"ASSESS THE EFFECTIVENESS OF BEETROOT JUICE IN REDUCING HYPERTENSION AMONG WOMEN AT SELECTED URBAN AREA IN CHOOLAI, CHENNAI"

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CERTIFICATE

This is to certify that this dissertation titled, **"ASSESS THE EFFECTIVENESS OF BEETROOT JUICE IN REDUCING HYPERTENSION AMONG WOMEN AT SELECTED URBAN AREA IN CHOOLAI, CHENNAI"** is a bonafide work done by **Ms.S.THANKA LEELAL ,** M.Sc(N)II year , College of Nursing, Madras Medical College Chennai-03, submitted to **The TamilNaduDr.MGR Medical University**, Chennai-32, in partial fulfillment of the award for the degree of **Master of Science in Nursing, Branch-IV, Community Health Nursing** under our guidance and supervision during the academic period from **2013-2015.**

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ABSTRACT

The prevalence of Hypertension is a silent killer disease, is rapidly increasing all over the world at an alarming rate over the recent years. Hypertension affects the majority of population worldwide. The increase incidence of Hypertension in developing countries follows the life style changes, low socio economics, dietary habits, etc. The consumption of beetroot juice is an influencing factor in reducing blood pressure among hypertensive patients. This study was done to identify the effectiveness of beetroot juice in reducing blood pressure among hypertensive women residing at selected urban areas of Choolai, Chennai. The main objective of the study was to compare the pre and post blood pressure level in relation to intake of beetroot juice among clients in both experimental and control group. An experimental study with pre test, post test research design was used and a sample of 60 hypertensive women (30 in experimental and 30 in control group) were selected by using simple random sampling technique. 200 ml of beetroot juice was given to the clients in experimental group after breakfast daily for 14 days. The conceptual frame work was based on modified model context input process and product evaluation model helping Art of clinical nursing theory. The tool used for the study includes questionnaires and observation method using sphygmomanometer monitor. The obtained data was analyzed by using descriptive and inferential statistics. The findings of the study showed that there was a significant ($p \leq 0.05$) level with confidence interval of 95% reduction in blood pressure level after administering beetroot juice in experimental group. The study reveals that greater significance of beetroot juice was observed in younger, less duration of illness when compared to others. Beetroot juice is cost effective, improves the general well being of the clients, prevents them from developing complications and reduces the dosage of drugs.

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LIST OF ABBREVIATIONS

S.NO	ABBREVIATIONS	EXPANSION
1	DF	Degrees of Freedom
2	SD	Standard Deviation
3	CI	Confidence Interval
4	Fig	Figure
5	H1 & H2	Research Hypothesis
6	M.Sc (N)	Master of Science in Nursing
7	χ^2	Chi square test
8	No	Number
9	SBP	Systolic Blood Pressure
10	DBP	Diastolic Blood Pressure
11	CIPP	Context Input Process and Product

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Chapter 1

Introduction

"Our greatest happiness does not depend on the
Condition of life in which
Chance that has placed us:
But is always the result of a good conscience,
Good health, occupation and freedom
In all just pursuits"

- Mahatma Gandhi

We have the strong mind to be healthy in body, mind and spirit, but some circumstances in life leads to the incidence of some incredible diseases. Hypertension is the major hill point in that aspects. Hypertension (HTN) or high pressure is a chronic cardiac medical condition in which the systemic arterial Blood Pressure is elevated.

Blood pressure is the force of blood pumped from your heart into the vessels known as arteries which delivers blood throughout your body. Each time your heart beats, blood is forced along the wall of the arteries and the impact is measured in millimeters of mercury (mmHg). This process is known as systole. When the heart rests between beats, blood pressure decreases, a process known as diastole. Normal blood pressure is a systolic pressure less than 120 mmHg and a diastolic pressure less than 80 mmHg and is expressed as 120/80 mmHg.

Hypertension is defined by the National Heart Lung and Blood Institutes (NHLBI) as a blood pressure greater than 139/89 mmHg. Individuals with a pressure between 120/80 mmHg and 139/89 mmHg are considered "*pre-hypertensive*" and are likely to develop hypertension in the future. Today, hypertension is a disease which is listed as a primary or contributing cause of

death for more than 270,000 Americans annually. According to the Centers for Disease Control and Prevention, over 40 percent of the entire African-American population has high blood pressure. The most alarming news overall is that many people are unaware they have hypertension. This disease which can lead to stroke, heart attacks, heart failure and kidney disease is often termed the "silent killer", because the disease is usually present without symptoms.

Hypertension is fast emerging as a modern epidemic in the world. Developed countries are considering it as a leading cause of death but even developing countries do not lag behind in being affected by it. In early stages of blood pressure, there are no symptoms. Many who are afflicted feel no discomfort until a medical crisis- a heart attack, the rupture of a blood vessel in the brain or a stroke-strikes. Therefore, high blood pressure is often called the "Silent Killer". Over the past, several decades extensive research, wide spread patient education and a concerned effort on the part of the health care professionals have led to decreased mortality and morbidity rates from the multiple organ damage arising of years of untreated hypertension.

In India, the prevalence of hypertension is reported to be increasing rapidly in the urban areas and the same trend is spreading gradually to rural areas. It is estimated that there were about 66 million hypertensives in India (32 million rural and 34 million urban). Lack of knowledge about the morbidity, complications and the method of control of hypertension contributes to a large percentage of undetected and untreated hypertensive subjects in the community. Therefore health care professionals must not only identify and treat patients with hypertension but also promote a healthy lifestyle and preventive strategies to decrease prevalence of hypertension in the general population.

The people with hypertension are taking many modes of health measures to control the disease process once they get some noticed changes, like anti-

hypertensive drugs as prescribed by the physician, exercises and salt restricted diet. Dietary and home management remains the key element in the control of Hypertension. So the management of the Hypertension should take place by the people themselves in their home environment with the available resources at their easiest manner which can reduce the risk of cardio vascular diseases.

Risk factors for hypertension are majorly divided into two classifications. First one is non modifying risk factors and second one is modifying risk factors non modifying risk factors are age, sex genetic factors and ethinicity. Modifying risk factors are density, increased salt intake, increasing cholesterol , decreasing factor intake, and decreasing physical activity, higher level blood pressure is low socio-economic groups. Other factors includes noise, vibration, temperature and humidity. Majority of risk factors are prevented by healthy life style factors.

Hypertension factors are mostly the life style factors, such as obesity, lack of exercise diet, stress, the use of certain medication, smoking, excessive alcohol intake, excessive weight and even modest adult weight gain substantially increase the rest of hyper tension. Weight loss reduces the risk for hyper tension.

"Since a long time, extra salt intake has been considered to cause hypertension. The hypertension prevalence was higher(28.99%) in participants following additional dietary salt intake compared to those who gave negative history of additional dietary salt consumption 36 times higher risk was found in study subjects with additional salt intake as compared with non additional salt consumers.

WHO classified hypertension according to level of blood pressure, if the systolic and diastolic blood pressure is less than 130/85 mm/hg is normal and if blood pressure in between 130-140/85-90 mm/hg is high normal, and between 141-159/91-99 mm/hg is mild hyper tension between 160-179/100-109 mm/hg is moderate hyper tension, above 180/110 mm/hg severe hyper tension.

