# AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF ACUPRESSURE UPON BLOOD PRESSURE AMONG HYPERTENSIVE CLIENTS AT SELECTED WARDS OF THIRUVALLUR DISTRICT

**By**

**Ms. V. SENBAHAVALLI, M.Sc (N), D.A.Sc.**



**A Thesis Submitted to**

**THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY, CHENNAI**

for the award of the degree of

**DOCTOR OF PHILOSOPHY IN NURSING**

**JANUARY 2019**

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**Under the guidance of**

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**JANUARY 2019**

# CERTIFICATE

This is to certify that the thesis entitled **"An Experimental Study to Assess the Effectiveness of Acupressure upon Blood Pressure among Hypertensive Clients at Selected Wards of Thiruvallur District"** is the outcome of the original research work undertaken and carried out by Ms. V. Senbahavalli., M.Sc (N), D.A.Sc**.** of Apollo College of Nursing under my supervision and guidance and that it has not formed the basis for the award of any other Degree, Diploma, Associateship, Fellowship or other similar title.

I also certify that this thesis is her original independent work. I recommend that this thesis can be placed before the examiners for their consideration for the award of the Ph.D. Degree in Nursing.

Seal

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Date:
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## DECLARATION

I hereby declare that the present dissertation entitled **"An Experimental Study to Assess the Effectiveness of Acupressure upon Blood Pressure among Hypertensive Clients at Selected Wards of Thiruvallur District"** is the outcome of the original research work undertaken and carried out by me under the guidance of **Dr.N.Chidambaranathan, MBBS., MD., D.M.R.D., Ph.D., D.N.B., F.I.C.R.** Head of the Department, Dept. of Radiology & Imaging Sciences, Apollo Hospitals, Greams Road, Chennai and **Dr.Lizy Sonia. A, M.Sc (N), Ph.D.,** Professor cum Vice Principal, Apollo College of Nursing, Chennai which was approved by the Research Committee, The Tamilnadu Dr.M.G.R. Medical University, Guindy, Chennai.

I further declare that to the best of my knowledge the thesis does not contain any part of any work which has been submitted for the award of any degree either in this University or in any other University / Deemed University without proper citation.

**Ms. V. SENBAHAVALLI**
Research Scholar

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**Ms. V. Senbahavalli**
**PhD Scholar**

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# ABBREVIATIONS

NRHM    -    National Rural Health Mission

NCD    -    Non Communicable Disease

WHO    -    World Health Organization

CHD    -    Coronary Heart Disease

CVD    -    Cardio Vascular Disease

CDC    -    Center for Disease Control

AHA    -    American Heart Association

BMI    -    Body Mass Index

HTN    -    Hypertension

BP    -    Blood Pressure

HBP    -    High Blood Pressure

SBP    -    Systolic Blood Pressure

DBP    -    Diastolic Blood Pressure

EA    -    Electro Acupuncture

HR    -    Heart Rate

CAM    -    Complementary and Alternative Medicine

DASH    -    Dietary Approaches to Stop Hypertension

PRISMA    -    Preferred Reporting Items for Systematic Reviews and Meta Analyses

| | | |
|---|---|---|
| NS | - | Not Significant |
| MP | - | Mean Pressure |
| PC | - | Pericardium |
| ST | - | Stomach |
| GB | - | Gall Bladder |
| LI | - | Large Intestine |

# ABSTRACT

Chronic diseases are the major contributors to the global disease burden for human population at present. It poses an important public health challenge to both economically developing and developed countries. We have a number of treatment modalities available for treating them. Our ancestors had a better control over their health by following various traditional methods of practice. Sidha in South India, Ayurvedha in North India, Acupressure in China etc., were some of them. Acupressure is a system where the treatment is given by applying slight pressure over the point selected based on pulse diagnosis.

Hypertension is regarded as a major public health problem worldwide. The World Health report identifies blood pressure as one of the five important risk factors for cardio vascular diseases globally. Acupressure is one of the traditional methods of treatment founded by Chinese 8000 years ago. In this study it refers to application of pressure on only one point at a time in any channel in the body, selected after pulse diagnosis. Pulse diagnosis is the evaluative tool for selecting the single point which needs to be stimulated.

**Statement of the Problem**

"An Experimental Study to Assess the Effectiveness of Acupressure upon Blood Pressure among Hypertensive Clients at Selected Wards of Thiruvallur District"

**The objectives of this study were**

1. To assess the level of blood pressure of control and experimental group of Hypertensive clients before and after Acupressure.

2. To evaluate the effectiveness of Acupressure upon blood pressure by comparing the blood pressure of Hypertensive clients before and after Acupressure.

3. To find out the association between selected demographic variables and the level of blood pressure in control and the experimental group of Hypertensive clients.

4. To find out the association between selected clinical variables and the level of blood pressure in control and the experimental group of Hypertensive clients.

5. To find out the acceptability of the Acupressure treatment by the experimental group of Hypertensive clients

**Null hypotheses**

**Ho1:** There will be no significant difference in the blood pressure between pretest and posttest in control and experimental group of hypertensive clients.

**Ho2:** There will be no significant association between selected demographic variables and blood pressure levels in pretest and posttest in control and experimental group of hypertensive clients.

**Ho3:** There will be no significant association between selected clinical variables and blood pressure levels in pretest and posttest in control and experimental group of hypertensive clients.

**Methods and Materials**

The present study was aimed to assess the effectiveness of Acupressure upon blood pressure among hypertensive clients. The framework of the study was based on "Wiedenbach Helping Art of Clinical nursing theory". Ernestine Wiedenbach Helping Art of Clinical Nursing theory (1964) describes a defined situation and a way to attain it.[7]

In this study Quasi Experimental Time Series design was adopted. The study was conducted among 220 samples with 110 samples for each control and experimental group. The Control group samples were taken from Koladi and the experimental group samples were from Thiruverkadu Municipality by using simple random sampling from selected areas, samples were chosen from the known cases of Hypertension using purposive sampling technique from each area by considering the inclusion and exclusion criteria.

The data was collected using the research instruments such as Demographic variable proforma, Clinical variable proforma, Blood pressure assessment chart, Checklist to assess the signs and symptoms of Hypertension and Rating scale for the assessment of level of acceptability of Acupressure treatment. Pre test was done for both the groups and then Acupressure treatment was given to the experimental group of samples once in a week for two months. Post test was done first immediately after completion of the treatment for two months and was repeated after one month of the first post test. Data was analyzed using descriptive and inferential statistics using the SPSS -20. The results were interpreted according to the objectives and hypotheses of the study as follows.

**The Major Findings of the Study**

➢ Demographic variables distribution shows that majority of the samples were male (59%, 61.8%), married (80%, 74.54%), Hindus (59%, 65.45%) in control and experimental group, respectively. Around half of them were in the age group of 51-59 years (50.8%, 49.09%), with family income 15000 and above (52.8%, 56.36%) and were professionals by occupation (53.6%, 45.5%) in control and experimental group, respectively. With regard to educational status 39% and 38.18% of them were graduates in control and experimental group, respectively.

➢ Study findings on clinical variables show that, majority of the samples were non alcoholic (62%, 54.54%), non smokers (62%, 54.54%) taking non vegetarian diet (50%, 61.8%) in control and experimental group, respectively. Around half of them were overweight with a BMI 25-29 (50.8%, 49.09%), did not follow any diet modifications (59%, 61.8%) and practiced walking (62%, 54.54%). With regard to sleep 51.8% and 50.8% of them had the habit of sleeping less than 6 hours per day in control and experimental group, respectively.

➢ The systolic blood pressure assessment revealed that in the control group 48.1% of them had normal blood pressure followed by 37.2% of them had pre hypertension in pretest. In post test 1 normal blood pressure was for 47% of clients followed by Prehypertensive (38%). In post test 2 47% of clients had normal blood pressure followed by Pre hypertension (38%).

➢ In the experimental group in the pretest 49.1% of their blood pressure was normal followed by pre hypertension (44.5%). In post test 1 77.3% of them had normal blood pressure followed by 20.9% had Pre hypertension. In post test 2 88.2% of them had normal blood pressure followed by 11.8% had Pre hypertension.

➢ The diastolic blood pressure assessment revealed that in the control group 84.5% of them had normal blood pressure followed by 8.2% of them had pre hypertension in pretest. In post test 1 normal blood pressure was for 84.5% of clients followed by Prehypertensive (8.2%). In post test 2 84.5% of clients had normal blood pressure followed by Pre hypertension (8.2%).

➢ In the experimental group in the pretest 66.4% of their blood pressure was normal followed by pre hypertension (28.2%). In post test 1 92.7% of them had normal blood pressure followed by 7.3% had Pre hypertension. In post test 2 93.6% of them had normal blood pressure followed by 6.4% had Pre hypertension.

- The assessment of SBP between the two groups at each levels namely pre, post 1 and 2 shows that there was no significant difference in blood pressure assessments within subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.097$). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.000$).

- The assessment of DBP between the two groups at each levels, namely pre, post 1and 2 shows that there was no significant difference in blood pressure assessments within subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.097$). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.000$).

- The difference between the means of both groups was statistically significant ($P<0.001$). The difference between the means of both groups was statistically significant ($P<0.001$). Previous studies have shown that acupuncture can lower Blood Pressure. The average decrease in systolic and diastolic BP in the present study was similar to that obtained after acupuncture.

- The Pearson Chi-Square test reveals that selected demographic variables age and marital status have significant association with the systolic blood pressure and diastolic blood pressure. The association between the clinical variables and the systolic blood pressure reveals that walking practice and presence of co-morbidities have highly significant association.

**Recommendations**

- The study can be done for a longer duration to confirm the long term effects of Acupressure

- The study can be conducted among different groups like school teachers, corporate sectors and traffic police.

- The study can be conducted on the quality of life among the hypertensive clients.
- Comparative study can be conducted to evaluate the effectiveness of Acupressure with other non pharmacological interventions and alternative therapies
- Experimental study can be conducted to evaluate the effectiveness of Acupressure upon any other common disease like Diabetes mellitus
- Comparative study can be conducted to evaluate the effectiveness of Acupressure among urban and rural population
- The study can be replicated in other settings

**Conclusion**

Acupressure is one of the methods used in traditional Chinese medicine for the prevention and treatment of disease. It is a simple, noninvasive technique that nurses can perform independently. These findings suggest that acupressure in acu point could lower systolic and diastolic Blood Pressure in patients with hypertension. Therefore, nurses could teach patients with hypertension and their family members how to use acupressure on the acu point. Further studies are needed to establish the effectiveness of this therapy in various groups and settings.

# CHAPTER I

# INTRODUCTION

## Background of the Study

*"I believe that the greatest gift you can give your family and the world is a healthy you"*

*-Joyce Meyer*

Our ancestors had the wisdom to lead a disease free and peaceful life. They coexisted with the nature and used it for their purpose without violating natural laws. Natural resources were used by them without manipulating their basic characters. Thus, they utilized its full potential. Every one of us seeks to lead a disease free life. According to Acu healer Umar Farook, Acupuncture is a life science that teaches us and shows the way to understand nature. Those people who followed acupuncture as a way of life or even thought it as a method of treatment lived a disease free life (e.g.: Chinese). Acupuncture is an ancient form of healing which pre-dates recorded history (approx. 6000 B.C.). Acupuncture is clinically proved, to be a safe and a natural way to restore and maintain health. It is sure that the wisdom of Acupuncture is the promise to the medical world.[1]

Humans, being a part of the universe, all laws that apply to the Universe must apply to humans. Man is made out of the same five elements (Panchabhutam) as the Universe. The existence of life and its activity is concealed. It cannot be seen and only through the external symptoms, it can be understood. The cause of the disease is concealed; the energy that cures it is also concealed. Hence, believing things that cannot be seen but can be understood is the basic of Classical Acupuncture. [1]

Chronic diseases are the major contributors to the global disease burden for human population at present[2]. It poses an important public health challenge to both economically developing and developed countries. We have a number of treatment modalities available for treating them. Our ancestors had a better control over their health by following various traditional methods of practice. Siddha in South India, Ayurvedha in North India, Acupressure in China etc., were some of them. Acupressure is a system where the treatment is given by applying slight pressure over the point selected based on pulse diagnosis.

Globally, 31.1% of the adult population (1.39 billion people) had hypertension in 2010. Hypertension prevalence is higher in low- and middle-income countries (31.5%) than in high-income countries (28.5%). Approximately, 75% of people with hypertension (1.04 billion) live in low- and middle-income countries. Hypertension awareness, treatment, and control are much lower in low- and middle-income compared to high-income countries. From 2000 to 2010, the hypertension prevalence in high-income countries decreased by 2.6%, and awareness, treatment, and control improved substantially. During the same 10-year period, low- and middle-income countries saw a 7.7% prevalence increase and little improvement in awareness, treatment, and control.[3]

It is known that blood pressure (BP) is positively correlated with the risk of heart attack, heart failure, stroke, and renal disease Thus, prevention and treatment of hypertension are an issue of international medical concern and a challenge faced by all medical professionals[5].

In 2008, 63% (36 of 57 million) deaths worldwide occurred due to non communicable diseases. These deaths are distributed widely among people from high-income to low-income

countries. About one-quarter of all non communicable diseases deaths were below the age of 60, amounting to approximately 9 million deaths per year. Ninety percent of premature deaths from non communicable diseases occurred in developing countries. Nearly 80% deaths (29 million) occur in low- and middle income countries[4].

Among the non communicable diseases hypertension is regarded as a major public health problem worldwide. The World Health Report identifies blood pressure as one of the five important risk factors for cardio vascular diseases globally. A recent report indicates that nearly one billion adults had hypertension in 2000 and this is predicted to increase to 1.56 billion by 2025. Average prevalence in India is 25% in urban and 10% in rural population. The data derived from two well planned studies in India, the prevalence of hypertension is 59.9 and 69.9 per 1000 males and females respectively in the urban population, and 35.5 and 35.9 per 1000 males and females, respectively in the rural population [2].

The prevalence of hypertension among adults in developed countries was 25% and developing countries ranging from 10% to 20%. A population based study in 2011 conducted for Asian Indian women aged 35-70 yrs revealed that 39.2% women were hypertensive in which 39.5% lived in rural area and 58.2% in urban[6]. In Tamilnadu, the prevalence rate of hypertension was 14.8% in the year 2011.

The prevalence and the rate of diagnosis of Hypertension appear to be increasing. Hypertension is a modern day's epidemic and it is becoming a public health emergency worldwide, especially in the developing countries. It is seen that majority of the hypertensive patients remain asymptomatic, only few of them develop some symptoms like headache, giddiness and irritability. That's why it is regarded as the silent killer[7]. Diagnosis of

hypertension is possible only through routine health check-ups, active surveys or screening programs because majority of hypertensive's are asymptomatic. This is a matter of concern since such patients are unaware of the disease but are having equal risk of developing complications as like chronic hypertensive patients.[7]

Cheryl[21] had assessed on expanding the role of nurses to improve hypertension care and control globally. The role of the nurse in improving hypertension control has expanded over the past 50 years, complementing and supplementing that of the physician. Nurses' involvement began with measuring and monitoring blood pressure (BP) and patient education and has expanded to become one of the most effective strategies to improve BP control.

Today the roles of nurses and nurse practitioners (NPs) in hypertension management involve all aspects of care, including detection, referral, and follow up; diagnostics and medication management; patient education, counseling, and skill building; coordination of care; clinic or office management; population health management; and performance measurement and quality improvement. The patient-centered, multidisciplinary team is a key feature of effective care models that have been found to improve care processes and control rates.

Various alternative and complementary medicine has effect on hypertension. Brewer[38] conducted a study involving 80 people compared the effects of acupressure in people with hypertension who were attending a cardiology outpatient department in Taiwan. Half were randomized to receive true acupressure at the Tai chong Acupoint, while half had sham acupressure applied over a point that was not a recognized acupoint. In the group who

received true acupressure, average blood pressure before the treatment was 165.0/96.3 mmHg.

Immediately after the acupressure, average blood pressure was 150.4/92.7 mmHg. When measured 15 minutes later it was 145.7/90.8, and 30 minutes after the acupressure it was 142.9/88.6 mmHg. This study suggested that the use of acupressure on the traditionally used Tai Chong acupoint in the foot was effective in lowering blood pressure in people with hypertension. The effects were immediate, and lasted for at least 30 minutes, with an average recorded reduction in blood pressure of 22.1/7.7 mm of Hg after 30 minutes.

Acupressure is one of the Traditional methods of treatment founded by Chinese 8000 years ago. In this study it refers to application of pressure on only one point at a time in any channel in the body, selected after pulse diagnosis. Pulse diagnosis is the evaluative tool for selecting the single point need to be stimulated.[1] It is proven by many studies regarding the effectiveness of acupressure for various other ailments, the researcher was interested to check the effectiveness of acupressure on hypertension in this study.

**Significance and Need for the Study**

World Health Day is being celebrated every year on 7th April. Theme for the year 2013 was "under PRESSURE? Cut your risk of heart attack & stroke – control your blood PRESSURE. The slogans were "Blood Pressure – Take Control, Control your Blood Pressure, Control your Life."

The Global brief on hypertension, published on the occasion of World Health Day 2013, describes why, in the early 21st century, hypertension is a global public health issue. It

describes how hypertension contributes to the burden of heart disease, stroke and kidney failure and premature death and disability. The document also explains how hypertension is both preventable and treatable and how governments, health workers, civil society, the private sector, families and individuals can join forces to reduce hypertension and its impact.[8] Acupressure is drug-free harmless therapy cures majority of the ailments completely and restores positive health and total wellness permanently. The beauty is that acupressure makes the practice of health care so much simpler, effortless, and universally accessible and cost beneficial. It's a great misconception that acupressure is good for treating pain related ailments only. Acupressure does not merely work as a painkiller, as allopathic medicines, but it works to eliminate the cause of pain from its root to affect a permanent cure or relief. When combined with medical anesthesia, the patients suffer much less from side effects of anesthetic drugs, post-operative pain, vomiting, etc. Also, their post-operative recovery is qualitatively much better and quicker. It is equally effective at all ages, and all the stages of every disease. It works wonders by filling in the gaps in the practice of modern medicine. It complements all the systems and specialties of medicine, as it helps to improve the final outcome of every sickness.[1]

The first-ever comprehensive public evaluation of the prevalence of Non-communicable diseases in rural Tamil Nadu in 2011 concluded that the prevalence of hypertension is 14.8 per cent and diabetes 13.5 per cent in the under-30 population. The analysis is a result of over 46,000 camps (NCD) conducted in (42 health unit districts) the rural areas of the State, testing over 21, 00,000 people who attended them.[7]

This makes it one of the largest population studies ever done in this part of the country for Non Communicable Diseases in the public sector. This puts just over 36.7 per

cent of the rural population at risk of complications due to hypertension and diabetes, including organ failure, stroke and heart attack, More women than men had both hypertension (1,79,230) and diabetes (1,70,242), according to the survey reported by Remya Kannan.[7]

At present we have a number of modern treatment modalities available for treating chronic diseases. Alternative system of medicine is being practiced in all Government hospitals also. Acupressure though it is a traditional system it has been utilized by larger population now-a-days for various health problems and one among the problems is Hypertension. According to Indian studies it is noted that prevalence of hypertension has increased by 30 times among the urban population over a period of 55 years and about 10 times among the rural population over a period of 36 years[9].

Furthermore, if hypertension is not controlled or prevented chances of heart attack, heart failure, stroke and kidney diseases increases. The relationship between blood pressure and risk of CVD events is continuous, consistent, and independent of other risk factors. Non communicable diseases are top killers in South-East Asia Region, causing 7.9 million deaths annually. One third of these deaths is premature and occurs before the age of 60 years, in the economically productive age groups.

Demographic changes (aging population), rapid unplanned urbanization, negative aspects of global trade and marketing, progressive increase in unhealthy lifestyle patterns, as well as social and economic determinants are accelerating the burden of non communicable diseases.[10]

Under NRHM, our government runs NCD clinics in all PHCs, where the patients visit regularly for treatment of all Non Communicable Diseases like Hypertension. This shows that people are aware that Hypertension and if untreated may lead to various complications. Health seeking behaviors are increasing in a large extent. They expect more from the health care professionals to take care of their health. However, when compared to the country's population this happens only in minimum percentage.

Hypertension is the silent killer disease of today and the single most important predictor of cardiovascular risk. Community based studies reveal that the prevalence of hypertension went on increasing significantly with increase in socio economic status and increase in literacy status. The clients with hypertension are known to have a twofold higher risk of developing coronary artery disease, four times higher risk of congestive heart failure and seven times higher risk of cerebral vascular disease compared to normo tensive subjects.

The nurse has major role in identifying the prevalence of hypertension, treating the affected, and educating the high-risk population. However, Hypertension is manageable and controllable with effective treatment with various psychosocial interventions, alternative and complimentary therapies such as positive therapy, Sidha, Ayurvedha, Homeopathy, Unani and Acupressure.

Among these Acupressure is one of the interventions, which has effectiveness on Hypertension. But there is paucity of research and evidence on effectiveness of Acupressure on Hypertension. Therefore this study was undertaken by the researcher in the selected community area to assess the effectiveness of Acupressure on blood pressure. The findings can be utilized for organizing further health camps and programs in the community.

**Statement of the Problem**

"An Experimental Study to Assess the Effectiveness of Acupressure upon Blood Pressure among Hypertensive Clients at Selected Wards of Thiruvallur District"

**Objectives of the Study**

1. To assess the level of blood pressure of control and experimental group of Hypertensive clients before and after Acupressure.

2. To evaluate the effectiveness of Acupressure upon blood pressure by comparing the blood pressure of Hypertensive clients before and after Acupressure.

3. To find out the association between selected demographic variables and the level of blood pressure in control and the experimental group of Hypertensive clients.

4. To find out the association between selected clinical variables and the level of blood pressure in control and the experimental group of Hypertensive clients.

5. To find out the level of acceptability of the Acupressure treatment by the experimental group of Hypertensive clients.

**Operational Definitions**

**Effectiveness**

In this study it refers to the outcome of Acupressure upon change in blood pressure levels as determined by the reduction in mean scores of blood pressure after Acupressure by using appropriate statistical methods.

**Acupressure**

It is one of the Traditional methods of treatment found by Chinese 8000 years ago. In this study it is single point treatment. It refers to application of pressure on only one point at a

time in any channel in the body, selected after pulse diagnosis. This stimulation can be given at one point once in a week, each time after pulse diagnosis only. So each time the point may vary or remain the same depending on pulse diagnosis. In this study, pressure was applied at the selected point which varies between clients based on the pulse characteristic that is in any of the five element channels, fire, earth, air, water and wood. Most of the clients were given pressure in their index finger near nail bud or in between the big toe and the next toe. It was given once in a week for three months by the researcher.

**Blood Pressure**

Blood pressure means the pressure exerted by the blood on the walls of the blood vessel. In this study, blood pressure was measured using Aneroid Manometer.

Along with blood pressure some common minor symptoms associated with Hypertension such as headache, giddiness, body pain, shortness of breath, vertigo and edema were also assessed using the checklist.

**Hypertensive Clients**

In this study, a hypertensive client refers to client with known history of Hypertension, who has been already diagnosed to have hypertension for more than a year by a physician.

**Null Hypotheses**

**Ho1:** There will be no significant difference in the blood pressure between pretest and posttest in control and experimental group of hypertensive clients.

**Ho2:** There will be no significant association between selected demographic variables and blood pressure levels in pretest and posttest in control and experimental group of hypertensive clients.

**Ho3:** There will be no significant association between selected clinical variables and blood pressure levels in pretest and posttest in control and experimental group of hypertensive clients.

**Assumptions**

The study assumes that:

- Hypertension is a significant public health problem.

- Adults are at risk for hypertension.

- Hypertension leads to many complications such as stroke, cardiac problems, renal failure, etc. if untreated.

- Hypertension is a silent killer.

**Delimitations**

The study is delimited to

- Data collection period of one year

- Known cases of hypertension residing in Thiruvallur District

**Conceptual Framework of the Study**

The conceptual framework for a particular study is the abstract, logical structure that enables the researcher to link the findings to nursing body of knowledge. Conceptual framework formalizes the thinking process, so that order may read and know the framework

of reference, basic to research problem. The framework is built from a set of concept linked to a plan or existing system of methods, behaviors, functions and objectives.

The present study aims to assess the effectiveness of Acupressure upon blood pressure among hypertensive clients. The framework of the study is based on 'Wiedenbach Helping Art of Clinical nursing theory'. Ernestine Wiedenbach Helping Art of Clinical Nursing theory (1964) describes a defined situation and a way to attain it.[12]

This theory has three factors

- Central purpose

- Prescription

- Realities

**Central Purpose**

It refers to what the investigator wants to accomplish. It is the overall goal towards which the investigator strives. In this study, it refers to the management of blood pressure among hypertensive clients.

**Prescription**

It refers to the plan of care for the participants of study. It will specify the nature of action that will fulfill the investigator's central purpose. In this study, it refers to the intervention planned by the investigator who will apply Acupressure for reducing blood pressure in hypertensive clients who will fulfill the sampling criteria.

**Realities**

It refers to the physical, physiological, emotional and spiritual factors that come into play in a situation involving investigator action. The five realities identified by Wiedenbach are agent, recipient, goal, means, activities and framework

In this study it refers to the following

- Agent            :       Investigator
- Recipient      :       Hypertensive clients who are in the age group of 31 – 59 years.
- Goal             :       To check the effectiveness of Acupressure upon blood pressure among hypertensive clients.
- Means          :       Acupressure on selected samples of hypertensive clients.
- Framework  :       Selected wards of Thiruvallur district.

**Step I: Identifying the need for help**

This step involves determining the need for help. The severity of blood pressure among hypertensive clients was assessed. Simple Random sampling technique was used to select the participants for experimental study.

**Step II: Ministering the needed help**

After the assessment of blood pressure, Acupressure was administered to the hypertensive clients once in a week for three months.

**Step III: Validating that the need for help was met**

It was accomplished by means of assessing blood pressure after Acupressure treatment followed by analysis of the finding.

**CENTRAL PURPOSE**

Reducing the blood pressure of hypertensive clients

**IDENTIFYING THE NEED FOR HELP**

**General information** : Pre assessment of blood pressure.

**Perception**: pre test and post test

**MINISTERING THE NEEDED HELP**

Means and activity- through application of Acupressure

| Recipient Hypertensive clients | Agent Nurse Investigator | Framework Community |

**VALIDATING THAT THE NEED FOR HELP WAS MET**

Assessment of blood pressure in hypertensive clients

Before Acupressure treatment

After Acupressure treatment

Assessment of blood pressure in hypertensive clients

Significant

Insignificant

**Fig. 1 Conceptual Framework Based on Wiedenbach's Helping Art Theory (1970)**

**Projected Outcome**

The projected outcome of the present study was that Acupressure will be useful to reduce the blood pressure among hypertensive patients. In turn it will help them to deal with reduction of signs and symptoms of hypertension effectively and also to cope up with day to day problems and improve the quality of life.

