ORIGINAL RESEARCH PAPER

Home Science

# IMPACT OF MILLETS ON HYPERTENSION

**KEY WORDS:** Millets, Hypertension, health benefits, nutrition.

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**ABSTRACT**

Millets offer nutritional security and there is a need for promoting millets as they are highly nutritious. These have been important food staples in human history, particularly in Asia and Africa. Almost all the millets are used for human consumption in most of the developing countries, but their consumption as direct food has significantly declined over the past three decades. Now a days, the millets are considering as a highly nutritious food and thus the year 2023 is celebrating as international year of millets all over the world. Millets are gluten free, and rich source of fibre, minerals and B-complex vitamins, antioxidants, immune modulators, detoxifying agents etc. and hence protect against hypertension, diabetes, cancer, cardiovascular diseases (CVD), etc. Being non-glutinous, millets are safe for people suffering from gluten allergy and celiac disease. They are non-acid forming, easy to digest and non-allergenic. A number of studies have revealed the potential of millets to reduce risk factors and offer protection against hypertension. The study has been conducted for providing health benefits of millets and its promising avenues for reducing hypertension.

## INTRODUCTION-

Millet grain is abundant in nutrients as well as health-beneficial. Millets can act as a multifaceted solution to the global challenges because of their nutritional quality. Daily consumption of millets can significantly reduce incidences of non-communicable diseases. Millets are rich in many functional compounds like dietary fiber, slow digestible carbohydrates, high protein content, B-complex vitamins, calcium, iron, magnesium, manganese, copper and phytochemicals. Apart from possessing specific characteristics like being gluten-free. They are non-acid forming, easy to digest and non-allergenic. Each goes a long way in enhancing health benefits. In this illustration, a approach has been evolved in order to explain how functional components of millets help obesity, hypertension and heart related issues, to restore a healthy wellbeing. Many studies have shown that consumption of millets reduces risk of hypertention and other disease as well.

Millets (DOM, 2017) are a highly varied group of small-seeded grasses, widely grown around the world as cereal crops or grains for fodder and human food. Most species generally referred to as millets belong to the tribe Paniceae, but some millets also belong to various other taxa.

Millets are important crops in the semiarid tropics of Asia and Africa (especially in India, Mali, Nigeria, and Niger), with 97% of millet production in developing countries. (McDonough et al.,2000). This crop is favored due to its productivity and short growing season under dry, high-temperature conditions.

The term millet is sometimes understood to comprise sorghum. The annual harvest of sorghum is twice the amount of other millets. Of these pearl millet is the most common. Pearl millet and sorghum are important crops in India and parts of Africa. Finger millet, proso millet, and foxtail millet are also important crop species. ( FAO, 1996)

Millets may have been consumed by humans for about 7,000 years and potentially had "a pivotal role in the rise of multi-crop agriculture and settled farming societies." (Cherfas & Jeremy, 2015)

High blood pressure (BP) has now become a major public health problem and a leading cause of death and disability in many countries worldwide. It affects the quality of life among hypertensive patients in terms of physical, physiological, social, and environmental domains. Therefore, high BP has become a serious threat to human health if not detected early and treated appropriately. A small decrease in systolic BP (SBP) can translate into considerable reductions in cardiovascular disease. Currently, the pharmacological therapeutics of hypertension mainly depends on oral anti-hypertensive agents. However, these treatments are constantly accompanied by undesirable side effects.

