A QUASI-EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF HIBISCUS TEA ON BLOOD PRESSURE AMONG SELECTED HYPERTENSIVE PATIENTS OF ANAND DISTRICT

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Abstract.

Background and aim: Hypertension is a prevalent and critical risk factor for heart disease and other health issues, making it both a major public health concern and a key area of research. The aim of the study is to find effectiveness of hibiscus tea on blood pressure.

Methods: A quasi-experimental research design was employed. Total 60 adults with elevated blood pressure and pre-hypertensive patients were selected using non-probability convenient sampling techniques, experimental group (30) and control group (30). Hibiscus tea packets were given to experimental group and were instructed by the researcher to take hibiscus tea in lukewarm water adding the provided packet of 6.25 gm powder. The tea was administered under researcher's supervision and guidance, twice a day for 30 days.

Results: In the experimental group, 80% were classified as pre-hypertensive, while 20% had stage 1 hypertension. Following the intervention (post-test), a significant improvement was observed, with 86.7% of participants achieving normal systolic blood pressure, 13.3% having elevated blood pressure, and none remaining in the pre-hypertensive or stage-1 hypertension category, a significant improvement was also observed in diastolic blood pressure, with 90% of participants achieving normal diastolic blood pressure, 10% having elevated blood pressure, and none remaining in the pre-hypertensive or stage-1hypertension categories.

Conclusions: The independent sample t-test results show that hibiscus tea effectively reduced both systolic and diastolic blood pressure levels in hypertensive patients in the experimental group when compared to the control group.

Key words: hibiscuses tea, blood pressure, hypertension

Running Title: A study to assess the effectiveness of hibiscus tea on blood pressure among selected hypertensive patients

BACKGROUND OF THE STUDY

Hypertension is common and a significant risk factor for heart disease and other problems, it is both a significant public health issue and an important topic of research. [1] "The American College of Cardiology and the American Heart Association divide blood pressure into four general categories. that shows in table no .1(table 1) [2]

Level of blood pressure		Interpretation
Systolic	Diastolic	
<120	<80	Normal
120-129	<80	Elevated
130-139	80-89	Pre-hypertension
>140above	>90above	Stage 1
>180above	>120above	Stage 2

Peoples with high blood pressure are far more likely to experience a stroke, coronary heart disease, heart or kidney failure, and peripheral artery disease during their lifetimes than people with normotension. [3]

An increased risk of heart, brain, kidney, and other diseases is associated with high blood pressure, a dangerous medical condition. Over a billion people have the condition; it is one of the biggest causes of premature death worldwide, impacting up to 1 in 4 men and 1 in 5 women. [4]

A significant research topic and public health issue, hypertension is a major risk factor for cardiovascular diseases and other complications in addition to being highly prevalent. [5]

Malaysia's national flower is the Hibiscus rosa-sinensis. Hibiscus flowers can now be found in a wide range of colours, including multicoloured, pink, yellow, orange, purple, and lavender. The large, showy, bisexual flowers can reach a width of up to 25 cm. They are stalked and emerge singly from the upper leaf axils. The five free petals that are joined at the base can be either red, yellow, or white in colour. The hibiscus plant was used in traditional Malay healing in the Dutch Indies in the late 19th and early 20th centuries. Its roots, leaves, and flowers are thought to have therapeutic qualities. Chinese and Indian hair dyes were made from the juice of hibiscus petals and flowers. [6]

Hibiscus rosa-sinensis flowers are high in fat, phosphorus, calcium, iron, nitrogen, and moisture. Hibiscus flowers also contain a number of pharmacological qualities, such as wound-healing, antioxidant, antibacterial, anti-inflammatory, anti-pyretic, hypotensive, anti-cancer, and

abortifacient qualities. The calyces, or sepals, of the hibiscus flower are used to make hibiscus tea, which is consumed hot or cold by people worldwide. "Roselle" is another name for it. [7]

Because anti-hypertensive medication side effects and expense make it difficult for certain clients to take adequate care of their hypertension, the investigator chose this particular study based on her observation of many clints experiencing difficulty from their hypertension during her clinical expertise. Easy to find and safe to use, hibiscus tea has no negative effects. Because of this the researcher was curious to find out if hibiscus tea may lower blood pressure in hypertensive patient

MATERIAL AND METHODS:

Research approach and Design: The Quantitative approach with quasi-experimental research design non-randomized control group study was adopted to fulfil the study objective.