**Summary**

This chapter one has dealt with three parts. Introduction which includes background of the study, significance and need for the study, aims and objectives which included statement of the problem, objectives of the study, operational definitions, null hypotheses, assumptions, delimitations and Conceptual framework based on Wiedenbach's Helping Art Theory Model.

**Organization of the Report**

Further aspects of the study are presented in the following five chapters.

**In Chapter - II  :** Review of literature.

**In Chapter -III :** Research methodology includes research approach, research design, setting,  population, sample and sampling techniques, tool description, content validity and reliability of tools, pilot study, data collection procedure and plan for data analysis.

**In Chapter - IV:** Analysis and interpretation of data.

**In Chapter – V :** Discussion.

**In Chapter - VI :** Summary, conclusion, nursing implications and recommendations.

# CHAPTER - II

# REVIEW OF LITERATURE

According to Burns, (2005)[13] a literature review is an organized written presentation of what has been published on a topic by scholars. The purpose of literature is to convey to the reader what is currently known regarding the topic of interest. The review is not a list describing or summarizing one published study after another part but rather requires that the author critically analyze the available literature on the topic. A critical summary of research on a topic of interest, often prepared to put research problem in context.

A literature review is an organized written presentation of what has been published on a topic of scholars. This chapter deals with a review of published and unpublished research studies and from related material for the present study. The review helped the researcher to develop an insight into problem area. This helped the researcher in building foundation of study.

Literature reviewed is related to the research work and Development of Nursing Evidence Based Practice Protocol. The Nursing Evidence Based Practice Protocol includes Nursing Evidence Based Practice question development, PRISMA Flow Diagram, Characteristics of included papers (Study design and Intervention wise) in the present study and Individual Evidence Summary.

The review of literature for the present study is organized under the following headings:

- Prevalence of hypertension

- Treatment of hypertension

- Effectiveness of alternative medicine on hypertension

- Effectiveness of Acupressure on health

- Effectiveness  of acupressure on hypertension

**Prevalence of Hypertension**

Effective control of hypertension can decrease the incidence of heart attack and   stroke. The World Health Organization (2013) recommends combining non pharmacological treatment with antihypertensive drugs to control BP in patients with hypertension. Despite combined treatment of hypertension, including traditional Chinese and conventional medicine, surveys have found that a large proportion of patients with hypertension do not achieve adequate BP control. Thus, effective BP control should be the main objective in the ongoing effort to prevent and treat hypertension.[8]

In 2010, sex-age-specific hypertension prevalence from each country was applied to population data to calculate regional and global numbers of hypertensive adults.[6] Proportions of awareness, treatment, and control from each country was applied to hypertensive populations to obtain regional and global estimates. It was found that 31.1% (95% confidence interval, 30.0-32.2%) of the world's adults had hypertension; 28.5% (27.3-29.7%) in high-income countries and 31.5% (30.2-32.9%) in low- and middle-income countries. An estimated 1.39 (1.34-1.44) billion people

had hypertension in 2010; 349 (337-361) million in high-income and 1.04 (0.99-1.09) billion in low- and middle-income countries. From 2000 to 2010, the age-standardized prevalence of hypertension decreased by 2.6% in high-income countries but increased by 7.7% in low- and middle-income countries.[14]

During the same period, the proportions of awareness (58.2% vs 67.0%), treatment (44.5% vs 55.6%), and control (17.9% vs. 28.4%) increased substantially in high-income countries, whereas awareness (32.3% vs 37.9%) and treatment (24.9% vs 29.0%) increased less, and control (8.4% vs 7.7%) even slightly decreased in low- and middle-income countries. Global hypertension disparities are large and increasing. Collaborative efforts are urgently needed to combat the emerging hypertension burden in low- and middle-income countries.[14]

While hypertension prevalence has decreased in high-income countries, it has increased in low- and middle-income countries. As a result, the prevalence of hypertension in low- and middle-income countries has surpassed that in high-income countries for the first time. The estimated 73.5% relative increase in the absolute number of hypertensive individuals from 599 million in 2000 to 1.0 billion in 2010 in low- and middle-income countries is worrisome because these countries are still suffering from infectious diseases and have limited healthcare resources. The greatest increases in absolute burden of hypertension were observed in East Asia and Pacific, South Asia, and Sub-Saharan Africa, which have experienced both increases in hypertension prevalence and in population size.[14]

Aging and urbanization with accompanying unhealthy lifestyle may play a role in the epidemic of hypertension in low- and middle-income countries. Primary prevention through lifestyle modifications, including increased physical activity, maintenance of normal body weight, limited alcohol consumption, reduction of salt intake, increased potassium intake, and consumption of a diet high in fruits, vegetables, and low fat dairy products, and low in saturated and total fat, should be the first choice for combating the emerging epidemic of hypertension in low- and middle-income countries.[6]

The primary prevention approach must be complemented by intensive antihypertensive pharmaceutical treatment of hypertensive patients to reduce blood pressure-related cardiovascular disease and premature death, which is likely to be cost-effective in both high-income and middle-income countries.[14]

Hypertension is the most important risk factor for chronic disease burden in India. Studies from various parts of India have reported high prevalence of hypertension. These studies have also reported that hypertension is increasing and there is low awareness and control. Two recent studies have been conducted with uniform tools and nationwide sampling to determine the true prevalence of hypertension in the country. Fourth National Family Health Survey evaluated hypertension in a large population based sample ($n = 799,228$) and reported hypertension in 13.8% men vs. 8.8% women (overall 11.3%) aged 15–49 and 15–54, respectively. More representative data (age $> 18$ years, $n = 1,320,555$) in Fourth District Level Household Survey reported hypertension in 25.3% with greater prevalence in men (27.4%) than women (20.0%).[15]

This translates into 207 million persons (men 112 million, women 95 million) with hypertension in India. Prevalence would be much higher using 2017 American guidelines. Global Burden of Diseases study reported that hypertension led to 1.63 million deaths in India in 2016 as compared to 0.78 million in 1990 (+108%). The disease burden (DALYs) attributable to hypertension increased from 21 million in 1990 to 39 million in 2016 (+89%). Social determinants of hypertension are important and Indian states with greater urbanization, human development and social development have more hypertension. There is poor association of hypertension prevalence with healthcare availability although there is positive association with healthcare access and quality. The health system in India should focus on better hypertension screening and control to reduce cardiovascular morbidity and mortality.[15]

Overall prevalence for hypertension in India was 29.8% (95% confidence interval: 26.7–33.0). Significant differences in hypertension prevalence were noted between rural and urban parts [27.6% (23.2–32.0) and 33.8% (29.7–37.8); $P = 0.05$]. Regional estimates for the prevalence of hypertension were as follows: 14.5% (13.3–15.7), 31.7% (30.2–33.3), 18.1% (16.9–19.2), and 21.1% (20.1–22.0) for rural north, east, west, and south India; and 28.8% (26.9–30.8), 34.5% (32.6–36.5), 35.8% (35.2–36.5), and 31.8% (30.4–33.1) for urban north, east, west, and south India, respectively. Overall estimates for the prevalence of awareness, treatment, and control of BP were 25.3% (21.4–29.3), 25.1% (17.0–33.1), and 10.7% (6.5–15.0) for rural Indians; and 42.0% (35.2–48.9), 37.6% (24.0–51.2), and 20.2% (11.6–28.7) for urban Indians. About 33% urban and 25% rural Indians are hypertensive. Of these, 25% rural and 42% urban Indians are aware of their hypertensive status. Only 25% rural

and 38% of urban Indians are being treated for hypertension. One-tenth of rural and one-fifth of urban Indian hypertensive population have their BP under control.[16]

**Treatment of Hypertension**

Bryan[17]conducted a study on task force for the management of arterial hypertension of the European society of cardiology and the European society of hypertension, a great number of guidelines have been issued in recent years by the European society of cardiology and by the European society of hypertension, as well as by other societies and organizations.

On the basis of the impact on clinical practice, quality criteria for the development of the guidelines have been established in order to make all decisions transparent to the user. These guidelines were introduced for the management of arterial hypertension designed for the adults with hypertension, that was aged at least 18 years and the purpose was to evaluate and incorporate new evidence into the guideline recommendation. The aims of the guidelines were to produce pragmatic recommendations to improve the detection and treatment of hypertension and to improve the poor rates of BP control by promoting simple and effective treatment strategies.

Esther[18] conducted a population based cohort study on the effects of risk assessment and management program for hypertension on the clinical outcomes and the Cardio vascular disease risks after 12 months. A total of 10,262 hypertension patients with Suboptimal BP despite treatment aged less than 80 years and without existing CVD were enrolled in RAMP-HT between October 2011 and March 2012

from public general out-patient clinics in Hong Kong. Their clinical outcomes and predicted 10-year CVD risk were compared with a matched cohort of hypertension patients who were receiving usual care in general out-patient clinics without any RAMP-HT intervention by propensity score matching.

Multivariable linear and logistic regressions were used to determine the independent effectiveness of RAMP-HT after adjusting for potential confounding variables. The outcome of the study was compared with the usual care group after 12 months, significantly greater proportions of RAMP-HT participants achieved target BP (i.e. BP<140/90 mmHg)(OR¼1.18, P<0.01) and LDL-C levels (i.e. <3.4 m.mol/l for Patients with CVD risk 20% or <2.6 m.mol/l for CVD risk>20%) (OR¼1.13, P<0.01). RAMP-HT participants also had significantly greater reduction in predicted 10-year CVD risk by 0.44% (coefficient¼ 0.44, P<0.01).

Hypertension is called "silent killer" of the body. There are 17 effective ways to lower our blood pressure- it deals about the elevated blood pressure that lifestyle changes can significantly reduce the numbers and lower the risk without requiring hypertensive medications[19].

A qualitative research study on Living with Hypertension, the aim of this research was to explore perspectives and experiences of patients with hypertension while living with this disease. This was a qualitative research using content analysis approach. Twenty seven hypertensive patients who were referred to hospitals affiliated to Tehran University of Medical Sciences were selected based on purposive

sampling, and semi-structured interviews were carried out. Graneheim and Lundman's approach was used for analysis of data[20].

Experiences of the participants were divided into three main categories as follows: (1) disease shadow; (2) dual understanding of the effect of drug therapy consisting of two sub-categories known as ''perceived benefits,'' ''negative consequences''; and (3) facing the disease that includes the two subcategories of ''Compatibility'' and ''Negligence and denial''.

Based on the findings, patients with hypertension had experienced many physical, psychological, social, familial and spiritual problems due to the disease and their cultural context. Comprehensive planning tailored to the cultural, social context and their beliefs is necessary to solve problems in these patients.

Cheryl[21] had assessed on expanding the role of nurses to improve hypertension care and control globally. The role of the nurse in improving hypertension control has expanded over the past 50 years, complementing and supplementing that of the physician. Nurses' involvement began with measuring and monitoring blood pressure (BP) and patient education and has expanded to become one of the most effective strategies to improve BP control.

Today the roles of nurses and nurse practitioners (NPs) in hypertension management involve all aspects of care, including detection, referral, and follow up; diagnostics and medication management; patient education, counseling, and skill building; coordination of care; clinic or office management; population health

management; and performance measurement and quality improvement. The patient-centered, multidisciplinary team is a key feature of effective care models that have been found to improve care processes and control rates.

Hales[22] conducted a study on Hypertension Prevalence, Awareness, Treatment and Control among Adults Aged ≥18 Years in Los Angeles County, 1999–2006 and 2007–2014. Data from the National Health and Nutrition Examination Survey (NHANES) were used to estimate the prevalence of hypertension, as well as awareness, treatment, and control of hypertension among adults in Los Angeles County compared with adults aged ≥18 years in the United States during 1999–2006 and 2007–2014.

During 2007–2014, the prevalence of hypertension was 23.1% among adults in Los Angeles County, lower than the prevalence of 29.6% among all U.S. adults. The examination component of NHANES allows estimation of the prevalence of both diagnosed and undiagnosed hypertension, as well as awareness, treatment, and control of hypertension. During 2007–2014 the age-adjusted prevalence of hypertension among adults was significantly lower in Los Angeles County (23.1%) than in the United States (29.6%), and improvements were made in awareness, treatment, and control of hypertension from 1999–2006 to 2007–2014.

However, during 2007–2014, a total of 1.7 million adults aged ≥18 years in Los Angeles County were estimated to have hypertension, including approximately 300,000 who were unaware of their hypertension, approximately 400,000 who were not being treated for hypertension, and approximately 800,000 whose hypertension

was not controlled. The findings in this report are subject to at least two limitations. First, the smaller Los Angeles County sample size required aggregation over an 8-year time period to produce reliable estimates.

Second, because of the low prevalence of hypertension in persons aged 18–39 years, awareness, treatment, and control of hypertension could not be estimated and statistical tests could not be performed for this age group in Los Angeles County. The smaller effective sample size also reduced the power to detect differences by age and race or Hispanic origin in Los Angeles County.

SmitaVerma[23] conducted a cross sectional study about the prevalence, awareness, treatment and control of hypertension among adults of Raipur city, Chhattisgarh. A predesigned, pretested questionnaire was used for data collection. To classify blood pressure JNC VII criteria was used. The results of the study the prevalence of hypertension was 29% out of 233 hypertensive, 59.2% were aware about their hypertensive status, in them 76.9% were on treatment and 49.5% were under control. There was striking lack of awareness of the condition and a sub optional rate of control among these treated.

A study on prevalence, awareness, treatment and control of hypertension was conducted in urban poor communities in Accra, Ghana. The aim of this study was to assess the prevalence, awareness, management and control of hypertension among a young adult population in their reproductive ages living in urban poor communities in Accra. It was a cross-sectional, population-based survey of 714 young adults in their

reproductive ages (women aged 15–49 years, men aged 15–59 years) living in three urban poor suburbs of Accra, Ghana[24].

The overall prevalence of hypertension in all three communities was 28.3% (women 25.6% and men 31.0%). Among respondents who had hypertension, 7.4% were aware of their condition; 4% were on antihypertensive medication while only 3.5% of hypertensive individuals had adequate blood pressure (BP) control (BP <140/90 mmHg). The level of awareness and treatment was lower in men than in women (3.1 and 1.3% for men and 11.9 and 6.5% for women, respectively). Among individuals with hypertension, the rate of control was higher among women than men (5.0 and 2.1%, respectively) [24].

Thankappan[25] assessed a study on Impact of a community based intervention program on awareness, treatment and control of hypertension in a rural Panchayat, Kerala, India. A baseline survey was conducted among 4627 adults aged ≥30 years (men 44%) selected by cluster sampling. Information was collected using a structured interview schedule by trained local volunteers. They measured weight, height, waist circumference and blood pressure using standard protocol. The volunteers monitored blood pressure at least once a month and educated the people in neighborhood groups on the need for regular medication and reducing risk factors of hypertension for a period of six years. A post intervention survey was conducted among 2263 adults aged ≥30 years (men 49%). Stepwise logistic regression analysis was done to find the odds of change in awareness, treatment and control of hypertension.

The results of the survey were the odds of awareness (OR 4.18, 95% CI 3.44–5.08), treatment (OR 3.44 CI 2.81–4.22) and control (OR 4.39 CI 3.36–5.73) of hypertension increased significantly in the post intervention survey compared to the baseline survey. Baseline hypertension prevalence of 34.9% (CI 33.8–36.1) was reduced to 31.0% (CI 29.1–32.9) in the post intervention survey based on age adjusted analysis[25].

**Effectiveness of Alternative Medicine on Hypertension**

Kamakhya Kumar [26] conducted a study on Reversing Hypertension through Yogic Intervention. The present study aimed at finding out the effect of yoga practice on hypertensive patients. Elevated blood pressure causes the heart to work harder than normal. The study was conducted at Center of Complementary and Alternative Medicine, Dev Sanskriti Vishwa Vidyalaya, Haridwar. Thirty patients suffering with mild hypertension were taken for the study and further divided into experimental and control group. Practice time was 45 minutes and the duration was 45 days. The result shows a significant change as yoga positively decreases the blood pressure (both systolic and diastolic) in the practice group.

Effect of Swedish massage to the face, neck, shoulders and chest on the blood pressure of women with pre hypertension was evaluated. Fifty women suffering from the condition were divided into control and test groups. The 25 patients in the test group received Swedish massage 10-15 minutes, three times a week for 10 sessions. The control group's 25 patients also were relaxed but received no massage. Their blood pressure was measured before and after each session. "Findings of the study indicated that massage therapy was a safe, effective, applicable, and cost-effective

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intervention in controlling blood pressure of the pre hypertension women," the study says. "It can be used in health care centers and even at home." A complementary and alternative medicine therapy, massage has become a mainstream treatment offered in hospitals, medical offices, spas and other wellness centers for the treatment and prevention of a wide range of health conditions, including managing blood pressure[27]. Saraswathi[28] conducted a study on Role of Yoga Nidra and Shirodhara on Hypertensive Patients. The aim of the present study was to determine the role of Yoga Nidra and Shirodhara on hypertensive patients. The study was conducted on 32 hypertensive patients aged 30-60 years who were randomly selected from Polyclinic, Dev Sanskriti Vishwa Vidyalaya, Gayatrikunj, Haridwar through the method of accidental sampling. In this study "Pre- Post Single group design" was used and t-test was used for statistical analysis.

There was a significant reduction in mean values of systolic blood pressure and diastolic blood pressure among subjects practicing Yognidra and Shirodhara (p<0.001). The findings revealed that the intervention significantly reduced the level of systolic and diastolic blood pressure of the hypertensive. Therefore the researchers concluded the intervention as safe and effective treatment for Hypertension that is free from any adverse effects and would maintain Blood Pressure.

Devi[29] conducted a study to assess the effect and experience of transcendental meditation on hypertension patients attending medical OPD at Mangalore, Karnataka. Objective was to know whether TM reduces subjective complaints, stress and blood pressure of patients with hypertension. A pre-experimental one group pre test- post test design was adopted, involving 60 patients through purposive sampling. BP, stress

levels, subjective complaints and experience were recorded before and after meditation. Data analysis include description of subjective complaints, paired t-test was carried out against the null hypothesis that SBP and DBP before and after meditation remained the same. Average systolic blood pressure before and after meditation was 141.66and 136.30 mmHg respectively. This decrease is statistically significant (p<0.0001). Average diastolic blood pressure before and after meditation was 84.84 and 79.86 mmHg, respectively, the difference is statistically significant (p<0.0001).

**Literature related to Acupressure**

A comparative study was conducted on effectiveness of Swamiji Vethathiri Maharishi's acupressure 14 points exercise with Traditional Chinese Medicine Acupressure therapy in the treatment of depression, thyroid problems and heart ailments. According to him, a continuous practice of acupressure 14 points exercise ensures free flow of bio- magnetic energy or vital life force energy throughout the body without short circuit by removing air bubbles in the nerves and helps in the fire flow of blood circulation and restores the body to the normal; condition free from body pain and disease.[30]

Borzou[31] conducted a study on the effect of acupressure at the point of Hugo on pain severity of needle insertion in Arterio venous fistulas in Haemo dialysis patients. In this single-group clinical trial, 35 haemo dialysis patients in the Besat hospital were selected by convenience sampling. Two minutes before and during insertion of needles in artery fistula area by nurse, acupressure was conducted on the Hugo point on other hand. This work was done in 3 sessions. Paired t-test was used to

measure pain intensity difference. There was a significant difference in pain intensity during a routine care and pressure on the Hugo point. The mean pain scores after the Hugo point acupressure was decreased in all 3 phases (P < 0.001). Hugo acupressure points can be used as an effective and low-cost way to reduce the pain of needle insertion during fistulas in patients undergoing hemodialysis.

Veena[32] conducted a Betty Neuman Conceptual Framework - Effect of Acupressure on Anxiety and Fertility among women with unexplained infertility subjected to Intrauterine Insemination. Nursing theories and models contribute significantly to the advancement of nursing profession. Nursing theories help explain phenomena important to clinical practice. The variability in nursing phenomena and situations demand flexibility in the choice of specific conceptualizations to be used. In this paper, self acupressure was conceptualized as an alternative nursing intervention to relieve anxiety – a stress response in women with unexplained infertility, subjected to intrauterine insemination and is synthesized on the framework of Betty Newman System model. Betty Newman System model identifies nurse's role in terms of reducing the stressor's reactions through primary, secondary or tertiary preventive interventions in order to retain, attain and maintain an optimum wellness level.

A single blind randomized controlled study on Auricular acupressure relieves anxiety and fatigue, and reduces cortisol levels in post-caesarean section women was conducted. The results of the study were, 76 women who completed the study, those who received auricular acupressure had significantly lower mean cortisol levels (mean difference = 4 μg/dl, p <0.05), heart rate (mean difference = 9.2 beats/min, p <0.001), anxiety symptoms (mean difference = 3.8, p <0.01), and fatigue symptoms (mean

difference = 7.1, p <0.01) than women in the control group at 5 days postpartum. Auricular acupressure is an effective non-pharmacological method for reducing cortisol levels, heart rate, anxiety, and fatigue in early postpartum after caesarean section[33].

Zick[34] conducted a randomized clinical trial study on Investigation of 2 types of Self-administered Acupressure for Persistent Cancer-Related Fatigue in Breast Cancer Survivors. A total of 424 survivors of stages 0 to III breast cancer who had completed cancer treatments at least 12 months previously were screened, and 288 were randomized, with 270 receiving relaxing acupressure (n = 94), stimulating acupressure (n = 90), or usual care (n = 86). One woman withdrew owing to bruising at the acupoints.

At week 6, the percentages of participants who achieved normal fatigue levels (Brief Fatigue Inventory score <4) were 66.2 %( 49 of 74) in relaxing acupressure, 60.9 %( 42 of 70) in stimulating acupressure, and 31.3 %( 26 of 84) in usual care. After ten weeks, a total of 56.3% (40 of 71) in relaxing acupressure, 60.9% (42 of 69) in stimulating acupressure and 30.1% (25 of 83) in usual care continued to have normal fatigue. At neither time point were the 2 acupressure groups significantly different. Relaxing acupressure, but not stimulating acupressure, showed significant improvements in sleep quality compared with usual care at week 6, but not at week 10. Only relaxing acupressure significantly improved quality of life vs. usual care at weeks 6 and 10.

Tan[35] conducted a systematic review and critique on Sham Acupressure Controls Used in Randomized Controlled Trials. Thirteen electronic databases were adopted to locate relevant studies from inception to July 3, 2014. Meanwhile, eight Chinese journals on complementary and alternative medicine were manually searched to locate eligible articles. In addition, eligible studies listed in the reference lists of the included papers and other related systematic reviews on acupressure were also screened to further search any potentially eligible trials. Methodological quality of the included studies was evaluated using the risk of bias assessment tool developed by the Cochrane Back Review Group.

Descriptive analysis was adopted to summarize the therapeutic outcomes. Sixty-six studies with 7265 participants were included. Methodological quality of the included trials was generally satisfactory. Six types of sham acupressure approaches were identified and "non-acupoint" stimulation was the most frequently utilized sham point while an acupressure device was the most commonly used approach for administering sham treatments. Acupressure therapy was a beneficial approach in managing a variety of health problems and the therapeutic effect was found to be more effective in the true acupressure groups than that in the sham comparative groups. No clear association could be identified between different sham acupressure modalities and the reported treatment outcomes.

A study was conducted on effectiveness of acupressure on improving the quality of sleep among cancer patients in Health Care Global cancer center. The research design used was pre experimental one group pretest posttest design. Non probability purposive sampling method was used to select 60 samples for the study.

The tool used for this study was Pittsburg Sleep Quality Index (PSQI) scale before and after intervention. Acupressure was given at 3 points (back of the ear, wrist and calf muscle for 3min /acupoints on the same day after completion of pretest and it was given for seven days continuously before bedtime. The data gathered was analyzed using descriptive and inferential statistics. The score of sleep after intervention was lower than the score of sleep before intervention. The 't' value was 23.06 (1.96), which was significant at 0.05 level. This study revealed that there was a significant improvement in the quality of sleep among cancer patients after acupressure and also there was no association between the qualities of sleep among cancer patients after intervention with their selected demographic variables.[36]

**Effectiveness of Acupressure on Hypertensive Patients**

Yehuda[37] in her article Acupressure points for high blood pressure, the need for a good and safe solution to the problem of high blood pressure has never been greater. According to the CDC - Center for Disease Control, as many as 70 million adults in the United States have high blood pressure, which is roughly one out of every three. This is a startling statistic because high blood pressure dramatically increases a person's risk for two of the three leading causes of death in our country: heart disease and stroke. This Ancient Chinese acupressure technique can help regulate one's blood pressure without the need for any type of drugs or chemicals. Acupressure is a self-applied therapy that tends to bring about relief quickly and effectively, and it gets even more effective with regular use. It is based on the theory that invisible energy known as qi in Chinese carries a tremendous healing power. When pressure is applied at special "acupoints" that are connected to various glands, it is believed that qi flow can be boosted.

Brewer[38] conducted a study involving 80 people compared the effects of acupressure in people with hypertension who were attending a cardiology outpatient department in Taiwan. Half were randomized to receive true acupressure at the Tai chong Acupoint, while half had sham acupressure applied over a point that was not a recognized acupoint. In the group who received true acupressure, average blood pressure before the treatment was 165.0/96.3 mmHg.

Immediately after the acupressure, average blood pressure was 150.4/92.7 mmHg. When measured 15 minutes later it was 145.7/90.8, and 30 minutes after the acupressure it was 142.9/88.6 mmHg. This study suggests that the use of acupressure on the traditionally used Tai Chong acupoint in the foot is effective in lowering blood pressure in people with hypertension. The effects were immediate, and lasted for at least 30 minutes, with an average recorded reduction in blood pressure of 22.1/7.7 mm of Hg after 30 minutes.

Ameerkhamam[39] wrote an article on How to Get Relief from Low Blood Pressure Applying Acupressure Therapy, Treating High Blood Pressure with Acupressure Point is generally safe when performed by an experienced practitioner. No serious complications have been published, despite millions of treatments every year. Self-administered acupressure is believed to be safe with proper training and knowledge.

