

Effect of hibiscus tea on blood pressure among hypertensive patients working at selected tertiary care hospital, Puducherry

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Abstract—Background: The force that the heart muscle's contraction activity exerts on the arterial wall is known as blood pressure. Naturally, our blood pressure changes every day. A person's life has an impact on their blood pressure levels as well. **Methods:** A pre – experimental study was used to assess the effect of hibiscus tea on blood pressure among hypertensive patients. The study was conducted in PIMS in the month of November – December 2024. 60 PIMS employees were selected using Purposive sampling technique. Socio demographic variables were collected using validated self – structured questionnaire and blood pressure was checked using pre validated digital sphygmomanometer. The data was analysed by using frequency, percentage, mean and standard deviation. Effect of intervention was analysed using Wilcoxon signed rank test. Association between pre – test level of blood pressure with their selected socio demographic variables were analysed using Fisher's exact test / Chi square test. **Results:** The results shows that 23 (38.3%) participants belong to the age more than or equal to 50 years, and 39 (65.0%) are female. Most of them are graduate education 20 (33.3%) and 54 (90.0%) belongs to moderate worker. 54 (90.0%) of them belongs to Hindu. Majority of them 51 (85.0%) were married and most of them are non-vegetarian 57 (95.0%). 35 (58.3%) were with normal BMI. Half 30 (50.0%) had family history of hypertension. 51 (85.0%) has no habits of smoking and alcoholism. For 23 (38.3%) the duration of hypertension ranges from 6 months to 3 years. Only 46 (76.7%) are on treatment for hypertension.

Regarding the effect of intervention, the comparison between the pre and post – test mean values of systolic and diastolic blood pressure. The pre – test mean value of systolic blood pressure was 134.00 with standard deviation 11.27 and pre – test mean value of diastolic blood pressure was 89.42 with standard deviation 7.14. and post – test mean value of systolic blood pressure was 123.42 with standard deviation 7.28 and post – test mean value of diastolic blood pressure was 86.75 with standard

deviation 5.19. Wilcoxon Signed Ranks Test was applied to analyse. The Z – value for systolic blood pressure 6.571, p value was < 0.001, Diastolic blood pressure Z – value 2.179 and p – value was 0.029 which is statistically significant.

I. INTRODUCTION

The force that the heart muscle's contraction activity exerts on the arterial wall is known as blood pressure. Naturally, our blood pressure changes every day. A person's life has an impact on their blood pressure levels as well.

According To World Health Organization (WHO), hypertension or high blood pressure, is when blood pressure is consistently 140/90 millimetres of mercury (mmhg) or higher. Hypertension can be serious if left untreated and is a risk factor for cardiovascular diseases and chronic kidney disease.

According to American Heart Association (AHA) guidelines Elevated Blood pressure systolic pressure between 120- and 129-mm Hg and diastolic pressure less than 80 mm Hg. Stage 1 hypertension, with a systolic pressure of 130 to 139 mm Hg or a diastolic pressure of 80 to 89 mm Hg. Stage 2 hypertension, with a systolic pressure of 140 mm Hg or greater or a diastolic pressure of 90 mm Hg or Greater.

An estimated 1.28 billion adults aged 30–79 years worldwide have hypertension, most (two-thirds) living in low- and middle-income countries. An estimated 46% of adults with hypertension are unaware that they have the condition. Less than half of adults (42%) with hypertension are diagnosed and treated. Approximately 1 in 5 adults (21%) with hypertension have it under control. Hypertension is a major cause of premature death worldwide. One of the global targets

for noncommunicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2030.

II. OBJECTIVES

Primary objectives

1. To find out the effectiveness of hibiscus tea on reduction of blood pressure among hypertensive patients.

Secondary objectives

2. To associate the pre - test level of blood pressure among hypertensive patients with their selected socio demographic variables.

III. METHODS

- **RESEARCH DESIGN:** pre – experimental one group pre and post-test design
- **SAMPLE:** Male and female employees working in PIMS hospital, Puducherry
- **SAMPLE SIZE:** 60
- **SAMPLING TECHNIQUE:** Purposive sampling

Inclusion criteria

- Hypertensive patients both male and female aged between above 20 years and below 60 years working at selected tertiary care hospital, Puducherry.
- Both male and female employee (administrative people, staff nurses, attenders, secretary, electrical workers, laboratory workers) working in tertiary care hospital, Puducherry.
- known case of hypertension more than six months.