There are two types of hypertension, including primary and secondary hypertension. Primary hyper tension occurs in 90% of population, most frequent is elderly between 25-55 years, commonly due to age, sex obesity, alcohol consumption, oral contraceptive users and drugs.

In the remaining 10 percent of all cases, high blood pressure is attributed to kidney disease, a hormonal imbalance , a narrowing of the artery to a kidney, a tumour of one of the adrenal glands or some other anatomic or physiologic abnormality. These cases are called " secondary hypertension", and usually disappear when the problem is controlled (WHO, 2009).

Management of hyper tension include and pharmacological and non pharmacological. In pharmacological management drugs used such as diuretics or "water pills" (thiazide, hydroclorathyazide, cholorathalidane and indapamide) increase the elimination of salt and water through urination. Thereby lessening blood volume and pressure , beta – blockers , (such as propanalol , atenolol, nadolol , pindolol and labetalol, lower blood pressure by reducing the amount of blood pumped by the heart, angiotension converting enzyme(ace) inhibitions (captopril, enalapril, and lisinopril lower blood pressure by blocking the production of a hormone known as angiotension, which increases blood pressure, calcium. Channel blockers (nifedipine , nicardipine , verapamil and diltiazem) relax the smooth muscle of the peripheral articles, which causes them to dilate and so reduce the resistance to blood flow.

Lifestyle modifications that effectively lower blood pressure are increased physical activity, weight loss, limited alcohol consumption, reduced sodium intake and the dietary approaches to stop hypertension . Lifestyle modification is recommended as initial therapy is stage1 hypertension before initation of drug therapy and as an adjunct to meditation in persons already on drug therapy. In

prehypertensives, it can reduce the incidence of hypertension and lower end-organ (Surya Prakash Bhatt, Luqman- Arafath and Randeep Guleria 2007).

Dietary approach to sleep hypertension (DASH) now recommended as an important nutrients and fiber but also includes foods that contain two half times the amounts of electrolytes potassium, calcium and magnesium. The foods high in nitrates other than beetroot are lettuce, spinach, cabbage, carrots and radishes, persevered fish, meat, poultry, so it is advisable to reduce the fatty acids in the diet and supplement it which fruits and vegetables which are essential for a healthy living and strong immune system.

Beet root is a vegetable, having so many nutrients. It also contains small amounts of vitamin B1, B2, B3 and vitamin A in the form of beta carotene, vitamin c and folic acid, minerals such as rich calcium, magnesium, phosphorus, potassium, and sodium. Also, smaller amount of iron, zinc, copper, manganese and selenium are present. Raw beets mostly contain water and carbohydrate. They also contain small amount of all the amino acids.

Beet root contains 35 calories as in 100 grams its carotenoids and flavanoids can help reduce the oxidation of low-density lipoprotein cholesterol which could lead to damaged artery walls and ultimately heart attacks and strokes. The deep red colour of beet root comes from betacyamin this prevents from colon from cancer the rice stock of silica in it does perfect utilization of calcium in the body and is also required for healthy skin, hair , nails and bones.

The WHO has recommended that two types of approaches in the prevention of hypertension that is primary prevention and secondary prevention primary prevention includes population strategy and high risk strategy.

Population strategy is directed at the whole population irrespective if individual risk level. This involves multi factorial approach based on the non

pharmacological intervention including nutrition (salt intake 5 gm per day moderate fat intake avoid alcohol) weight reduction of stress and smoking in valve yoga and meditation) self care.

NEED FOR STUDY:

Recent data of World Health Organisation suggest that individuals who are normotensive at age 55 years have a 90% lifetime risk of developing hypertension. The relationship between blood pressure and risk of cerebrovascular disease events is continuous, consistent and independent of other risk factors. The higher the blood pressure, the greater the chance of myocardial infarction, heart failure, stroke and kidney diseases. For individuals aged 40-70 years, each increment of 20 mm Hg in systolic blood pressure or 10 mm Hg in diastolic blood pressure doubles the risk of cardiovascular diseases. These alarming data support a need for greater emphasis on public awareness of the problem of high blood pressure and for an aggressive approach to anti hypertensive treatment.

The World Health Organization (WHO) has estimated that about 62% of cerebrovascular disease and 49% of ischemic heart disease burden worldwide are attributable to suboptimal blood pressure levels (systolic blood pressure, SBP > 115 mm Hg), an observation consistent across groups defined by sex, age and ethnicity. High blood pressure is estimated to cause 7.1 million deaths annually accounting for 13% of all deaths globally. Overall 26.4% (972 million) of the adult world population was estimated to have hypertension in the year 2020, a figure that is projected to increase to 29.2% (1.56 billion) by the year 2025.

Oxford University (2009) established the worldwide prevalence for hypertension as one billion affected individuals and 7.1 million deaths per year. The prevalence of hypertension varies widely among populations in rural India. The rates are low as 3.4%. in economically developed countries, the prevalence of

hypertension is 20 to 50%. At the state level 79.8% above 35 years have developed hypertension.

In 2008 overall 26.4% of adult population had hypertension. 26.6% men and 26.1% women were projected to have this condition. By 2025, the adult population of 29.2% will have hypertension. The number of men with hypertension was predicted to increase to 20.0% an women up to 29.5% and overall 60% population.

As a report of Daily News at Hindu, at the state level 79.8% above 35 years of age have developed hypertension. In Tamil Nadu 65.4/1000 males, 47.8/1000 females were exposed to hypertension in urban areas and 22.8/1000 males and 17.3/1000 females in rural areas. In Chennai, total population affected by hypertension is 3,041,038. In that 1,528,308 males and 1,512,730 females are affected.In Choolai total population is 1,10586 in that females are 49,504. Hypertension affected population is 8718 (4177 males and 4541 females).

Dietary nitrate supplementation, a natural means of increasing bodily stores of the vascular protective molecular nitric oxide, has well established blood pressure lowering effects and considerable therapeutic potential for the prevention and treatment of hypertension and other cardio vascular diseases. the effectiveness of chronic dietary nitrate supplementation as a potential adjunctive cardiovascular destiffening therapy can be seen in older women and in men.

Health benefits of Beetroot and its juice

Reduces blood pressure:

Drinking beetroot juice creates perfusions, or blood flow to the brain. This is because beets contain a high concentration of nitrates which allows blood to flow freely in blood vessels.

Anaemia and low blood haemoglobin:

Beetroot juice can cure anaemia because of it is high in iron which means it is also good for pre menstrual symptoms.

Cancer:

Beets have also been found to increase the number of CD8 cells in the colon which are cancer destroying cells.

Aging:

The antioxidants, phytochemicals, vitamins and minerals make beets an excellent anti aging food.

Brain function:

Beetroot juice's benefits crossed right through the tricky blood brain and increased blood flow in key areas of the brain relating executive function.

Antioxidant:

It reduces the oxidation of LDL cholesterol. It contains folic acid which is essential for normal body growth.

