

Effect of Medication and Dietary Intervention on Blood Pressure in Hypertensive Patients

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ABSTRACT

This study examines the impact of medication and combined drug and dietary interventions on blood pressure in hypertensive patients over a 60-day treatment period. The results demonstrate a significant reduction in both systolic and diastolic blood pressure across all treatment groups, with more pronounced improvements observed in the drug and diet-treated group. On Day 0, the systolic and diastolic blood pressures were highest in both groups but decreased progressively by Day 60. The findings suggest that integrating dietary changes with medication can lead to better blood pressure control in hypertensive patients.

Keywords: Hypertension, Blood Pressure, Medication, Dietary Intervention, Systolic Pressure, Diastolic Pressure, Hypertensive Treatment

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INTRODUCTION

A person's life would not be complete without food. Eating satisfies hunger and helps the body carry out its many functions. Whatever a creature consumes in order to meet its nutritional demands. (Huang *et al*, 2006). Essential nutrients like as carbohydrates, lipids, proteins, vitamins, and minerals are mostly found in foods that are either produced by animals, plants, or fungus. After an organism ingests the substance, its cells absorb it to provide energy, sustain life, or stimulate growth. The unique metabolic needs of different animal species necessitate dietary differences throughout species. In many cases, these routines have developed to meet the needs of a certain ecosystem in a specific region. (Ingelsson *et al*. 2009).

The incredible versatility of omnivores has allowed them to locate food in a wide range of environments. Primitive humans relied on farming, hunting, and gathering for the majority of their food supply. As farming became more feasible as technology improved, more and more people began to base their diets on what was available to them in their local areas. Diversity in geography and culture has shaped the evolution of numerous culinary skills and cuisines, as well as a wide range of ingredients, preparation techniques, and ingredients. (Jain *et al*, 1999).

An organism can obtain energy and nutrients from any substance that is consumed as food. Animals consume it in many forms, including raw, processed, or cooked, for various reasons, including development, health, or pleasure. The bulk of our diet consists of water, carbohydrates, fats, and proteins. In addition to minerals like salts and organic substances like vitamins, food also contains both. Plants, algae, and even certain bacteria are able to synthesize their own food molecules through a process known as photosynthesis. Many foods contain water, which has since been recognized as a food itself. In terms of calories per unit volume, 2 water and fiber rank lowest, while fat is at the top. Furthermore, the functioning of both plants and animals depends on a number of inorganic (non-food) components. (Jenkins *et al* 1981).

Diet and nutrition:

A community's overall and dental health depends on its members eating right. A person's diet, or the amount of food consumed, is influenced by numerous things, including their social level, religious views, environmental conditions, and the ease with which they may obtain food (Jockers, 2013). The entire procedure, from intake to digestion, absorption, transit, cellular integration, and finally, elimination, is a part of it. The term "nutrition" refers to the steps taken to use food for metabolic processes, tissue growth,

and repair. There are four main dietary patterns that people follow: omnivore, flexitarian, pescatarian, pollotarian, and lacto-ovo vegetarian. Omnivores eat both plant and animal products, flexitarians eat animal protein occasionally, pescatarians eat only fish and seafood, pollotarians eat only poultry and fowl, and lacto-ovo vegetarians eat dairy products like cheese. Many factors subtly influence people's eating habits, including convenience, lifestyle, health, nutritional status, and the ability to regulate their weight. (John McDougall, 2006).

A person's health, nutrition, and diet all work hand in hand. This means that food deficiencies can impact health status and that health status can impact nutritional status; likewise, oral health can influence nutritional status. Essential for overall and dental health are the macronutrients: protein, carbs, fat, vitamins, and minerals. Obesity, diabetes, heart disease, osteoporosis, and dental disease are just some of the health issues that a balanced diet can help ward against. (Johnston *et al*, 2010). For maximum health, a "Balanced Diet" should consist of a variety of meals that each contributes the right quantity of nutrients. In order to provide citizens with guidance on what to eat and drink based on scientific evidence, governments worldwide have developed dietary recommendations. Obesity and dental caries are two food-related illnesses that these

recommendations aim to combat by encouraging a balanced diet. One of these is the "Healthy Eating Pyramid" produced by the Australian Nutrition Foundation. (Katsilambros *et al*, 2006). The other is the "Eatwell Guide" released by Public Health England. This advice was derived from the following sources: the Dietary Reference Intakes (DRIs) for the UK, the Nutrient Reference Values (NRVs) for nutrients in Australia, and the USDA Dietary Reference Intakes. (Keith *et al*, 2006).