In his article Yue[40] explains about Lowering High Blood Pressure by Pinching Ears. Using finger nails put the index finger inside ear, and the thumb on the top of this point. Pinch and hold on the left ear for 15 seconds before releasing. Repeat this

process on the right ear; pinch and hold for 15 seconds then release.  Keep alternating on both sides for about 5 minutes totally. If the blood pressure is very high, use this method a couple times daily, combined with current treatments. Pinching the ears will result in the blood pressure showing a decreasing trend in the long term. Consistently measuring the blood pressuring throughout the day will give an accurate gauge of blood pressure curve throughout the day. The most effective way to apply this acupressure method is to perform this stimulation one hour before high blood pressure periods. This will help in controlling blood pressure well. On doing this for a period of time, the blood pressure trends down. Until then, it is better to visit the doctor regularly and attain advice regarding the gradual reduction of medication intake.

GanHonLi[41] conducted a randomized clinical trial study on effectiveness of Acupressure on the Taichong Acu point in Lowering Blood Pressure in Patients with Hypertension. Eighty patients with hypertension attending a cardiology outpatient department in central Taiwan were included in this randomized clinical trial. Acupressure was applied to the Taichong acu point in the experimental group (n = 40) and to the first metatarsal (sham acu point) in the control group (n = 40).

Blood pressure was measured by electronic monitoring before and immediately 15 min and 30 min after acupressure. A result of the study shows the average age of the experimental and control participants was 59.3 ± 9.2 years and 62.7 ± 8.4 years, respectively. The two groups were similar in demographics and antihypertensive drug use. Mean systolic and diastolic BP in the experimental group decreased at 0, 15, and 30 min after acupressure (165.0/96.3, 150.4/92.7, 145.7/90.8, and 142.9/88.6 mmHg); no significant changes occurred in the control group. There

was a significant difference in systolic and diastolic BP between the experimental and control groups immediately and 15 and 30 min after acupressure (p < 0.05). Acupressure on the Taichong acu point can lower BP in hypertensive patients and may be included in the nursing care plan for hypertension.

HollyTse[42] opines that hypertension is the most common type of community problem. Stress and tension were the major factors in raising the blood pressure. For high blood pressure, consistently massaging all of the pressure points on our feet would result in the greatest benefit in healing the blood pressure rather than fixating on some numbers appearing in a blood pressure reading.

A randomized control trial by Pengli [43] on Long-Lasting Reduction of Blood Pressure by Electro acupuncture (EA) in Patients with Hypertension: Randomized Controlled Trial. They used sixty-five hypertensive patients not receiving medication, who were assigned randomly to one of the two acupuncture intervention (33 versus 32 patients). Patients were assessed within 24-hour ambulatory blood pressure monitoring. They were treated with 30-minutes of EA at pericardium points 5-6+ stomach points 36-37 or large intestine points 6-7+ gall bladder points 37-39 once weekly for 8 weeks.

Four acupuncturists provided single-blinded treatment. After 8 weeks, 33 patients treated with EA at PC 5-6+ST 36-37 had decreased peak and average SBP and DBP, compared with 32 patients treated with EA at LI 6-7+GB 37-39 control acu points. Changes in blood pressures significantly differed between the two patient groups. In 14 patients, a long-lasting blood pressure–lowering acupuncture effect was

observed for an additional 4 weeks of EA at PC 5-6+ST 36-37. After either treatment, the plasma concentration of nor epinephrine, which was initially elevated, was decreased by 41%; likewise, renin was decreased by 67% and aldosterone by 22%. EA at select acu points reduces blood pressure. Sympathetic and renin-aldosterone systems were likely related to the long-lasting EA actions.

According to Acupressure there are five elements in each and every unit (cell) in our body. They are Fire, Earth, Air, Water and Wood. We can check the pulse and identify the element which has lost its equilibrium in the body. This is Character Pulse Diagnosis. Based on the diagnosis that particular element channel is chosen and pressure is given at one particular element point in that channel which is affected. This stimulation can be given at one point once in a week or every three days, each time after pulse diagnosis only. So each time the point may vary or remain the same depending on pulse diagnosis.[1]

As per Acupressure patho physiology, the cause of any disease is lack of energy supply. It may be either due to morbid matter accumulation, which requires more energy to eliminate that or due to lack of absorption of universal energy by the element points. So as part of the intervention, the steps to be taken includes - to support morbid matter elimination by giving complete rest to the patient (fasting / restricted diet- taking only fruits or only vegetable soup) - to facilitate the absorption of universal energy by stimulating the Acupressure points.

**Development of Nursing Evidence-Based Practice Protocol**

For the development of evidence based practice guideline, an extensive systematic review was carried out by the researcher. The electronic data bases and various hand search strategies were adopted for the systematic review. The search engines included were Pubmed Central, Google Scholar, Cochrane Library and Medline. All the studies identified through this search were subjected to quality check by using Johns Hopkins evidence Practice Model. The researcher obtained permission from Johns Hopkins University (https://www.ijhn-education) to use the Johns Hopkins Nursing Evidence Based Practice (JHN EBP) model and tools (Annexure J).

The Protocol includes the following aspects in this study:

1. Nursing Evidence Based Practice Question Development

2. PRISMA Flow Diagram

3. Characteristics of included papers (Study design wise and Intervention wise)

4. Individual Evidence Summary

**1. Nursing Evidence Based Practice Question Development**

**What is the problem and why is it important?**

This research aims to assess the effectiveness of Acupressure upon Blood pressure among the hypertensive clients. Hypertension is the common health problem among community people and needs more attention of health sector people towards the care of hypertensive clients in the community setting.

**What is the current practice?**

The current practice for treating hypertensive patients focus towards maintaining blood pressure under normal range using medications. Once in every three months the patients are to be evaluated and the medicine dosage has to be adjusted as needed.

**What is the focus of the problem?**

The focus of the problem is both of clinical and educational concern. In clinical practice Acupressure treatment is easy to give. No extra material resources is needed for Acupressure. As an educational concern nurses need to be given more of skill based training about Acupressure. We need to identify the clinical effectiveness of Acupressure upon blood pressure.

**How was the problem identified?**

Hypertension has many complications including Cerebro vascular accident, cardiac problems, renal problems. Thus we need effective alternative methods to treat hypertension to prevent complications. Cost effective treatment could reduce the medical expenditure. Thus acupressure was chosen for treating hypertension.

**What are the PICO Components?**

**P**    -    Population / Patient: Here it is the Hypertensive Clients.

**I**    -    Intervention: Using Acupressure for hypertensive clients.

**C**    -    Comparison. A comparison group was identified who were under routine allopathic treatment alone.

**O**    -    Outcome. The expected outcome is the reduction in the blood

pressure levels of the hypertensive clients with Acupressure treatment.

## 2. PRISMA Flow Diagram

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta – Analyses) is evidence based minimum set of items aimed at helping authors to report a wide array of systematic reviews and meta-analyses that assess the benefits and harms of a health care intervention. PRISMA focuses on ways in which authors can ensure a transparent and complete reporting of this type of research.

The two important components of PRISMA are: The PRISMA checklist and The PRISMA flow diagram. In this research work, the researcher used the PRISMA flow diagram to depict the flow of information through the different phases of systematic review.

In this research work, PRISMA helped the author mainly focus and improve the reporting of systematic review of randomized controlled trials. It is further used as a basis for reporting reviews of other types of researches like cross sectional, cohort, case–control studies. Total records collected for systematic review included 101, out of which 93 were identified through data base search and 8 were identified through other searches. Duplicate records were excluded at this stage were 42. The remaining records undergoing screening for abstract and methodology were 59. Among these 59, 39 records were excluded based on the exclusion criteria. The remaining 20 full text articles were assessed for eligibility, out of which 9 full text articles were excluded with reasons.  Hence, there were 11 studies included for qualitative synthesis / Meta synthesis.
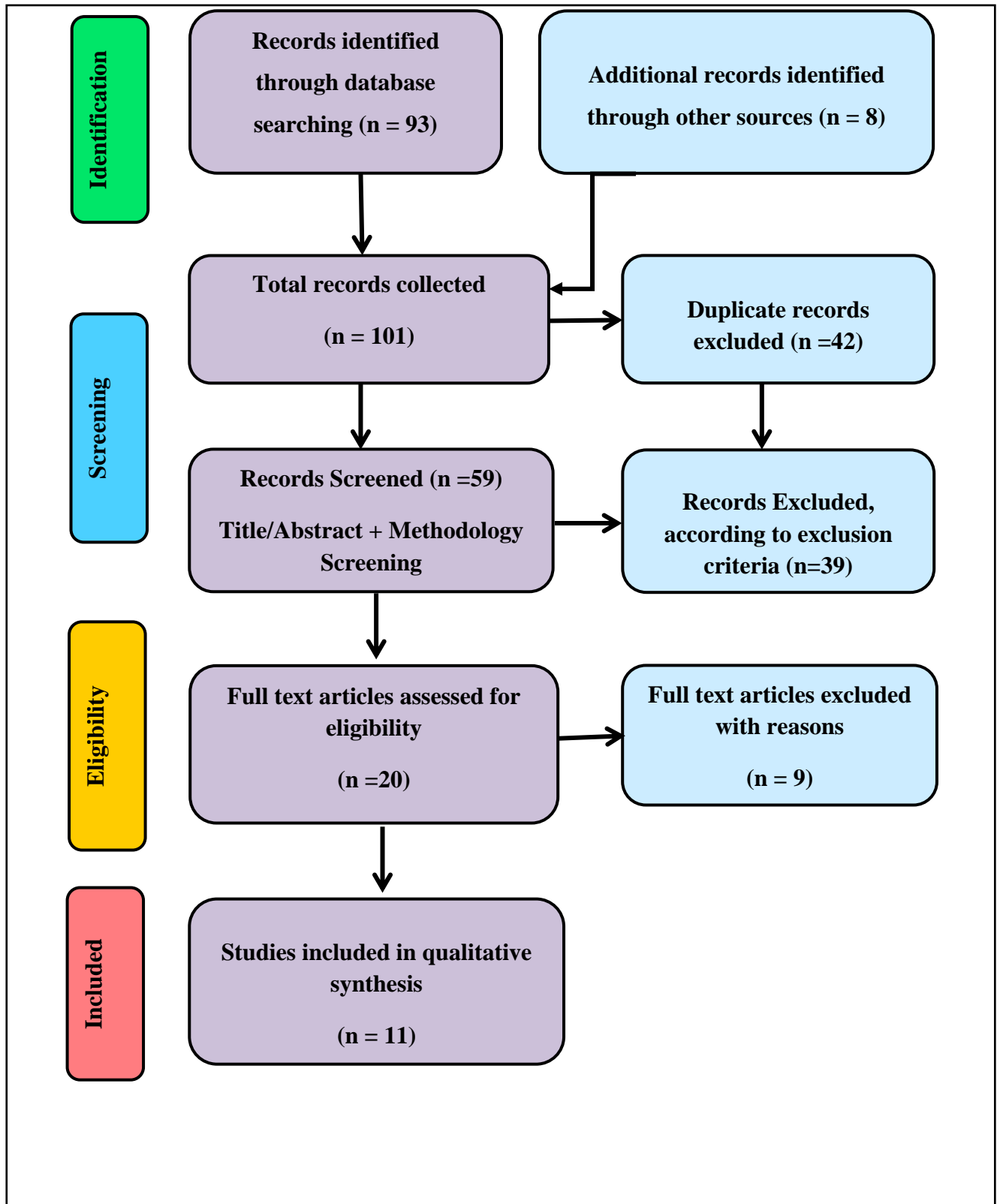
**Fig 2: PRISMA Flow Diagram Depicting the Different Phases of Systematic Reviews**

## 3. Characteristics of Included Papers in the Literature Review

## Table 1: Characteristics of Included Papers

| I | Study Design | Number of Articles (n= 84) | % |
|---|---|---|---|
| | Systematic Reviews | 2 | 2.3 |
| | Randomized controlled Trials | 19 | 22.6 |
| | Non Randomized controlled Trials | 19 | 22.6 |
| | Longitudinal | 1 | 1 |
| | Prospective/Cohort | 8 | 9.5 |
| | Descriptive / Prevalence studies | 20 | 23.8 |
| | Retrospective Studies | 2 | 2.3 |
| | Cross sectional | 6 | 7.1 |
| | Review Articles | 7 | 8.3 |
| II | Interventions | Number of Articles (n= 22) | % |
| | Effectiveness of Acupressure on other problems | 15 | 68.1 |
| | Effectiveness of Acupressure on blood pressure | 4 | 18.1 |
| | Effectiveness of other complementary therapies | 3 | 13.6 |

**EBP Question: What is the clinical effectiveness of Acupressure on blood pressure?**

**Table.2 Individual Evidence Summary of RCT's Based on Effectiveness of Acupressure on Blood Pressure**

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| The World Health Organization (2013)[8] | Patients with hypertension | Combined treatment of hypertension, including traditional Chinese and conventional medicine non pharmacological treatment with antihypertensive drugs to control BP in patients with hypertension. | Control group | Effective control of hypertension. Effective BP control should be the main objective in the ongoing effort to prevent and treat hypertension. |
| Katherine T. Mills,[14] August 9 2016 | MEDLINE, Cochrane Central Register of Controlled Trials, EMBASE, CINAHL, | A Systematic analysis of population based studies from 90 countries | | Global hypertension disparities are large and increasing. Collaborative efforts are urgently needed to combat the |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | Web of Science and Google were searched | | | emerging hypertension burden in low- and middle-income countries |
| Bryan, (2018)[17] | Adults with hypertension, aged at least 18 years | Guidelines were introduced for the management of arterial hypertension and the purpose was to evaluate and incorporate new evidence into the guideline recommendation. | Task force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension | Because of the impact on clinical practice, quality criteria for the development of the guidelines have been established in order to make all decisions transparent to the user. To improve the poor rates of BP control by promoting simple and effective treatment strategies. |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| Esther, (2017)[18] | A total of 10262 hypertension patients with Suboptimal BP despite treatment aged less than 80 years and without existing CVD was enrolled from public general out-patient clinics in Hong Kong. | Study on the Effects of risk assessment and management program for hypertension on the clinical outcomes and the Cardio vascular disease risks after 12 months. Their clinical outcomes and predicted 10-year CVD risk were compared. Multivariable linear and logistic regressions were used to determine the independent effectiveness of RAMP-HT after adjusting for potential confounding variables. The | A matched cohort of hypertension patients who were receiving usual care in general out-patient clinics without any RAMP-HT intervention by propensity score matching | Significantly greater proportions of RAMP-HT participants achieved target BP (i.e. BP<140/90 mmHg)(OR¼41.18, P<0.01) and LDL-C levels (i.e. <3.4 m.mol/l for Patients with CVD risk 20% or <2.6 m.mol/l for CVD risk>20%) (OR¼41.13, P<0.01). RAMP-HT participants also had significantly greater reduction in predicted 10-year |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | | outcome of the study was Compared with the usual care group after 12 months | | CVD risk by 0.44% (coefficient¼ 0.44, P<0.01). |
| Marcin, (2018)[19] | Adults with hypertension | 17 effective ways to lower high blood pressure | | According to her, hypertension is called "silent killer" of the body. Lifestyle changes can significantly reduce the numbers and lower the risk without requiring hypertensive medications. |
| Afzalshamsi, (2017)[20] | 27 hypertensive patients who referred to hospitals | A qualitative research study on Living with Hypertension to explore | Graneheim and Lundman's approach | Experiences of the participants were divided into three main |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | affiliated to Tehran University of Medical Sciences were selected based on purposive sampling | perspectives and experiences of while living with this disease. This was a qualitative research using content analysis approach and semi-structured interviews were carried out. | was used for analysis of data. | categories as follows: (1) disease shadow; (2) dual understanding of the effect of drug therapy consisting of two sub-categories known as ''perceived benefits,'' ''negative consequences''; and (3) facing the disease that includes the two subcategories of ''Compatibility'' and ''Negligence and denial''. Based on the findings, patients |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | | | | with hypertension had experienced many physical, psychological, social, familial and spiritual problems due to the disease and their cultural context. |
| Cheryl, (2016)[21] | Nurses and Nurse Practitioners (NPs) in hypertension management | Assessed on Expanding the Role of Nurses to Improve Hypertension Care and Control Globally. | | Today the roles of nurses and nurse practitioners (NPs) in hypertension management involve all aspects of care, including (1) detection, referral, and follow up; (2) diagnostics |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | | | | and medication management; (3) patient education, counseling, and skill building; (4) coordination of care; (5) clinic or office management; (6) population health management; and (7) performance measurement and quality improvement. The patient-centered, multidisciplinary team is a key feature of effective care models that have been found to |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | | | | improve care processes and control rates. |
| Tan, (2015)[35] | Thirteen electronic databases were adopted to locate relevant studies. Eight Chinese journals on complementary and alternative medicine were manually searched to locate eligible articles. In addition, eligible studies listed in the reference lists | Systematic review and critique on Sham Acupressure Controls Used in Randomized Controlled Trials. | Methodological quality of the included studies was evaluated using the risk of bias assessment tool developed by the Cochrane Back Review Group. Descriptive analysis | Acupressure therapy was a beneficial approach in managing a variety of health problems and the therapeutic effect was found to be more effective in the true acupressure groups than that in the sham comparative groups. No clear association could be identified between different sham acupressure modalities and |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | of the included papers and other related systematic reviews on acupressure were also screened to further search any potentially eligible trials. | | was adopted to summarize the therapeutic outcomes. | the reported treatment outcomes. |
| Yehuda, (2018)[37] | Hypertensive clients | Acupressure points for high blood pressure, the need for a good and safe solution to the problem of high blood pressure has never been greater. | According to the CDC | The Ancient Chinese acupressure technique can help regulate your blood pressure without the need for any type of drugs or chemicals. It is based on the theory that invisible |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | | | | energy known as qi in Chinese carries a tremendous healing power. When pressure is applied at special "acupoints" that are connected to various glands, it is believed that qi flow can be boosted. |
| Sarah Brewer, (2018)[38] | People with hypertension who were attending a cardiology outpatient department in Taiwan. | Compared the effects of acupressure between true acupressure at the Tai chong Acu point and sham acupressure applied over a point that was not a recognized acu point | Two different group received different therapy | This study suggests that the use of acupressure on the traditionally used Tai Chong acu point in the foot is effective in lowering blood pressure in |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | | | | people with hypertension. The effects were immediate, and lasted for at least 30 minutes, with an average recorded reduction in blood pressure of 22.1/7.7 mmHg after 30 minutes. |
| Ameerkhamam, (2018)[39] | Hypertensive clients | Treating High Blood Pressure with Acupressure Point | - | No serious complications have been published, despite millions of treatments every year. Acupressure is believed to be safe with proper training and knowledge. |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| Yue, (2017)[40] | Hypertensive clients | Explains about Lower High Blood Pressure by Pinching Ears. Using your finger nails put the index finger inside your ear, and the thumb on the top of the ear point. Pinch and hold on your left ear for 15 seconds before releasing. Repeat this process on the right ear; pinch and hold for 15 seconds then release. Keep alternating on both sides for about 5 minute's totally. | Consistently measuring your blood pressuring throughout the day will give you an accurate gauge of your blood pressure curve throughout the day. | The most effective way to apply this acupressure method is to perform this stimulation one hour before your high blood pressure periods. This will help you control your blood pressure well. If you keep doing this for a period of time, you will find out your blood pressure trends down. |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| Ganhonli, (2016)[41] | Eighty patients with hypertension attending a cardiology outpatient department in central Taiwan were included in this randomized clinical trial. | Acupressure was applied to the Taichong acu point in the experimental group (n = 40) and to the first metatarsal (sham acu point) in the control group (n = 40). Blood pressure was measured by electronic monitoring before and immediately 15 min and 30 min after acupressure. | Control group | There was a significant difference in systolic and diastolic BP between the experimental and control groups immediately and 15 and 30 min after acupressure (p < 0.05). Acupressure on the Taichong acu point can lower BP in hypertensive patients and may be included in the nursing care plan for hypertension. |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| Reene Sukhuban, (2016)[27] | Women with hypertension | Swedish massage to the face, neck, shoulders, and chest on the blood pressure of women with pre hypertension. | Control group | Findings of the study indicated that massage therapy was a safe, effective, applicable, and cost-effective intervention in controlling blood pressure of the pre hypertension women. It can be used in health care centers and even at home. |
| Pengli, (2015)[43] | Sixty-five hypertensive patients not receiving medication | They were treated with 30-minutes of EA at PC 5-6+ST 36-37 or LI 6-7+GB 37-39 once weekly for 8 weeks. Four acupuncturists provided | Two different group received different therapy | Changes in blood pressures significantly differed between the two patient groups. In 14 patients, a long-lasting blood |

| First Author, Year | Population | Intervention(s) | Comparator(s) | Author Findings & Conclusions |
|---|---|---|---|---|
| | | single-blinded treatment. | | pressure–lowering acupuncture effect was observed for an additional 4 weeks of EA at PC 5-6+ST 36-37. After treatment, the plasma concentration of nor epinephrine, which was initially elevated, was decreased by 41%; likewise, renin was decreased by 67% and aldosterone by 22%. |

**Summary**

This chapter has dealt with a review of literature related to the problem stated. It has helped the researcher to understand the impact of the problem under study. It has also enabled the researcher to understand the impact of the problem, design the study, develop the tool and plan the data collection procedure and to analyze the data. It has also dealt with Nursing evidence Based Practice Protocol which include Nursing EBP question development, PRISMA flow diagram, the characteristics of included papers with regard to study design and interventions and individual evidence summary of qualitative synthesis.

# CHAPTER - III

## RESEARCH METHODOLOGY

The methodology of the research study is defined as the way, the data is gathered and analyzed in order to answer the research questions or analyze the research problem. The research methodology involves a systematic procedure by which the researcher starts from an initial identification of the problem to find its conclusion.[44]

This chapter deals with a brief description of different steps undertaken by the investigator for the study. It includes research approach, research design, setting, population, the sample and sampling technique, development and description of tool, content validity, reliability, pilot study, protection of human rights and procedure for data collection and plan for data analysis.

### Research Approach

To accomplish the objective of this study, an experimental approach was considered most appropriate as the researcher wanted to assess the effectiveness of Acupressure upon blood pressure level. In this study experimental research approach was used.

### Research Design

Quasi Experimental (Non Equivalent control group) Time series design was used in this study

|  |  |  |  |
|------|---|------|------|
| **O1** |  | **O2** | **O3** |
| **O1** | **X** | **O2** | **O3** |

O1 : Pre test- assessment of blood pressure before Acupressure in control and experimental group

X : Intervention - Acupressure Treatment given once in a week for three months

O2 : Post test 1- assessment of blood pressure after Acupressure in control and experimental group

O3 : Post test 2- assessment of blood pressure one month after post test 1
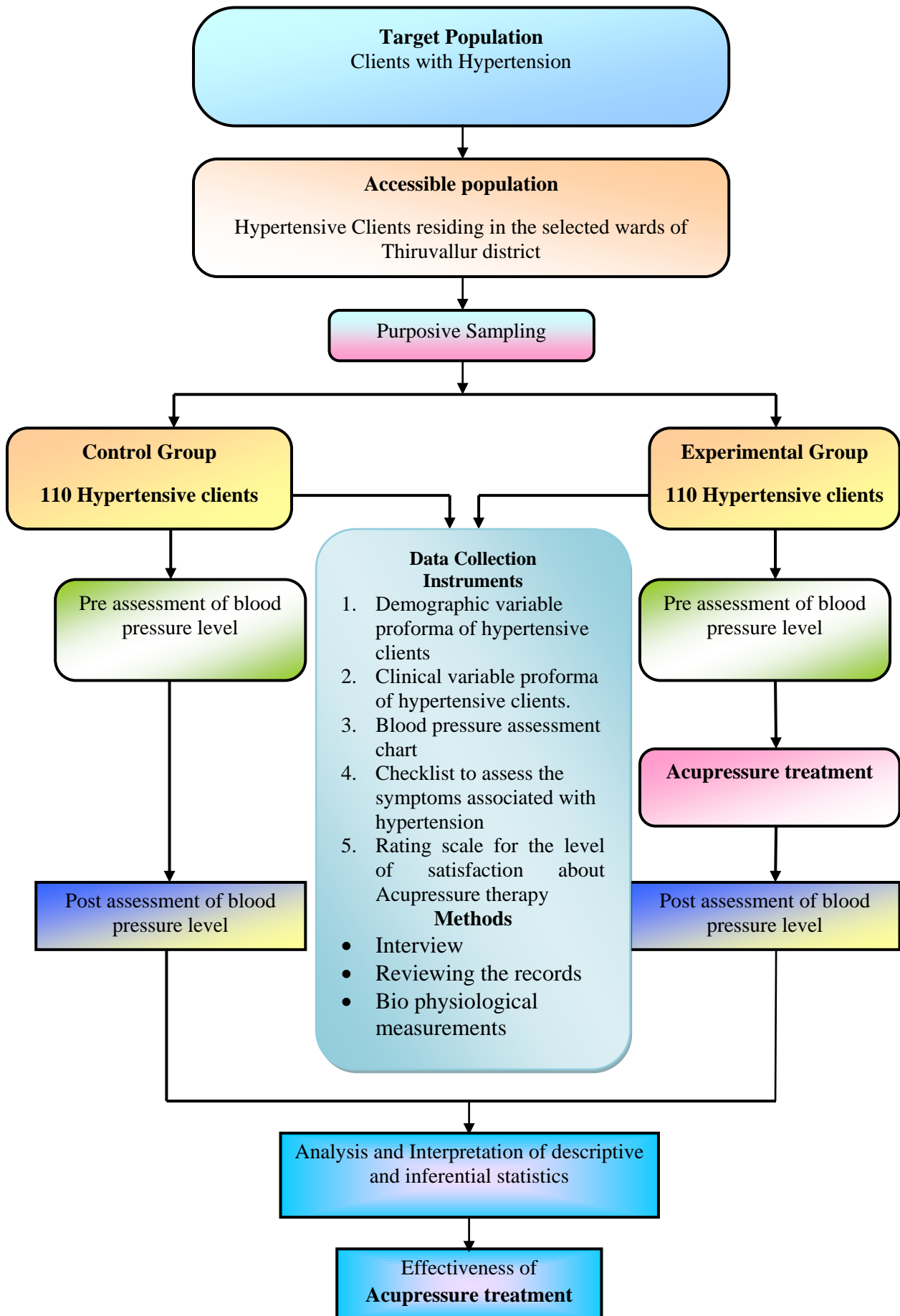
**Fig.3 Schematic Representation of Research Design**

**Variables**

Variables are attributes that vary taking on different values. [44]

**Dependent variable**

The variable hypothesized to depend on or to be caused by another variable.[44]

In this study dependent variable is blood pressure of the Hypertensive clients.