Osteoporosis:

It reduces the risk of osteoporosis through its content of silica which helps body to utilize calcium.

This study was conducted with the objective of finding out the efficacy of beetroot juice intervention on Hypertension clients. In 21st century the attention is focused on alternative and complementary therapies. As a community health nurse I had a chance to visit both rural and urban areas at Chennai. The investigator during the home visit found that more number of hypertensive clients in Choolai.

Many journals and articles provide generalized statement on the benefits on beetroot juice in various disorders. Therefore the investigator is interested to create empirical evidence on the efficacy of beetroot juice intervention on hypertension clients.

STATEMENT OF PROBLEM:

"Assess the effectiveness of Beetroot Juice reducing hypertension among women residing at selected urban area Choolai, Chennai."

OBJECTIVES:

- To assess the level of blood pressure among hypertensive women before the intervention in control and experimental group.
- To assess the level of blood pressure among hypertensive women after intervention in control and experimental group.
- To find out the effectiveness of beetroot juice on reducing the blood pressure among the hypertensive women
- To find out the association between post assessment level of blood pressure with selected demographic variables

OPERATIONAL DEFINITIONS

BLOOD PRESSURE:

Blood pressure is the force exerted by the blood against the walls of the blood vessels and must be adequate to maintain tissue perfusion during activity and rest.

HYPERTENSION:

Hypertension is a systolic blood pressure greater than 140 mm of Hg and a diastolic pressure greater than 90 mm Hg, based on the average at two or more

correct blood pressure measurements taken during two or more contacts with a health care provider.

BEETROOT JUICE:

200 gms of beetroot mixed with 50 ml of pure water and add 1 teaspoon of sugar to prepare 200 ml of beetroot juice.

ASSESS:

It refers to the systematically and continuously collect, validate the information about hypertensive women.

EFFECTIVENESS:

It refers to evaluating the outcomes of beetroot juice in reducing blood pressure among the hypertensive women.

ASSUMPTIONS:

Beetroot juice may reduce the blood pressure. It is less costlier than pharmacological approach. It is easy to administer, no need of skilled persons to perform the procedure. When compared to pharmacological management, dietary approach has no complications.

HYPOTHESIS:

H1: There will be a significant difference in the blood pressure level among hypertensive women between the experimental and control group.

H2: There will be a significant difference between pre and post test mean blood pressure level among hypertensive women.

H3: There will be significant association between the mean difference in blood pressure level and selected demographic variables among hypertensive women in experimental group.

DELIMITATIONS:

- The study is delimited to a period of 4 weeks
- The study is delimited only to the area of urban women having raising blood pressure.
- The study is delimited within the Choolai premises.

CHAPTER –II

REVIEW OF LITERATURE

James (2004) stated that literature review provides the researcher with information concerning what has been done and what needs to be done. Review of literature is a systemic search of literature to gain information about a search topic.

Related of literature entails the systematic identification, reflection, critical analysis and reporting of existing information in relation to the problem of interest. The purpose of review of literature is to obtain comprehensive knowledge and is depth information about effectiveness of beetroot juice on hypertension.

This chapter deals with the information collected in relation to the present study through published material which provided the foundation to carry out this study.

The literature that was found and useful for this study is organized and presented in the following headings.

2.1 : REVIEW OF LITERATURE RELATED TO STUDIES

PART 1

Section A: : Studies related to hypertension

Section B:: Studies related to effects of beetroot juice on health

Section C:: Studies related to effects of beetroot juice on hypertension

PART 2 : Conceptual framework

PART I

Section A: Studies related to Hypertension.

Anghel et al, (2010) conducted a study on dyslipidemias, a risk factor of Hypertension in the country side. The main objective of the study was to evaluate the prevalence of dyslipidemias as a risk factor of Hypertension. Among 413 patients evaluated by the process of history taking, physical examination, an Electro cardiogram and biological findings. The results shown that 65.7% women and 50.29% men have Hypertension associated with dyslipidemias which poses a risk for cardio vascular diseases.

Bhardwaj et al., (2010) performed a study to assess the prevalence, awareness and control of Hypertension in rural communities of Himachal Pradesh. Population bases survey was done in 3 villages. They gave their results that prevalence of Hypertension was higher than the national average. Among the total 35.89% subjects (39.8% males and 33.15% females) only one – fifth of Hypertensive persons were aware of their disease and only fifth of these had their Blood pressure under control.

Leong KT,Krum.H et al., (2013) Resistant hypertension poses significant health concerns. There are strong demands for new safe therapeutics to control resistant hypertension, while addressing its common causes, specifically poor compliance to lifelong polypharmacy, lifestyle modification and physician inertia. The sympathetic nervous system plays a significant pathophysiological role in hypertension. Surgical sympathectomy for blood pressure reduction is an old but extremely efficacious therapeutic concept, since abandoned, with the dawn of safer contemporary pharmacology era.

Malinoc et al., (2013) Hypertension is a major global public health risk and significant precursor to cardiovascular disease, stroke, diabetes and maternal mortality. A possible strategy to reduce chronic disease in resource-poor areas is social intervention. Research into the possible relationship of social determinants and disease is needed to determine appropriate social

interventions. This study aims to determine the association between social capital and hypertension in rural Haitian women. From June to August 2005, 306 women, ages 18-49, who attended one of Hospital Albert Schweitzer's five rural dispensaries as patients or accompanying patients, were interviewed.

Satou R. Gonzalez et al (2112) – Villabos RA The renin-angiotensin system (RAS) plays important roles in blood pressure control and tissue disease. An inappropriate local angiotensin II elevation in the kidneys leads to the development of hypertension, tissue damage and chronic injury. Studies have demonstrated that the JAK-STAT pathway mediates angiotensin II-triggered gene transcription. The JAK-STAT pathway in turn, acting as an amplifying system, contributes to further intrarenal RAS activation. These observations prompt the suggestion that the JAK-STAT pathway may be of importance in elucidating the mechanisms RAS-associated tissue injury.

Diaz KM, et al., (2013) as the world wide prevalence of hypertension continues to increase, the primary prevention of hypertension has become an important global public health initiative. Physical activity is commonly recommended as an important lifestyle modification that may aid in the prevention of hypertension. Recent epidemiologic evidence has demonstrated a consistent, temporal, and dose-dependent relationship between physical activity and the development of hypertension. Experimental evidence from interventional studies has further confirmed a relationship between physical activity and hypertension as the favourable effects of exercise on blood pressure reduction have been well characterized in recent years.

Thomas AJ et al.,(2013) Acute ischemia of the brainstem has been known to produce hypertension. After an initial review of central nervous system mechanisms contributing to systemic hypertension and the impact of the dorsal ventro lateral medulla (RVLM) on arterial pressure, the authors propose that essential hypertension involves neurochemical changes at the level

of the RVLM which are triggered by cerebral ischemia. Experimental and clinical data are presented to show that there is a link between ischemia of the brainstem and chronic hypertension.