Scoring key

Level of blood pressure		Interpretation	Score
Systolic (mm of Hg)	Diastolic (mm of Hg)		
< 120	< 80	Normal	0
120 - 139	80 - 89	Pre hypertension	1
140 - 159	90 - 99	Stage I hypertension	2
>=160	>= 100	Stage II hypertension	3

- Patients who are able to understand Tamil / English.

Exclusion criteria

- Those who are contraindications to hibiscus tea.
- Allergic to hibiscus.

IV. DEVELOPMENT AND DESCRIPTION OF THE TOOL

The tool was developed by the investigator after reviewing the related literature and guidance from the experts in the field.

Description of the tool

The tool consists of 2 items

Tool 1: Tool to assess socio demographic variables by using self – structured questionnaire

Tool 2: Digital sphygmomanometer

TOOL-1

It consists of structured self-administered questionnaire related to Demographic variables of study participant age, gender, education, occupation, religion, marital status, dietary habits, body built, family history of hypertension, and life style practice, duration of hypertension, on treatment for hypertension.

TOOL-2

Digital sphygmomanometer

Blood pressure level checking with the help of digital sphygmomanometer before administration of hibiscus tea on 1st day , BP monitoring :@10.30am. Post test is conducted on 21 th day .

V. DESCRIPTION OF INTERVENTION

Hibiscus flowers contain three major effective agents,

- Anthocyanins (40%) - It contains acidic polysaccharides – 10% and flavonoid glycosides such as cyanidin – 10%, delphinidin – 15%, chromenylum, trichloride.
- It has anti hypertensive compounds and anti-oxidant properties. It contains esculetin, 6, 7 dihydroxychromen-2-one, gossypetin. It controls the proper level of blood viscosity reducing blood pressure and enhancing activity of intestinal peristalsis.
- It acting as angiotensin – converting enzyme (ACE) inhibitors, it reduce the activity of the rennin angiotensin aldosterone system, block the conversion of angiotensin I to angiotensin II, leading to decreased blood pressure.
- Hibiscus tea is rich in vitamin c. It contains 15-30% of organic acids including 3% citric acid, 4% maleic acid and 3% tartaric acid. It strengthens our immune system, ability to oxidize lipoproteins that they act by diluting the concentration of waxy built up in the arteries due to the action of lipoproteins. It is required for the conversion of cholesterol to bile acids. It has rich natural sources of gamma – linoleic acids, which against cholesterol deposits in blood vessels.
- Hibiscus tea helps to lowers cholesterol, fight cancer and reducing bloating. It can also strengthen the immune system and fight free radicals. It also improves blood circulation, reduces stress levels, protects body against bacterial attack, reduces weight, prevent bladder infection and constipation.

Source of hibiscus

The hibiscus will be sourced from Puducherry.

Recipe of hibiscus tea

- Water – 150 ml
- Hibiscus rosa-synesis dried flower powder – 2 grams

Method of preparation

Take 150ml of water. Once the water starts boiling add 2 grams of dried hibiscus rosa-synesis flowers powder to the boiling water. Let it boil for 5 minutes in low flame, close the lid and keep the vessel closed, switch off the stove and cool it for 1 minutes. After that strain and drink .100 ml of hibiscus tea given at 10 - 11 am for 21 days (6 days per week –

Monday to Saturday) to the participants. Blood Pressure measurement on 21 the day at 11.30 am.

DATA COLLECTION PROCESS

The study was conducted after obtaining permission from the concerned authority. The data was collected during the month of November – December 2024 at Pondicherry Institute of Medical Sciences, Puducherry. PIMS hospital staff were screened and those who fulfilled inclusion and exclusion criteria were selected using purposive sampling technique. The investigator obtained written consent from each sample. The nature and the purpose of the study were explained to them. The data was collected from 60 participants.

On day 1, the participants were gathered in the demonstration room of general medicine out – patient department, Demographic data are collected using structured interview method and pre – test blood pressure was checked using pre validated digital sphygmomanometer 5 – 10 minutes spent for each participant. Every day from Day 1 – 21 the participants were instructed to come to general medicine demonstration room and were given 100 ml of hibiscus tea between 10 – 11 am. Attendance sheet was maintained, and a packet of 2 gm hibiscus rosa sinesis powder was given in prior to all participants for self – preparation, in case of any absence. Day 21 post – test was done blood pressure was checked using pre validated digital sphygmomanometer after administration of hibiscus tea.