The two most prevalent ways that vitamins are categorized are according to their solubility in water and fat. Along with the eleven vitamins that are water-soluble, humans also need the four vitamins that are fat-soluble: A, D, E, and K. The body typically gets rid of a water-soluble vitamin quite fast. According to Fukuwatari and Shibata (2008), one can estimate the consumption of water-soluble vitamins by analyzing urine output. You should increase the frequency of your doses because they are more difficult for the body to metabolize. According, bacteria produce numerous vitamins that can dissolve in water. The digestive tract is able to absorb fat-soluble vitamins with the help of lipids. They tend to build up in the body and produce hypervitaminosis more readily than water-soluble vitamins. Important for cystic fibrosis is the control of fat-soluble vitamins.

Preventing diabetes, obesity, colon cancer, and countless other diseases is only one of the several long-term advantages of eating a high-fiber diet. Some people with diabetes find that eating a diet high in fiber helps them control their blood sugar levels (Anderson et al., 2004). Regularly, those whose meals include 30–50 grams of fiber from whole foods have lower blood glucose levels than those whose diets contain less fiber. (Anderson et al, 2004).

Specifically, Hopping et al. (2010) looked examined the link between fiber consumption and T2D. The incidence of diabetes was 22% lower in individuals whose fiber consumption was higher than in those whose fiber consumption was lower. Consumption of whole grains has been associated with a decreased risk of type 2 diabetes, according to multiple studies.

MATERIAL AND METHOD

Place of Study

- **Location:** The study was conducted at the Shri Radhakrishna Hospital & Research Institute and CPH – Center Point Hospital, both located in Nagpur, India.
- **BRAMH:** A government-run hospital with 800 beds, specializing in various fields such as medicine, radiology, ophthalmology, orthopedics, gynecology, pediatrics, and psychiatry.
- **Focus:** The research focused on both indoor and outdoor patients from the departments of medicine and radiology.
- **Approval:** The study was approved by officials from Shri Radhakrishna Hospital & Research Institute and CPH – Center Point Hospital, and the research ethics committees of both hospitals, Nagpur.

The Patients

- **Objective:** The study aimed to explore how healthy eating habits affect five different markers related to cancer, obesity, diabetes, high blood pressure, and anemia.
- **Patient Demographics:** 1,185 patients, aged 15 to 70, both male and female, were assessed.

Data Sheet for Patients

- A detailed data sheet was created to collect personal details, physical traits, and habits, including:
 - **Basic Information:** Name, address, contact details, sex, age, occupation, and income group.
 - **Food Habits:** Vegetarian/non-vegetarian, alcohol consumption, frequency of food intake, and specific food items consumed (tea, coffee, juice, soup).

- **Physical Parameters:** Height, weight, BMI, blood pressure, and others like lipid profile, blood glucose levels, and thyroid status.
- **Other Parameters:** Biochemical data such as ESR, LFT, RFT, and dietary prescriptions.

Selection Criteria for Patients

- **Inclusion Criteria:** Patients were selected based on the presence of specific diseases. Each disease had its own set of criteria:
 - Obesity: BMI > 24.9 Kg/m².
 - Diabetes: Fasting glucose > 100 mg/dl and post-meal glucose > 180 mg/dl.
 - Hypertension: Blood pressure > 120/80 mmHg.
 - Anemia: Hemoglobin < 11 gm/dl.
 - Cancer: Biopsy-confirmed malignant cells.
- **Exclusion Criteria:** Patients who discontinued treatment were excluded from the study.

Sample Size

- A total of 1,085 patients were investigated on average. The patients were divided into two groups:
 - **First Group:** Treated only with medications (except for obese patients).
 - **Second Group:** Treated with a combination of diet and medication.

Treatment of Patients

- **Drug Treatment:** The first group received medications as prescribed by specialists based on disease severity.
- **Dietary and Medication Treatment:** The second group was treated with both dietary and medicinal interventions, with diets tailored to the patient's condition.
- **Diet Treatment for Obesity:** Obese patients were treated solely through dietary plans created by professional dietitians. The caloric intake was calculated based on the patient's gender, age, profession, and BMI.

Data Collection

Data were collected from patients at three intervals: baseline (0 days), 30 days, and 60 days. This included pathology reports recommended by the doctor.