Khan MI et al.,(2013) The metabolic syndrome is one of the most vibrant and widely prevailing health concerns worldwide. It is characterized by several metabolic abnormalities, which involve obesity, insulin resistance, dyslipidemia, enhanced oxidative stress; hypertension and increased pro-inflammatory state that ultimate contribute towards poor health. The prevalence of metabolic syndrome in Pakistan according to different definitions is reported to be from 18 % to 46 %. Fifty percent of Pakistani population is at high risk of metabolic syndrome as being hypertensive. In studying dyslipidemia in Pakistan, hypertriglyceridemia is found in 27-54 % of the population, whereas 68-81 % has low levels of high-density lipoprotein (HDL). Population likes to eat healthier diet without changing their fundamental dietary pattern.

Kulkarni et al., (2013) Disulfiram (DSF) is one of the recommended aids in the management of alcohol dependence. Hypertension may be a clinically significant, dose-dependent, and usually reversible adverse event of DSF therapy. We report 6 month prospective study of normotensive case of comorbid alcohol and tobacco dependence that developed reversible stage-II hypertension within 2-4 weeks of DSF therapy. We suggest that regular monitoring of blood pressure at least fortnightly for 1(st) 3 months, followed by monthly for next 3 months, and later once in 3 months, may possibly detect "silent" adverse event of DSF - hypertension.

Maizunova M et al., (2013) Reactive oxygen species (ROS) are products of normal cellular metabolism and derive from various sources in different cellular compartments. Oxidative stress resultant from imbalance between ROS generation and antioxidant defense mechanisms is important in pathogenesis of cardiovascular diseases, such as hypertension, heart failure, atherosclerosis, diabetes, and cardiac hypertrophy.

Bharucha NE and Kuruvilla.T. (2009) conducted about the hypertension in the Paris community about prevalence, awareness and compliance to treatment aged between 25-49 years. The results reported that the overall prevalence rates were 36.4% were unaware of their condition. The control rate was 13.6%. The study concluded that the awareness was very low among the Paris community and 19.5% risk for the ischemic heart diseases among the hypertensive population. The study insists mainly the need for the regular screening along with the educational programs to detect and optimally treat the hypertension and bring the life style modification.

SECTION B : EFFECTS OF BEETROOT JUICE ON HEALTH

Weitzberg(2008), performed the randomized double blind study to assess the effect of nitrate content in reducing blood pressure a total of 17 physically active healthy volunteers (15 men an d 2 women mean age, 24 years all non smokers, involved in this study. 3 day dietary supplementation with either sodium nitrate 0.1mmol/kg body weight were given to the participants. Subjects were involved in 2 different treatment periods during which the subjects received nitrate separated by a wash out period of at least 10 days. During treatment all subjects avoided food with a moderate –to high nitrate content. After nitrate supplementation mean arterial pressure were significant lower by an average of 3.7mm/hg($P<002$) and 3.2 mm hg ($p<003$) respectively the result shows plasma nitrate and nitrite levels were significantly higher after nitrate ingestion and it reduce the blood pressure level.

Amrita Ahluwalia (2008) conducted the study to asses effect of daily glass of beetroot juice can beat high blood pressure. A total of fourteen healthy volunteers was involved this study and administered 500 milliliters of beetroot juice with 30 minutes to all participants. This nitrite in the juice is converted in saliva by bacteria on the tongue into nitrite. After this nitrite-containing saliva is swallowed it is either converted into nitric acid or reenters the circulation as nitrite in the acidic environment of the stomach. Blood pressure was measured

every 15 minutes from one hour before taking the drink. Thereafter readings were taken every hour for six hours a final test was conducted 24 hours after that volunteers who drank the juice started to show. After two and a half hours their systolic rate lowers around 10 ml of mercury. For the diastolic reduction in blood pressure correlated with the appearance and peak levels of nitrite in the circulation.

Andrew Web, Nakul Patel, Stavros Loukaoge Orakis, Mike Okorie; Zainate Abound; Shivani Misraa and Rahim Rashid et al (2008) conducted a study to identify the acute blood pressure lowering, vasoprotective and antiplatelet properties of dietary nitrate via bio conversion to nitrite. In healthy volunteers approximately 3 hours after ingestion of a dietary nitrate load c beetroot juice (500 ml) blood pressure was substantially reduced(-10.4/8 mm hg); an effect that correlated with peck increases in plasma nitrite concentration . The dietary nitrate load also prevented endothelial dysfunction. Interruption of the entero salivary conversion of nitrate to nitrite (facilitated by bacterial anaerobes situated on the surface of the tongue prevented the rise in plasma nitrite , blocked the decrease in blood pressure and abolished the inhibitory effects an platelet aggregating confirming that these vasoprotective effects were attributable to the activity of nitrite converted from the ingested nitrate . The result showed the mean concentration of nitrate in the beetroot juice was 45.0+-2.6 mmd/l blood pressure study and 34.0+-0.1 mmol/l (2.11 g/l, spitting study), where as nitrite underlines the beneficial effects of a vegetable rich diet and highlights the potential of a natural low cost approach for the treatment of cardio vascular diseases.

TER-arkh (2007) conducted the study among the patients with arterial hypertension living in high mountains. The aim of the study was to estimate correlations of stable metabolites of nitric oxide nitrites and nitrates in blood components of hypertensive patients living in high mountains. 90 healthy subjects and 90 patients with hypertension of different severity and duration living in high mountains regimes near elbrus were selected for the study of the

age of participants varies from 37 to 78 years. The result suggested that all the hypertension patients had low concentrations of nitric oxide metabolic in plasma erythrocytes and blood aggravating with progress of hypertension and its duration.

Jennifer Warner (2006) reported that nitrates lower blood pressure. In this study examined the effects of short term nitrates supplementation in a group of 17 health non smoker adults. Each participant related between taking a daily use of nitrate supplement equivalent to the amount of normally found in 150 to 250 grams of a nitrate rich vegetables for 3 days. The result showed that average diastolic blood pressure was lower 3.7 mm/hg after the 3 days of nitrate supplementation.

Lung berg JO Feelish M Bihrne ,H Janson ea and Weitzberg et all. (2006) conducted study to identify effect of dietary nitrate and cardio products activity. A diet rich in fruits and vegetables is associated with a lower risk of certain form of cancer and cardiovascular disease. Recent epidemic logical studies suggest a cardio productive action afforded specifically by green leafy vegetables. In organic nitrate is converted into nitric oxide by bacteria in the anal cavity, secondary reaction products with vasodilating and tissue productive properties.

American Heart Association journal on hypertension(2011) has found that drinking beetroot juice causes blood nitrate levels to rise and thus reducing blood pressure within three hours of consumption. A reduction in blood pressure is beneficial for the avoidance of cardio vascular diseases and stroke. Study says nitrate rich foods may help in heart attack survival. The high nitrate concentration of beetroots may also act as a protective factor against heart attacks. The nitric oxide gas that is formed by nitrate rich foods opens arteries that have been clogged or closed. This has a protective function for the heart muscle as it reduces the amount of permanent damage through injury.

American Heart Association Journal hypertension, 2008).

