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RESEARCH ARTICLE

A Study to Evaluate the Effectiveness of *Moringa oleifera* Leaves Tea on Reduction of Blood Pressure among Hypertensive Clients in selected rural area at Beml Nagar, KGF

Arun. S[1], Indira Jospeh[2], Evangelene. G[3], R. Rajesh[4], Muhammed Ajinas[5]
[1]Lecturer, Dept of Medical Surgical Nursing, Tjohn College of Nursing, Bangalore.
[2]Principal, Sambhram College of Nursing, BEML Nagar, KGF.
[3]HOD-Dept of Medical Surgical Nursing, Sambhram College of Nursing, BEML Nagar, KGF.
[4]Professor, Dept of Psychiatric Nursing, Sri Devaraj Urs College of Nursing, Tamaka, Kolar.
[5]Rainbow Childrens Hospital, Bannarghatta Road, Bangalore.
*Corresponding Author Email: **arun.mani17@gmail.com, indirajoseph_2007@rediffmail.com, eva.arun1986@gmail.com, ranjinirajesh007@gmail.com, ajinasmuhammad71@gmail.com**

ABSTRACT:
A Pre experimental one group pre and post test design was used to evaluate the effectiveness of *Moringa oleifera* leaves tea on reduction of blood pressure among hypertensive clients in selected rural area at BEML Nagar, KGF with 30 samples of hypertensive clients, selected by non probability purposive sampling technique. The blood pressure of the participants were monitored and recorded before and after intervention by using sphygmomanometer. The data obtained were analyzed and interpreted in terms of the objectives and hypothesis of the study. Descriptive and inferential statistics were used for the data analysis the level of significance was set at 0.05 level. Before intervention 8 (27%) participants had mild Hypertension, 17 (56%) participants had moderate hypertension, 5(17%) participants had severe hypertension. After intervention 20 (67%) participants had normal blood pressure, 7(23%) participants had mild hypertension, 2 (07%) participants had moderate hypertension and only 1(3%) participant had severe hypertension. The difference between pre test mean score and post test mean score was 19.1. The obtained t value is 6.46 which is greater than the table value at 0.05 level of significance. Therefore the t value is found to be significant. There is remarkable reduction of blood pressure among hypertensive clients after administration of moringa leaves tea. None of the demographic variables show any statistical significance with effectiveness of moringa leaves tea on reduction of blood pressure among hypertensive clients except habit of smoking (p value is 0.0368) significance level set was < 0.05. The present study concluded that, there is remarkable reduction of blood pressure among hypertensive clients after administration of moringa leaves tea. Hence moringa leaves is found to be effective in reduction of hypertension.

KEYWORDS: Effectiveness, Hypertensive clients, *Moringa oleifera*.

INTRODUCTION:
Moringa oleifera is a plant that has been praised for its health benefits for thousands of years. It is very rich in healthy antioxidants and bioactive plant compounds. So far, scientists have only investigated a fraction of the many reputed health benefits. There are health benefits of *Moringa oleifera* that are supported by scientific research[1]. *Moringa* leaves are an excellent source of

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many vitamins and minerals like protein, vitamin B6**,** vitamin C**,** iron**,** riboflavin B2**,** vitamin A**,** and magnesium. *Moringa oleifera* is a nutrient dense product that has a number of health benefits including lower blood pressure and cholesterol levels. Having high blood pressure has been linked to an increased risk of heart disease and complication[2].

Fortunately, many plant foods can effectively reduce blood pressure, among which moringa is the best plant food. *Moringa oleifera* is rich in various antioxidants, including quercetin and chlorogenic acid. Moringa leaf can increase blood antioxidant levels. Both animal- and human-based studies have shown that *Moringa oleifera* have blood pressure lowering effects. *Moringa oleifera* can lower your blood pressure levels, potentially reducing the risk of heart disease. Here's how:Moringa contains Vitamin C, an essential compound to produce nitric oxide. Nitric oxide supports the normal functioning of blood vessels.Potassium in moringa helps to combat sodium, a mineral that is proven to raise blood pressure.Magnesium, zinc, and Vitamin E are three compound proven to relax the muscles of blood vessels, which is essential for healthy blood pressure.Other antioxidants found in moringa may help to reduce eliminate harmful compounds in your blood stream that weaken blood vessels[3].

