison between the hypertension patient that are found following dietary approaches to stop hypertension (DASH) diet. Data indicates that there are medium level diet follower overlaps the high DASH diet following among population of DASH followers. While on the other hand chart in figure 06 focuses on comparison between patient those are irregular in diet which gives more number of people with low attention towards diet (58%) and both together draws great attention for need of counselling and educating such patients for increasing adherence towards dietary approaches to stop hypertension.

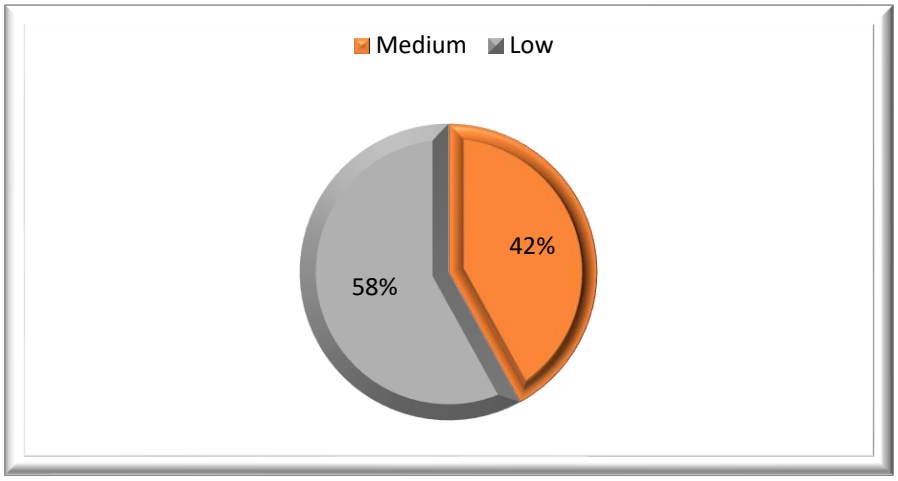

Figure 06: Comparison between attention of patients consuming diet responsible for hypertension in daily lifestyle

Total No. of Patients	Mean Initial Blood Pressure	Mean Present Blood Pressure
50 patients	170.96/111.86	136.82/90.32

Table 04: Readings of mean initial and present blood pressure in patient following DASH diet

On relating the data of initial reading of blood pressures recorded at the time of diagnosis of hypertension with present readings among patient on DASH shows remarkable reduction in average blood pressure levels shown in table 04 that figures dietary approaches to stop hypertension DASH to be proved of great advantage in treatment of hypertension.

CONCLUSION

To conclude, the present pilot study of 50 patients clearly reflects the benefits of adopting dietary approaches to stop hypertension (DASH) with essential pharmacological measures specially population with co morbid conditions that are more prone towards future complication. Further study also directs towards major need of awareness among people to follow and be adhere on dietary approaches hence reducing the global burden of hypertension. Thus, DASH DIET is a very curable method for hypertension with no side effects.

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