DATA ANALYSIS PLAN

The investigator analyses the data obtained by using descriptive and inferential statistics. Data analysis was organized as follows,

- Demographic data were analyzed by using frequency and percentage.
- To determine the effect of hibiscus tea on reduction of blood pressure among hypertensive patients, Wilcoxon signed ranks test used.
- Association between pre - test level of blood pressure with selected socio demographic variables (age, gender, occupation, dietary habits, body built, family history of hypertension, life style practice, on treatment for hypertension) were found using Fisher's exact test / Chi square test. $P < 0.05$ was considered statistically significant.

VI. RESULTS

SECTION I : DISTRIBUTION OF PATIENTS BASED ON THE SOCIO DEMOGRAPHIC VARIABLES

Table 1 : Frequency and percentage distribution of patients based on selected demographic variables

n = 60

s.no.	Demographic variables	Frequency	Percentage
1	AGE IN YEARS		
	29 – 39 years	18	30.0
	40 – 49 years	19	31.7
	≥ 50 years	23	38.3
2	GENDER		
	Male	21	35.0
	Female	39	65.0
3	EDUCATION		
	Illiterate	3	5.0
	Primary education	19	31.7
	Secondary education	18	30.0
	Graduate education	20	33.3
4	OCCUPATION		
	Sedentary worker	6	10.0
	Moderate worker	54	90.0
5	RELIGION		
	Hindu	54	90.0
	Muslim	1	1.7
	Christian	5	8.3
6	MARITAL STATUS		
	Unmarried	1	1.7
	Married	51	85.0
	Widow	8	13.3
7	DIETARY HABITS		
	Vegetarian	3	5.0
	Non vegetarian	57	95.0
8	BODY BUILT		
	Underweight	10	16.7
	Normal weight	35	58.3
	Over weight	13	21.7
	Obesity	2	3.3
9	FAMILY HISTORY OF HYPERTENSION		
	Present	30	50.0
	Absent	30	50.0
10	LIFE STYLE PRACTICE		
	Alcoholism	9	15.0
	None	51	85.0
11	DURATION OF HYPERTENSION		
	6 months to 3 years	23	38.3
	3.1 years to 5.0 years	9	15.0
	5.1 years to 7.0 years	9	15.0
	More than 7 years	19	31.7
12	ON TREATMENT FOR HYPERTENSION		
	Yes	46	76.7
	No	14	23.3

Table 1 shows that 23 (38.3%) participants belongs to the age more than or equal to 50 years, and 39 (65.0%) are female. Most of them are graduate education 20 (33.3%) and 54 (90.0%) belongs to moderate worker. 54 (90.0%) of them belongs to Hindu. Majority of them 51 (85.0%) were married and most of them are non-vegetarian 57 (95.0%). 35

(58.3%) were with normal BMI. Half 30 (50.0%) had family history of hypertension. 51 (85.0%) has no habits of smoking and alcoholism. For 23 (38.3%) the duration of hypertension ranges from 6 months to 3 years. Only 46 (76.7%) are on treatment for hypertension.