NEED FOR THE STUDY:

- Hypertension - or elevated blood pressure - is a serious medical condition that significantly increases the risks of heart, brain, kidney and other diseases.
- An estimated 1.13 billion people worldwide have hypertension, most (two-thirds) living in low- and middle-income countries.
- Fewer than 1 in 5 people with hypertension have the problem under control.
- Hypertension is a major cause of premature death worldwide.
- One of the global targets for non-communicable diseases is to reduce the prevalence of hypertension by 25% by 2025.

A poor diet is a major contributor to high blood pressure. The National Heart, Lung, and Blood Institute (NHLBI) has developed a diet specifically for preventing high blood pressure. This is called the DASH (Dietary Approaches to Stop Hypertension) diet[3]. This diet is primarily composed of fruits, vegetables, and low-fat dairy products. It also includes whole grains, fish, poultry, beans, seeds, nuts, and vegetable oils. This diet asks that you cut down on foods high in sodium and sugars, as well as limiting red meat and alcohol[4].

Fruits and vegetables high in potassium are great for preventing high blood pressure! Potassium helps regulate the adverse effects that excess sodium has in our bodies. Just like many other leafy greens, *moringa* is high in potassium, vitamins, and minerals[5]. *Moringa* has three times as much potassium as bananas, making it an amazing source of potassium. Moringa is an excellent addition to a diet for preventing high blood pressure. The powerful antioxidants found in Moringa extract might help prevent cardiac damage and has also been shown to maintain a healthy heart. Moringa contains isothiocyanate and niaziminin, compounds that help to stop arteries from thickening, which can cause blood pressure to rise[6].

Moringa oleifera plant, is a reservoir of abundant number of phytochemicals which have protective or disease preventive properties. The intake of *Moringa* leaf, by boiling with water can effect in the regulation of high blood pressure to a normal rate. This is due to the presence of various phytochemicals like, tannins, flavonoids, saponins, anthrax quinones, alkaloids and reducing sugars, triterpanoids and steroids. Flavanoids being a strong antioxidant have the properties to reduce blood pressure[7]. The use of *Moringa* leaf has give a constant change in many studies; that too in a short period of time while modern medicine do not give a constant change in blood pressure reading[8]. Thus the *Moringa* leaf can provide desired effect as a natural control measure for high blood pressure and can be regarded as an alternative medicine. Modern medicine drugs are made in such a way that only the needed phytochemical content is extracted and prepared the medicine[9]. But when we intake the leaf as a whole, many phytochemical contents present in it work together and make the action more effective[10].

METHODOLOGY:

This deals with research design, setting, population, sample size, sampling technique, criteria for selection of sample, description of tools and data collection.

STATEMENT OF THE PROBLEM:

A study to evaluate the effectiveness of *Moringa oleifera* leaves tea on reduction of blood pressure among hypertensive clients in selected rural area at, BEML Nagar, KGF.

OBJECTIVES:

- To assess the level of blood pressure before and after intervention among hypertensive clients.
- To evaluate the effectiveness of *Moringa oleifera* leaves tea by comparing pre and post test blood pressure values.
- To find-out the association between post test blood pressure values with their selected demographic variables of hypertensive clients.

Variables:
Independnt: Moringa leaves tea
Dependant: Blood pressure

RESEARCH DESIGN:
Pre -experimental - One group pretest-posttest research design is adopted to evaluate the effectiveness of moringa leaves tea among hypertensive clients.

SETTING:
The study is conducted in a selected rural area called Jayanagar at BEML Nagar, KGF.

Population:
The study population refers to the clients who are having hypertension residing at Jayanagar –KGF.

Sample Size:
A Sample size of 30 clients group who is diagnosed with hypertension.

Sampling Technique:
Non probability purposive sampling technique is used to select the samples for the study.

Criteria for Sample Selection:
Inclusion Criteria:
- The study included both men and women.
- Clients who are willing to participate in the study.
- The clients who can understand Kannada and English.
- The clients who are diagnosed as hypertension.
- The clients, who are present during data collection.