Dietary changes are recommended first-line treatments for mildly hypertensive subjects. Specifically, diets that are rich in whole grains, are associated with decreased risk of diseases and conditions, including obesity, type-2 diabetes, and hypertension (Cho et al., 2013). Whole grains are rich in potential hypotensive components, such as dietary fiber, protein, minerals, and phytochemicals. A study on whole grain diet intervention (100 g/d for 16 wk) in overweight and obese adults has shown a decline in diastolic BP (DBP) of 5.8 mmHg (Kirwan et al., 2016). In a randomized study, after intake of whole oat cereals for 12 wk, SBP and DBP significantly reduced by 7.5 mmHg and 5.5 mmHg, respectively, in patients with mild or borderline hypertension( JCS,2018). According to new guidelines from the American Heart Association, different category of blood pressure-

**Blood Pressure Categories**

| BLOOD PRESSURE CATEGORY | SYSTOLIC mm Hg (upper number) | | DIASTOLIC mm Hg (lower number) |
|---|---|---|---|
| NORMAL | LESS THAN 120 | and | LESS THAN 80 |
| ELEVATED | 120 - 129 | and | LESS THAN 80 |
| HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1 | 130 - 139 | or | 80 - 89 |
| HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2 | 140 OR HIGHER | or | 90 OR HIGHER |
| HYPERTENSIVE CRISIS (consult your doctor immediately) | HIGHER THAN 180 | and/or | HIGHER THAN 120 |

## Objectives-

The purpose of the study is to find out the demographic profile of the hypertensive patients, their anthropometry, biochemical measurements and impact of consumption of millets in the daily diet through counselling by giving them nutrition education on millets.

## Hypothesis-

It is assumed that patients with hypertension will be benefited in reduction of blood pressure after consumption of millets.

## Methodology-

The research areas were different hospitals of Old Bhopal City. 100 Patients both male and female age group 40-60 year has been selected from different hospitals of Bhopal city. They were hypertensive. Purposive sampling method was used in which patients who satisfied were selected for treatment. A prior written informed consent was also taken from the participants. First of all, patients were selected randomly, out of which 100 samples were selected for experimental work.

Data collection was the primary and most important step for the study in which assessment of measurements were done before providing the millets. In this assessment, Anthropometric Measurements, Biochemical Test, Dietary Assessment and Nutritional counselling were included. Millets(sorghum & pearl millet) were given in the morning or in between the meal or with meal for 15 days feedback till 3 months. After giving millets, results were collected through documents and records with the help of questionnaires, interview, focus group, oral history etc.

Anthropometric measurements was used to estimate total body fat, regional fat, and fat distribution. It includes BMI, skinfold thickness, waist, hip, and other girth measurements. BMI was widely used as an index of relative adiposity. The biochemical and clinical parameters were measured on samples of blood and blood pressure respectively. Dietary assessment methods provided valuable data to measure dietary exposure in nutritional epidemiology. It was done with the help of diet records, diet-history questionnaires, 24-h recalls, food-frequency questionnaires (FFQs) and nutritional counselling. These assessments were the most common methods to get individual dietary intakes. It was an integral part of treatment. It provided information, educational materials, and support to the patients and the knowledge of millets to these hospitalized patients with the help of counseling, questionnaires, interview, pamphlets, secondary data, democratic profile and also found the effect of millets on particular disease.

While conducting the study, adults aged 40-60 years included who were hospitalized and diagnosed only hypertension with informed consent. Both male and female were included.

**RESULT -**

Study was conducted on treatment group who were consuming millets in various form in their daily diet for the period of three months. Before starting the study the data was showing fluctuation in their blood pressure level, but after completion of study, the observation was found positive. Data was taken from the respondents after 3 months millet interventions. The systolic blood pressure (SBP) decreased from 140mmHg to 135mmHg and diastolic blood pressure (DBP) decreased from 90mmHg to 87mmHg due to millets consumption in their daily diet. Dietary fiber, protein, and minerals in millets are inversely associated with blood pressure (BP). Study has been revealed that the positive impact of millets on hypertensive patients in the form of reduction in SBP and DBP respectively.

**Table 1-Demographic profile of respondents-**

| VARIABLES | N (100) | PROPORTION% |
|---|---|---|
| Age Group | | |
| 40-45 | 10 | 10% |
| 46-50 | 15 | 15% |
| 51-55 | 40 | 40% |
| 56-60 | 35 | 35% |
| Sex- | | |
| Male | 60 | 60% |
| Female | 40 | 40% |
| Education- | | |
| Illiterate | 20 | 40% |
| Primary | 40 | 40% |
| Secondary | 20 | 20% |
| Graduate & above | 20 | 20% |
| BMI ($kg/m^2$)- | | |
| Overweight | 80 | 80% |
| obese | 20 | 20% |

Where N= total no. of respondents.