RESULTS

Table 1. Characteristics and Percentage Distribution of Patients

	Drug Treated	Drug + Diet Treated
Gender		
Male	67	65
Female	33	35
Age Group		
30-40 years	12	16
41-50 years	49	34
51-60 years	39	38
Occupation		
Heavy Workers	37	39
Semi Secondary Workers	23	23
Secondary Workers	40	38
Monthly Income (Rs)		
< 10,000	24	40
10,000 – 20,000	47	38
20,000 – 30,000	20	13
Diet		
Vegetarian	34	22
Non-Vegetarian	66	78
Alcohol Consumption		
Alcoholic	10	19
Non-Alcoholic	90	81
Exercise		
Regular Exercise	17	12
Non-Exercise	83	88
Diabetes Control		
Frank Diabetic	50	48
Modest Diabetic	38	42
Good Control Diabetic	12	10

This table displays the characteristics and percentage distribution of the diabetic patient population, separated into drug-treated and drug + diet-treated categories.

Table 2. The impact of medications on blood pressure in people with hypertension. The standard deviation is indicated by the items in bracket

Days of Treatment	Drug Treated	Drug and Diet Treated
	Systolic BP mmHg ($\pm$ SD)	Diastolic BP mmHg ($\pm$ SD)
0	200 ($\pm$ 4.58)	146 ($\pm$ 2.12)
30	174 ($\pm$ 3.27)	131 ($\pm$ 4.09)
60	168 ($\pm$ 4.04)	113 ($\pm$ 5.61)

Table 2 shows that over a 60-day treatment period, both drug-treated and drug + diet-treated groups experienced significant reductions in blood pressure. The systolic and diastolic BP values decreased more sharply in the drug + diet-treated group, indicating the added benefit of dietary intervention alongside medication. The standard deviations indicate the variability in blood pressure reduction across patients.

DISCUSSIONS

The characteristics and percentage distribution of the diabetic patient population show distinct patterns across drug-treated and drug + diet-treated groups (Kemper, *et al*, 2004). Males dominate both categories, though the gender gap narrows slightly when diet is included. Age distribution indicates that younger patients (30-40 years) are more prevalent in the drug + diet group, suggesting a possible willingness to adopt lifestyle changes earlier. Occupational patterns are similar across both groups, but a notable difference emerges in income distribution: patients in the lower income bracket (< Rs 10,000) are more likely to use both drugs and diet as a treatment method, potentially reflecting financial constraints. (Kevin *et al*, 2012). Non-vegetarians constitute the majority in both groups, especially among the drug + diet-treated patients. Interestingly, alcohol consumption is higher in the drug + diet group, while exercise levels remain low overall, with an even larger proportion of non-exercisers in the drug + diet group. Diabetes control levels are comparable in both groups, although there is a slightly higher percentage of modest diabetics in the drug + diet group. (Tarnopolsky *et al*. 1992).

Regarding the impact of medications on blood pressure in hypertensive patients, the data reveals that a combined approach of drugs and dietary changes leads to greater reductions in both systolic and diastolic blood pressure over 60 days. At baseline, blood pressure is elevated in both groups, but the addition of diet to drug treatment results in a more significant drop in diastolic blood pressure by day 30, and further improvement by day 60. The systolic and diastolic BP values decrease steadily in both groups, but the drug + diet-treated group shows a greater reduction in systolic BP as well. This suggests that dietary modifications, alongside medication, contribute to better overall blood pressure management. The standard deviation indicates slightly more variability in the drug + diet group, but the trend suggests a stronger impact on blood pressure reduction with combined treatment.

CONCLUSIONS

The analysis of the diabetic patient population highlights significant differences between those treated with drugs alone and those treated with both drugs and dietary changes. Males are more likely to be treated in both categories, but the gender distribution is slightly more balanced in the drug + diet group. Younger patients and those with lower incomes are more inclined to adopt a combined treatment approach, possibly reflecting greater health awareness or financial considerations. Additionally, non-vegetarian diets and alcohol consumption are more common in the drug + diet-treated group, while exercise participation remains low in both categories, indicating room for improvement in lifestyle interventions.

In terms of blood pressure management, the study demonstrates that combining dietary changes with drug treatment leads to greater reductions in both systolic and diastolic blood pressure in hypertensive patients. Over a 60-day period, the drug + diet group showed a more pronounced reduction in blood pressure compared to those treated with drugs alone, highlighting the effectiveness of a holistic approach to hypertension management. The findings suggest that lifestyle modifications, such as diet, significantly enhance the efficacy of medication in controlling hypertension, emphasizing the importance of a multi-faceted treatment plan for better health outcomes.

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