Regular intake of beetroot juice prevents acne, dandruff, dry skin problems. Beetroot juice is beneficial in treating circulatory disorders such as hypertension heart trouble and arteriosclerosis. This juice is extremely effective in treating anemia because it has higher iron content and red blood cells one reactivated by this juice. Drinking fresh juice of beetroot mixed with 1 tesp of honey every morning on an empty stomach helps in curing gastric ulcer. Beetroot juice is effective in cancer prevention, and provide strengthens to the body. It restores the energy levels. It increases the resistance body against viruses.

One glass of beetroot juice daily can control high blood pressure effectively. Diabetics should avoid beetroot juice. Beetroot juice cleans the liver, kidneys and arteries. It gives strength to the bones it is one of the best natural means for beating high blood pressure. Beetroot juice can is very effective for constipation and it cleans the intestines. Beetroot juice is very effective in treating kidneys and gallbladder disorders. Beetroot juice mixed with lime prevents oxidative stress and heart related diseases. It also removes memory. Beetroot juice purifies the blood. It can cure eye fatigue and tiredness (Amritha Ahluwalea 2008).

Beetroot having nitrate this regulate control hypertension the nitrate in the beetroot juice is converted in saliva by bacteria one the tongue onto nitrite. This nitrite containing saliva is swallowed and is the acidic environment of the stomach is either converted into nitric oxide or re enters the circulation as nitrite. The peak time of reduction in blood pressure co related with the appearances and peak levels of nitrite in the circulation (Health and nutrition 2010).

Ghosh SM et al.(2013) conducted a randomized crossover study at William Harvey Research Institute where 30 people receive all of the treatments and are tested in a random order. The average age of participants

was 52.9 years and they were all considered to have grade 1 hypertension. Participants were randomly assigned to drink either 250 ml of beetroot juice, considered the experimental group, or 250 ml of water (containing a small amount of nitrate), which acted as the control group. Consumption of the relatively low dose of dietary nitrate caused a significant decrease in blood pressure (systolic and diastolic) compared with participants who drank water. Intake of beetroot juice has significant character in reducing the prevalence of iron deficiency in children.

SECTION C: EFFECTS OF BEETROOT JUICE ON HYPERTENSION

Dr. Leah Coles et al.,(2013) conducted a study in Londoners with hypertension. Their systolic pressure was between 140 and 159, while their diastolic pressure was between 90 and 99. These 15 volunteers were given a cup (250 ml) of beetroot juice to drink as a dietary source of nitrate. In the placebo arm, the beverage was low nitrate water. In patients with hypertension SBP$\geq$ 140 mm Hg at baseline, systolic blood pressure was on average p=0.03, lower in the beetroot juice group compared with control group over the 15 days treatment. He concluded that beetroot extract is lowering systolic blood pressure with treated hypertension.

David Proctor et al.(2013) conducted a experimental study on Acute vasoprotective effects of nitrate rich beetroot juice in Pennsylvania state with 8 healthy men aged 19-35 years and found that the nitrate that is present in the juice is converted into nitrite by the bacteria on the tongue and this nitrite mixes with the saliva in the mouth and travels down to the body. After the research, the mean systolic and diastolic blood pressure level was reduced than the baseline variable. Regression analysis revealed a significant association between blood pressure at the start of intervention and the level of blood pressure lowered. Systolic blood pressure R=0.057: P=0.03. Diastolic blood pressure: R=0.0315: P=0.02. The study concluded that beetroot juice at any

preparation is reducing blood pressure in individuals with uncontrolled hypertension.

Peter Weissberg et al.,(2013) did a study in London University with 15 people, they gave a drink of 250 ml (just over 8 ounces) of beetroot juice or water with a small amount of nitrate in it. The beetroot juice contained 0.2 g of dietary nitrate. During the 24 hour period that their blood pressure was monitored, the participants averaged a twenty point decrease in their diastolic blood pressure levels. The researchers concluded that little nitrate was producing large effect on blood pressure level.

Webb et al.,(2013) conducted a study and evaluated the effects of 0.5 L of beetroot juice (22.5 mmol of nitrate) on blood pressure, plasma nitrate concentrations and endothelial function. Systolic blood pressure dropped 10.4 mm Hg three hours after ingestion and diastolic blood pressure fell 8 mm Hg 2 ½ hours after ingestion. Plasma nitrite increased two fold after beetroot juice ingestion, reached a peak at three hours and correlated with the decrease in blood pressure. Researchers measured endothelial function by brachial artery flow – mediated vasodilation after ischemic occlusion of the forearm. Beetroot juice significantly prevented endothelial dysfunction induced by an acute ischemic insult in the forearm and attenuated ex vivo platelet aggregation. Thus the conclusion was physiological effects of dietary nitrate are due to the production of nitrite from symbiotic anaerobic bacteria on the surface of the tongue rather than from the nitrate itself.

Larsen et al.(2013) conducted a study and showed that dietary nitrate supplementation increased the level of plasma nitrite and nitric oxide.(NO + O_2 => nitrite, nitrite + HbO_2 => nitrate). However, recent study has suggested the mechanism that nitrites can be recycled to generate bioactive nitric oxide. Based on these results, the authors speculated that nitric oxide can be derived from dietary nitrate supplementation and nitric oxide increased oxidative phosphorylation efficiency. After nitrate supplementation, ATP production was

improved during sub maximal exercise while oxygen consumption was reduced. Oxidative phosphorylation efficiency (P/O ratio) was higher by 19% following nitrate supplementation during sub maximal exercise (Nitrate: 1.62±0.07 vs Placebo: 1.36±0.06, p=0.02). authors concluded that oxidative phosphorylation efficiency was improved by oral intake of beetroot juice.

Kapil et al.,(2013) conducted a study and concluded that nitric oxide derived from inorganic nitrate reduces blood pressure and increases blood flow. This reduction in blood pressure is seen in both systolic and diastolic readings. They reported that oral inorganic nitrate caused an elevation of plasma nitrite which resulted in increased nitric oxide concentration. Since nitrite plays a role in human vasodilation this may explain which expands blood vessels to increase blood flow.

British Journal of Nutrition(2013) published in the title of "Beetroot Juice can lower blood pressure by Seven percent" by Elijah Wolfson at April 16,2013. A glass of beetroot juice a day keeps the doctors away. That's what you may start to hear in schools after researchers found that drinking one cup of beetroot juice every day can lead to a seven percent drop in blood pressure readings. A study was conducted at the American heart Association, looked at a small group of eight women and seven men at North America, all of whom had systolic pressure between 140 and 159 mm Hg. The participants were given either beetroot juice or water tested to ensure very low nitrate levels. All the men and women had their blood pressure monitored for 24 hours. Those drinking beetroot juice were able to cut their systolic pressure by 10 mm Hg. The conclusion was continuous intake of beetroot juice an ounce a day will reduce the hypertension and become normotensive.

Vanhatalo et al. (2013) investigated that the acute (2 ½ hours) and chronic (upto 15 days) effects of dietary nitrate supplementation on blood pressure and the physiological responses to moderate intensity. Beetroot juice significantly elevated plasma nitrite concentration throughout the 30 day test

period and this was accompanied by a marked reduction in systolic (40 mm Hg) and diastolic (10-20 mm Hg) blood pressure. These effects tended to be more pronounced after 15 days of dietary nitrate supplementation. He concluded that compared with placebo, the oxygen cost during moderate exercise was acutely reduced by 4% after 2 ½ hours and remained similarly lowered after twelfth and 30 days of continual beetroot juice ingestion.