Table no.1-depicts different variables of respondents. A total of 100 respondents were purposively selected for the study and denoted by N. The respondents were selected among the age group of 40-60 years .They both were male and female.60 respondents were male and 40 were female.

**Table 2-Age wise distribution of hypertensive patients (male and female)-**

| AGE GROUP | N(100) | HYPERTENSIVE MALE AND FEMALE (%) | |
|---|---|---|---|
| | | Male | Female |
| 40-45 | 10 | 5(50%) | 5(50%) |
| 46-50 | 15 | 10(66%) | 5(34%) |
| 51-55 | 40 | 25(63%) | 15(37%) |
| 56-60 | 35 | 20(57%) | 15(43%) |
| Total | 100 | 60(60%) | 40(40%) |

Table no.2 depicts the proportion of hypertensive male and female according to age and gender. All the respondents were under the age of 40-60 years.

**Table 3-Stages of hypertension of the given respondents-(before consumption of millets)**

| STANDARD VALUE OF BP | AVERAGE VALUE OF BP | 40-60AGE GROUP-MALE-60, FEMALE-40 | |
|---|---|---|---|
| | | Male% | Female% |
| Normal <120/80 | 119/80 | 4(6.6) | 3(7.5) |
| Elevated >120/<80 | 123/80 | 10(16.66) | 7(17.5) |
| Stage 1 >130/>80 | 135/86 | 25(41.66) | 15(37.5) |
| Stage 2 > 140/>90 | 145/93 | 20(33.33) | 14(35) |
| Stage 3 >180/ >120 | 182/121 | 1(1.66) | 1(2.5) |

Table no.3 depicts the standard and average value of BP under the age of 40-60 years respondents.The data was collected before consumption of millets among 40-60 age group. Males are highly affected.

**Table 4- Frequency of consumption of millets in respondents-**

| FREQUENCY OF CONSUMPTION OF MILLETS | 40-60 AGE GROUP(N=100) | |
|---|---|---|
| | Male (%) | Female (%) |
| Regularly | 2(3) | 3(7.5) |
| Very often | 4(7) | 7(17.5) |
| Occasionally | 40(67) | 20(50) |
| Not at all | 14(23) | 10(25) |

Table 4 depicts frequency of consumption of millets in different age group. The percent of male of consumption of millets were high as compare to female consumption.

**Table 5- Stages of hypertension of the given respondents-(after consumption of millets)**

| STANDARD VALUE OF BP | AVERAGE VALUE OF BP | 40-60AGE GROUP-MALE-60, FEMALE-40 | |
|---|---|---|---|
| | | Male% | Female% |
| Normal <120/80 | 117/79 | 12(20) | 7(17) |
| Elevated >120/<80 | 120/78 | 20(33.33) | 12(30) |
| Stage 1 >130/>80 | 131/82 | 15(25) | 10(25) |
| Stage 2 > 140/>90 | 142/91 | 12(20) | 10(25) |
| Stage 3 >180/ >120 | 182/121 | 1(1.66) | 1(2.5) |

Table 5 depicts average value of blood pressure after consumption of millets. Positive changes were found in 40-60 age group.

## CONCLUSION-

- Millets are one of the oldest cultivated grain .It is one of the most important cereal and is a staple crop for humans.
- It is a good source of potassium,magnesium and fibres which play a role in regulating blood pressure.
- This study shows that millets are beneficial to control hypertension and it is suggested to incorporate millets in regular diet in various forms so as to keeps a person fit, healthy and free from diseases.
- Millets are rich in health promoting phytochemicals like polyphenols, lignans, phytosterols, phyto-oestrogens, phytocyanins.

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