Exclusion Criteria
- Clients who are below 30 yrs.
- Clients who are not cooperative.
- Clients who are not understand Kannada /English

HYPOTHESIS:
H1: There will be significant difference in the pre and post test levels of blood pressure on administration of drumstick leaves tea among hypertensive clients
H2: There will be significant association between the selected demographic variables with post test levels of blood pressure among the hypertensive clients

Description of the Tool:
Details of the tool are given below.
Part - I - Demographic variables such as age, sex, family history duration of illness, etc
Part - II - Sphygmomanometer to monitor clients BP and BP chart to record BP.

PILOT STUDY:
Prior permission from the authorities was obtained and individual consent is taken from five samples selected for the study. The pilot study was conducted in Chaithanyapuram, BEML Nagar KGF, for a period of one week.

Validity:
The tools had been prepared by the help of experts" guidance on the basis of objectives which had been assessed and evaluated accepted by experts of Research committee. Content validity was obtained from community health nursing experts.

Reliability:
The reliability is checked by test retest method. The reliability score is 0.82. Reliability and practicability of tool is tested through the pilot study and used for main study.

DATA COLLECTION PROCEDURE:
The study was conducted at Jayanagar, BEML Nagar, KGF, Kolar district. The data was collected for a period of six weeks by using the prepared tools. The tools have been developed based on the objectives of the study and through review of literature. The investigator obtained the approval from the Ethical committee of Sambhram College of nursing, BEML Nagar, KGF and from the president of Jayanagar, BEML Nagar, KGF, Kolar District. Oral consent was taken from individual study participants to conduct the study.

On the assessment day blood pressure of all the participants were monitored and recorded. *Moringa oleifera* leaves tea was prepared by boiling 10 grams of moringa leaves in 200 ml of water for 8 to 10 minutes and administered to the subjects once a day in the morning for the period of 15 days . Then the blood pressure of participants were monitored and recorded on the evaluation day.

DATA ANALYSIS:
- The data had been organized, tabulated and analyzed by using descriptive statistics.
- Mean , standard deviation and paired t- test was carried out to assess the effectiveness of Drumstick leaves tea on reduction of blood pressure among hypertensive clients.

Chi-square test was used for the association of demographic variables with effectiveness of drumstick leaves tea among hypertensive clients.

RESULTS:
Data analysis and interpretation have been done under the following headings.

Section –A:

Socio Demographic Variables of the Study Participants:

Age: Majority of hypertensive clients 50% belongs to age group of 46-60 years, 30% of clients belongs to 61-65years, 16.7% clients belongs to at the age group of 30-45years.

Sex:

Majority of hypertensive clients 53.33% were males, and 46.66% were females.

Marital Status:

Majority of hypertensive clients 96.66% were married and 3.33% client were unmarried

Type of Family:

Majority of the hypertensive clients 60% belongs to Nuclear family, only 40% belongs to extended family

Occupation:

Majority of the hypertensive clients 43.4% were house wife and retired, 23.3% clients were coolies, 16.7% clients were private employees and only 13.3% were government employees.

EDUCATIONAL STATUS:

Majority of the clients 46.7 had primary education and 16.7% had secondary education, 10% were diploma holders, 10% were undergraduates, 10% were illiterate, 3.3% were post graduate and only 3.3% had other type of education.

ACTIVITY:

Majority of hypertensive clients 43.3% were involved in heavy activity, 36.7% were in moderate activity and only 20% were involved in sedentary activity.

Income Per Month:

Majority of the hypertensive clients 46.7% were not earning, 33.3% were earning more than Rs- 15000 per month, only 20% were earning Rs 11000-15000 per month.

DIET:

Majority of the hypertensive clients 93.3% were Mixed diet and only 6.7% were vegetarian diet.

DURATION OF HYPERTENSION:

Majority of the hypertensive clients 40% had hypertension more than 5 years, 26.6% had hypertension from 3-5years, 16.7% had hypertension from 1-3 years, and 16.7% had hypertension for less than 1year.

BMI:

Majority of hypertensive clients 56.7% were under normal weight, 36.7% were obese, 3.3% were over weight and 3.3% were under weight.