George TW et al. (2013) conducted a study in UK with 30 population and has found more evidence that beetroot may help lower blood pressure. The findings come in a small study of 15 men and 15 women with high blood pressure published in the journal Hypertension. Early research involved giving very high doses of beetroot juice to healthy volunteers. Having found the juice helped lower blood pressure, they then pinpointed nitrate as the blood pressure lowering ingredient.

Elijah Wolfson, Bushnell (2013) conducted new study and published in the American Heart Association's Hypertension journal. In an earlier study conducted at Queen Mary University research team first observed that drinking beetroot juice lowered blood pressure in test subjects within 24 hours. Only a small amount of juice is needed – just 250 ml – to have this effect and that higher the blood pressure at the start of the study the greater the decrease caused by the nitrate. He concluded that the research is good news for people suffering from high blood pressure who want to use a natural approach to reduce their risk of cardiovascular disease.

Kim-Shapiro, Milsom AB (2013): the research was conducted by scientists at London's Queen Mary University on red beets, called beetroot juice in Britain. Beets have drawn attention from nutritional scientists in recent years because of their health benefits. Specifically beets have been found to be rich in betaine, a nutrient which reduces the blood concentration of homocycsteine, an amino acid linked to heart disease and stroke. They found

that nitrate presence in beetroot produce vasodilatation and produce marvelous result.

Bailey SJ, Winyard P, Vanhatalo A(2012) conducted a follow up study at Translational Science Centre researchers at Wake Forest University to determine the mechanisms by which beetroot juice lowered the oxygen cost of moderate intensity exercise and improved tolerance of high intensity exercise. 15 subjects consumed 0.5 L of beet (5.1 mmol of nitrate) or placebo (the black current cordial) for 15 days and completed a series of low and high intensity knee extensor exercises in the prone position on the last three days. Beetroot juice more than doubled plasma nitrite concentration and reduced the oxygen cost and rate of phosphocreatine breakdown during low and high intensity exercise. Beetroot juice greatly reduced the oxygen cost of moderate intensity knee extensor exercise by 25% and increased the time to exhaustion during high intensity knee extensor exercise by 25%.

Lundberg JO, Larsen FJ, Weitzberg E Fulford, Hobbs DA(2012) In a new study, researchers conducted two separate studies to evaluate the effects of beetroot juice on blood pressure. People with normal blood pressure levels were randomly assigned to drink 0 grams, 100 grams, 250 grams or 500 grams of beetroot juice; or to eat a control bread product containing no beetroot juice, a bread product containing 100 grams of red beetroot juice or a bread product containing white beetroot juice. Blood pressure was measured over 24 hours and nitrate levels in the urine were measured before treatment and again for 2 hours, 4 hours and 24 hours after treatment. The researchers found that consuming beetroot juice was significantly linked to reduced blood pressure over the 24-hour period. The authors noted that the reduction in blood pressure was almost dependent on the amount of beetroot juice consumed.

Prof Amrita Ahluwalia, Bruce King, Paul J Laurienti (2011) conducted a study on randomized controlled trial with free living adults at Queen Mary's University at UK about the consumption of beetroot juice on a

low nitrate diet may lower blood pressure and therefore reduce the risk of cardiovascular events. The aim of the study to investigate if consuming beetroot juice in addition to normal diet produces a measurable reduction in BP. 15 women and men participated in a double bind , randomized, placebo controlled, crossover study. Volunteers were randomized to receive 500 g of beetroot and apple juice or a placebo juice (PL). Volunteers had BP measured at baseline and at least hourly for 24 hours following juice consumption using an ambulatory blood pressure monitor(ABPM). Volunteers remained at the clinic for 1 hour before resuming normal non-strenuous daily activities. The identical procedure was repeated 2 weeks later with the drink (BJ or PL) not consumed on the first visit. Overall, there was a trend to lower systolic blood pressure at 6 h after drinking BJ relative to PL. Analysis in men only (n=13) after adjustment for baseline differences demonstrated a significant ($P<0.05$) reduction in SBP of 4-5 mm Hg at 6 h after drinking beetroot juice.

Lansley KE, Winyard PG, Fulford J(2011) conducted a study to determine the physiological effects of beetroot juice where due to high nitrate content. The subjects consumed 0.5 L of beetroot juice for 6 days. The nitrate rich beetroot juice significantly raised plasma nitrite concentration and decreased systolic blood pressure by 10% (12 mm Hg) compared with placebo. These results indicate that the positive physiological effects of beetroot juice ingestion on blood pressure and exercise performance are due to the high nitrate content rather than other compounds.

Winson, Ferguson, Scott Kohman (2010) conducted a correlation study on the effectiveness of uncooked beetroot's content and betaine, a nutrient which reduces the blood concentration of homosycsteine, an amino acid absorption compared with the synthetic iron content absorption. The study revealed that along with every iron rich food it is essential to take vitamin C for rapid absorption. Hence in beetroot vitamin C components are already present. Compared with synthetic nitrite content absorption (r=0.032), uncooked beetroot has natural source of iron and vitamin C has faster absorption (r=0.42).

So the absorption of betine and nitrite in beetroot is easier to get absorbed than the synthetic contents.

Robin W Dove, Janine M Fritz (2010) conducted an experimental study to assess the effectiveness of beetroot juice correction. In Indonesia 105 adults working in industrial area with increased hypertension were selected, aged from 30-60 years, experimental and control groups were allocated by random sampling method. Beetroot juice (100 ml) was given by oral up to 20 days. Blood pressure level was checked at pre and post intervention. There was significant improvement in the blood pressure level (79.72%) of the samples ($p<0.001$) than the control group ($p<0.05$). He concluded that the intake of beetroot juice has significant character in reducing the prevalence of systolic and diastolic blood pressure level.

David Weir. Wylie LJ (2010) conducted a study by balanced crossover design, with 10 healthy men study on dietary supplementation with beetroot juice(BJ), ingested 70, 140, or 280 ml concentrated BJ (containing 4.2,8.4 and 16.8 mmol NO_3 (-) respectively) or no supplement to establish the effects of BJ on resting plasma (NO_3 (-) and $NO_{2\ (-)}$) over 24 hours. However, 140 and 280 ml BJ reduced the steady state oxygen uptake during moderate – intensity exercise by 1.7% ($P=0.06$) and 3% ($P<0.05$), whereas time to task failure was extended by 14% and 12% (both $P<0.05$) respectively compared with placebo. These findings have important implications for the use of beetroot juice to enhance cardiovascular health and exercise performance in young adults.

Jeminar (2009) conducted an experimental study to assess the effectiveness of beetroot extract upon hypertension in Washington in which 105 adults were selected as samples by random sampling method and was blood pressure were measured from then before and after the intervention. Beetroot extract was given once in a day for 25 days. The result showed that 76% of adults were uncontrolled hypertensive before the treatment. There was significant reduction in the systolic and diastolic (82%) of the study population ($P=0.05$).