**Independent variable**

The variable hypothesized to the outcome variable of interest.[44]

In this study the independent variable is Acupressure.

**Attribute variables**

Variables that describe the study sample characteristics are termed as attribute variables. It confounds the relationship between the independent and dependent variables that needs to be controlled either in the research design or through statistical procedures.[44] In this study it includes the demographic and the clinical variables which have influence on blood pressure level of hypertensive clients.

**Research Setting**

Research setting is the physical location and conditions in which data collection takes place in a study.[44] Settings were chosen by Convenient Sampling as Thiruverkadu and Koladi which were proximal to Apollo College of Nursing and convenient for the researcher.

This study was conducted in areas under Thiruverkadu Municipality. Thiruverkadu Municipality is situated in the West Chennai of Tamil Nadu in Thiruvallur District. This town

is surrounded with infrastructural facilities and it is near to visit Chennai Metropolitan Bus Terminal. Thiruverkadu is a Locality in Ambattur in TamilNadu State. Tamil is the local language here. Thiruverkadu Municipality includes area of Thiruverkadu, Koladi, Ayanambakam, Velapanchavadi, Veeraraghavapuram, and Noombal.

Tiruverkadu (or Thiruverkadu or TVK) (literally meaning A forest of holy herbs and roots) is a western suburb of Chennai, Tamil Nadu. It comes under Thiruvallur district administration. It is famous for its Devi Karumariamman Temple. The town is located 2 km from Chennai Bangalore highway NH4 and 1.5 km from Avadi Poonamalle road SH55. The town is 10 km from Chennai Metropolitan Bus Terminus CMBT. Nearby towns include Porur, Kattupakkam, Iyyapantangal, Kumananchavadi, Karayanchavadi, Poonamalle, Paruthipattu, Ayapakkam, Ambattur, Vaangaram and Maduravoyal.

According to 2011 census, Thiruverkadu had a population of 62,824 with a sex-ratio of 977 females for every 1,000 males, much above the national average of 929. A total of 7,189 were under the age of six, constituting 3,617 males and 3,572 females. Thiruverkadu is governed by Municipality of Thiruverkadu, coming under the Thiruvallur district. Thiruverkadu is a selection grade Municipality.

From selected setting Koladi area was allocated to Control group and Thiruverkadu main area was allocated to Experimental group by tossing a coin. From the selected areas samples were chosen out of the known cases of Hypertension using purposive sampling technique in each area.

**Population**

**Target population**

Target population is the group of population, that the researcher is aimed to study and to whom the study findings was generalized.[42] In this study target population is all patients with hypertension.

**Accessible population**

Accessible population is the list of population, the researcher finds in the setting of the study/research area.[42] Accessible population in this study is the patients with hypertension residing at Thiruverkadu and Koladi which are the selected wards of Thiruvallur district.

**Sample**

The sample size calculation was estimated with the online information and sample size calculator. Sample size was estimated to be 100 on the basis of the previous study findings using the power analysis. They were type 1 error alpha= 0.01, beta= 0.2, effect size=1.0 and standard deviation= 3.0. The requirement was estimated to be 100 samples for the present study. Considering attrition rate 10% due to various reasons 110 samples were required for each group. Therefore, a sample size of 220 was chosen for this study, 110 for control group and 110 for experimental group.

**Sampling technique**

It was stated by Polit and Beck[42] that sampling referred to the process of selecting a portion of the population to represent the entire population. In this study purposive sampling technique was used. The study settings were chosen by Convenient Sampling as

Thiruverkadu and Koladi were proximal to Apollo College of Nursing and convenient for the researcher.

From the selected setting, Thiruverkadu Municipality, Koladi area was selected for Control group and the Thiruverkadu main area for Experimental group by tossing a coin. From the selected areas samples were chosen out of the known cases of Hypertension using purposive sampling technique in each area. Known cases were identified by interviewing the family members and confirmed by the records. Identified patients were included in the study.

**Sampling Criteria**

**Inclusion criteria**

The study includes Hypertensive clients:

➢ who were already diagnosed by a physician

➢ who were willing to participate

➢ who were in the age group of 31 - 59 years

**Exclusion criteria**

The study excludes Hypertensive clients:

➢ who were on any other alternative system of treatment like Sidha, Homeopathy.

➢ who were seriously ill during data collection period

**Selection and Development of Tools**

As the study aimed to evaluate the effectiveness of Acupressure upon blood pressure level, the data collection instruments were developed through an extensive review of literature in consultation with the opinion of experts and with the opinion of faculty members.

The instruments used in the study were

- Demographic Variables Proforma

- Clinical Variables Proforma

- Aneroid Manometer and Blood Pressure Assessment Chart

- Checklist to Assess the Symptoms Associated with Hypertension

- Rating Scale for the Level of Acceptance about Acupressure Therapy

**Demographic Variable Proforma of Hypertensive Clients**

Demographic variable proforma included information regarding age, gender, education status, occupation status, religion, marital status and family income.

**Clinical Variable Proforma of Hypertensive Clients**

Clinical variable proforma included height, weight, BMI, habits, history of hypertension.

**Aneroid Manometer and Blood Pressure Assessment Chart**

Blood pressure assessment chart included recording of systolic and diastolic Blood Pressure for one pretest and two post test.

**Checklist to Assess the Symptoms Associated with Hypertension**

A checklist was developed by the investigator to assess the symptoms associated with hypertension. It consists of eight items with responses such as absent, mild, moderate and severe. It included the health problems like headache, body pain, giddiness, fatigue, shortness of breath, nose bleeding, vertigo, other problems if present (signs and symptoms of Hypertension).

The scoring interpretation was as follows:

| Score | Interpretation |
|-------|----------------|
| 0 | Absent |
| 1 | Mild |
| 2 | Moderate |
| 3 | Severe |

**Level of Acceptability Scale**

A Rating scale to assess the Level of Acceptability about the Researcher, Acupressure Therapy and the Effectiveness of Acupressure on their health was used with four points scale. The four responses included Highly Acceptable, Acceptable, Unacceptable and highly unacceptable. Scoring was given as 3 for Highly Acceptable, 2 for Acceptable, 1 for Unacceptable and 0 for highly unacceptable.

**Scoring interpretation:**

| Score | Percentage | Interpretation |
|-------|------------|----------------|
| 21-30 | 67-100 | Highly Acceptable |
| 11-20 | 34-66 | Acceptable |
| 1-10 | 10-33 | Unacceptable |
| 0 | 0 | Highly unacceptable |

## Psychometric Properties of the Tools

**Validity**

Content validity is the degree to which an instrument measures what it is supposed to measure. Content validity is the sampling adequacy of the content being measured.[42] The content validity of the tool was obtained by getting opinion from 16 experts in the field of Medicine and Nursing. They had suggested some specific modifications in the tools. The modifications and suggestions of experts were incorporated in the final tool.

**Reliability**

Reliability is the degree of consistency with which an instrument measures the attribute it intended to measure.[42] Since the study was prospective in nature, the reliability of internal consistency of the tools was studied at the context of study. The internal consistencies of the tools were tested for their reliability by using inter rater reliability. The reliability was high with R=0.99.

## Pilot Study

According to Polit & Beck [42], a pilot study is a miniature or part of the actual study, in which the instruments are administered to the subjects drawn from the population. It is a small scale version or trial run, done in preparation for the major study. The purpose was to find out the feasibility and practicability of the study design and to find out the reliability and feasibility of data collection tools, which were to be used in the main study data collection.

Pilot study was conducted with 20 clients for a period of 3 months. Clients were selected using purposive sampling technique and pre test assessment was done for the samples. For the control group no intervention was given. Experimental group received Acupressure treatment once in a week for three months. Post test was done after acupressure treatment. After one month of the first post test, second post test was done. It was found to be effective for the experimental clients**.**

## Intervention Protocol

According to Acupressure there are five elements in each and every unit (cell) in our body. They are Fire, Earth, Air, Water and Wood. We can check the pulse and identify the element which has lost its equilibrium in the body. This is Character Pulse Diagnosis. Based on the diagnosis that particular element channel is chosen and pressure is given at one particular element point in that channel which is affected. This stimulation can be given at one point once in a week or every three days, each time after pulse diagnosis only. So each time the point may vary or remain the same depending on pulse diagnosis.

As per Acupressure pathophysiology the cause of any disease is lack of energy supply. It may be either due to morbid matter accumulation, which requires more energy to eliminate that or due to lack of absorption of universal energy by the element points. So as part of the intervention the steps to be taken included

- to support morbid matter elimination by giving complete rest to the patient (fasting / restricted diet- taking only fruits or only vegetable soup)

- to facilitate the absorption of universal energy by stimulating the Acupressure points

In this study stimulating the Acupressure point after pulse diagnosis was done after pretest for all the experimental group of clients once in a week for three months. First post test was done at the end of third month and second posttest was done one month after the first post test.

**Protection of Human Rights**

➢ The study was conducted after obtaining Ethical Clearance from the Institutional Ethics Committee, Apollo Hospitals, Chennai.

➢ Formal permission was obtained from Principal of Apollo College of Nursing, Head of Community Health and Medical Surgical Nursing Department and Government Authorities.

➢ The purpose of the study was explained to the Hypertensive clients.

➢ Verbal Consent was obtained from all the samples before the data collection.

➢ Confidentiality was maintained throughout the study.

## Data Collection Procedure

Data collection is gathering of information needed to address the research problem.[42] The present study was conducted in the selected wards of Thiruvallur district - Thiruverkadu and Koladi. In this study purposive sampling technique was used. Settings were chosen by Convenient Sampling as Thiruverkadu and Koladi were proximal to Apollo College of Nursing and convenient for the researcher. From selected settings, Koladi area was selected for Control group and the Thiruverkadu area for Experimental group by tossing a coin. From the selected areas samples were chosen out of the known cases of Hypertension using purposive sampling technique in each area.

Known cases were identified by interviewing the family members and confirmed by the records. Identified patients were included in the study. Data from the samples was collected using the research tools. The tools were Demographic Variable proforma, Clinical variable proforma and BP assessment chart. All the tools were pre tested by a Pilot study.

Acupressure was given for the experimental group samples once in every week and assessment was done for all samples before and after Acupressure and was recorded on the BP assessment chart. In this study stimulating the Acupressure point after pulse diagnosis was done after pretest for all the Experimental group of clients once in a week for three months. First post test was done at the end of third month and second posttest was done one month after the first post test. The Researcher collected data for one year.

## Problems Faced During Data Collection

The problems faced by the researcher during this study was that some clients wanted their Blood Pressure to be assessed every week. Hence it was time consuming for the researcher.

## Plan for Data Analysis

Data analysis is the systematic organization and synthesis of research data and testing of research hypothesis by using the obtained data[42]. Descriptive statistics like frequency distribution, percentage, mean, standard deviation and inferential statistics like ANOVA and chi- square were used to analyze the data.

**Table 3: Plan for Data Analysis**

| Statistics | Methods | Purpose |
|---|---|---|
| **Descriptive statistics** | Frequency and Percentage | ➢ To assess the Demographic variables, Clinical variables, level of Blood pressure and level of acceptability of the clients. |
| | Mean and standard deviation | ➢ To assess the blood pressure of the clients before and after Acupressure |
| **Inferential Statistics** | Independent 't' test | ➢ To compare the blood pressure of the clients before and after Acupressure |
| | ANOVA | ➢ To Compare the Mean and Standard Deviation of Systolic and diastolic Blood Pressure between assessments in Experimental Group and control group of Hypertensive clients |
| | Chi square test | ➢ To associate the demographic variables with blood pressure<br>➢ To associate the clinical variables with blood pressure |

## Summary

This chapter has dealt with the research approach, research design, and settings of the study, population, and sampling technique, criteria for selection of sample, development of tool, description of tool, method of data collection, plan for data analysis, pilot study report and protection of human rights.

# CHAPTER - IV

## ANALYSIS AND INTERPRETATION

This chapter deals with analysis and interpretation of data collected from the hypertensive clients. Data was collected from 220 hypertensive clients at selected wards of Thiruvallur district. The data was analyzed according to the objectives and hypotheses of the study, tabulated and interpreted using descriptive and inferential statistics.

**Organization of Study Findings**

The findings of the study have been organized and presented under the following headings:

➢ Frequency and Percentage Distribution of Demographic Variables of Control and Experimental Group of Hypertensive Clients

➢ Frequency and Percentage Distribution of Clinical Variables of Control and Experimental Group of Hypertensive Clients

➢ Level of Systolic Blood Pressure of the Control and the Experimental Group of Clients in Pretest, Post Test 1 and Post Test 2

➢ Level of Diastolic Blood Pressure of the Control and the Experimental Group of Clients in Pretest, Post Test 1 and Post Test 2

➢ Comparison of Mean and Standard Deviation of Systolic Blood Pressure between assessments in Control Group (ANOVA) of Hypertensive Clients

➢ Comparison of Mean and Standard Deviation of Systolic Blood Pressure between assessments in Experimental Group (ANOVA) of Hypertensive Clients

➢ Comparison of Mean and Standard Deviation of Diastolic Blood Pressure between assessments in Control Group (ANOVA) of Hypertensive Clients

- Comparison of Mean and Standard Deviation of Diastolic Blood Pressure between assessments in Experimental Group (ANOVA) of Hypertensive Clients

- Association between Demographic Variables and Systolic Blood Pressure among Control and Experimental Group of clients with Hypertension in pretest

- Association between Demographic Variables and Diastolic Blood Pressure among Control and Experimental Group of clients with Hypertension in pretest

- Association between Clinical Variables and Systolic Blood Pressure among Control and Experimental Group of clients with Hypertension in pretest

- Association between Clinical Variables and Diastolic Blood Pressure among Control and Experimental Group of clients with Hypertension in pretest

- Association between Demographic Variables and Systolic Blood Pressure among Control and Experimental Group of clients with Hypertension in posttest 2

- Association between Demographic Variables and Diastolic Blood Pressure among Control and Experimental Group of clients with Hypertension in posttest 2

- Association between Clinical Variables and Systolic Blood Pressure among Control and Experimental Group of clients with Hypertension in posttest 2

- Association between Clinical Variables and Diastolic Blood Pressure among Control and Experimental Group of clients with Hypertension in posttest 2

- Comparison of the Mean and Standard Deviation of Pre test Systolic Blood Pressure between Experimental and Control group clients

- Comparison of the Mean and Standard Deviation of Post test I Systolic Blood Pressure between Experimental and Control group clients

- Comparison of the Mean and Standard Deviation of Post test II Systolic Blood Pressure between Experimental and Control group clients

➤ Comparison of the Mean and Standard Deviation of Pre test Diastolic Blood Pressure between Experimental and Control group clients

➤ Comparison of the Mean and Standard Deviation of Post test I Diastolic Blood Pressure between Experimental and Control group clients

➤ Comparison of the Mean and Standard Deviation of Post test II Diastolic Blood Pressure between Experimental and Control group clients

➤ Frequency distribution of signs and symptoms associated with Hypertension among the experimental group of clients

➤ Frequency and Percentage distribution of the Level of Acceptance of Acupressure treatment among Experimental group

**Table 4 Frequency and Percentage Distribution of Demographic Variables of Control and Experimental Group of Hypertensive Clients**

| Demographic variable | Control group (n=110) | | Experimental group (n=110) | | $\chi^2$ Value df P value |
|---|---|---|---|---|---|
| | **n** | **p** | **n** | **p** | |
| **Age in years** 31-40 | 9 | 8.2 | 5 | 4.5 | 0.00 df= 2 p= 1.0 |
| 41-50 | 45 | 41 | 51 | 46.36 | |
| 51-59 | 56 | 50.8 | 54 | 49.09 | |
| **Gender** Male | 65 | 59 | 68 | 61.8 | 0.693 df= 1 p= 0.405 |
| Female | 45 | 41 | 42 | 38.18 | |
| **Education** Graduate | 43 | 39 | 42 | 38.18 | 2.69 df= 3 p=0.442 |
| Higher secondary | 41 | 37.2 | 40 | 36.36 | |
| High school | 17 | 15.4 | 18 | 16.36 | |
| Middle school | 9 | 8.4 | 10 | 9.09 | |
| **Occupation** Profession | 59 | 53.6 | 50 | 45.45 | 9.157 df= 4 p=0.06 |
| Semi profession | 6 | 5.4 | 10 | 9.09 | |
| Clerical, shop owner, farmer | 17 | 15.4 | 19 | 17.27 | |
| Skilled worker | 8 | 7.2 | 9 | 8.18 | |
| Semi skilled worker | 20 | 18.4 | 22 | 0.2 | |
| **Family monthly income** 5000 and below | 6 | 5.4 | 10 | 9.09 | 6.194 df=3 p=0.103 |
| 5001-10000 | 30 | 32.8 | 34 | 30.90 | |
| 10001-15000 | 16 | 14.6 | 14 | 12.72 | |
| 15000 and above | 58 | 52.8 | 52 | 56.36 | |
| **Marital status** Married | 88 | 80.0 | 82 | 74.54 | 3.484 df= 3 p=0.323 |
| Unmarried | 19 | 17.2 | 27 | 24.54 | |
| Widow/ widower | 3 | 2.8 | 1 | 0.9 | |
| **Religion** Hindu | 65 | 59 | 72 | 65.45 | 0.463 df=1 p=0.5 |
| Christian | 45 | 41 | 38 | 34.54 | |

Table 4 shows that majority of the samples were male (59%, 61.8%), married (80%, 74.54%), and Hindus (59%, 65.45%). Around half of them were in the age group of 51-59 years (50.8%, 49.09%), with family income of 15000 and above (52.8%, 56.36%) and were professionals by occupation (53.6%, 45.5%), 39%, 38. 18% of them were graduates in control and experimental groups, respectively. Hence the two groups were homogenous with regard to the demographic variables.

**Table 5 Frequency and Percentage Distribution of Clinical Variables of Control and Experimental Group of Hypertensive Clients**

| Clinical variables | Control group (n=110) | | Experimental group (n=110) | | $\chi^2$ Value df P value |
|---|---|---|---|---|---|
| | **n** | **p** | **n** | **p** | |
| **BMI** <18 | 9 | 8.2 | 5 | 4.5 | 2.69 df= 3 p=0.442 |
| 18-24 | 45 | 41 | 51 | 46.36 | |
| 25-29 | 53 | 50.8 | 53 | 49.09 | |
| 30 and above | 3 | 2.7 | 1 | 0.9 | |
| **History of taking non vegetarian** No | 55 | 50 | 42 | 38.18 | 0.463 df=1 p=0.5 |
| yes | 55 | 50 | 68 | 61.8 | |
| **History of diet modification** No | 65 | 59 | 68 | 61.8 | 0.693 df= 1 p= 0.405 |
| yes | 45 | 41 | 42 | 38.18 | |
| **History of smoking** No | 68 | 62 | 60 | 54.54 | 0.534 df= 1 p= 0.405 |
| Yes | 42 | 38 | 50 | 45.45 | |
| **Alcoholism** No | 68 | 62 | 60 | 54.54 | 0.693 df= 1 p= 0.405 |
| Yes | 42 | 38 | 50 | 45.45 | |
| **Physical activity** No | 68 | 62 | 60 | 54.54 | 0.463 df=1 p=0.5 |
| Yes | 42 | 38 | 50 | 45.45 | |
| **Walking practice** No | 68 | 62 | 60 | 54.54 | 0.534 df= 1 p= 0.405 |
| Yes | 42 | 38 | 50 | 45.45 | |
| **Sleep** less than 6 hours | 57 | 51.8 | 57 | 51.8 | 0.00 df= 2 p= 1.0 |
| 6-8 hours | 35 | 31.8 | 35 | 31.8 | |
| >8 | 16 | 14.5 | 16 | 14.5 | |

Table 5 shows that majority of the samples were non alcoholic (62%, 54.54%), non smokers (62%, 54.54%) on non vegetarian diet (50%, 61.8%). Around half of them were overweight BMI 25-29 (50.8%, 49.09%), were not having any diet modifications (59%, 61.8%), with no walking practice (62%, 54.54%) and were sleeping less than 6 hours (51.8%, 51.8%) in control and experimental group, respectively. Hence these two groups were homogenous with regard to the clinical variables.

Figure 4 shows that 57% of control group clients were suffering from Hypertension for 1-3 years in the past. Figure 5 shows that 60% of Experimental group clients were suffering from Hypertension for 1-3 years in the past.
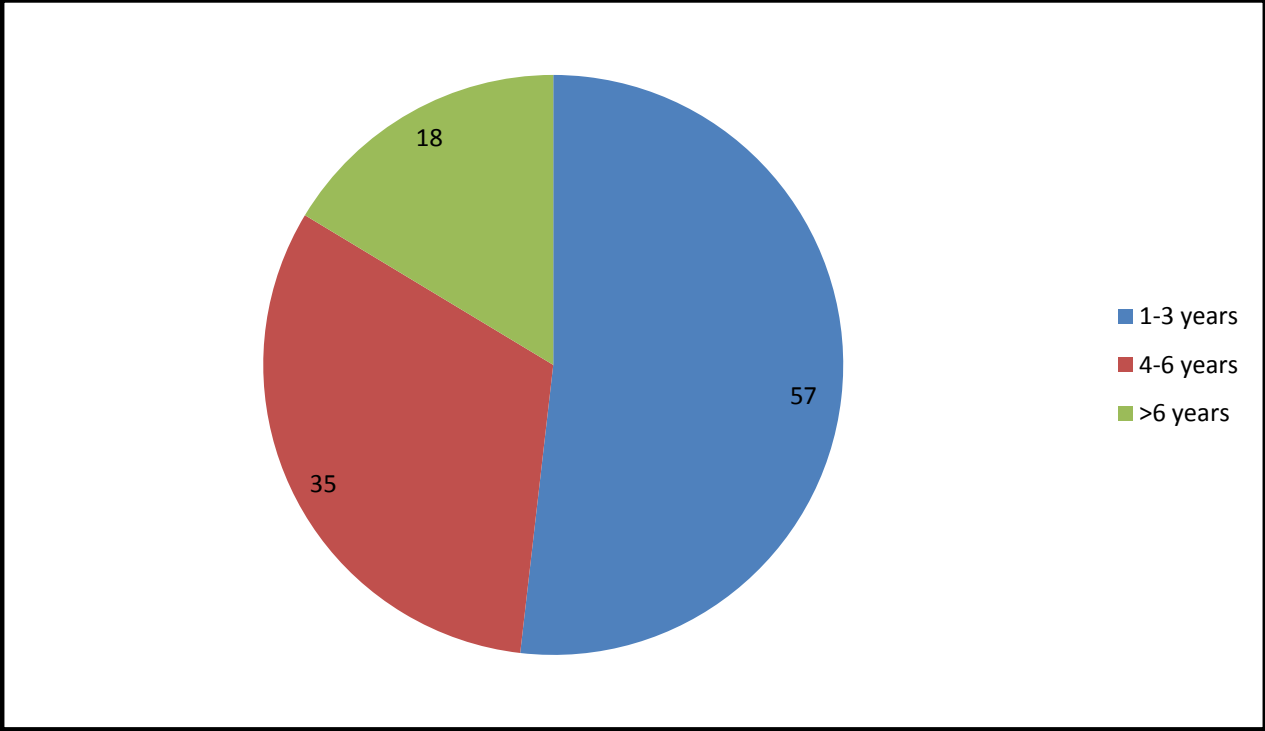
**Fig. 4 Percentage Distribution of the Duration of having Hypertension in Control group**
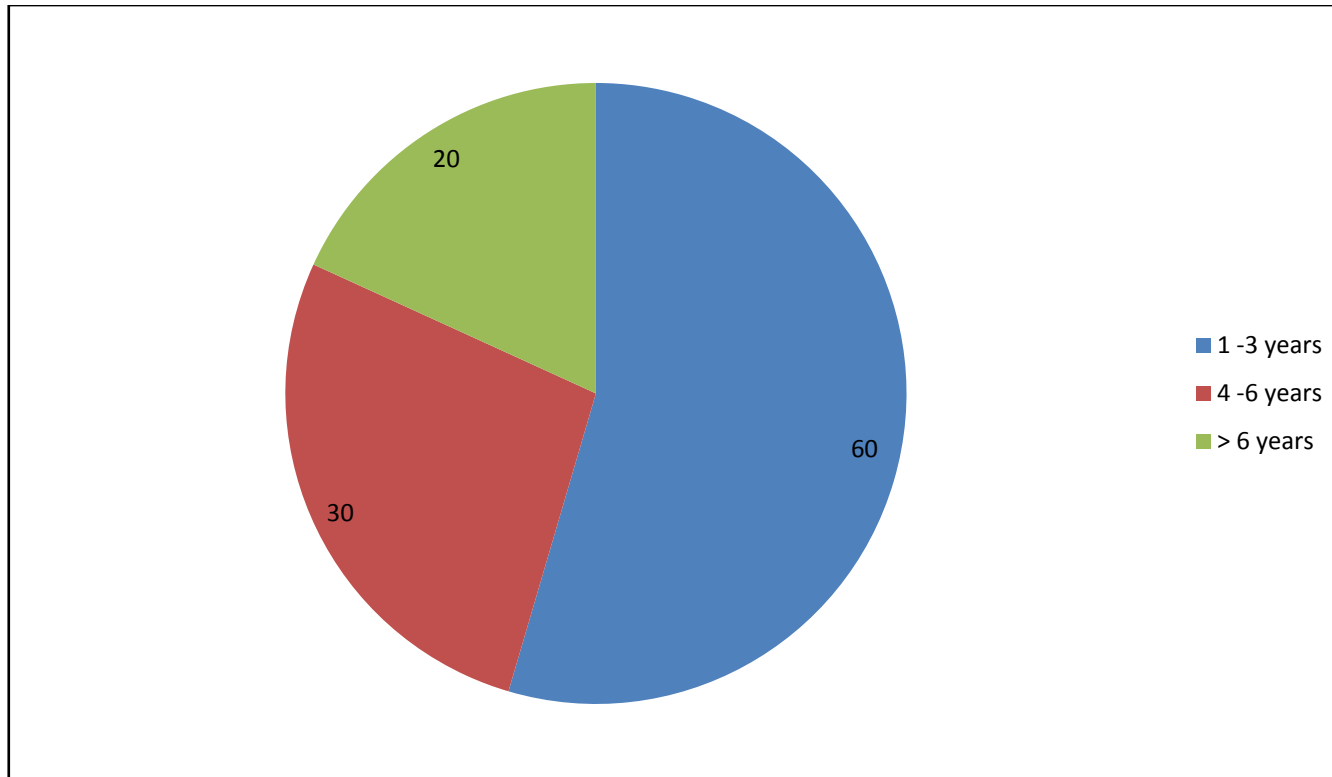
**Fig. 5 Percentage Distribution of the Duration of having Hypertension in Experimental group**

**Table 6: Level of Systolic Blood Pressure of the Control and the Experimental Group of Clients in Pretest, Post Test 1 and Post Test 2**

| Level of Systolic Blood Pressure | Control group (n=110) | | | | | | Experimental group (n=110) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre test | | Post test-1 | | Post test-2 | | Pre test | | Post test-1 | | Post test-2 | |
| | f | % | f | % | f | % | f | % | F | % | f | % |
| Normal | 53 | 48.1 | 52 | 47 | 52 | 47 | 54 | 49.1 | 85 | 77.3 | 97 | 88.2 |
| Pre Hypertensive | 41 | 37.2 | 42 | 38 | 42 | 38 | **49** | **44.5** | **23** | **20.9** | **13** | **11.8** |
| High Blood Pressure | 16 | 14.5 | 16 | 14.5 | 16 | 14.5 | **7** | **6.4** | **2** | **1.8** | **-** | **-** |

Table 6 shows the systolic blood pressure levels in the pre test, post test 1 and post test 2. In the control group 48.1% of them had normal blood pressure followed by 37.2% of them had pre hypertension in pretest. In post test 1 normal blood pressure was for 47% of clients followed by Prehypertensive (38%). In post test 2 47% of clients had normal blood pressure followed by Pre hypertension (38%).