SECTION II ASSESSMENT OF THE LEVEL OF SYSTOLIC AND DIASTOLIC BLOOD PRESSURE FOR THE HYPERTENSIVE PATIENTS

n = 60

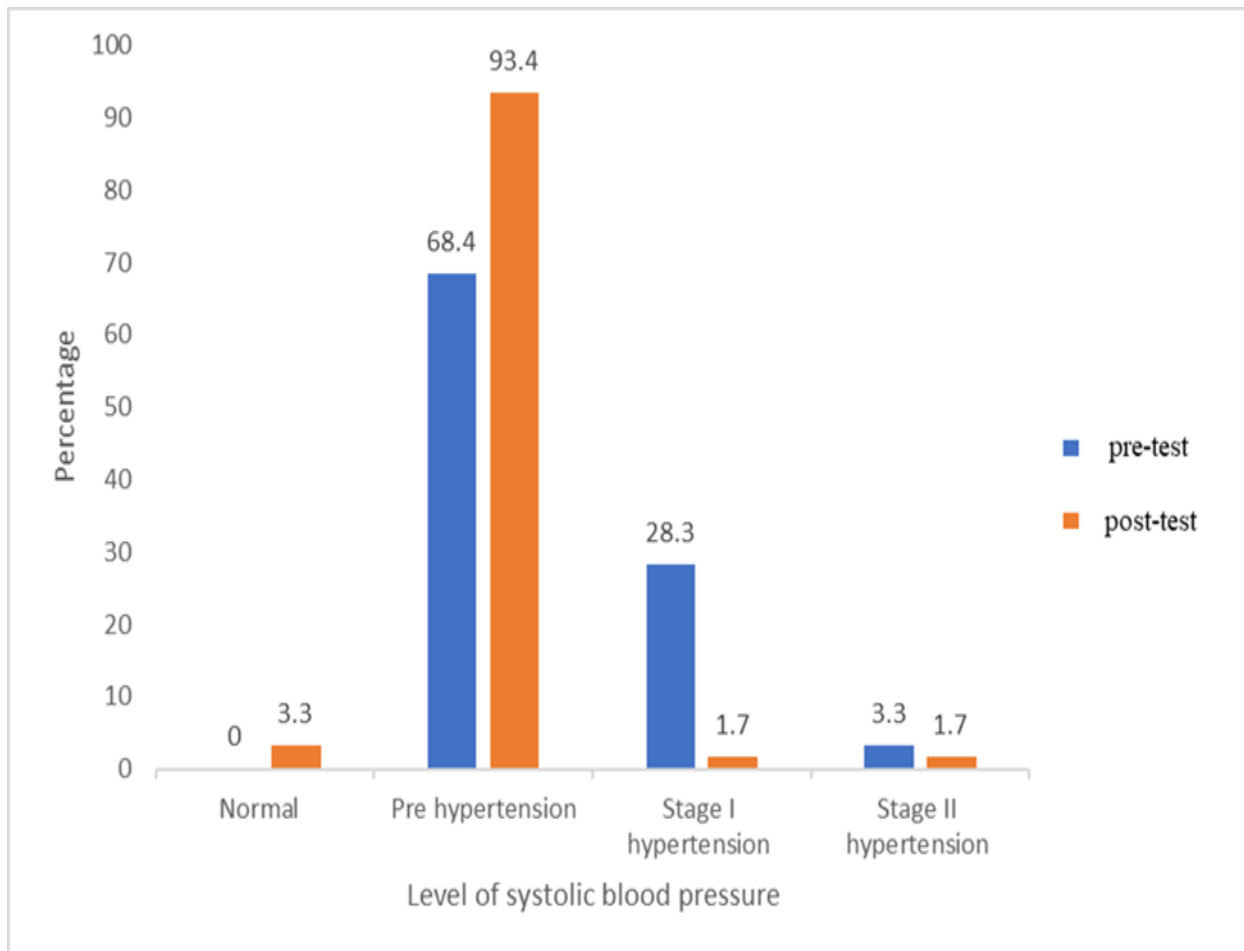


Figure 3 : Assessment of pre and post test level of systolic blood pressure

Figure 3 reveals the percentage distribution of pre and post test level of systolic blood pressure. It is evident from the above figure that in the pre test level of systolic blood pressure, none of the patients had normal blood pressure, 41 (68.4%) of the patients had Pre hypertension, 17 (28.3%) of them had Stage I

hypertension, 2 (3.3%) had Stage II hypertension, where as in the post test level of systolic blood pressure 2(3.3%) of the patients had normal blood pressure, 56(93.4%) of them had Pre hypertension, 1(1.7%) of them had Stage I and Stage II hypertension each.