Population and Sampling: A total of 60 samples (in that 30 samples belong to intervention group and other 30 samples were in control group.) were enrolled using Nonprobability: Convenient sampling from SKH extension centre who met the inclusion and exclusion criteria

Criteria for sample selection

Inclusion criteria:
- Patient Age group of 30 to 70.
- Newly diagnosed patient with elevated hypertension
- Newly diagnosed patient with pre- hypertension

Exclusion criteria:
- Patient unwilling to participate.
- Patient who has a kidney disorder
- Pregnant women
- Patient who has ongoing hypertensive medication
- Hypertensive patients whose blood pressure above 160/100mm of Hg.
- Hypertensive patients who are on other herbal treatment.
- Hypertensive patients who are having chronic illness.
- Eligible couple comes under family planning.

ETHICAL CONSIDERATION:

This study was conducted with the approval of the Institutional Ethical Committee of Bhaikaka University. Permission was also obtained from the HOD of Shree Krishna hospital's extension centres . Participants were informed about the study's purpose, assured of confidentiality, and told their participation was voluntary. Informed consent was obtained, participants were assigned numbers for anonymity, and interventions were carried out in a controlled setting to minimize harm.

Informed Consent Process

A researcher from the SKH Extension Centre identified the participants. Participants were chosen based on the inclusion and exclusion criteria. Participants who met the criteria were given a participant information sheet that tracked risks, benefits, harm, and withdrawal from the study. Participants' concerns about research and intervention were alleviated. After fully understanding the research purpose, participants were given an informed consent form. Participants who agreed to participate in the study were chosen as a sample.

Tools: The data was captured by the tool developed by the researcher and validated by the experts which consist of 2 parts

- Section A: Demographic variables
- Section B: Blood pressure level monitoring sheet

Data collection procedure:

A research study was done in February–March 2024 in Shree Krishna Hospital's extension centre. The present study was conducted after approval was obtained from the institutional ethical committee. Then, prior permission was obtained from the head of the institute and the HOD of Shree Krishna Hospital's extension centre. A non-probability convenience sampling technique was used for sample collection. Then questionnaires were given to all participants, which contained demographic variables. A total of 60 samples were taken, with 30 from the experimental group and 30 from the control group. with the help of extension centres medical social workers on daily basis for 30 days hibiscus tea was given to the experimental group. All experimental groups were instructed by the researcher to administer this hibiscus tea in lukewarm water, adding 6.25 g of powder. The tea was administered under the researcher's supervision and guidance twice a day for the next 30 days. On the 31st day, Post test was done

Data analysis:

The data collected for the study was analyzed using both descriptive and inferential statistics, with guidance from experts in nursing and statistics. The data was organized and tabulated to show frequencies and percentages, and descriptive statistics such as mean, standard deviation, and frequency were calculated to describe the study population. SPSS software was used for data analysis, including a paired t-test to determine the effectiveness of hibiscus tea on hypertension and a chi-square test to identify any associations between demographic variables and hypertension.

RESULTS:

Table No. 2 Shows Frequency and percentage distribution of demographic variables of Hypertensive patients in experimental and control group. (n=60)

Demographic Variables	Experimental Group Frequency	Experimental Group Percentage	Control Group Frequency	Control Group Percentage
Age in Year				
30 to 44 years	9	30%	10	33.3%
45 to 54 years	13	43%	12	40%
55 to 64 Years	8	26%	8	26.7%
Gender				
Male	18	60%	20	66.7%
Female	12	40%	10	33.3%
Educational Status				
No Formal Education	2	6.7%	2	6.7%
Primary	7	23.3%	13	43.3%
Higher Secondary	7	23.3%	7	23.3%
Graduate & Post Graduate	14	46.7%	8	26.7%
Occupation Status				
Sedentary Work	14	46.7%	12	40%
Moderate worker	15	50%	16	53.3%
Heavy worker	1	3.3%	2	6.7%
Dietary Patterns				
Vegetarian	13	43.3%	17	56.7%
Non-Vegetarian	9	30%	4	13.3%
Mix Diet	8	26.7%	9	30%
Family Monthly Income				
2000-5000 Rs	2	6.7%	5	16.7%
Above 5000 Rs	28	93.3%	25	83.3%
Family History of Hypertension				
Yes	9	30%	13	43.3%
No	21	70%	17	56.7%
Body Mass Index				
Thin Body	12	40%	11	36.7%
Moderate body	15	50%	18	60%
Obese Body	3	10%	1	3.3%
Life Style Practice				
Smoking	8	26.7%	8	26.7%
Alcohol	6	20%	4	13.3%
Tobacco Chewing	3	10%	2	6.7%
None	6	20%	7	23.3%
Other Habits	7	23.3%	9	30%
Regular Physical Exercise				
Running	4	13.3%	5	16.7%
Yoga	0	0%	0	0%
Meditation	0	0%	0	0%
Other	26	86.7%	25	83.3%