In the experimental group in the pretest 49.1% of their blood pressure was normal followed by pre hypertension (44.5%). In post test 1 77.3% of them had normal blood pressure followed by 20.9% had Pre hypertension. In post test 2 88.2% of them had normal blood pressure followed by 11.8% had Pre hypertension.

**Table 7: Level of Diastolic Blood Pressure of the Control and the Experimental Group of Clients in Pretest, Post Test 1 and Post Test 2**

| Level of Diastolic Blood Pressure | Control Group (n=110) | | | | | | Experimental group (n=110) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre test | | Post test-1 | | Post test-2 | | Pre test | | Post test-1 | | Post test-2 | |
| | f | % | f | % | f | % | f | % | F | % | f | % |
| Normal | 93 | 84.5 | 93 | 84.5 | 93 | 84.5 | 73 | 66.4 | 102 | 92.7 | 103 | 93.6 |
| Pre Hypertensive | 9 | 8.2 | 9 | 8.2 | 9 | 8.2 | 31 | 28.2 | 8 | 7.3 | 7 | 6.4 |
| High Blood Pressure | 8 | 7.3 | 8 | 7.3 | 8 | 7.3 | 6 | 5.5 | - | - | - | - |

Table 7 shows diastolic blood pressure levels in the pre test, post test 1 and post test 2. In the control group 84.5% of them had normal blood pressure followed by 8.2% of them had pre hypertension in pretest. In post test 1 normal blood pressure was for 84.5% of clients followed by Prehypertensive (8.2%). In post test 2 84.5% of clients had normal blood pressure followed by Pre hypertension (8.2%).

In the experimental group in the pretest 66.4% of their blood pressure was normal followed by pre hypertension (28.2%). In post test 1 92.7% of them had normal blood pressure followed by 7.3% had Pre hypertension. In post test 2 93.6% of them had normal blood pressure followed by 6.4% had Pre hypertension.

**Table 8: Comparison of Mean and Standard Deviation of Systolic Blood Pressure between assessments in Control Group (ANOVA) of Hypertensive Clients (N=110)**

| Assessment | Mean | Standard Deviation | Within subjects | | Between subjects | |
|---|---|---|---|---|---|---|
| | | | F Value | P Value | F Value | P Value |
| **Pre test** | 119.6 | 14.9 | 2.362 | .097 | 6755.821 | .000 |
| **Post test1** | 120 | 15.3 | | | | |
| **Post test2** | 120 | 15.4 | | | | |

Table 8 shows no significant difference in blood pressure assessments within subjects in pre test with mean 119.6 and SD 14.9, post test 1 with mean 120 and SD 15.3 and post test 2 with mean 120 and SD 15.4 in control group of hypertensive clients ($p > 0.097$). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p = 0.000$).

**Table 9: Comparison of Mean and Standard Deviation of Systolic Blood Pressure between assessments in Experimental Group (ANOVA) of Hypertensive Clients**

<div align="right">(N=110)</div>

| Assessment | Mean | Standard Deviation | Within subjects | | Between subjects | |
|---|---|---|---|---|---|---|
| | | | F Value | P Value | F Value | P Value |
| **Pre test** | 124 | 16.68 | | | | |
| **Post test1** | 114 | 13.95 | 33.340 | .000 | 288.581 | 0.000 |
| **Post test2** | 114 | 8.02 | | | | |

Table 9 shows a significant difference in blood pressure assessments within subjects and between subjects in pre test with mean 124 and SD 16.68, post test 1 with mean 114 and SD 13.95 and post test 2 with mean 114 and SD 8.02 in experimental group of hypertensive clients (p = 0.000).

**Table 10: Comparison of Mean and Standard Deviation of Diastolic Blood Pressure between assessments in Control Group (ANOVA) of Hypertensive Clients**

**(N=110)**

| Assessment | Mean | Standard Deviation | Within subjects | | Between subjects | |
|---|---|---|---|---|---|---|
| | | | F Value | P Value | F Value | P Value |
| Pre test | 87 | 14.9 | | | | |
| Post test1 | 86 | 15.3 | 2.362 | .097 | 6755.821 | .000 |
| Post test2 | 87 | 15.4 | | | | |

Table 10 shows no significant difference in blood pressure assessments within subjects in pre test with mean 87 and SD 14.9, post test 1 with mean 86 and SD 15.3 and post test 2 with mean 87 and SD 15.4 in control group of hypertensive clients (p = 0.097). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients (p = 0.000).

**Table 11: Comparison of Mean and Standard Deviation of Diastolic Blood Pressure between assessments in Experimental Group (ANOVA) of Hypertensive Clients**

<div align="right">(N=110)</div>

| Assessment | Mean | Standard Deviation | Within subjects | | Between subjects | |
|---|---|---|---|---|---|---|
| | | | F Value | P Value | F Value | P Value |
| **Pre test** | 97 | 16.68 | 33.340 | .000 | 288.581 | 0.000 |
| **Post test1** | 87 | 13.95 | | | | |
| **Post test2** | 86 | 8.02 | | | | |

Table 11 shows a significant difference in blood pressure assessments within subjects and between subjects in pre test with mean 97 and SD 16.68, post test 1 with mean 87 and SD 13.95 and post test 2 with mean 86 and SD 8.02 in experimental group of hypertensive clients (p = 0.000).

**Table 12: Association between Demographic Variables and Systolic Blood Pressure in Control and Experimental Group of clients with Hypertension in pretest**

| Demographic Variables | Control group (n=110) | | | | Experimental group (n=110) | | | |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | $X^2$ | Normal | Pre hyper tensive | High BP | $X^2$ |
| **Age group** 31-40 | 4 | 3 | 2 | $\chi^2=10.138$ df=4 P=0.038* | 4 | 4 | 1 | $\chi^2=11.439$ df=4 P=0.022* |
| 41-50 | 29 | 16 | 0 | | 14 | 27 | 4 | |
| 51-59 | 40 | 12 | 4 | | 36 | 18 | 2 | |
| **Gender** Male | 44 | 24 | 3 | $\chi^2=3.382$ df=2 P=0.184 | 30 | 29 | 6 | $\chi^2=2.332$ df=2 P=0.312 |
| Female | 29 | 7 | 3 | | 24 | 20 | 1 | |
| **Education** Graduate | 24 | 6 | 3 | $\chi^2=4.722$ df=6 P=0.580 | 20 | 21 | 2 | $\chi^2=5.7$ df=6 P=0.458 |
| Higher secondary | 29 | 14 | 3 | | 18 | 18 | 5 | |
| High school | 11 | 6 | 0 | | 10 | 7 | 0 | |
| Middle school | 9 | 5 | 0 | | 6 | 3 | 0 | |
| **Occupation** Profession | 32 | 10 | 1 | $\chi^2=9.382$ df=8 P=0.311 | 33 | 24 | 2 | $\chi^2=7.847$ df=8 P=0.449 |
| Semi profession | 5 | 1 | 0 | | **3** | 2 | 1 | |
| Clerical, shop | 13 | 4 | 3 | | 9 | 6 | 2 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| owner, farmer | | | | | | | | |
| Skilled worker | 3 | 1 | 0 | | 2 | 5 | 1 | |
| Semi skilled worker | 20 | 15 | 2 | | 7 | 12 | 1 | |
| **Monthly family Income**<br>5000 and below | 29 | 10 | 5 | $\chi^2$=**17.039**<br>**df=6**<br>**P=0.009*** | 28 | 27 | 3 | $\chi^2$=0.967<br>df=4<br>P=0.915 |
| 5001- 10000 | 22 | 19 | 0 | | 19 | 14 | 3 | |
| 10001- 15000 | 19 | 2 | 1 | | 7 | 8 | 1 | |
| Above 15000 | 3 | 0 | 0 | | 0 | 0 | 0 | |
| **Marital status**<br>Married | 53 | 24 | 5 | $\chi^2$=3.283<br>df=6<br>P=0.773 | 47 | 37 | 4 | $\chi^2$=7.523<br>df=4<br>P=0.111 |
| Unmarried | 13 | 6 | 0 | | 7 | 10 | 2 | |
| Widow / widower | 6 | 1 | 1 | | 0 | 2 | 1 | |
| Divorced | 1 | 0 | 0 | | 0 | 0 | 0 | |
| **Religion**<br>Hindu | 40 | 16 | 4 | $\chi^2$=0.465<br>df=2<br>P=0.793 | 30 | 29 | 6 | $\chi^2$=2.332<br>df=2<br>P=0.312 |
| Christian | 33 | 15 | 2 | | 24 | 20 | 1 | |

Table 12 shows that the Pearson Chi-Square test reveals that selected demographic variables, age and monthly family income have significant association with the systolic blood pressure at $p < 0.05$ level. There is no association between other demographic variables like gender, education, occupation, marital status and religion. ($p>0.05$)

Thus the hypothesis stated earlier that **"There will be no significant association between selected demographic variables and blood pressure levels before and after Acupressure in control and experimental group of hypertensive clients"** was rejected with respect to age and monthly family income.

**Table 13: Association between Demographic Variables and Diastolic Blood Pressure in Control and Experimental Group of clients with Hypertension in pretest**

| Demographic Variables | Control group (n=110) | | | | Experimental group (n=110) | | | |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | $X^2$ | Normal | Pre hyper tensive | High BP | $X^2$ |
| **Age group** 31-40 | 4 | 3 | 2 | $\chi^2$=10.138 df=4 P=0.038* | 0 | 9 | 0 | $\chi^2$=2.22 df=4 P=0.695 |
| 41-50 | 29 | 16 | 0 | | 4 | 37 | 4 | |
| 51-59 | 40 | 12 | 4 | | 4 | 49 | 3 | |
| **Gender** Male | 44 | 24 | 3 | $\chi^2$=3.382 df=2 P=0.184 | 3 | 57 | 5 | $\chi^2$=2.016 df=2 P=0.365 |
| Female | 29 | 7 | 3 | | 5 | 38 | 2 | |
| **Education** Graduate | 24 | 6 | 3 | $\chi^2$=4.722 df=6 P=0.580 | 2 | 40 | 1 | $\chi^2$=**13.84** **df=6** **P=0.031*** |
| Higher secondary | 29 | 14 | 3 | | 3 | 36 | 2 | |
| High school | 11 | 6 | 0 | | 2 | 14 | 1 | |
| Middle school | 9 | 5 | 0 | | 1 | 5 | 3 | |
| **Occupation** Profession | 32 | 10 | 1 | $\chi^2$=9.382 df=8 P=0.311 | 4 | 52 | 3 | $\chi^2$=5.041 df=8 P=0.753 |
| Semi profession | 5 | 1 | 0 | | **0** | 6 | 0 | |
| Clerical, shop owner, farmer | 13 | 4 | 3 | | 2 | 14 | 1 | |
| Skilled worker | 3 | 1 | 0 | | 1 | 7 | 0 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Semi skilled worker | 20 | 15 | 2 | | 1 | 16 | 3 | |
| **Monthly family Income** 5000 and below | 29 | 10 | 5 | $\chi^2$=**17.039** **df=6** **P=0.009*** | 6 | 49 | 3 | $\chi^2$=3.228 df=4 P=0.520 |
| 5001- 10000 | 22 | 19 | 0 | | 2 | 32 | 2 | |
| 10001- 15000 | 19 | 2 | 1 | | 0 | 14 | 2 | |
| Above 15000 | 3 | 0 | 0 | | 0 | 0 | 0 | |
| **Marital status** Married | 53 | 24 | 5 | $\chi^2$=3.283 df=6 P=0.773 | 6 | 77 | 5 | $\chi^2$=1.491 df=4 P=0.828 |
| Unmarried | 13 | 6 | 0 | | 2 | 15 | 2 | |
| Widow / widower | 6 | 1 | 1 | | 0 | 3 | 0 | |
| Divorced | 1 | 0 | 0 | | 0 | 0 | 0 | |
| **Religion** Hindu | 40 | 16 | 4 | $\chi^2$=0.465 df=2 P=0.793 | 3 | 57 | 5 | $\chi^2$=2.016 df=2 P=0.365 |
| Christian | 33 | 15 | 2 | | 5 | 38 | 2 | |

Table 13 shows the Pearson Chi-Square test reveals a significant association between age group, educational status and income with the diastolic blood pressure. Thus the hypothesis stated earlier that **"There will be no significant association between selected demographic variables and diastolic blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to age group, educational status and income. **However, the hypothesis is accepted with respect to other variables.**

**Table 14: Association between Clinical Variables and Systolic Blood Pressure in Control and Experimental Group of clients with Hypertension in pretest**

| Clinical variables | Control (n=110) | | | $\chi^2$ Value df P value | Experimental (n=110) | | | $\chi^2$ Value df P value |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | | Normal | Pre hyper tensive | High BP | |
| **BMI** <18 | 18 | 6 | 0 | 6.664 df= 6 p=0.353 | 2 | 26 | 1 | 6.49 df= 6 p=0.3 |
| 18-24 | 36 | 14 | 4 | | 0 | 66 | 1 | |
| 25-29 | 16 | 6 | 1 | | 0 | 11 | 0 | |
| 30 and above | 3 | 5 | 1 | | 0 | 3 | 0 | |
| **History of taking non vegetarian** No | 36 | 26 | 3 | 10.966 df=2 p=0.004 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 37 | 5 | 3 | | 2 | 43 | 0 | |
| **History of diet modification** No | 45 | 17 | 2 | 2.025 df= 2 p= 0.36 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 28 | 14 | 4 | | 2 | 43 | 0 | |
| **History of smoking** No | 45 | 17 | 2 | 2.025 df= 2 p= 0.36 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 28 | 14 | 4 | | 2 | 43 | 0 | |
| **Alcoholism** No | 45 | 17 | 2 | 2.025 df= 2 p= 0.36 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 28 | 14 | 4 | | 2 | 43 | 0 | |
| **Physical activity** Sedentary | 35 | 19 | 4 | 20.234 df=6 | 0 | 53 | 1 | 4.389 df=8 |
| Moderate | 26 | 7 | 2 | | 2 | 35 | 1 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Heavy | 12 | 5 | 0 | p=0.003 | 0 | 18 | 0 | p=0.8 |
| **Walking practice**<br>No | 58 | 26 | 5 | 2.049<br>df= 4 | 2 | 86 | 0 | **20.02**<br>**df= 4** |
| Yes | 15 | 5 | 1 | p= 0.73 | 0 | 20 | 2 | **p= 0.00 *** |
| **Sleep**<br>< 6 hours | 35 | 19 | 4 | **20.699**<br>**df= 8**<br>**p= 0.008*** | 0 | 53 | 1 | 4.389<br>df= 8<br>p= 0.8 |
| 6-8 hours | 26 | 7 | 2 | | 2 | 35 | 1 | |
| >8 | 12 | 5 | 0 | | 0 | 18 | 0 | |
| **Duration of hypertension**<br>1-3 years | 35 | 19 | 3 | **20.699**<br>**df= 8**<br>**p= 0.008*** | 0 | 53 | 1 | 4.389<br>df= 8<br>p= 0.8 |
| 4-6 years | 26 | 7 | 3 | | 2 | 36 | 1 | |
| >6 years | 12 | 5 | 0 | | 0 | 17 | 0 | |
| **Family history of hypertension**<br>No | 46 | 19 | 4 | 2.732<br>df= 6 | 0 | 63 | 2 | 4.27<br>df= 2 |
| Yes | 27 | 12 | 2 | p= 0.842 | 2 | 43 | 0 | p= 0.1 |
| **Co-morbidity**<br>No | 58 | 26 | 5 | 2.049<br>df= 4 | 2 | 86 | 0 | **20.02**<br>**df= 4** |
| Yes | 15 | 5 | 1 | p= 0.73 | 0 | 20 | 2 | **p= 0.00 *** |
| **Compliance to treatment**<br>Good | 45 | 17 | 2 | 2.025<br>df= 2 | 0 | 63 | 2 | 4.27<br>df= 2 |
| Average | 28 | 14 | 4 | p= 0.363 | 2 | 43 | 0 | p= 0.1 |

Table 14 shows the Pearson Chi-Square test reveals that selected clinical variables walking, sleep duration, duration of hypertension and co-morbidities have significant association with the systolic blood pressure at p= 0.00 level. There is no association between Blood Pressure and other clinical variables.

Thus the hypothesis stated earlier that **"There will be no significant association between selected clinical variables and blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to walking, sleep, duration of hypertension and co-morbidities and accepted with respect to the other clinical variables.

**Table 15: Association between Clinical Variables and Diastolic Blood Pressure in Control and Experimental Group of clients with**

**Hypertension in pretest**

| Clinical variables | Control (n=110) | | | $\chi^2$ Value df P value | Experimental (n=110) | | | $\chi^2$ Value df P value |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | | Normal | Pre hyper tensive | High BP | |
| **BMI** <18 | 1 | 22 | 1 | 2.213 df=6 p=0.899 | 2 | 26 | 1 | 6.49 df= 6 p=0.3 |
| 18-24 | 5 | 45 | 4 | | 0 | 66 | 1 | |
| 25-29 | 2 | 20 | 1 | | 0 | 11 | 0 | |
| 30 and above | 0 | 8 | 1 | | 0 | 3 | 0 | |
| **History of taking non vegetarian** No | 2 | 57 | 6 | 5.931 df=2 p=0.052 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 6 | 38 | 1 | | 2 | 43 | 0 | |
| **History of diet modification** No | 3 | 54 | 7 | **6.508 df= 2 p= 0.04** | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 5 | 41 | 0 | | 2 | 43 | 0 | |
| **History of smoking** No | 3 | 54 | 7 | **6.508 df= 2 p= 0.04** | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 5 | 41 | 0 | | 2 | 43 | 0 | |
| **Alcoholism** No | 3 | 54 | 7 | **6.508 df= 2 p= 0.04** | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 5 | 41 | 0 | | 2 | 43 | 0 | |
| **Physical activity** | 1 | 52 | 5 | 8.715 | 0 | 53 | 1 | 4.389 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sedentary | | | | df=6 | | | | df=8 |
| Moderate | 6 | 28 | 1 | p=0.190 | 2 | 35 | 1 | p=0.8 |
| Heavy | 1 | 15 | 1 | | 0 | 18 | 0 | |
| **Walking practice** No | 6 | 76 | 7 | 2.552 df=4 p=0.635 | 2 | 86 | 0 | **20.02 df= 4 p= 0.00 *** |
| Yes | 2 | 15 | 0 | | 0 | 20 | 2 | |
| **Sleep** < 6 hours | 1 | 52 | 5 | 8.840 df=8 p=0.356 | 0 | 53 | 1 | 4.389 df= 8 p= 0.8 |
| 6-8 hours | 6 | 28 | 1 | | 2 | 35 | 1 | |
| >8 | 1 | 15 | 1 | | 0 | 18 | 0 | |
| **Duration of hypertension** 1-3 years | 1 | 52 | 5 | 8.840 df=8 p=0.356 | 0 | 53 | 1 | 4.389 df= 8 p= 0.8 |
| 4-6 years | 6 | 28 | 1 | | 2 | 36 | 1 | |
| >6 years | 1 | 15 | 1 | | 0 | 17 | 0 | |
| **Family history of hypertension** No | 4 | 59 | 3 | 9.914 df=6 p=0.128 | 0 | 63 | 2 | 4.27 df= 2 p= 0.1 |
| Yes | 4 | 36 | 4 | | 2 | 43 | 0 | |
| **Co-morbidity** No | 6 | 76 | 7 | 2.552 df=4 p=0.635 | 2 | 86 | 0 | **20.02 df= 4 p= 0.00 *** |
| Yes | 2 | 19 | 0 | | 0 | 20 | 2 | |
| **Compliance to treatment** Good | 3 | 54 | 7 | **6.508 df= 2 p=0.039*** | 0 | 63 | 2 | 4.27 df= 2 p= 0.1 |
| Average | 5 | 41 | 0 | | 2 | 43 | 0 | |

Table 15 shows the Pearson Chi-Square shows test reveals that selected clinical variables history of diet modification, smoking, alcoholism, walking, co-morbidities and compliance have significant association with the diastolic blood pressure at $p < 0.05$ level. There is no association between Diastolic Blood Pressure and other clinical variables.

Thus the hypothesis stated earlier that **"There will be no significant association between selected clinical variables and diastolic blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to history of diet modification, smoking, alcoholism, walking, co-morbidities and compliance.

**Table 16: Association between Demographic Variables and Systolic Blood Pressure in Control and Experimental Group of clients with Hypertension in post test 2**

| Demographic Variables | Control group (n=110) | | | | Experimental group (n=110) | | | |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | $X^2$ | Normal | Pre hyper tensive | High BP | $X^2$ |
| **Age group** 31-40 | 4 | 3 | 2 | $\chi^2=10.138$ df=4 P=0.038* | 4 | 4 | 1 | $\chi^2=11.439$ df=4 P=0.022* |
| 41-50 | 29 | 16 | 0 | | 14 | 27 | 4 | |
| 51-59 | 40 | 12 | 4 | | 36 | 18 | 2 | |
| **Gender** Male | 44 | 24 | 3 | $\chi^2=3.382$ df=2 P=0.184 | 30 | 29 | 6 | $\chi^2=2.332$ df=2 P=0.312 |
| Female | 29 | 7 | 3 | | 24 | 20 | 1 | |
| **Education** Graduate | 24 | 6 | 3 | $\chi^2=4.722$ df=6 P=0.580 | 20 | 21 | 2 | $\chi^2=5.7$ df=6 P=0.458 |
| Higher secondary | 29 | 14 | 3 | | 18 | 18 | 5 | |
| High school | 11 | 6 | 0 | | 10 | 7 | 0 | |
| Middle school | 9 | 5 | 0 | | 6 | 3 | 0 | |
| **Occupation** Profession | 32 | 10 | 1 | $\chi^2=9.382$ df=8 | 33 | 24 | 2 | $\chi^2=7.847$ df=8 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Semi profession | 5 | 1 | 0 | P=0.311 | **3** | 2 | 1 | P=0.449 |
| Clerical, shop owner, farmer | 13 | 4 | 3 | | 9 | 6 | 2 | |
| Skilled worker | 3 | 1 | 0 | | 2 | 5 | 1 | |
| Semi skilled worker | 20 | 15 | 2 | | 7 | 12 | 1 | |
| **Monthly family Income** 5000 and below | 29 | 10 | 5 | $\chi^2$**=17.039** **df=6** **P=0.009\*** | 28 | 27 | 3 | $\chi^2$=0.967 df=4 P=0.915 |
| 5001- 10000 | 22 | 19 | 0 | | 19 | 14 | 3 | |
| 10001- 15000 | 19 | 2 | 1 | | 7 | 8 | 1 | |
| Above 15000 | 3 | 0 | 0 | | 0 | 0 | 0 | |
| **Marital status** Married | 53 | 24 | 5 | $\chi^2$=3.283 df=6 P=0.773 | 47 | 37 | 4 | $\chi^2$=7.523 df=4 P=0.111 |
| Unmarried | 13 | 6 | 0 | | 7 | 10 | 2 | |
| Widow / widower | 6 | 1 | 1 | | 0 | 2 | 1 | |
| Divorced | 1 | 0 | 0 | | 0 | 0 | 0 | |
| **Religion** Hindu | 40 | 16 | 4 | $\chi^2$=0.465 df=2 P=0.793 | 30 | 29 | 6 | $\chi^2$=2.332 df=2 P=0.312 |
| Christian | 33 | 15 | 2 | | 24 | 20 | 1 | |

Table 16 shows that the Pearson Chi-Square test reveals that selected demographic variables, age and monthly family income have significant association with the systolic blood pressure at $p < 0.05$ level. There is no association between other demographic variables like gender, education, occupation, marital status and religion. ($p > 0.05$)

Thus the hypothesis stated earlier that **"There will be no significant association between selected demographic variables and blood pressure levels before and after Acupressure in control and experimental group of hypertensive clients"** was rejected with respect to age and monthly family income.