PART II

CONCEPTUAL FRAMEWORK

Conceptual framework is an organized phenomenon which deals with concepts that are assembled by virtue of their relevance to a common theme. Here, the conceptual framework was based on Modified Daniel L. Stufflebeam's Cipp (1966) which included context evaluation, input evaluation, process evaluation and product evaluation.

CONTEXT EVALUATION:

It includes the selected factors such as age, education, occupation, family history of hypertension, dietary habits, duration of illness, and exercise pattern. The setting was at the urban area, Choolai.

INPUT EVALUATION

It refers the resources used in the study process. In this study, input evaluation includes measuring pre-assessment bloodpressure level by Digital Blood Pressure Monitor, the selection of experimental and control group Hypertensive.

PROCESS EVALUATION

It specifies the evaluation of implementation process including the interaction between the client and the care giver. In this process, regular administration of beetroot juice 200 ml after the breakfast for 14 days. 200 ml of beetroot juice is prepared and served daily in the morning after food.

PRODUCT EVALUATION

This refers to the output as a result of the intervention. It includes measuring post test Blood pressure level for both groups after the intervention of 14 days.

FEEDBACK

It refers to the information sent backward from the product evaluation to the input evaluation in order to gain understanding and modify or accept the strategies.

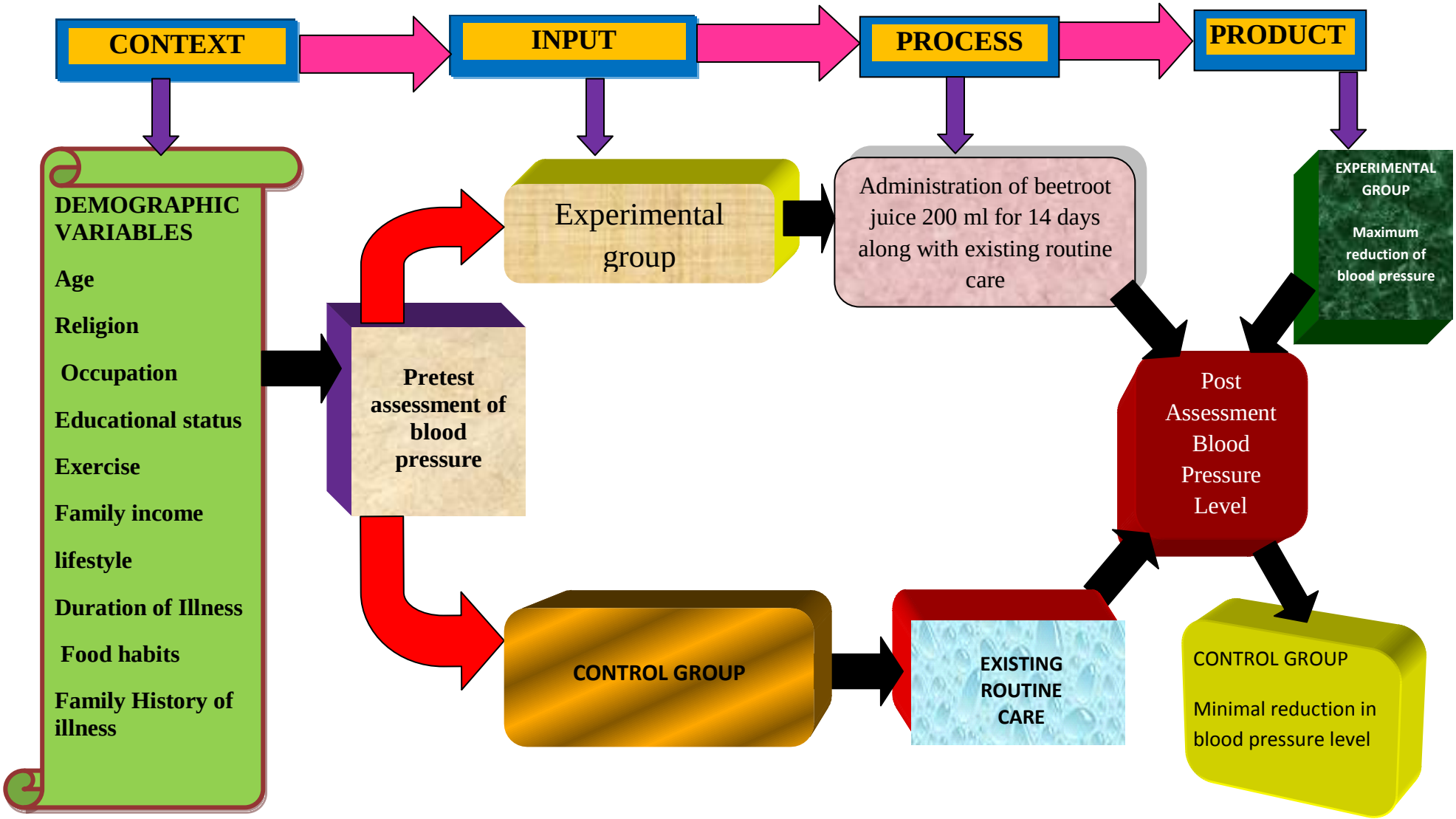


FIGURE 1. CONCEPTUAL FRAMEWORK BASED ON MODIFIED DANIEL L, STUFFLEBEAM'S EVALUATION CIPP MODEL (2003)

CHAPTER III

METHODOLOGY

Research methodology can be defined as, "Research designed to develop or refine methods of obtaining, organizing or analyzing data".

Denise P. Polit (2008)

This chapter includes research approach, research design, variables, setting, population, sample, sample size, sampling technique, developing the tool, content validity, pilot study, data collection procedure, plan for data analysis and ethical consideration.

The present study was done to assess the effectiveness of beetroot juice in reducing hypertension levels among the Hypertensive women at the Urban area, Choolai, Chennai.

3.1 RESEARCH APPROACH

A research approach guides the researcher in the nature of data to be collected and the method of analysis. To accomplish the objectives of the current study, quantitative research approach was considered as an appropriate approach by the investigator.

3.2 RESEARCH DESIGN:

The research design used in this study was true experimental design that helps to provide factual information about the existing phenomena.

Pre-test post test design.

RE O1 x O2

RC O3 -- O4

R → Randomization

E → Experimental Group

C → Control Group

X → Intervention

O → Observation

3.3 RESEARCH VARIABLE

Variables included in this study were:

Dependent variables: Blood pressure levels

Independent variables: Beetroot juice

Demographic variables: Age, Religion, Education, Occupation, Income, Duration of Illness, Dietary pattern, Obesity, Habits of non vegetarian food.