ASSOCIATED ILLNESS:

Majority of the hypertensive clients 43.3% had Diabetes Mellitus, and 43.3% had no associated illness, 6.7% had Cardiovascular Disorders and 6.7% had some other illness.

Type of Treatment and Follow Up:

Majority of the hypertensive clients 63.3% were under regular treatment, 23.4% were under irregular treatment and only 13.3% were not taking any type of treatment.

Sources of Information:

Majority of the hypertensive clients 96.7% were aware of hypertension, only 3.3% were unaware of hypertension.

Familial History of Hypertension:

Majority of hypertensive clients 60% had familial history of hypertension, only 40% had no familial history of hypertension.

Habit of Alcohol:

Majority of hypertensive clients 93.3% have no habit of taking alcohol, and only 6.7% were consuming alcohol in that 10%, 3% were consuming alcohol since 3-5 years, 3% were consuming for more than five years

Habit of Smoking:

Majority of hypertensive clients 90% have no habit of smoking, 10% were smokers In this 10%, 7% were smoking since 3-5years with 5-10 cigarettes per day, 3% were smoking since more than 5 years with more than 10 cigarettes per day.

Exercise:

Majority of hypertensive clients 73.3% doesn't do any type of exercise and only 26.7% were doing some exercises like walking (20%) and 96.7%) practicing yoga.

Section B

Table 1- The Level of Blood Pressure Before and After Intervention Among Hypertensive Clients

Blood pressure	Pre intervention Blood Pressure		Post intervention Blood pressure	
	Frequency	%	Frequency	%
Normal BP	0	0	20	67%
Mild HTN	08	27%	07	23%
Moderate HTN	17	56%	02	07%
Severe HTN	05	17%	01	03%

Table 1 shows that, before intervention 8 participants 27% had mild Hypertension, 17 participants 56% had moderate hypertension, 5 participants 17% had severe hypertension. After intervention 20 participants 67% had normal blood pressure, 7 participants 23% had mild hypertension, 2 participants 07% had moderate

hypertension and only 1 participant 3% had severe hypertension.

The level of blood pressure before and after intervention among hypertensive clients:

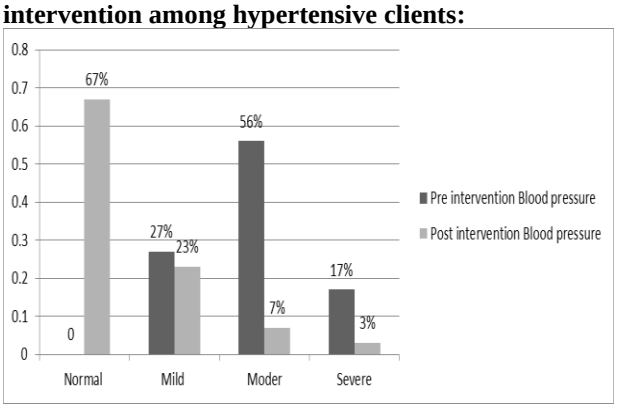

Fig 1 Diagrammatic representation of blood pressure levels of hypertensive clients before and after intervention

Section – C

Table 2: Comparison between Pre and Post Test Mean and Standard Deviation Scores of Effectiveness of Moringa Leaves Tea Among Hypertensive Clients

Parameter	Mean	SD	Mean difference	Paired t test value	P value	Significance <0.05
Pre Test	123.1	13.23	19.2	6.46	< .00001	Significant
Post Test	104.0	09.33				

The difference between pre test mean score and post test mean score was 19.1. The obtained t value is 6.46 which is greater than the table value at 0.05 level of significance. Therefore the t value is found to be significant. There is remarkable reduction of blood pressure among hypertensive clients on administration of moringa leaves tea.

Distribution of mean and standard deviation scores of hypertensive clients:

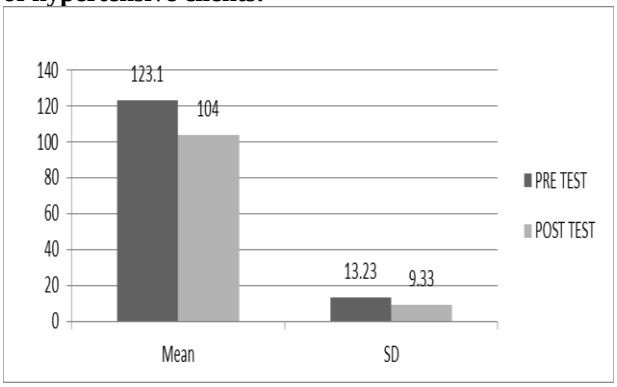

Fig 2 Diagrammatic representation of mean and standard deviation scores of effectiveness of moringa leaves among hypertensive clients.