In the experimental group, which includes 30 participants, the majority are aged 45-54 years (43%), followed by 30-44 years (30%) and 55-64 years (26%). Gender distribution shows 60% males and 40% females. Educationally, 46.7% are graduates or postgraduates, 23.3% have higher secondary education, 23.3% have primary education, and 6.7% have no formal education. Occupationally, 50% are engaged in moderate work, 46.7% in sedentary roles, and 3.3% in heavy work. Dietary preferences show 43.3% are vegetarians. Most participants (93.3%) have a family income above 5000 Rs, and 30% have a family history of hypertension. The BMI distribution indicates 40% have moderate body mass, with lifestyle practices including 26.7% smoking, 20% alcohol consumption, and 23.3% not engaging in regular exercise.

In the control group of 60 participants, age distribution is similar with 33.3% in the 30-44 years range, 40% in the 45-54 years range, and 26.7% in the 55-64 years range. Gender representation is 66.7% male and 33.3% female. Educational levels include 43.3% graduates/postgraduates, 26.7% with primary education, and 23.3% with higher secondary education. Occupationally, 53.3% are involved in moderate work, 40% in sedentary roles, and 6.7% in heavy work. Dietary preferences show 56.7% are vegetarians. Family income above 5000 Rs is reported by 83.3% of participants, and 56.7% have a family history of hypertension. The BMI distribution shows 36.7% with moderate body mass, with lifestyle practices including 26.7% smoking, 13.3% alcohol consumption, and 16.7% not engaging in regular exercise. (table-2)

Table No. 3 shows Assessment of Pretest and Post test Blood Pressure (Hypertension) Levels in Experimental Group

Level of Blood Pressure in Experimental Group	Pretest		Posttest	
	Frequency	Percent	Frequency	Percent
Systolic Blood Pressure				
Normal	0	0%	26	86.7%
Elevated BP	0	0%	4	13.3%
Pre-hypertension	24	80%	0	0%
Stage-1 hypertension	6	20%	0	0%
Diastolic Blood Pressure				
Normal	1	3.3%	27	90%
Elevated BP	4	13.3%	3	10%
Pre-hypertension	23	76.7%	0	0%
Stage-1 hypertension	2	6.7%	0	0%

Table 3 shows the changes in blood pressure levels among participants in the experimental group before and after the intervention.

Systolic Blood Pressure: Initially, none of the participants had normal systolic blood pressure; 80% were pre-hypertensive, and 20% had stage-1 hypertension. After the intervention,

86.7% of participants achieved normal systolic blood pressure, 13.3% had elevated blood pressure, and none remained pre-hypertensive or stage-1 hypertensive.

Diastolic Blood Pressure: Before the intervention, only 3.3% had normal diastolic blood pressure, 13.3% had elevated blood pressure, 76.7% were pre-hypertensive, and 6.7% had stage-1 hypertension. Post-intervention, 90% of participants achieved normal diastolic blood pressure, 10% had elevated blood pressure, and none were pre-hypertensive or stage-1 hypertensive. (table-3)

Table No. 4 shows Assessment of Pretest and Post-test Blood Pressure (Hypertension) Levels in Control Group

Level of Blood Pressure in Control Group	Pretest		Posttest	
	Frequency	Percent	Frequency	Percent
Systolic Blood Pressure				
Normal	0	0%	0	0%
Elevated BP	0	0%	0	0%
Pre-hypertension	20	66.7%	24	80%
Stage-1 hypertension	10	33.3%	6	20%
Diastolic Blood Pressure				
Normal	0	0%	2	6.7%
Elevated BP	4	13.3%	4	13.3%
Pre-hypertension	23	76.7%	23	76.7%
Stage-1 hypertension	3	10%	1	3.3%

Table 4 outlines the blood pressure levels in the control group before and after the intervention. For systolic blood pressure, none of the participants had normal or elevated readings initially; 66.7% were pre-hypertensive, and 33.3% had stage-1 hypertension. After the intervention, 80% remained pre-hypertensive, 20% had stage-1 hypertension, and no participants achieved normal or elevated systolic blood pressure. Regarding diastolic blood pressure, none had normal readings before the intervention; 13.3% had elevated blood pressure, 76.7% were pre-hypertensive, and 10% had stage-1 hypertension. Post-intervention, 6.7% achieved normal diastolic blood pressure, 13.3% had elevated readings, 76.7% remained pre-hypertensive, and 3.3% were in the stage-1 hypertension category. (table-4)