n = 60

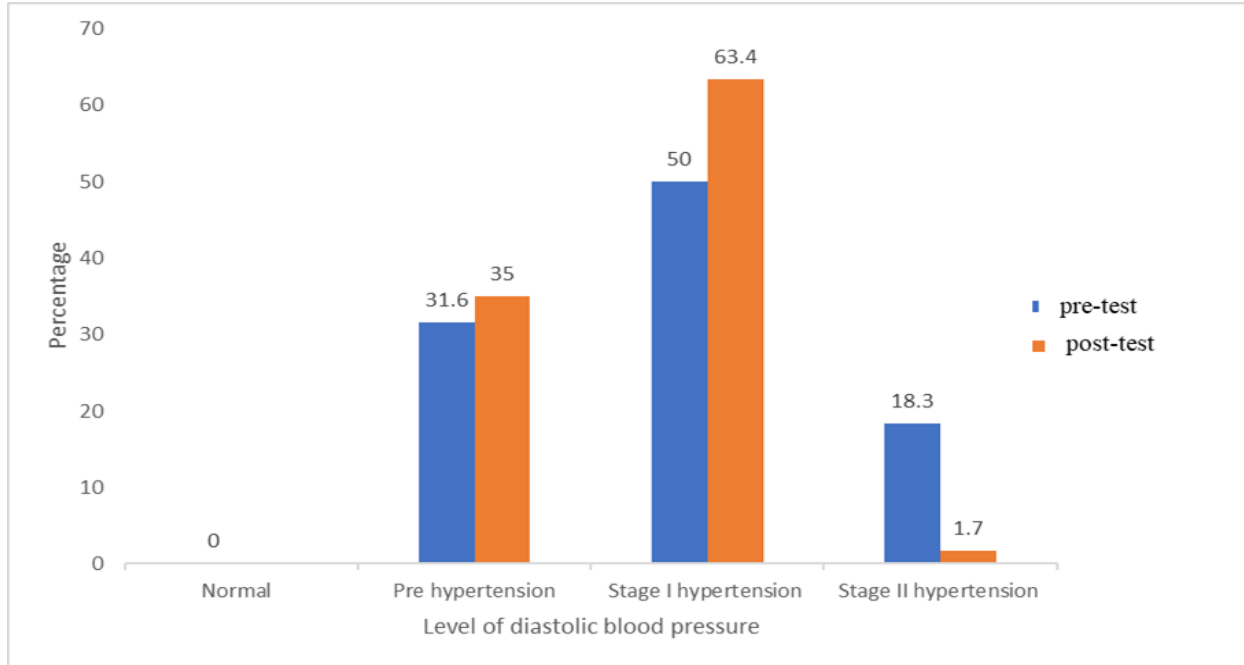


Figure 4 : Assessment of pre and post test level of diastolic blood pressure

Figure 4 shows the percentage distribution of pre and post test level of diastolic blood pressure. Above figure it is revealed that in the pre test level of diastolic blood pressure, none of them had normal blood pressure, 19 (31.6%) of them had Pre hypertension, 30 (50.0%) of them had Stage I hypertension and 11

(18.3%) had Stage II hypertension, whereas in the post test level of diastolic blood pressure, none of the patients had normal blood pressure, 21 (35.0%) of them had Pre hypertension, 38 (63.4%) of them had Stage I hypertension, 1 (1.7%) of them had Stage II hypertension.

SECTION III: EFFECT OF HIBISCUS TEA ON BLOOD PRESSURE AMONG HYPERTENSIVE PATIENTS

Table 2: Effect of Hibiscus tea on Blood Pressure among hypertensive patients

n = 60

Blood pressure	Pre – test			Post – test			'Z' value	p value
	MEAN	SD	MEDIAN (IQR)	MEAN	SD	MEDIAN (IQR)		
Systolic blood pressure	134.00	11.27	130 (140.00 - 130.00)	123.42	7.28	120 (130.00 - 120.00)	6.571	<0.001*
Diastolic blood pressure	89.42	7.14	90 (95.00 - 80.00)	86.75	5.19	90 (90.00 - 80.00)	2.179	0.029*

*significant at p value < 0.05

Table 2 shows that comparison between the pre and post – test mean values of systolic and diastolic blood pressure. The pre – test mean value of systolic blood

pressure was 134.00 with standard deviation 11.27 and pre – test mean value of diastolic blood pressure was 89.42 with standard deviation 7.14. and post – test

mean value of systolic blood pressure was 123.42 with standard deviation 7.28 and post – test mean value of diastolic blood pressure was 86.75 with standard deviation 5.19. Wilcoxon Signed Ranks Test was

applied to analyze. The Z – value for systolic blood pressure 6.571, p value was < 0.001, Diastolic blood pressure Z – value 2.179 and p – value was 0.029 which is statistically significant.

SECTION IV: ASSOCIATION BETWEEN PRE – TEST LEVEL OF BLOOD PRESSURE AND SELECTED SOCIO DEMOGRAPHIC VARIABLES OF HYPERTENSIVE PATIENTS.

Table 3: Association between pre – test level of blood pressure with their selected socio demographic variables