Table 3 - Comparing Mean, Standard Deviation, t Value, p-Value by Different Methods

1. MAP-MEAN ARTERIAL PRESSURE (Systolic and Diastolic converted to single value)

$$\text{FORMULA} = \frac{2 \text{ X (Diastolic+Systolic)}}{3}$$

Parameter	Mean	SD	Paired t test t value	P value	Significance <0.05
Pre Test	123.1	13.23	6.46	< .00001	Significant
Post Test	104.0	09.33			

2. Systolic Blood Pressure

Parameter	Mean	SD	Paired t test t value	P value	Significance <0.05
Pre test	162.33	15.4	7.741	< .00001	Significant
Post test	135.33	11.21			

3. Diastolic Blood Pressure

Parameter	Mean	SD	Paired t test t value	P value	Significance <0.05
Pre Test	103.5	12.5	5.35	< .00001	Significant
Post Test	88.33	9.12			

SECTION D:

Association between Demographic variables and effectiveness of Drumstick Leaves Tea among Hypertensive Clients:

None of the demographic variables show any statistical significance with effectiveness of moringa leaves on reduction of blood pressure among hypertensive clients except habit of smoking (p value is 0.0368) significance level set was < 0.05.

DISCUSSION:

In present study, before intervention 8(27%) participants had mild Hypertension, 17(56%) participants had moderate hypertension, 5(17%) participants had severe hypertension but after intervention 20(67%) participants had normal blood pressure, 7(23%) participants had mild hypertension, 2(07%) participants had moderate hypertension and only 1(3%) participant had severe hypertension. The findings are consistent with a study conducted by V. Hemavathy, Girija Bhaskaran and Pauline Sheela Priya , with a sample of 40 hypertensive clients their study findings reveals pretest majority of the hypertensive clients out of 40 samples 29(72.5%) were belongs to mild level of hypertension, 11(27.5%) were having moderate hypertension before administration of drumstick leaves tea. In posttest after administration of drumstick leaves tea over a period of 2 weeks, out of 40 samples 26(65%) were having normal blood pressure,14(35%) belongs to mild level of hypertension.

The present study found there is difference between pre test mean score and post test mean score was 19.1. The obtained t value is 6.46 which is greater than the table value at 0.05 level of significance. Therefore the t value is found to be significant. There is remarkable reduction of blood pressure among hypertensive clients on administration of moringa leaves tea. And the study is supported by a study conducted by Jayasree. C the mean score on assessment day was 35.47 with standard deviation of 2.52 and on evaluation the mean was 20.10 with the standard deviation of 2.64. So there is a significant improvement between the assessment score and evaluation score. It shows drumstick leaves tea was very effective.

In the present study none of the demographic variables show any statistical significance with effectiveness of moringa leaves on reduction of blood pressure among hypertensive clients except habit of smoking (p value is 0.0368) significance level set was < 0.05. The study findings was congruent with a study conducted by Kumar Sai Sailesh, Jabir PK, Madhusudhan, in which there was a statistical significance with weight of the hypertensive clients.

CONCLUSION:

The present study concluded that, there is remarkable reduction of blood pressure among hypertensive clients on administration of moringa leaves tea. Hence moringa leaves is found to be effective in reduction of hypertension.

RECOMMENDATIONS:

Based on the research findings the following recommendations have been made,

- Similar study can be conducted with large samples.
- This study can be conducted to find out the relationship between systolic and diastolic blood pressure
- Experimental study can be conducted by introducing structured teaching programme.
- A descriptive study can also be conducted to evaluate problems and institute nursing care for hypertensive clients.
- Descriptive study on assessment of knowledge, attitude, and practice of hypertension and its advanced management can be initiated.

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