Table No. 5 Assessment of Pretest and Post-test Blood Pressure (Hypertension) Levels in Control Group

Blood Pressure level Before and After in Experimental Group	Mean	Std. Deviation	Mean Difference Score	Paired- t score	df	P- Value
Systolic BP Pretest	135	2.177	16.36**	25.33	29	0.000 S
Systolic BP Posttest	119	2.224				
Diastolic BP Pretest	84	1.832	8.46**	17.42	29	0.000 S
Diastolic BP Posttest	76	1.960				

Table 5 shows that The paired t-test results demonstrate a significant reduction in both systolic and diastolic blood pressure levels among hypertensive patients in the experimental group after consuming hibiscus tea. These findings support the effectiveness of hibiscus tea as an intervention for lowering blood pressure in this population, highlighting its potential role as a non-pharmacological approach to managing hypertension. (table-5)

Table No. 6 shows the Comparison to assess the effectiveness of Hibiscus Tea on blood pressure level among hypertensive patient in Experimental and Control group: Independent t-test Analysis.

Independent Sample t-test for Equality of Means Difference Comparison						
Variable	Groups	Mean Score	Std. Deviation	Mean Difference Score	Independent t-test	P- Value
Pretest Systolic BP	Experimental	135	3.383	1.93	2.212	0.031
	Control	137	3.388			
Pretest Diastolic BP	Experimental	84	3.200	0.70	0.876	0.385 NS
	Control	85	2.987			
Posttest **Systolic** **BP**	**Experimental**	**119**	**2.224**	**17.8**	**27.01**	**0.000 S**
	Control	**136**	**2.842**			

Posttest Diastolic BP	Experimental	76	2.041	7.76	13.83	0.000 S
	Control	119	2.224			

The independent sample t-test analysis confirms that hibiscus tea effectively reduced both systolic and diastolic blood pressure levels among hypertensive patients in the experimental group compared to the control group. The significant differences observed between the groups highlight the efficacy of hibiscus tea as an intervention for managing hypertension.(tab;e-6)

DISCUSSION:

The study found that hibiscus tea effectively lowered both systolic and diastolic blood pressure levels in participants, supporting its use as a non-pharmacological treatment for hypertension. The research hypothesis was confirmed by the significant reduction in blood pressure levels. Another study by Chitra (2023) also showed the effectiveness of hibiscus tea in reducing blood pressure among hypertensive patients, with statistically significant results.

The independent sample t-test analysis showed that hibiscus tea effectively lowered both systolic and diastolic blood pressure in hypertensive patients in the experimental group compared to the control group, supporting the hypothesis that hibiscus tea is an effective intervention for managing hypertension. The present study supports the findings of similar study by Sandhya B. (2020) on prehypertensive individuals also found significant differences in blood pressure levels between the experimental and control groups.

A chi square analysis was conducted to examine the relationship between blood pressure levels and demographic variables among hypertensive patients. The study found that regular exercise was significantly associated with blood pressure levels at a P value <0.05. This supports the research hypothesis that selected demographic variables, such as regular exercise, are linked to blood pressure levels in hypertensive patients. This finding is consistent with previous research by M. Jalalyazdi (2019) showing a significant association between demographic variables and blood pressure levels, specifically with regular exercise and age.

The independent sample t-test analysis confirms that hibiscus tea effectively reduced both systolic and diastolic blood pressure levels among hypertensive patients in the experimental group compared to the control group. The significant differences observed between the groups highlight the efficacy of hibiscus tea as an intervention for managing hypertension.

CONCLUSION:

The study aimed to assess the impact of hibiscus tea on hypertension in a group of selected patients in Anand district. A quantitative research approach was used, with a quasi-experimental design. 60 participants were divided into an experimental group and a control group. The experimental group was given hibiscus tea for 30 days and their blood pressure levels were measured before and after. The results showed a significant decrease in blood pressure levels in the experimental group, particularly among those who engaged in regular exercise. These findings suggest that hibiscus tea could be a promising non-pharmacological intervention for managing hypertension.

Ethic Committee: Institution name : Institutional ethics committee – 2, Bhaikaka university, Karamsad, Ananad , Gujarat
protocol number and year : IEC/BU/Faculty/01/318/2023

Conflict of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

Authors Contribution:
Praneeta Christian: Designing, supervision guiding &scientific publication
Dhruv Mahla: Data collecting, creating, processing, analyzing data, & scientific publication

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