**Table 17: Association between Demographic Variables and Diastolic Blood Pressure in Control and Experimental Group of clients with Hypertension in post test 2**

| Demographic Variables | Control group (n=110) | | | | Experimental group (n=110) | | | |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | $X^2$ | Normal | Pre hyper tensive | High BP | $X^2$ |
| **Age group** 31-40 | 4 | 3 | 2 | $\chi^2$**=10.138** **df=4** **P=0.038\*** | 0 | 9 | 0 | $\chi^2$=2.22 df=4 P=0.695 |
| 41-50 | 29 | 16 | 0 | | 4 | 37 | 4 | |
| 51-59 | 40 | 12 | 4 | | 4 | 49 | 3 | |
| **Gender** Male | 44 | 24 | 3 | $\chi^2$=3.382 df=2 P=0.184 | 3 | 57 | 5 | $\chi^2$=2.016 df=2 P=0.365 |
| Female | 29 | 7 | 3 | | 5 | 38 | 2 | |
| **Education** Graduate | 24 | 6 | 3 | $\chi^2$=4.722 df=6 P=0.580 | 2 | 40 | 1 | $\chi^2$**=13.84** **df=6** **P=0.031\*** |
| Higher secondary | 29 | 14 | 3 | | 3 | 36 | 2 | |
| High school | 11 | 6 | 0 | | 2 | 14 | 1 | |
| Middle school | 9 | 5 | 0 | | 1 | 5 | 3 | |
| **Occupation** | 32 | 10 | 1 | $\chi^2$=9.382 | 4 | 52 | 3 | $\chi^2$=5.041 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Profession | | | | df=8 P=0.311 | | | | df=8 P=0.753 |
| Semi profession | 5 | 1 | 0 | | **0** | 6 | 0 | |
| Clerical, shop owner, farmer | 13 | 4 | 3 | | 2 | 14 | 1 | |
| Skilled worker | 3 | 1 | 0 | | 1 | 7 | 0 | |
| Semi skilled worker | 20 | 15 | 2 | | 1 | 16 | 3 | |
| **Monthly family Income** 5000 and below | 29 | 10 | 5 | $\chi^2$=**17.039** **df=6** **P=0.009*** | 6 | 49 | 3 | $\chi^2$=3.228 df=4 P=0.520 |
| 5001- 10000 | 22 | 19 | 0 | | 2 | 32 | 2 | |
| 10001- 15000 | 19 | 2 | 1 | | 0 | 14 | 2 | |
| Above 15000 | 3 | 0 | 0 | | 0 | 0 | 0 | |
| **Marital status** Married | 53 | 24 | 5 | $\chi^2$=3.283 df=6 P=0.773 | 6 | 77 | 5 | $\chi^2$=1.491 df=4 P=0.828 |
| Unmarried | 13 | 6 | 0 | | 2 | 15 | 2 | |
| Widow / widower | 6 | 1 | 1 | | 0 | 3 | 0 | |
| Divorced | 1 | 0 | 0 | | 0 | 0 | 0 | |
| **Religion** Hindu | 40 | 16 | 4 | $\chi^2$=0.465 df=2 P=0.793 | 3 | 57 | 5 | $\chi^2$=2.016 df=2 P=0.365 |
| Christian | 33 | 15 | 2 | | 5 | 38 | 2 | |

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Table 17 shows the Pearson Chi-Square test reveals a significant association between age group, educational status and income with the diastolic blood pressure. Thus the hypothesis stated earlier that **"There will be no significant association between selected demographic variables and diastolic blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to age group, educational status and income. **However, the hypothesis is accepted with respect to other variables.**

**Table 18: Association between Clinical Variables and Systolic Blood Pressure in Control and Experimental Group of clients with Hypertension in post test 2**

| Clinical variables | Control (n=110) | | | $\chi^2$ Value df P value | Experimental (n=110) | | | $\chi^2$ Value df P value |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | | Normal | Pre hyper tensive | High BP | |
| **BMI** <18 | 18 | 6 | 0 | 6.664 df= 6 p=0.353 | 2 | 26 | 1 | 6.49 df= 6 p=0.3 |
| 18-24 | 36 | 14 | 4 | | 0 | 66 | 1 | |
| 25-29 | 16 | 6 | 1 | | 0 | 11 | 0 | |
| 30 and above | 3 | 5 | 1 | | 0 | 3 | 0 | |
| **History of taking non vegetarian** No | 36 | 26 | 3 | 10.966 df=2 p=0.004 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 37 | 5 | 3 | | 2 | 43 | 0 | |
| **History of diet modification** No | 45 | 17 | 2 | 2.025 df= 2 p= 0.36 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 28 | 14 | 4 | | 2 | 43 | 0 | |
| **History of smoking** No | 45 | 17 | 2 | 2.025 df= 2 p= 0.36 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 28 | 14 | 4 | | 2 | 43 | 0 | |
| **Alcoholism** No | 45 | 17 | 2 | 2.025 df= 2 p= 0.36 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 28 | 14 | 4 | | 2 | 43 | 0 | |
| **Physical activity** Sedentary | 35 | 19 | 4 | 20.234 | 0 | 53 | 1 | 4.389 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Moderate | 26 | 7 | 2 | df=6 | 2 | 35 | 1 | df=8 |
| Heavy | 12 | 5 | 0 | p=0.003 | 0 | 18 | 0 | p=0.8 |
| **Walking practice** No | 58 | 26 | 5 | 2.049 df= 4 | 2 | 86 | 0 | **20.02 df= 4** |
| Yes | 15 | 5 | 1 | p= 0.73 | 0 | 20 | 2 | **p= 0.00 *** |
| **Sleep** < 6 hours | 35 | 19 | 4 | **20.699 df= 8 p= 0.008*** | 0 | 53 | 1 | 4.389 df= 8 p= 0.8 |
| 6-8 hours | 26 | 7 | 2 | | 2 | 35 | 1 | |
| >8 | 12 | 5 | 0 | | 0 | 18 | 0 | |
| **Duration of hypertension** 1-3 years | 35 | 19 | 3 | **20.699 df= 8 p= 0.008*** | 0 | 53 | 1 | 4.389 df= 8 p= 0.8 |
| 4-6 years | 26 | 7 | 3 | | 2 | 36 | 1 | |
| >6 years | 12 | 5 | 0 | | 0 | 17 | 0 | |
| **Family history of hypertension** No | 46 | 19 | 4 | 2.732 df= 6 p= 0.842 | 0 | 63 | 2 | 4.27 df= 2 p= 0.1 |
| Yes | 27 | 12 | 2 | | 2 | 43 | 0 | |
| **Co-morbidity** No | 58 | 26 | 5 | 2.049 df= 4 | 2 | 86 | 0 | **20.02 df= 4** |
| Yes | 15 | 5 | 1 | p= 0.73 | 0 | 20 | 2 | **p= 0.00 *** |
| **Compliance to treatment** Good | 45 | 17 | 2 | 2.025 df= 2 | 0 | 63 | 2 | 4.27 df= 2 |
| Average | 28 | 14 | 4 | p= 0.363 | 2 | 43 | 0 | p= 0.1 |

Table 18 shows the Pearson Chi-Square test reveals that selected clinical variables walking, sleep duration, duration of hypertension and co-morbidities have significant association with the systolic blood pressure at p= 0.00 level. There is no association between Blood Pressure and other clinical variables.

Thus the hypothesis stated earlier that **"There will be no significant association between selected clinical variables and blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to walking, sleep, duration of hypertension and co-morbidities and accepted with respect to the other clinical variables.

**Table 19: Association between Clinical Variables and Diastolic Blood Pressure in Control and Experimental Group of clients with**

**Hypertension in post test 2**

| Clinical variables | Control (n=110) | | | $\chi^2$ Value df P value | Experimental (n=110) | | | $\chi^2$ Value df P value |
|---|---|---|---|---|---|---|---|---|
| | Normal | Pre hyper tensive | High BP | | Normal | Pre hyper tensive | High BP | |
| **BMI** <18 | 1 | 22 | 1 | 2.213 df=6 p=0.899 | 2 | 26 | 1 | 6.49 df= 6 p=0.3 |
| 18-24 | 5 | 45 | 4 | | 0 | 66 | 1 | |
| 25-29 | 2 | 20 | 1 | | 0 | 11 | 0 | |
| 30 and above | 0 | 8 | 1 | | 0 | 3 | 0 | |
| **History of taking non vegetarian** No | 2 | 57 | 6 | 5.931 df=2 p=0.052 | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 6 | 38 | 1 | | 2 | 43 | 0 | |
| **History of diet modification** No | 3 | 54 | 7 | **6.508 df= 2 p= 0.04** | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 5 | 41 | 0 | | 2 | 43 | 0 | |
| **History of smoking** No | 3 | 54 | 7 | **6.508 df= 2 p= 0.04** | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 5 | 41 | 0 | | 2 | 43 | 0 | |
| **Alcoholism** No | 3 | 54 | 7 | **6.508 df= 2 p= 0.04** | 0 | 63 | 2 | 4.27 df=2 p=0.1 |
| Yes | 5 | 41 | 0 | | 2 | 43 | 0 | |
| **Physical activity** | 1 | 52 | 5 | 8.715 | 0 | 53 | 1 | 4.389 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sedentary | | | | df=6 | | | | df=8 |
| Moderate | 6 | 28 | 1 | p=0.190 | 2 | 35 | 1 | p=0.8 |
| Heavy | 1 | 15 | 1 | | 0 | 18 | 0 | |
| **Walking practice** No | 6 | 76 | 7 | 2.552 df=4 p=0.635 | 2 | 86 | 0 | **20.02 df= 4 p= 0.00 \*** |
| Yes | 2 | 15 | 0 | | 0 | 20 | 2 | |
| **Sleep** < 6 hours | 1 | 52 | 5 | 8.840 df=8 p=0.356 | 0 | 53 | 1 | 4.389 df= 8 p= 0.8 |
| 6-8 hours | 6 | 28 | 1 | | 2 | 35 | 1 | |
| >8 | 1 | 15 | 1 | | 0 | 18 | 0 | |
| **Duration of hypertension** 1-3 years | 1 | 52 | 5 | 8.840 df=8 p=0.356 | 0 | 53 | 1 | 4.389 df= 8 p= 0.8 |
| 4-6 years | 6 | 28 | 1 | | 2 | 36 | 1 | |
| >6 years | 1 | 15 | 1 | | 0 | 17 | 0 | |
| **Family history of hypertension** No | 4 | 59 | 3 | 9.914 df=6 p=0.128 | 0 | 63 | 2 | 4.27 df= 2 p= 0.1 |
| Yes | 4 | 36 | 4 | | 2 | 43 | 0 | |
| **Co-morbidity** No | 6 | 76 | 7 | 2.552 df=4 p=0.635 | 2 | 86 | 0 | **20.02 df= 4 p= 0.00 \*** |
| Yes | 2 | 19 | 0 | | 0 | 20 | 2 | |
| **Compliance to treatment** Good | 3 | 54 | 7 | **6.508 df= 2 p=0.039\*** | 0 | 63 | 2 | 4.27 df= 2 p= 0.1 |
| Average | 5 | 41 | 0 | | 2 | 43 | 0 | |

Table 19 shows the Pearson Chi-Square shows test reveals that selected clinical variables history of diet modification, smoking, alcoholism, walking, co-morbidities and compliance have significant association with the diastolic blood pressure at $p < 0.05$ level. There is no association between Diastolic Blood Pressure and other clinical variables.

Thus the hypothesis stated earlier that **"There will be no significant association between selected clinical variables and diastolic blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to history of diet modification, smoking, alcoholism, walking, co-morbidities and compliance.

**Table 20: Comparison of the Mean and Standard Deviation of Systolic Blood Pressure between Experimental and Control group clients in pre test**

| Group | Mean | SD | Independent t - test | P value |
|---|---|---|---|---|
| Experimental group | 123.90 | 16.76 | 1.927 | 0.055 |
| Control group | 119.77 | 15.03 | | |

Table 20 shows that comparison of the mean and standard deviation of the pre test systolic blood pressure between experimental and control group of clients that there is no significant difference between control and the experimental group of Hypertensive clients. (p>0.05)

**Table 21: Comparison of the Mean and Standard Deviation of Systolic Blood Pressure between Experimental and Control group clients in Post test I**

| Group | Mean | SD | Independent t - test | P value |
|---|---|---|---|---|
| Experimental group | 113.97 | 14.01 | 3.014 | 0.003 |
| Control group | 119.95 | 15.39 | | |

Table 21 shows that comparison of the mean and standard deviation of the post test I systolic blood pressure between experimental and control group of clients that there is significant difference between control and the experimental group with t= 3.014 at p = 0.003 level.

**Table 22: Comparison of the Mean and Standard Deviation of Systolic Blood Pressure between Experimental and Control group clients in Post test II**

| Group | Mean | SD | Independent t - test | P value |
|---|---|---|---|---|
| Experimental group | 114.27 | 8.06 | 3.458 | 0.001 |
| Control group | 120.04 | 15.54 | | |

Table 22 shows that comparison of the mean and standard deviation of the post test II systolic blood pressure between experimental and control group of clients that there is significant difference between control and the experimental group with t= 3.458 at p=0.001 level.

**Table 23: Comparison of the Mean and Standard Deviation Diastolic Blood Pressure between Experimental and Control group clients in Pre test**

| Group | Mean | SD | Independent t - test | P value |
|-------|------|-----|---------------------|---------|
| Experimental group | 71.18 | 9.74 | 0.137 | 0.891 |
| Control group | 71.36 | 9.99 | | |

Table 23 shows that comparison of the mean and standard deviation of the pre test diastolic blood pressure between experimental and control group of clients that there is no significant difference between control and the experimental group at p > 0.05 level.

**Table 24: Comparison of the Mean and Standard Deviation of Diastolic Blood Pressure between Experimental and Control group clients in Post test I**

| Group | Mean | SD | Independent t - test | P value |
|---|---|---|---|---|
| Experimental group | 70.45 | 9.80 | 0.873 | 0.384 |
| Control group | 71.63 | 10.27 | | |

Table 24 shows that comparison of the mean and standard deviation of the post test I diastolic blood pressure between experimental and control group of clients that there is no significant difference between control and the experimental group with t= 0.873 at p > 0.05 level.

**Table 25: Comparison of the Mean and Standard Deviation of Diastolic Blood Pressure between Experimental and Control group clients in Post test II**

| Group | Mean | SD | Independent t - test | P value |
|---|---|---|---|---|
| Experimental group | 69.90 | 9.23 | 1.263 | 0.208 |
| Control group | 71.54 | 9.97 | | |

Table 25 shows that comparison of the mean and standard deviation of the post test II diastolic blood pressure between experimental and control group of clients that there is significant difference between control and the experimental group with t= 1.263 at p=0.208 level.

**Table 26: Frequency Distribution of Signs and Symptoms Associated with Hypertension in the experimental group of Hypertensive clients**

N = 110

| Signs and Symptoms | Observation | Absent 0 | Mild 1 | Moderate 2 | Severe 3 |
|---|---|---|---|---|---|
| Headache | Pretest | 6 | 4 | 34 | 66 |
| | Post test 1 | 6 | 4 | 34 | 66 |
| | Post test 2 | 71 | 37 | 2 | 0 |
| Body pain | Pretest | 10 | 0 | 32 | 68 |
| | Post test 1 | 10 | 0 | 32 | 68 |
| | Post test 2 | 85 | 25 | 0 | 0 |
| Giddiness | Pretest | 11 | 46 | 32 | 21 |
| | Post test 1 | 26 | 45 | 23 | 16 |
| | Post test 2 | 75 | 32 | 3 | 0 |
| Fatigue | Pretest | 11 | 69 | 30 | 0 |
| | Post test 1 | 110 | 0 | 0 | 0 |
| | Post test 2 | 110 | 0 | 0 | 0 |
| Shortness of breath | Pretest | 11 | 76 | 23 | 0 |
| | Post test 1 | 0 | 0 | 0 | 0 |
| | Post test 2 | 0 | 0 | 0 | 0 |

From table 26, it is evident that Acupressure is effective in reducing the signs and symptoms of hypertension. Pretest level of all the symptoms have been reduced in the post test level.

**Table 27: Frequency and Percentage Distribution of the Level of Acceptability regarding Acupressure Treatment in Experimental group**

| S. No | Level of Acceptance | N | % |
|-------|---------------------|-----|-----|
| 1. | Highly acceptable | 102 | 93 |
| 2. | Acceptable | 8 | 7 |
| 3. | Unacceptable | 0 | 0 |
| 4. | Highly unacceptable | 0 | 0 |

Table 27 shows that majority (93%) of the experimental group of clients expressed high acceptability of Acupressure intervention and 7% of them expressed acceptance.

# CHAPTER V

## DISCUSSION

The study was conducted to determine the effectiveness of Acupressure upon blood pressure among hypertensive clients. Hypertension is regarded as a major public health problem worldwide. The world health report identifies blood pressure as one of the five important risk factors for cardio vascular diseases globally. Acupressure is one of the traditional methods of treatment founded by Chinese 8000 years ago. In this study, it refers to application of pressure on only one point at a time in any channel in the body, selected after pulse diagnosis. Pulse diagnosis is the evaluative tool for selecting the single point need to be stimulated.

The heart of the research report lies in reporting the findings. This is the most creative and demanding part of the study.

**The Objectives of the Study were**

1. To assess the level of blood pressure of the control and the experimental group of Hypertensive clients before and after Acupressure.
2. To evaluate the effectiveness of Acupressure upon blood pressure by comparing the blood pressure of Hypertensive clients before and after Acupressure.
3. To find out the association between selected demographic variables and the level of blood pressure in control and the experimental group of Hypertensive clients.
4. To find out the association between selected clinical variables and the level of blood pressure in control and the experimental group of Hypertensive clients.

5.  To find out the level of acceptability of the Acupressure treatment by the experimental group of Hypertensive clients.

**The Major findings of the study were**

Keeping the above objectives of the study in view, the results are discussed under the following headings.

**Demographic Variables of Hypertensive Clients**

In the present study the Demographic variables distribution shows that majority of the samples were male (59%, 61.8%), married (80%, 74.54%), and Hindus (59%, 65.45%) in control and experimental group respectively. Around half of them were in the age group of 51-59 years (50.8%, 49.09%), with family income 15000 and above (52.8%, 56.36%) and were professionals in occupation (53.6%, 45.5%) in control and experimental group respectively. With regard to educational status 39% and 38.18% of them were graduates in control and experimental group respectively.

The above findings are similar to the study findings of Fourth National Family Health Survey that evaluated hypertension in a large population based sample ($n = 799,228$) and reported hypertension in 13.8% men vs. 8.8% women (overall 11.3%) aged 15–49 and 15–54 respectively. More representative data (age > 18 years, $n = 1,320,555$) in Fourth District Level Household Survey reported hypertension in 25.3% with greater prevalence in men (27.4%) than women (20.0%). This translates into 207 million persons (men 112 million, women 95 million) with hypertension in India.

The Clinical variables shows that majority of the samples were non alcoholic (62%, 54.54%), non smokers (62%, 54.54%) and taking non vegetarian diet (50%, 61.8%). Around half of them were with overweight BMI 25-29 (50.8%, 49.09%), were not having any diet modifications (59%, 61.8%), with no walking practice (62%, 54.54%) and were sleeping less than 6 hours (51.8%, 51.8%).

Similar findings reported in study on Aging and urbanization with accompanying unhealthy lifestyle may play a role in the epidemic of hypertension in low- and middle-income countries.[6] Primary prevention through lifestyle modifications, including increased physical activity, maintenance of normal body weight, limited alcohol consumption, reduction of salt intake, increased potassium intake, and consumption of a diet high in fruits, vegetables, and low fat dairy products, and low in saturated and total fat, should be the first choice for combating the emerging epidemic of hypertension in low- and middle-income countries.[14]

The primary prevention approach must be complemented by intensive antihypertensive pharmaceutical treatment of hypertensive patients to reduce blood pressure-related cardiovascular disease and premature death, which is likely to be cost-effective in both high-income and middle-income countries.[14]

**First objective of the study was to assess the level of blood pressure of the control and the experimental group of Hypertensive clients before and after Acupressure.**

The systolic blood pressure assessment revealed that in the control group 48.1% of them had normal blood pressure followed by 37.2% of them had pre hypertension in pretest. In post test 1 normal blood pressure was for 47% of clients followed by Prehypertensive

(38%). In post test 2 47% of clients had normal blood pressure followed by Pre hypertension (38%). In the experimental group in the pretest 49.1% of their blood pressure was normal followed by pre hypertension (44.5%). In post test 1 77.3% of them had normal blood pressure followed by 20.9% had Pre hypertension. In post test 2 88.2% of them had normal blood pressure followed by 11.8% had Pre hypertension.

The diastolic blood pressure assessment revealed that in the control group 84.5% of them had normal blood pressure followed by 8.2% of them had pre hypertension in pretest. In post test 1 normal blood pressure was for 84.5% of clients followed by Prehypertensive (8.2%). In post test 2 84.5% of clients had normal blood pressure followed by Pre hypertension (8.2%). In the experimental group in the pretest 66.4% of their blood pressure was normal followed by pre hypertension (28.2%). In post test 1 92.7% of them had normal blood pressure followed by 7.3% had Pre hypertension. In post test 2 93.6% of them had normal blood pressure followed by 6.4% had Pre hypertension.

A study conducted in Apollo college of Nursing, Chennai also found similar results. It was a descriptive prevalence study on Hypertension among the population living in the hamlets covered by the Department of Community Health Nursing of Apollo College of Nursing, Chennai. The study findings revealed that among 465 samples majority were Normo tensive (72%), followed by Hypertensive (24%) and Hypotensive (4%). Based on their BMI majority were Normal (66%), followed by Overweight (23%), Underweight (6%) and Obese (5%).

The estimated global age-standardized prevalence of hypertension in adults aged ≥20 years in 2010 was also showing that 31.1% (95% confidence interval, 30.0-32.2%): 31.9%

(30.3-33.5%) in men and 30.1% (28.5-31.6%) in women. The age-standardized prevalence of hypertension was 28.5% (27.3-29.7%) in high-income countries (31.6% [29.6-33.6%] in men and 25.3% [23.9-26.7%] in women) and 31.5% (30.2-32.9%) in low- and middle-income countries (31.7% [29.7-33.6%] in men and 31.2% [29.3-33.1%] in women). The p-value for the difference in prevalence between high-income and low-and middle-income countries is 0.001.[14]

**Second objective was to evaluate the effectiveness of Acupressure upon level of blood pressure by comparing the blood pressure of Hypertensive clients before and after Acupressure.**

**The corresponding hypothesis was that there will be no significant difference in the blood pressure between before and after Acupressure in control and experimental group of hypertensive clients.**

The assessment of SBP between the two groups at each levels namely pre, post 1 and 2 shows that there was no significant difference in blood pressure assessments within subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.097$). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.000$).

The assessment of DBP between the two groups at each levels namely pre, post 1and 2 shows that there was no significant difference in blood pressure assessments within subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.097$). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients ($p > 0.000$).

The difference between the means of both groups was statistically significant (P<0.001). The difference between the means of both groups was statistically significant (P<0.001). Previous studies have shown that acupuncture can lower Blood Pressure. The average decrease in systolic and diastolic BP in the present study was similar to that obtained after acupuncture.

Comparison of the mean and standard deviation of the pre test systolic blood pressure between experimental and control group of client's shows that there is no significant difference in between control and the experimental group. Comparison of the mean and standard deviation of the post test I systolic blood pressure between experimental and control group of clients shows that there is significant difference in between control and the experimental group with t= 3.014 at p=0.003 level.

Comparison of the mean and standard deviation of the post test II systolic blood pressure between experimental and control group of clients shows that there is significant difference in between control and the experimental group with t= 3.458 at p=0.001 level.

There was no significant difference in blood pressure assessments within subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients (p > 0.097). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients (p > 0.000).

There was significant difference in the blood pressure levels in pretest, post test1 and post test 2 and thus the hypothesis Ho1 stated earlier that there will be no significant difference in the blood pressure levels before and after Acupressure in control and

experimental group of hypertensive clients was rejected. There was a significant difference in blood pressure assessments within subjects and between subjects in pre test, post test 1 and post test 2 in experimental group of hypertensive clients (p > 0.000).

Significant reduction in BP in post test in experimental group can be attributed to the effectiveness of Acupressure treatment. The above findings are similar to the findings of Ganhonli[39] conducted a randomized clinical trial study on Effectiveness of Acupressure on the Taichong Acu point in Lowering Blood Pressure in Patients with Hypertension. Eighty patients with hypertension attending a cardiology outpatient department in central Taiwan were included in this randomized clinical trial. Acupressure was applied to the Taichong acu point in the experimental group (n = 40) and to the first metatarsal (sham acu point) in the control group (n = 40). Blood pressure was measured by electronic monitoring before and immediately 15 min and 30 min after acupressure.

A result of the study shows the average age of the experimental and control participants was 59.3 ± 9.2 years and 62.7 ± 8.4 years, respectively. The two groups were similar for demographics and antihypertensive drug use. Mean systolic and diastolic BP in the experimental group decreased at 0, 15, and 30 min after acupressure (165.0/96.3, 150.4/92.7, 145.7/90.8, and 142.9/88.6 mmHg); no significant changes occurred in the control group. There was a significant difference in systolic and diastolic BP between the experimental and control groups immediately and 15 and 30 min after acupressure (p < 0.05). Acupressure on the Taichong acu point can lower BP in hypertensive patients and may be included in the nursing care plan for hypertension

Dr Sarah Brewer, (2018)[36], conducted a study involving 80 people compared the effects of acupressure in people with hypertension who were attending a cardiology outpatient department in Taiwan. Half were randomized to receive true acupressure at the Tai chong Acu point, while half had sham acupressure applied over a point that was not a recognized acu point. In the group who received true acupressure, average blood pressure before the treatment was 165.0/96.3 mmHg.

Immediately after the acupressure, average blood pressure was 150.4/92.7 mmHg. When measured 15 minutes later it was 145.7/90.8, and 30 minutes after the acupressure it was 142.9/88.6 mmHg. This study suggests that the use of acupressure on the traditionally used Tai Chong acupoint in the foot is effective in lowering blood pressure in people with hypertension. The effects were immediate, and lasted for at least 30 minutes, with an average recorded reduction in blood pressure of 22.1/7.7 mmHg after 30 minutes.

Ameerkhamam[37] wrote an article on How to Get Relief from Low Blood Pressure Applying Acupressure Therapy, Treating High Blood Pressure with Acupressure Point and documented that it is generally safe when performed by an experienced practitioner. No serious complications have been published, despite millions of treatments every year. Self-administered acupressure is believed to be safe with proper training and knowledge.

In his article Yue[40] explains about Lowering High Blood Pressure by Pinching Ears. Using finger nails put the index finger inside ear, and the thumb on the top of this point. Pinch and hold on the left ear for 15 seconds before releasing. Repeat this process on the right ear; pinch and hold for 15 seconds then release. Keep alternating on both sides for about 5 minutes totally. If the blood pressure is very high, use this method a couple times daily,

combined with current treatments. Pinching the ears will result in the blood pressure showing a decreasing trend in the long term.

Consistently measuring the blood pressuring throughout the day will give an accurate gauge of blood pressure curve throughout the day. The most effective way to apply this acupressure method is to perform this stimulation one hour before high blood pressure periods. This will help in controlling blood pressure well. On doing this for a period of time, the blood pressure trends down. Until then, it is better to visit the doctor regularly and attain advice regarding the gradual reduction of medication intake.

Hypertension is the most common type of community problem. Stress and tension were the major factors in raising the blood pressure. For high blood pressure, consistently massaging all of the pressure points on our feet would result in the greatest benefit in healing the blood pressure rather than fixating on some numbers appearing in a blood pressure reading.[40]

**The third objective was to find out the association between selected demographic variables and the level of blood pressure in control and the experimental group of Hypertensive clients.**
**The corresponding hypothesis was that there will be no significant association between selected demographic variables and blood pressure levels before and after Acupressure in control and experimental group of hypertensive clients**.