n = 60

Demographic variables	PRE – TEST LEVEL OF BLOOD PRESSURE (systolic)			Fishers exact test	PRE – TEST LEVEL OF BLOOD PRESSURE (diastolic)			Fishers exact test / Chi square test
	Pre hyperten sion (120 – 139) mm Hg	Stage I hyperten sion (140 – 159) mm Hg	Stage II hyperten sion (≥160) mm Hg		Pre hyperten sion (80 – 89) mm Hg	Stage I hyperten sion (90 – 99) mm Hg	Stage II hyperten sion (≥100) mm Hg	P value
AGE IN YEARS								
29-39	15	3	0	0.187	5	12	1	0.281
40 – 49	14	4	1		8	7	4	
≥ 50	12	10	1		6	11	6	
GENDER								
Male	12	8	1	0.327	3	14	4	0.082
Female	29	9	1		16	16	7	
OCCUPATION								
Sedentary worker	5	1	0	0.725	1	5	0	0.302
Moderate worker	36	16	2		18	25	11	
DIETARY HABITS								
Vegetarian	2	1	0	1.000	0	3	0	0.286
Non vegetarian	39	16	2		19	27	11	
BODY BUILT								
Underweight	5	5	0	0.140	3	5	2	0.983
Normal weight	25	10	0		12	16	7	
Over weight	9	2	2		3	8	2	
Obesity	2	0	0		1	1	0	
FAMILY HISTORY OF HYPERTENSION								
Present	22	7	1	0.779	11	15	4	0.524
Absent	19	10	1		8	15	7	
LIFE STYLE PRACTICE								
Alcoholism	5	4	0	0.586	2	5	2	0.798
None	36	13	2		17	25	9	
ON TREATMENT FOR HYPERTENSION								
Yes	31	13	2	1.000	13	23	10	0.367
No	10	4	0		6	7	1	

Table 3 shows that there was no statistically significant association between pre – test level of blood pressure with selected socio demographic variables such as age, gender, occupation, dietary habits, body built, family history of hypertension, life style practice, and on treatment for hypertension. Fisher's exact test / Chi square test was used to find out the association between pre – test level of blood pressure with selected socio demographic variables.

IMPLICATIONS

The findings of the study had implications on the field of nursing practice, nursing education, nursing administration and nursing research.

Nursing practice

The nurses have a vital role in providing safe and effective nursing care to enhance blood pressure control among patients with hypertension. This can be facilitated by motivating the nurses to have an in-depth

knowledge of physiological considerations in blood pressure control. Develop skill in providing efficient nursing care for controlling blood pressure and teach the client about the effectiveness of various non-pharmacological measures for controlling blood pressure. Nurses need to practice an evidence-based approach while giving care to the hypertension patients.

Nursing education

Before nurses enter into their practice, they need to have strong foundation in terms of education. Nurse educator not only have a role to educate the student but also to educate the staff nurses in order to prepare them and update their knowledge, to enhance the application of theory in to practice. The education in the clinical area should be provided in the form of Educate the students about various complementary and alternative therapies for blood pressure control.

- Encourage the students for effective utilization of evidence based practice.
- Make use of available literature and studies related to non-pharmacological measures for controlling blood pressure.

Nursing administration

- Conduct in service education programs and continuing education programs on hypertension and its control.
- Arrange and conduct workshops, conferences, seminars on nonpharmacological methods on blood pressure control.
- Provide opportunities for nurses to attend training programs on complementary and alternative therapies on hypertension and its control.

Nursing research

- Nurse researcher should disseminate the findings of the studies through conference, seminar and publishing in professional journals.
- As a nurse researcher, promote more research on effective measures for blood pressure control.
- Evidence based nursing practice must take higher profile in order to increase the knowledge about Hibiscus tea intervention for hypertension.

VII. RECOMMENDATIONS

Based on the findings of the present study the following recommendations are made,

- Similar study can be conducted with large samples for better generalization.
- A study can be conducted to assess the effectiveness of other herbs for effective blood pressure control.
- The study can be conducted to assess the knowledge and practice of nurses with regard to nursing intervention for control of blood pressure in patients with hypertension.
- A comparative study can be conducted by using hibiscus tea and laughter therapy in reduction of blood pressure in hypertension patients.
- The Same study can be repeated by using the true experimental design.
- The effectiveness of hibiscus tea can be tested for other disease condition also such as dysmenorrheal problem, obesity, renal problems.

VIII. CONCLUSION

The study was conducted at Pondicherry institute of medical sciences, Puducherry. Purposive sampling technique was used to select samples. The data was collected from 60 hospital employees. The main aim of the present study was to assess the effect of Hibiscus tea on blood pressure among the hypertensive patients. Collected data was analyzed by using descriptive and inferential statistics and was presented in forms of tables and figures. The study findings revealed that there is a significant association on the level of blood pressure after administration of hibiscus tea. On the basis of the study, the researcher concluded that administration of hibiscus tea has a significant effect on reduction of blood pressure. Hibiscus tea is an effective, natural, easily available, easy to use and potentially risk-free intervention.

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