The Pearson Chi-Square test reveals that selected demographic variables, age and monthly family income have significant association with the systolic blood pressure at $p <$

0.05 level. There is no association between other demographic variables like gender, education, occupation, marital status and religion. (p>0.05)

Thus the hypothesis stated earlier that **"There will be no significant association between selected demographic variables and blood pressure levels before and after Acupressure in control and experimental group of hypertensive clients"** was rejected with respect to age and monthly family income. Blood Pressure was high in people aged 51-59 years than lesser age group. This shows that when age increases blood pressure prevalence also increases. Family monthly income shows that lower income group has high blood pressure.

Pearson Chi-Square test reveals a significant association between age group, educational status and income with the diastolic blood pressure. Thus the hypothesis stated earlier that **"There will be no significant association between selected demographic variables and diastolic blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to age group, educational status and income. Blood Pressure was high in people aged 51-59 years than lesser age group. This shows that when age increases blood pressure prevalence also increases. People those who had completed up to higher secondary have more prevalence of blood pressure. Family monthly income shows that lower income group has high blood pressure.

This study finding are consistent with the study results of Fourth District Level Household Survey that gives Social determinants of hypertension are important and Indian states with greater urbanization, human development and social development have more hypertension. There is poor association of hypertension prevalence with healthcare

availability although there is positive association with healthcare access and quality. The health system in India should focus on better hypertension screening and control to reduce cardiovascular morbidity and mortality.

In another study[39] among the factors affecting the change in systolic BP, the groups as well as interactions between groups and time interval between measures were significantly different ($p < 0.05$). In contrast, factors such as time between measures, gender, age, and medication use were not significantly different ($p > 0.05$). Among the factors affecting change in diastolic BP, gender, age, interactions between groups, and time between measures were significantly different ($p < 0.05$). The effectiveness of acupressure in lowering systolic and diastolic BP in the experimental group was significantly different from that in the control group after adjusting for confounding factors, including gender, age, and medication use.

**The fourth objective was to find out the association between selected clinical variables and the level of blood pressure in control and the experimental group of Hypertensive clients.**
**The corresponding hypothesis was that there will be no significant association between selected clinical variables and blood pressure levels before and after Acupressure in control and experimental group of hypertensive clients.**

The Pearson Chi-Square test reveals that selected clinical variables walking, sleep duration, duration of hypertension and co-morbidities have significant association with the systolic blood pressure at p= 0.00 level. There is no association between Blood Pressure and other clinical variables.

Thus the hypothesis stated earlier that **"There will be no significant association between selected clinical variables and blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to walking, sleep, duration of hypertension and co-morbidities and accepted with respect to the other clinical variables.

Pearson Chi-Square shows test reveals that selected clinical variables history of diet modification, smoking, alcoholism, walking, co-morbidities and compliance have significant association with the diastolic blood pressure at $p < 0.05$ level. There is no association between Diastolic Blood Pressure and other clinical variables.

Thus the hypothesis stated earlier that **"There will be no significant association between selected clinical variables and blood pressure levels in control and experimental group of hypertensive clients"** was rejected with respect to history of diet modification, smoking, alcoholism, walking, co-morbidities and compliance.

The above findings were similar with the study[39] a randomized clinical trial study on Effectiveness of Acupressure on the Taichong Acu point in Lowering Blood Pressure in Patients with Hypertension. Among the factors affecting the change in systolic BP, the groups as well as interactions between groups and time interval between measures were significantly different ($p < 0.05$). In contrast, factors such as time between measures, gender, age, and medication use were not significantly different ($p > 0.05$).

Among the factors affecting change in diastolic BP, gender, age, interactions between groups, and time between measures were significantly different ($p < 0.05$). Group, time

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between measures, and medication use were not significantly different ($p > 0.05$). The effectiveness of acupressure in lowering systolic and diastolic BP in the experimental group was significantly different from that in the control group after adjusting for confounding factors, including gender, age, and medication use.

**The fifth objective was to find out the acceptability of the Acupressure treatment by the experimental group of Hypertensive clients.**

In the experimental group of clients majority (93%) have high acceptance towards the Acupressure treatment and 7% of the experimental group of clients have acceptance and none of the experimental group have non acceptance or highly non acceptance towards the Acupressure treatment.

Acupressure is easy and simple method to apply to the clients. No instrument is necessary instead just slight pressure with fingers is needed. This treatment was given once in a week for three months. Many of the clients expressed that they felt better and satisfied with Acupressure treatment as it do not have any side effects, adverse effects or any restriction of food.

# CHAPTER VI

## SUMMARY, CONCLUSION, NURSING IMPLICATIONS AND RECOMMENDATIONS

**Introduction**

Chronic diseases are the major contributors to the global disease burden for human population at present. It poses an important public health challenge to both economically developing and developed countries. We have a number of treatment modalities available for treating them. Our ancestors had a better control over their health by following various traditional methods of practice. Sidha in South India, Ayurvedha in North India, Acupressure in China etc., were some of them. Acupressure is a system where the treatment is given by applying slight pressure over the point selected based on pulse diagnosis.

Hypertension is regarded as a major public health problem worldwide. The World Health report identifies blood pressure as one of the five important risk factors for cardio vascular diseases globally. Acupressure is one of the traditional methods of treatment founded by Chinese 8000 years ago. In this study, it refers to application of pressure on only one point at a time in any channel in the body, selected after pulse diagnosis. Pulse diagnosis is the evaluative tool for selecting the single point which needs to be stimulated.

**Statement of the Problem**

"An Experimental Study to Assess the Effectiveness of Acupressure upon Blood Pressure among Hypertensive Clients at Selected Wards of Thiruvallur District"

**The Objectives of this Study were**

1. To assess the level of blood pressure of control and experimental group of Hypertensive clients before and after Acupressure.

2. To evaluate the effectiveness of Acupressure upon blood pressure by comparing the blood pressure of Hypertensive clients before and after Acupressure.

3. To find out the association between selected demographic variables and the level of blood pressure in control and the experimental group of Hypertensive clients.

4. To find out the association between selected clinical variables and the level of blood pressure in control and the experimental group of Hypertensive clients.

5. To find out the acceptability of the Acupressure treatment by the experimental group of Hypertensive clients.

**Methods and Materials**

This study was conducted using Quasi Experimental Time Series design among 220 samples with 110 samples for each control and experimental group. The control group samples were selected from Koladi and the experimental group samples were selected from Thiruverkadu by using simple random sampling. From selected areas, samples were chosen among the known cases of Hypertension using purposive sampling technique in each area by considering the inclusion and exclusion criteria.

The data was collected using the research instruments such as Demographic variable proforma, Clinical variable proforma, Blood pressure assessment chart, Checklist to assess the signs and symptoms of Hypertension and Rating scale for the assessment of level of acceptability of Acupressure treatment. Pre test was done for both the groups and then Acupressure treatment was given to the experimental group of samples once in a week for

two months. Post test was done first immediately after completion of the treatment for two months and again for second time after one month of the first post test. Data was analyzed using both the descriptive and inferential statistics using the SPSS -20. The results were interpreted according to the objectives and the hypothesis of the study and they were as follows.

**Major Findings of the Study were**

**Demographic Variables of Hypertensive Clients**

Demographic variables distribution shows that majority of the samples were male (59%, 61.8%), married (80%, 74.54%), and Hindus (59%, 65.45%) in control and experimental group, respectively. Around half of them were in the age group of 51-59 years (50.8%, 49.09%), with family income 15000 and above (52.8%, 56.36%) and were professionals in occupation (53.6%, 45.5%) in control and experimental group respectively. With regard to educational status 39% and 38.18% of them were graduates in control and experimental group, respectively.

Study findings on clinical variables show that, majority of the samples were non alcoholic (62%, 54.54%), non smokers (62%, 54.54%) and taking non vegetarian diet (50%, 61.8%) in control and experimental group, respectively. Around half of them were with overweight BMI 25-29 (50.8%, 49.09%), did not follow any diet modifications (59%, 61.8%), walking practice (62%, 54.54%) and with regard to sleep 51.8% and 50.8% of them had the habit of sleeping less than 6 hours per day in control and experimental group, respectively.

The assessment of SBP between the two groups at each levels namely pre, post 1 and 2 shows that there was no significant difference in blood pressure assessments within subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients (p > 0.097). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients (p > 0.000).

The assessment of DBP between the two groups at each levels namely pre, post 1and 2 shows that there was no significant difference in blood pressure assessments within subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients (p > 0.097). There is significant difference in blood pressure assessments between subjects in pre test, post test 1 and post test 2 in control group of hypertensive clients (p > 0.000). The difference between the means of both groups was statistically significant (P<0.001).

The Pearson Chi-Square test reveals that selected demographic variables age and marital status have significant association with the systolic blood pressure and diastolic blood pressure. The association between the clinical variables and the systolic blood pressure reveals that walking practice and presence of co-morbidities have highly significant association.

**Nursing Implications**

Based on the findings, the researcher recommends the following implications in the field of nursing practice, nursing administration, nursing education, nursing research.

**Nursing Practice**

Acupressure helps to modify the behavior and attitude towards hypertension and its control. In this context, the public health nurses can use the Acupressure to bring about the awareness, prevention and control of hypertension and to make the clients understand the benefits of the new treatment modalities. Acupressure can be given for any type of illness or health problem and also for any age group. There is no side effect or adverse reaction for applying Acupressure for any person. Thus the Acupressure treatment can be given for any type of illness to completely cure the disease.

**Nursing Education**

Nursing students should be taught the importance of reducing hypertension and enhancement of quality of life of hypertensive clients. Therefore the nursing student should be introduced with the alternative methods with the knowledge about the factors which enhance and reduce the blood pressure. Nursing curriculum can have incorporation of knowledge regarding Acupressure and its benefits. Clients can be given health teaching about the effectiveness of various complementary and Alternative treatment modalities.

**Nursing Administration**

It helps the nurses to update their knowledge with the latest innovations and to demonstrate high quality care. The nurse administrator should periodically organize formal training program for nurses to know about various alternative therapies, formulate appropriate networking, check out suitable program and incorporate this into practice.

**Nursing Research**

Encourage further research studies in reducing hypertension and other diseases. Disseminate the findings through conferences, seminars, publications, journals and the world wide websites. More researches need to be conducted with the use of locally available resources in reducing hypertension.

**Recommendations**

➢ The study can be done for a longer duration to confirm the long term effects of Acupressure.

➢ The study can be conducted among different groups like school teachers, corporate sectors and traffic police.

➢ The study can be conducted on the quality of life among the hypertensive clients.

➢ Comparative study can be conducted to evaluate the effectiveness of Acupressure with other non pharmacological interventions and alternative therapies.

➢ Experimental study can be conducted to evaluate the effectiveness of Acupressure upon any other common disease like Diabetes mellitus.

➢ Comparative study can be conducted to evaluate the effectiveness of Acupressure among urban and rural population.

➢ The study can be replicated in other settings.

**Summary**

Experimental studies have been reported on the BP-lowering effects of acupressure. Thus, the purpose of this study was to explore the ability of acupressure on the acu point to lower BP in patients with hypertension. The results of this study could provide the nursing staffs with a further therapeutic option when managing patients with hypertension. Further,

nurses are well placed to teach patients and/or their family members to perform this massage technique at home to enhance the quality of care available for patients with hypertension.

**Conclusion**

Acupressure is one of the methods used in traditional Chinese medicine for the prevention and treatment of disease. It is a simple, noninvasive technique that nurses can perform independently. These findings suggest that acupressure in acu point could lower systolic and diastolic BP in patients with hypertension. Therefore, nurses could teach patients with hypertension and their family members how to use acupressure on the acu point. Further studies are needed to establish the effectiveness of this therapy in various groups and settings.

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# THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

## No.69, ANNA SALAI, GUINDY, CHENNAI - 600 032.

Website : www.tnmgrmu.ac.in     Ph  : 22353574, 22353576 - 79, 22301760 - 63, 22353094
E-mail    : mail@tnmgrmu.ac.in     Fax : 91-44-22353698

Dr.N.JEYALAKSHMI DEVI.,M.D.,D.G.O.,                    Dated : .02.06.2015
ACADEMIC OFFICER.

### PROVISIONAL REGISTRATION  CERTIFICATE FOR Ph.D.

| | | | |
|---|---|---|---|
| 1) | Name of the Candidate | : | **Mrs.V.SENBAHAVALLI** |
| 2) | Qualification | : | M.Sc (Nursing) – Community Health Nursing |
| 3) | Duration of the Research | | **Part – Time  -- 4 YEARS** |
| 4) | Name and Designation of Guide | : | Dr.N.Chidambaranathan,<br>Head of the Department<br>Dept. of Radiology & imaging Sciences,<br>Apollo Hospitals,<br>Chennai – 600 006. |
| 5) | Name and Designation of Co-Guide | : | Ms.A.Lizy Sonia, M.Sc.,(N)<br>Professor<br>Apollo College of Nursing<br>Chennai -600 008. |
| 6) | Department in which candidate is conducting  Research | : | Medical Surgical Nursing |
| 7) | Name of the Institution | : | Apollo College of Nursing ,Chennai- 600 006. |
| 8) | Broad Topic of Research | : | Medical Surgical Nursing |
| 9) | Provisional Title of Research | : | An Experimental study to assess the effectiveness of Acupressure upon Blood pressure among Hypertensive clients at selected wards of Tiruvallur District. |
| 10) | Faculty & Branch | : | **Nursing / Medical Surgical Nursing** |
| 11) | Date of Registration i.e. session | : | **01.07.2014** |
| 12) | Date of conduct of Methodology Examination | : | **01.07.2015** |
| 13) | Last Date for completion of Methodology examination | : | **31.07.2015** |
| 14) | Last date for submission of Synopsis | : | **01.04.2018** |
| 15) | Prescribed date for submission of Thesis | : | **01.07.2018** |
| 16) | Last date for submission of Thesis | : | **01.07.2019** |

for ACADEMIC OFFICER

a

# THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

### No.69, ANNA SALAI, GUINDY, CHENNAI - 600 032.

Website : www.tnmgrmu.ac.in    Ph : 22353574, 22353576 - 79, 22301760 - 63, 22353094
E-mail   : mail@tnmgrmu.ac.in    Fax : 91-44-22353698

**Dr.C.SRIDHAR, MD**
**CONTROLLER OF EXAMINATIONS i/c**

Ref.No.EXII(5)/21126/2014           Dated: 28.10.2015

To

**Dr.N.Chidambaranathan, MD, Ph.D.,**
**HOD in Radiology,**
**Department of Radiology & Imaging,**
**Apollo Hospitals, 21, Greams Lane,**
**Chennai 600 006.**

Sir/ Madam,

     Sub:    The Tamil Nadu Dr. M.G.R.Medical University, Chennai – Research leading to Ph.D.– Mrs.V.SENBAHAVALLI - Part I Methodology Examination JULY 2015 – Confirmation of Provisional Registration Order for Ph.D. – Regarding.

     Ref:     1. This University's Letter of even number dated 28.09.15.
            2. Your letter dated 06.10.2015.
                        *****

     In the reference first cited, It is informed that the Part I - Paper I Methodology Examination was conducted on 28.07.2015 at University Premises and also Paper II & Paper III conducted by the Doctoral Advisory Committee on 13.07.2015 and 14.07.2015 in respect of the Candidate, **Mrs.V.SENBAHAVALLI** and the report sent thereon is hereby approved by this University, to proceed with the course for Ph.D. degree.

     2. In the reference second cited, a sum of Rs.5,000/- (Five thousand rupees only) has been received from you. In view of this, the provisional registration of the candidate for Ph.D. Degree as     **PART-TIME** candidate is hereby confirmed with effect from **01.07.2014.** The candidate Registered Number is **141420516.**

     Last date for submission of Synopsis       : 01.04.2018
     Prescribed date for submission of Thesis : 01.07.2018
     Last date for submission of Thesis        : 01.07.2019

All the members of the Doctoral Advisory Committee may kindly be informed accordingly.

The candidate should submit 6(six) copies of the Synopsis through the Guide along with the prescribed application form together with the fee prescribed and the necessary original certificates along with xerox copy. While submitting the Synopsis and Thesis, kindly ensure that the title of research should be as per the title approved by this University. **The wrapper of the Thesis should be in PINK colour.**

                                                     (P.T.O.)

2. I request you to kindly inform the other members and the candidate concerned regarding the date, time and venue of Advisory Committee meeting to be held.

3. I am also to request you to kindly **prescribe the course the candidate** has to undergo in consultation with the Advisory Committee after interviewing the candidate. <u>A copy of the course work so prescribed may also be forwarded to this office record</u>.

4. Further, you are permitted to conduct the Methodology examination both written and oral during **JULY 2015** and <u>**forward the Minutes, duly signed by all the members of the Advisory Committee on the candidate's fitness to proceed with his research work for the Ph.D. degree along with question paper and Answer script. The percentage (%) of marks obtained by the candidate in oral and written should be indicated separately in the report**</u>.

5. The Part I Methodology Examination should be conducted with the following New Ph.D. Regulation. The Regulation are:

**20.C. The Methodology Examination answer sheets and the results should be sent to the University within a month's time from the day of the Methodology Examination.**

**20.D.** - As resolved in the 44th Meeting of the Standing Academic Board dated 15.06.2012, the candidates those who have registered from 01.07.2012, shall write 3 papers in Methodology Examinations.

The Methodology – Paper I Examination is common to all speciality

Paper-I - Research Methodology  - **University Premises**
Paper-II - Broad subject of the field -  Research Centre
Paper-III - Area related to the thesis subject - Research Centre

Followed by Oral presentation of the proposal.

**20.E.** - As resolved in the 47th Meeting of the Standing Academic Board dated 18.12.2013, the maximum of 100 marks may be allotted for each of the three papers of the Methodology Examination. **No marks be allotted for Oral Presentation of the proposal.**

**## Candidates must obtain 50% marks in Research Methodology (Paper I) Examination**
&
**50% aggregate in all the 3 (Three) papers of Part I Examination (i.e. 150/300)** to continue their Ph.D  programme. (## As resolved in the 48th Meeting of the Standing Academic Board dated 02.07.2014).

1. As resolved in the 47th Meeting of the Standing Academic Board dated 18.12.2013- **All the Ph.D. candidates should undergo the training in Research Methodology, Biostatistics and Bio-ethics.** The Ph.D. research work involving human subject and clinical trials should undergo GCP [Good Clinical Practice] training.

Dr.C.SRIDHAR, MD
**CONTROLLER OF EXAMINATIONS i/c**

Ref.No. EXII(5)/21126/2014                                     Dated: 16 .07.2015

To

Dr.N.Chidambaranathan, MD, Ph.D.,
HOD in Radiology,
Department of Radiology & Imaging,
Apollo Hospitals, 21, Greams Lane,
Chennai 600 006.

Sir/ Madam,

Sub:   The Tamil Nadu Dr.M.G.R.Medical University, Chennai - Research leading
to Ph.D. - **Mrs.V.SENBAHAVALLI** - Registered for Ph.D. during 01.07.2014
session - Constitution of Doctoral Advisory Committee – Regarding.

Ref:   Your letter received on 25.06.2015.

\* \* \* \* \*

With reference to your letter cited, I am to inform you that the constitution of Doctoral
Advisory Committee consisting of the following persons to examine the Ph.D. candidate,
**Mrs.V.SENBAHAVALLI** for conducting Part I Methodology Examinations of the Ph.D Degree
Research Program is hereby approved. **The duties of the Doctoral Advisory Committee should be
followed as per Ph.D. Regulations 2010 – Section -19B.**

1. Dr.N.Chidambaranathan, M.Pharm., Ph.D.,                    -GUIDE
   Head of Department of Radiology,
   Department of Radiology & Imaging Sciences,
   Apollo Hospitals, 21, Greams Lane,
   Chennai 600 006.

2. Dr.Latha Venkatesan,M.Sc.,(N).,Ph.D.,                       -MEMBER
   Principal,
   Apollo College of Nursing
   Vanagaram to Ambattur Road,
   Ayanambakkam, Chennai 600 095.

3. Dr.Janie Vanitha, M.Sc.,(N), Ph.D.,                         -MEMBER
   Principal, BKR College of Nursing,
   GRT Mahalakshmi Nagar,
   Chennai to Tirupathi Highway,
   Tirutanni 631 209.

TITILE: "AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF
ACUPRESSURE UPON BLOOD PRESSURE AMONG HYPERTENSIVE CLIENTS AT
SELECTED WARDS OF TIRUVALLUR DISTRICT."

(P.T.O.)

d

9 December 2015

To,
Ms. V. Senbahavalli,
Ph. D (Nursing),
Apollo College of Nursing, Chennai

**Ref:** An experimental study to assess the effectiveness of Acupressure upon Blood pressure among Hypertensive clients at selected wards of Thiruvallur district.

**Sub:** Approval of the above referenced project and its related documents.

Dear Ms. V. Senbahavalli,

The Institutional Ethics Committee – Clinical studies has received the following document submitted by you related to the conduct of the above-referenced study.

- Project proposal

The Institutional Ethics Committee-Clinical Studies, Apollo Hospitals, Chennai reviewed and discussed the following documents submitted by you during the IEC-CS meeting held on 8 December 2015 -

The following Institutional Ethics Committee – Clinical Studies members were present at the meeting held on 8 December 2015 at 3:00 pm at Apollo Hospitals Educational Research Foundation, Conference Hall, Room No: 19, 2nd Floor, Krishnadeep Chambers, (Apollo Hospitals, Annex No: 1), Wallace Garden, Chennai -600006 –

| Name | Gender | Designation | Affiliation | Position in the committee |
|------|--------|-------------|-------------|---------------------------|
| Dr. Rema Menon | F | Blood Bank Transfusion Services | Apollo Hospitals, Chennai | Member Secretary (Clinician) |
| Dr. Pradeep kumar | M | Pharmacologist | Apollo Hospitals, Chennai | Member (Pharmacologist) |

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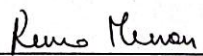
| | | | | |
|---|---|---|---|---|
| Ms. Maimoona Badsha | F | Lawyer | Independent Legal Practitioner, Chennai | Member (Lawyer) |
| Mrs. S. V. Mathanghi | F | Executive- project | Apollo Pharmacy, Chennai | Member (Layperson) |
| Dr. K. Sathyamurthi | M | Asst. Professor | Madras School of Social work, Chennai | Member (Social Scientist) |
| Dr. R. Ramakrishnan | M | Statistician | NIE, ICMR, Chennai | Member |

The Institutional Ethics Committee – Clinical Studies reviewed the proposal, its methodology and design of the study. The proposed thesis work is approved in its present proposal without any modifications.

The Institutional Ethics Committee – Clinical Studies review and approval of the report is only to meet the academic requirement and will not amount to any approval of the conclusions / recommendations as conclusive, deserving adoption and implementation, in any form, in any health care institution.

The Institutional Ethics Committee – Clinical Studies is constituted and works as per ICH-GCP, ICMR and revised Schedule Y guidelines.

With Regards,

Dr. Rema Menon
Member Secretary
Institutional Ethics Committee – Clinical Studies
Apollo Hospitals, Chennai,
Tamil Nadu, India.

Date 9|12|15
Place: Chennai

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE CLINICAL STUDIES

f

## CERTIFICATE - II

This is to certify that this dissertation work titled ………………………………….

of the candidate …………………………………………… with registration Number

……………for the award of …………………………………………… in the branch  of

………………….. .  I personally  verified  the  urkund.com  website  for  the

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percentage of plagiarism in the dissertation.

Guide & Supervisor sign with Seal.

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# Municipal Administration and Water Supply Department

**FROM**

THIRU.K.KRISHNAMURTHY., MA
COMMISSIONER
THIRUVERKADU MUNCIPALITY
CHENNAI 600077

**TO**

DR. L ATHA VENKATESAN
PRINCIPAL
APOLLO COLLEGE OF NURSING
CHENNAI 600095

### ROC NO 50/2017/H1 DATED :01/08/2017

**SUB:** Permisssion to conduct research study for Ph. D (N) candidateregarding

**REF :** Principal of apollo college of nursing letter dated 03/07/2017

***********

RESPECTED MADAM

      Greetings Mrs.V.Senbahavalli, Assistant Professor, research scholar at Apollo College Of Nursing Chennai. The Title Of Research Is "An Experimental Study To Assess The Effectiveness Of Acupressure Upon Blood Pressure Among Hypertensive Clients At Selected Wards Of Thiruvallur District " for her Ph D work . The candidate is permitted to collect data from the hypertensive clients living at the community area under Thiruverkadu municipality for the research purpose to complete her Ph D in nursing.

COMMISSIONER
THIRUVERKADU MUNICIPALITY

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Home » JHNEBP Model and Tools- Permission

# JHNEBP MODEL AND TOOLS- PERMISSION

## HERE ARE YOUR JHNEBP TOOLS (AND A SURPRISE GIFT)!

Thank you for your submission. We are happy to give you permission to use the JHNEBP model and tools in adherence of our legal terms noted below:

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Go back to the form

# DEMOGRAPHIC VARIABLE PROFORMA

**Purpose**

This Performa is used to measure the demographic variables of hypertensive clients such as age, gender, educational status, marital status, income, personal habits, occupation and religion. The information collected will be kept confidential and will be used for research purpose only.

**Instruction**

The researcher collects the following information from the research participants by asking question in the interview form and marks appropriate tick (√) mark in the space provided as per their response.

**Sample number:-** ☐

**Address and contact number:**


**1. Age in years …………………. (Write the actual age)**

    1.1    31 - 40    ☐

    1.2    41 – 50    ☐

    1.3    51 - 59    ☐

**2. Gender**

                  ☐

    2.1     Male

                  ☐

    2.2     Female

**3. Educational status**    ☐

    3.1    Graduate or post graduate    ☐

    3.2    Higher secondary or Post high school diploma    ☐

    3.3    High school certificate

                  ☐

    3.4    Middle school certificate

                  ☐

Primary school certificate

3.6    Illiterate ☐

**4. Occupation** ……………………………………………………

4.1    Profession ☐

4.2    Semi profession ☐

4.3    Clerical, shop owner, farmer ☐

4.4    Skilled worker ☐

4.5    Semi skilled worker ☐

4.6    Unskilled worker ☐

4.7    Unemployed ☐

**5. Family income per month**

5.1    5000 and below ☐

5.2    5001 – 10,000 ☐

5.3    10,001 – 15,000 ☐

5.4    Above 15,000 ☐

6.  **Marital status**

6.1.    Married ☐

6.2.    Unmarried ☐

6.3.    Widow / widower ☐

6.4.    Divorce/separated ☐

**7.  Religion**

7.1    Hindu ☐

7.2    Christian ☐

7.3    Muslim ☐

7.4    If others specify………...... ☐

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## CLINICAL VARIABLE PROFORMA OF HYPERTENSIVE CLIENTS

**Purpose**

This proforma is used to assess the risk factors for hypertension

**Instruction**

The researcher collects the following information from the research participants by asking question in the interview form and marks appropriate tick (√) mark in the space provided as per their response. Question 1, 2, and 3 will be filled by the researcher using bio physiological instruments.

**1. Height ---------------cm**

   1.1.   ≤ 150     ☐

   1.2.   151-160     ☐

   1.3.   161-170     ☐

   1.4.   >170     ☐

**2. Weight ----------------kg**

   2.1   ≤ 50     ☐

   2.2   51-60     ☐

   2.3   61-70     ☐

   2.4   >70     ☐

**3. Body mass index-------------- (kg/m2)**

   3.1   <18.4     ☐

   3.2   18.5-22.9     ☐

   3.3   23-29.9     ☐

   3.4   >30     ☐

**4. History of taking non vegetarian diet**

   4.1.  No     ☐

   4.2.  Yes     ☐

n

If yes

    4.2.1. Occasionally ☐

    4.2.2. Once in a week ☐

    4.2.3. Twice in a week ☐

    4.2.4. More than twice in a week ☐

**5. History of Diet modifications ( salt, oil )**

    5.1. No ☐

    5.2. Yes ☐

If yes specify…………………………………………………

**6. History of smoking**

    6.1. No ☐

    6.2. Yes ☐

If yes

At Past:    Duration    -

        No. of cigar per day  -

At Present:  Duration    -

        No. of cigar per day  -

**7. Habit of alcoholism**

    7.1. No ☐

    7.2. Yes ☐

If yes

At Past:    Duration    -

        Amount consumed per day  -

At Present:  Duration    -

        Amount consumed per day  -

o

**CAGE Questionnaire**:

Have you ever had to **C**ut down on alcohol amount?   Yes / No

Have you ever been **A**nnoyed by people's criticism?   Yes / No

Have you ever felt **G**uilty about drinking?   Yes / No

Have you ever needed an **E**ye opener drink?   Yes / No

**8. Nature of physical activity**

8.1. Sedentary   ☐

8.2. Moderate   ☐

8.3. Heavy   ☐

**9. Walking practice**

9.1. No   ☐

9.2. Yes   ☐

If yes

9.2.1. Every day morning and evening   ☐

9.2.2. Every day morning only   ☐

9.2.3. Every day evening only   ☐

9.2.4. Occasionally   ☐

**10. Sleep duration-------------------- hours per day**

10.1. Less than 6   ☐

10.2. 6 to 8   ☐

10.3. More than 8   ☐

**11. Duration of hypertension**

11.1 1-3 years   ☐

11.2 4-6 years   ☐

11.3 >6 years   ☐

12. **Family history of hypertension**

     12.1  No ☐

     12.2  Yes ☐

If yes

     12.2.1.  Parents ☐

     12.2.2.  Children ☐

     12.2.3.  Siblings ☐

     12.2.4. Grand parents ☐

     12.2.5. Others (specify) …………………………………☐

13. **History of co-morbidities**

     13.1. No ☐

     13.2. Yes ☐

If yes

☐

     13.2.1. Diabetes

     13.2.2. Others (specify) ……………………………☐

14. **Anti Hypertensive drugs used at present with dosage**

    …………………………………………………………………….

    …………………………………………………………………….

    ……………………………………………………………………..

     14.1.Adrenergic inhibitors ☐

     14.2.Calcium antagonists ☐

     14.3.Diuretics ☐

     14.4.Vasodilators ☐

     14.5.ACE Inhibitors ☐

     14.6.No drugs ☐

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**15. Perceived Drug Compliance**

15.1. Good Compliance ☐

15.2. Average Compliance ☐

15.3. Poor Compliance ☐

**16. Perceived side effects of Anti- Hypertensive medications**

16.1. No ☐

16.2. Yes ☐

   **If yes specify** ----------------------------------------------

**17. History of any Complications of Hypertension**

17.1. No ☐

17.2. Yes ☐

   **If yes specify** ----------------------------------------------

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# CHECKLIST TO ASSESS THE SYMPTOMS ASSOCIATED WITH HYPERTENSION

**Purpose:** This check list is used to record the blood pressure values, any pain and other physical problems of hypertensive clients.

**Instruction:** The researcher will record the blood pressure values among hypertensive clients before, during and after Acupressure therapy. Standardized BP apparatus is used to assess the blood pressure. Head Ache, Body Pain, Giddiness, Fatigue, Shortness of Breath, Nose Bleeding, and Vertigo is assessed by self reporting by the client. If absent score = 0, mild = 1, moderate = 2, severe = 3.

| OBSERVATION | O1 | O2 | O3 |
|---|---|---|---|
| | Pre test | Post test 1 (After 3 months) | Post test 2 (After 4months) |
| **Date** | | | |
| **Systolic BP** | | | |
| **Diastolic BP** | | | |
| **Head ache** | | | |
| **Body pain** | | | |
| **Giddiness/ Light headedness** | | | |
| **Fatigue** | | | |
| **Shortness of breath** | | | |
| **Nose bleeding** | | | |
| **Vertigo** | | | |
| **Other physical problems if present specify** | | | |

s

<div align="center">**RATING SCALE TO ASSESS THE LEVEL OF SATISFACTION**

**REGARDING ACUPRESSURE THERAPY**</div>

**Purpose**

   This rating scale is designed to assess the level of satisfaction of the study participants regarding Acupressure Therapy.

**Instruction**

   There are 10 items below. Kindly read the items. Response extends from highly satisfied to highly dissatisfy. Put a tick mark against your answers. Describe your responses freely and frankly. The responses will be kept confidential and used for research purpose only.

| S. No. | ITEMS | HIGHLY SATISFIED | SATISFIED | DIS SATISFIED | HIGHLY DISSATISFIED |
|---|---|---|---|---|---|
| 1. | Researcher's explanation regarding Acupressure Therapy | | | | |
| 2. | Approach of the Researcher towards you | | | | |
| 3. | Time spend by the Researcher for Acupressure therapy | | | | |
| 4. | Skill of the researcher in Acupressure therapy | | | | |
| 5. | Arrangements made During the Acupressure therapy | | | | |
| 6. | The Acupressure therapy was easy to undergo | | | | |
| 7. | Acupressure is given after checking pulse | | | | |
| 8. | It helps in relaxing. | | | | |
| 9. | Given at the appropriate time | | | | |
| 10. | It helps to reduce symptoms | | | | |

**Scoring**

| | | | |
|---|---|---|---|
| Highly satisfied | - 4 | Dissatisfied | - 2 |
| Satisfied | - 3 | highly dissatisfied | - 1 |

The total score is converted into percentage and graded as given below.

**Scoring key**

| Scoring | Interpretation |
|---|---|
| Highly satisfied | 76-100% |
| Satisfied | 51-75% |
| Dissatisfied | 25-50% |
| Highly dissatisfied | Below 25% |

**BLUE PRINT FOR LEVEL OF SATISFACTION ON ACUPRESSURE THERAPY**

| S.NO | CONTENT | ITEM NO | TOTAL | PERCENTAGE (%) |
|---|---|---|---|---|
| 1. | Researcher | 1, 2, 3. 4 | 4 | 40% |
| 2. | Acupressure Therapy | 5, 6, 7 | 3 | 30% |
| 3. | Effectiveness of the Acupressure therapy | 8, 9,10 | 3 | 30% |
| TOTAL | | | 10 | 100% |

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## CERTIFICATE OF PUBLICATION

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### V. Senbahavalli

published a paper entitled

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| Dr. Chidambaranathan | drchidambaranathan_n@apollohospitals.com 4428290580 | Consultant Radiologist | Apollo Hospitals, Chennai, Tamil Nadu |

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| V. Senbahavalli | shenvino2004@yahoo.co.in 9840683210 | Other | Apollo College of Nursing, Chennai, Tamil Nadu |
| Dr. Chidambaranathan | drchidambaranathan_n@apollohospitals.com 4428290580 | Consultant Radiologist | Apollo Hospitals, Chennai, Tamil Nadu |

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1. **Details of Remittance**

   a) Name of the Bank/ Branch.                :    (enclosed)

   b) Amount Remitted.

   c) Demand Draft/Chelan No.

   d) Date of Issue /remittance.

2. Name of the Candidate                       :    Mrs. V. Senbahavalli

3. Date of Birth & Age                         :    07/09/1982, 36 yrs

4. Place of Birth                              :    Nagarkovil

5. Name of Occupation of father / guardian     :    Mr. B. Anand, Production Supervisor, MRF
6. Nationality                                 :    Indian

7. Religion                                    :    Hindu

8. Designation of the Candidate                :    Associate Professor

9. Office Address with Tel. No./Fax No

   E-mail ID                                   :    Apollo College of Nursing,
                                                    Vanagaram to Ambattur Main Road,
                                                    Ayanambakam, Chennai- 600 095
                                                    044- 26534387, 044-265343,
                                                    shenvino2004@yahoo.co.in

10. Address for Communication
    With Telephone No /Fax No /E mail ID        :    Apollo College of Nursing,
                                                    Vanagaram to Ambattur Main Road,
                                                    Ayanambakam, Chennai- 600 095
                                                    044- 26534387, 044-265343,
                                                    shenvino2004@yahoo.co.in

11. a) Name of the University                   :    The TamilNadu Dr. M.G.R. Medical University

    b) Register Number                          :    141420516

    c) Month and Year of Passing of the
    qualifying examination as mentioned
    in No.3 of Ph.D Regulations.                :    April 2009

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| | | | |
|---|---|---|---|
| 12. | Date, Month &Year of the Convocation at which the qualifying Degree was taken | : | 2010 |
| 13. | The Examination passed is from any other University, state the number and date of the communication recognizing the Degree [Enclose certified Xerox Copies] | | |
| 14. | The month and year in which the candidate was provisionally registered [Enclose certified Xerox copies of confirmation of Provisional Registration. | : | June 2015 |
| 15. | Name of the Guide. | : | Dr. Chidambaranathan, M.B.B.S., M.D., D.M.R.D., Ph.D. |
| 16. | Name of the Department / Institution where the Research Work was done. Mention may be made about additional places of the Research work if any | : | Medical Surgical Nursing, Apollo College of Nursing. |
| 17. | Title of the Thesis in Block Letters. | : | |

**AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF ACUPRESSURE UPON BLOOD PRESSURE AMONG HYPERTENSIVE CLIENTS AT SELECTED WARDS OF THIRUVALLURDISTRICT**

| | | | |
|---|---|---|---|
| 18. | Signature of the Candidate | : | *J. Shubahavalli* |
| 19. | Signature of the Guide with Designation | : | |

DR.N.CHIDAMBARANATHAN
MD, Ph.D, DNB, DMRD, FICR, MAMS,
Head of the Department
Dept. of Radiology & Imaging Sciences
Apollo Hospitals, Chennai-600 006.
Reg. No: 36123

aa

20.   Signature of the Head of the Department where the   :
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VANAGARAM TO AMBATTUR MAIN ROAD,
AYANAMBAKKAM, CHENNAI - 600 095.

21.   Signature of the Head of the Institution where the   :
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b) Amount Remitted.                          30,500/-

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   2)        Name of the Candidate               : V. Senbahavalli

   3)        Date of Birth & Age                 : 7-09-1982

   4)        Place of Birth                      : Nagarkovil

   5)        Name and Occupation of father / guardian    : Mr. B. Anand, Supervisor, MRF

   6)        Nationality                         : Indian

   7)        Religion                            : Hindu

   8)        Designation of the Candidate          : Associate Professor

   9)        Office Address with Tel. No./Fax No./E-mail I.D.    :Apollo College of Nursing, Chennai.

                                                      apollocollegeofnursing@gmail.com

   10)      Address for Communication with         : Apollo College of Nursing, Chennai.

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   11)      Name of the University, Register Number    : TN Dr.MGR Medical University

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   12)      Date, Month & Year of the Convocation at

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   13)      The Examination passed is from any other University,

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           provisionally registered

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           about the additional places of the Research Work

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23) Signature of the Guide with Designation :

24) Signature of the Head of the Department :
where the candidate conducted the
Research Work.

25) Signature of the Head of the Institution
where the candidate is working :

26) Station with Date :

dd

ee

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| sample no | age | age group | gender | education | occupation | income | marital | religion | height | weight | BMI 1 | BMI | NV | diet m | smoking | alcoholism | activity | walking | sleep | duration | family | comorbidity | anti hypertensive | compliance | side effect | complication | eg1 | sys 1 | eg2 | sys 2 | eg3 | sys 3 | EDG1 | ED1 | EDG2 | ED2 | EDG3 | ED3 | headache | bodypain | giddiness | fatigue | shortness of breath | nose bleeding | vertigo | others |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 45 | 2 | 1 | 2 | 5 | 2 | 1 | 1 | 157 | 49 | 2 | 20 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 140 | 1 | 120 | 1 | 120 | 2 | 60 | 2 | 70 | 2 | 60 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
| 2 | 58 | 3 | 1 | 2 | 2 | 5 | 2 | 1 | 159 | 59 | 2 | 23 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 3 | 150 | 1 | 120 | 2 | 130 | 2 | 70 | 2 | 60 | 2 | 70 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 3 | 39 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 157 | 47 | 2 | 24 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 120 | 2 | 60 | 2 | 60 | 2 | 60 | 2 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 4 | 47 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 158 | 47 | 2 | 19 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 140 | 2 | 140 | 2 | 130 | 2 | 70 | 2 | 80 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 5 | 49 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 150 | 41 | 1 | 16 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 100 | 2 | 70 | 2 | 60 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 6 | 44 | 2 | 2 | 3 | 5 | 3 | 2 | 2 | 151 | 48 | 2 | 21 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 140 | 1 | 100 | 1 | 110 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 7 | 48 | 2 | 1 | 4 | 5 | 2 | 1 | 1 | 160 | 57 | 2 | 22 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 110 | 3 | 90 | 2 | 60 | 3 | 90 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 8 | 59 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 163 | 55 | 2 | 21 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 60 | 2 | 60 | 2 | 60 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 9 | 56 | 3 | 2 | 1 | 1 | 2 | 1 | 2 | 159 | 50 | 2 | 21 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 100 | 1 | 100 | 1 | 110 | 2 | 80 | 2 | 60 | 2 | 80 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 10 | 55 | 3 | 1 | 2 | 1 | 2 | 1 | 1 | 153 | 48 | 2 | 21 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 1 | 120 | 1 | 120 | 2 | 80 | 2 | 70 | 2 | 80 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 11 | 54 | 3 | 1 | 2 | 3 | 1 | 1 | 1 | 169 | 49 | 1 | 16 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 120 | 1 | 120 | 1 | 110 | 2 | 60 | 2 | 80 | 2 | 60 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 12 | 55 | 3 | 4 | 3 | 1 | 2 | 1 | 1 | 152 | 69 | 4 | 30 | 1 | 1 | 1 | 1 | 4 | 2 | 4 | 4 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 50 | 2 | 60 | 1 | 50 | 3 | 2 | 1 | 1 | 1 | 0 | 0 | 0 |
| 13 | 59 | 3 | 2 | 1 | 3 | 1 | 1 | 2 | 159 | 44 | 1 | 17 | 2 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 110 | 1 | 110 | 1 | 110 | 2 | 70 | 2 | 60 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 14 | 46 | 2 | 1 | 1 | 3 | 1 | 1 | 1 | 169 | 71 | 2 | 24 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 1 | 110 | 1 | 110 | 2 | 70 | 2 | 70 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 15 | 59 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 167 | 63 | 2 | 22 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 110 | 2 | 80 | 2 | 70 | 2 | 80 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 16 | 40 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 160 | 73 | 3 | 29 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 110 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 17 | 48 | 2 | 1 | 2 | 5 | 1 | 1 | 1 | 163 | 59 | 2 | 22 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 140 | 2 | 140 | 2 | 130 | 2 | 80 | 1 | 50 | 2 | 80 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 18 | 50 | 2 | 1 | 2 | 5 | 2 | 2 | 1 | 152 | 42 | 2 | 18 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 130 | 1 | 100 | 1 | 110 | 2 | 60 | 2 | 60 | 2 | 60 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 19 | 45 | 2 | 1 | 3 | 5 | 2 | 2 | 1 | 152 | 43 | 2 | 19 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 110 | 3 | 90 | 2 | 60 | 3 | 90 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 20 | 49 | 2 | 1 | 2 | 5 | 2 | 2 | 1 | 158 | 79 | 4 | 32 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 130 | 1 | 110 | 1 | 110 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 21 | 54 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 160 | 46 | 2 | 18 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 110 | 1 | 110 | 1 | 120 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 22 | 58 | 3 | 2 | 2 | 5 | 1 | 1 | 2 | 159 | 44 | 1 | 17 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 130 | 2 | 130 | 1 | 120 | 2 | 70 | 2 | 60 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 23 | 57 | 3 | 2 | 4 | 4 | 3 | 1 | 2 | 158 | 51 | 2 | 20 | 2 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 140 | 2 | 130 | 1 | 120 | 2 | 70 | 2 | 70 | 2 | 70 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 24 | 57 | 3 | 2 | 2 | 5 | 3 | 1 | 2 | 161 | 49 | 2 | 19 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 140 | 2 | 140 | 2 | 130 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 25 | 58 | 3 | 2 | 3 | 1 | 3 | 1 | 2 | 168 | 49 | 1 | 17 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 100 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 26 | 45 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 167 | 53 | 2 | 19 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 2 | 130 | 1 | 110 | 2 | 80 | 2 | 60 | 2 | 80 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 27 | 58 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 158 | 46 | 1 | 17 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 140 | 2 | 130 | 1 | 110 | 2 | 70 | 1 | 50 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 28 | 39 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 160 | 44 | 2 | 20 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 140 | 2 | 130 | 1 | 120 | 2 | 70 | 2 | 60 | 2 | 70 | 2 | 2 | 1 | 2 | 2 | 0 | 0 | 0 |
| 29 | 47 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 167 | 54 | 2 | 20 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 1 | 100 | 1 | 110 | 2 | 70 | 2 | 60 | 2 | 70 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | 59 | 3 | 2 | 3 | 1 | 1 | 2 | 2 | 149 | 47 | 2 | 21 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 100 | 1 | 100 | 1 | 110 | 2 | 60 | 2 | 80 | 2 | 60 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
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| 53 | 39 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 166 | 58 | 2 | 23 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 60 | 2 | 70 | 2 | 60 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
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| 74 | 57 | 3 | 2 | 4 | 5 | 1 | 2 | 2 | 156 | 45 | 2 | 18 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 140 | 1 | 100 | 1 | 110 | 2 | 70 | 2 | 60 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82 | 48 | 2 | 1 | 3 | 4 | 1 | 2 | 1 | 151 | 61 | 3 | 26 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 130 | 1 | 100 | 1 | 120 | 2 | 70 | 3 | 90 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
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| 90 | 59 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 160 | 40 | 1 | 15 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 120 | 2 | 60 | 2 | 60 | 2 | 60 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 91 | 40 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 152 | 39 | 1 | 16 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 90 | 1 | 90 | 1 | 110 | 2 | 70 | 1 | 50 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 92 | 48 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 158 | 56 | 2 | 22 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 110 | 2 | 70 | 2 | 70 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 93 | 50 | 2 | 1 | 2 | 5 | 2 | 1 | 1 | 155 | 66 | 3 | 27 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 2 | 130 | 1 | 110 | 2 | 70 | 3 | 90 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
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| 95 | 49 | 2 | 1 | 2 | 5 | 1 | 1 | 1 | 157 | 64 | 3 | 26 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 110 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
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| 98 | 57 | 3 | 2 | 1 | 2 | 2 | 1 | 2 | 147 | 33 | 1 | 15 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 100 | 1 | 100 | 1 | 110 | 2 | 70 | 2 | 60 | 2 | 70 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
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| 100 | 58 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 156 | 74 | 4 | 30 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 110 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
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| 103 | 39 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 152 | 40 | 1 | 17 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 2 | 130 | 1 | 120 | 2 | 70 | 2 | 60 | 2 | 70 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
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| sample no | age | age group | gender | education | occupation | income | marietal | religion | height | weight | BMI | NV | diet m | smoking | alcoholism | activity | walking | sleep | duration | family | comorbidity | anti hypertensive | compliance | side effect | cg1 | sys 1 | cg2 | sys 2 | cg3 | sys 3 | systolic G | CDG1 | CD1 | CDG2 | CD2 | CDG3 | CD3 | headache | bodypain | giddiness | fatigue | shortness of breath | nose bleeding | vertigo | others |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 49 | 2 | 2 | 3 | 5 | 3 | 1 | 1 | 167 | 69 | 25 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 140 | 2 | 140 | 2 | 140 | 2 | 2 | 60 | 2 | 60 | 2 | 60 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
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| 8 | 55 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 161 | 40 | 15 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 130 | 2 | 130 | 2 | 130 | 1 | 2 | 60 | 2 | 60 | 2 | 60 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 9 | 59 | 3 | 1 | 1 | 3 | 1 | 3 | 1 | 180 | 73 | 23 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 10 | 46 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 155 | 64 | 27 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 4 | 2 | 2 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 2 | 60 | 2 | 60 | 2 | 60 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
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| 16 | 49 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 161 | 63 | 25 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
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| 20 | 57 | 3 | 2 | 3 | 1 | 3 | 1 | 1 | 169 | 69 | 24 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 2 | 60 | 2 | 60 | 2 | 60 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
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| 22 | 39 | 1 | 1 | 2 | 5 | 2 | 1 | 1 | 140 | 31 | 16 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 60 | 2 | 60 | 2 | 60 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 59 | 3 | 2 | 3 | 5 | 3 | 1 | 2 | 151 | 52 | 22 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 60 | 2 | 60 | 2 | 60 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
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| 56 | 55 | 3 | 1 | 2 | 1 | 2 | 1 | 2 | 154 | 60 | 25 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 | 46 | 2 | 1 | 4 | 3 | 1 | 3 | 1 | 161 | 68 | 26 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 59 | 59 | 3 | 2 | 1 | 3 | 1 | 2 | 1 | 156 | 44 | 18 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 3 | 90 | 3 | 90 | 3 | 90 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
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| 74 | 57 | 3 | 1 | 2 | 2 | 5 | 1 | 1 | 148 | 61 | 28 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
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| 78 | 47 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 150 | 50 | 20 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 2 | 130 | 2 | 130 | 2 | 1 | 50 | 1 | 50 | 1 | 50 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 79 | 49 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 148 | 37 | 17 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
| 80 | 44 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 159 | 56 | 22 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 81 | 48 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | 155 | 43 | 18 | 2 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 82 | 59 | 3 | 1 | 4 | 3 | 1 | 2 | 1 | 159 | 51 | 20 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 83 | 56 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 160 | 56 | 23 | 2 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 84 | 55 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 153 | 75 | 32 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | 150 | 3 | 150 | 3 | 150 | 3 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 85 | 54 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 153 | 40 | 17 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 3 | 90 | 3 | 90 | 3 | 90 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 86 | 55 | 3 | 1 | 1 | 1 | 2 | 1 | 2 | 150 | 50 | 26 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 130 | 2 | 130 | 2 | 130 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 87 | 59 | 3 | 1 | 2 | 5 | 1 | 1 | 2 | 151 | 46 | 17 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 140 | 2 | 140 | 2 | 140 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 88 | 46 | 2 | 1 | 2 | 5 | 2 | 1 | 1 | 158 | 58 | 23 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 1 | 50 | 1 | 50 | 1 | 50 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |

| 89 | 59 | 3 | 1 | 3 | 5 | 2 | 2 | 1 | 181 | 70 | 21 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 140 | 2 | 140 | 2 | 140 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90 | 40 | 1 | 1 | 2 | 5 | 2 | 1 | 2 | 149 | 40 | 18 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 91 | 48 | 2 | 2 | 3 | 1 | 2 | 1 | 2 | 173 | 54 | 18 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 90 | 1 | 90 | 1 | 90 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 92 | 50 | 2 | 2 | 2 | 5 | 1 | 1 | 1 | 163 | 75 | 32 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 93 | 45 | 2 | 2 | 4 | 4 | 3 | 2 | 2 | 154 | 92 | 38 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 94 | 49 | 2 | 2 | 2 | 5 | 3 | 2 | 2 | 158 | 61 | 24 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 95 | 54 | 3 | 2 | 3 | 1 | 3 | 1 | 2 | 168 | 80 | 28 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 96 | 49 | 2 | 1 | 1 | 1 | 3 | 1 | 2 | 152 | 48 | 20 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
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| 98 | 58 | 3 | 1 | 2 | 2 | 5 | 1 | 1 | 150 | 59 | 26 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
| 99 | 57 | 3 | 1 | 2 | 2 | 1 | 4 | 1 | 158 | 42 | 16 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 100 | 57 | 3 | 2 | 3 | 5 | 3 | 2 | 1 | 140 | 39 | 20 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 101 | 58 | 3 | 1 | 4 | 5 | 2 | 1 | 2 | 137 | 34 | 18 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 130 | 2 | 130 | 2 | 130 | 2 | 3 | 90 | 3 | 90 | 3 | 90 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 102 | 39 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 160 | 65 | 25 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 150 | 3 | 150 | 3 | 150 | 3 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
| 103 | 47 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 144 | 33 | 12 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 2 | 2 | 0 | 0 | 0 |
| 104 | 49 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 167 | 57 | 21 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 140 | 2 | 140 | 2 | 140 | 2 | 3 | 90 | 3 | 90 | 3 | 90 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 105 | 44 | 2 | 1 | 2 | 3 | 1 | 1 | 1 | 163 | 73 | 27 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 140 | 2 | 140 | 2 | 140 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 106 | 48 | 2 | 1 | 4 | 3 | 1 | 1 | 2 | 148 | 40 | 18 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |
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| 108 | 56 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 154 | 60 | 17 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 120 | 1 | 120 | 1 | 120 | 2 | 2 | 80 | 2 | 80 | 2 | 80 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| 109 | 55 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 168 | 46 | 17 | 2 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 100 | 1 | 100 | 1 | 100 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |
| 110 | 54 | 3 | 1 | 1 | 1 | 2 | 1 | 2 | 160 | 44 | 17 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 110 | 1 | 110 | 1 | 110 | 2 | 2 | 70 | 2 | 70 | 2 | 70 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 |