3.4 SETTING OF THE STUDY:

The selection of setting was done on the basis of the feasibility for conducting the study, availability of the sample, convenience to the investigator, geographical proximity and cooperation from the authority. The study was conducted in the Urban area Choolai. The area belongs to Chennai corporation. It is approximately 6km away from Madras Medical college, Chennai-3.the department of community Health Nursing, College of Nursing , Madras Medical College adopted Choolai to provide the curative and preventive care. These areas were selected for the study. This study was conducted in urban area (Choolai) which belongs to the North Zone of Chennai Corporation and it is very near to urban health post. It has four wards covering

total population of 56,744. Totally there are 16 streets in Choolai area. Among these 16 streets, 3 streets were selected by simple random technique, using to conduct the present study. College of Nursing provides comprehensive care to the population. The 3 streets which were selected to conduct the present study are Andiappan Street, Arimuthu Mesthri Street and KP park.

3.5 STUDY POPULATION

Population is the entire aggregation of cases that meet a designed set of criteria. In this present population is women who are having hypertension residing at Choolai. The total clients with hypertensive women from the selected streets in Choolai were 92.

3.6 SAMPLE

Sample refers to subjects of a population selected to participate in a research study. In this present study the sample consisted of 60 women who were having hypertension who fulfill the inclusion and exclusion criteria. Simple random sampling technique was adopted to select the subjects.

3.7 SAMPLE AND SAMPLE SIZE:

The study sample comprises of Hypertensive women with the Blood pressure above 140/90mmhg at the Urban area, Choolai. The experimental group 30 and control were selected from Andiappan street, Arimuthu mesthri street and KP park in Choolai.

3.8 SAMPLING TECHNIQUE

The sampling technique employed to recruit the samples for the study was simple random sampling. The researcher conducted the survey in the study area of Choolai to identify total hypertensive women with known hypertensive and on regular treatment with oral anti hypertensive drugs, duration of illness within 10 years and without any other diseases were collected with the total of 92 women, using simple random technique 60 samples were selected from the sampling frame based on the inclusion and exclusion criteria.

Table 1:Experimental and control group in Andiappan street, Arimuthu mesthri street and KP park

Name of the street	**Number of Hypertensive clients with blood pressure 140mmhg**	**Experimental group**	**Control group**
Andiappan Street	23	8	8
Arimuthu mesthri Street	37	13	13
KP park	32	9	9
TOTAL	92	30	30

3.9 CRITERIA FOR SAMPLE SELECTION

Inclusion Criteria:

- Women who are willing to provide informed concern
- Women who are willing to participate in the study
- Women who are in the age group of 30-60 years

- Women who are having hypertension above 140/90 mm Hg residing at the urban area, Choolai
- Women who are able to understand English and Tamil
- Women on treatment for hypertension

Exclusion Criteria:

- Hypertensive women whose blood pressure is above 180/110 mm Hg
- Hypertensive women with the history of diabetes mellitus
- Women with complication related to hypertension like myocardial infarction, Angina etc.,
- Hypertensive women who are not willing to participate in the study

3.10 DEVELOPMENT AND DESCRIPTION OF THE TOOL:

The development of the tool was developed based on the objectives of the study, review of literature and the opinion from the experts and it helped the investigator in the development of the tool.

Section A: Demographic data of the Hypertensive women which included the age, educational status, occupation, income, family history of hypertension, dietary habits, duration of illness, obesity, habit of non vegetarian food, other diseases and history of practicing exercise.

Section B: Observation schedule includes pre assessment of blood pressure level of both experimental and control group and there after post interventional assessment of blood pressure on the 15^{th} day for both the group.

BLOOD PRESSURE ASSESSMENT:

The investigator has to assess and record blood pressure level before and after administration of beetroot juice.

Maximum reduction of blood pressure level: 20-40 mm Hg

Minimum reduction of blood pressure level: <10 mm Hg

DESCRIPTION OF SPHYGMOMANOMETER

A sphygmomanometer includes a pressure manometer and cloth or vinyl cuff that encloses an inflatable rubber bladder and a pressure bulb with a release valve that inflates the bladder. Mercury manometer had one gold stand. Pressure created by the inflation of the compression cuff moves the column of mercury upward against the force of gravity. Millimetre calibrations mark the height of the mercury column. To ensure accurate readings the mercury column should fall freely as pressure is released and should always be at zero when the cuff is deflated. Accurate readings are obtained by looking at the meniscus of the mercury at eye level. When the sound starts, it indicates systolic pressure that is normally 120 mm of Hg and when the sound stops it indicates diastolic pressure, normally 90 mm of Hg.

DESCRIPTION OF STETHOSCOPE

Stethoscope was used to assess the heart beat of the human beings. The five major parts of the stethoscope are the ear piece, binaural tubing, bell chest piece and diaphragm chest piece. The stethoscope is a delicate instrument and requires proper care for optimal function. When the nurse uses light pressure, the chest piece is a bell and exerting more pressure converts the bell into diaphragm**.**

ETHICAL CONSIDERATION

The proposal of the study was approved by the experts prior to the pilot study by the Ethics Committee. Each individual client was informed about the purpose of the study. Informed consent was obtained. Assurance was given to them that confidentiality and privacy would be maintained. The client was informed that she was having the freedom to leave the study with their own reason.

TESTING OF THE TOOL CONTENT VALIDITY:

The content validity refers to the degree to which an instrument measures what it is supposed to measure. The content of the tool was validated by one medical expert, and one community health nursing Expert. The expert's suggestions were incorporated and the tool was finalised and used by the investigator for the main study.

PILOT STUDY:

A pilot study was conducted at urban area Choolai, Chennai by obtaining prior permission from the authorities and conducted with six patients, who fulfilled the inclusion criteria. The study in which the pilot study was conducted was excluded from the main study. The data related to the variables were collected. The pre and post assessment of blood pressure was assessed to both the groups. 200 ml of beetroot juice was given to the experimental group for 14 days daily by the investigator in person. Results were analysed. The investigator found that the instrument was feasible to use and further no modifications were needed before the actual implementation of the study.

RELIABILITY:

After pilot study reliability of the tool was assessed by using test interrater method and its correlation coefficient r value of SBP is 0.92 and DBP is 0.90. This correlation coefficients are very high and it is good tool for

assessing the effectiveness of beetroot juice in reducing hypertension among hypertensive women at selected urban area. The tool was highly reliable, feasible and practicable.

DATA COLLECTION PROCEDURE

The study was conducted in selected urban areas of Choolai, Chennai after obtaining permission from the city health officer, Corporation of Chennai, Zonal officer and medical officer of Choolai health post. A self introduction was given by the investigator and the informed written consent was obtained from the patients and benefits of beetroot juice was explained to the participants. The objectives and purpose of the study were explained and confidentiality was maintained. The data collection procedure was done for the period of 4 weeks and the time taken for the data collection for each patient was 10-15 minutes and 5-10 minutes for checking blood pressure for each patient and the investigator selected 60 samples (30 participants in experimental and 30 in control group) by simple random sampling technique based on the inclusion and exclusion criteria. Pre-assessment of blood pressure and post-assessment of blood pressure level was assessed by blood pressure monitor in both experimental and control, same instrument was used for both the group. The experimental group of the hypertensive women with high blood pressure above 140mm/hg were informed about beetroot juice and consent should be obtained. 200 ml of beetroot juice was given in the morning after breakfast daily for 14 days and post assessment was conducted on the 15th day in both experimental and control group.

PLAN FOR DATA ANALYSIS

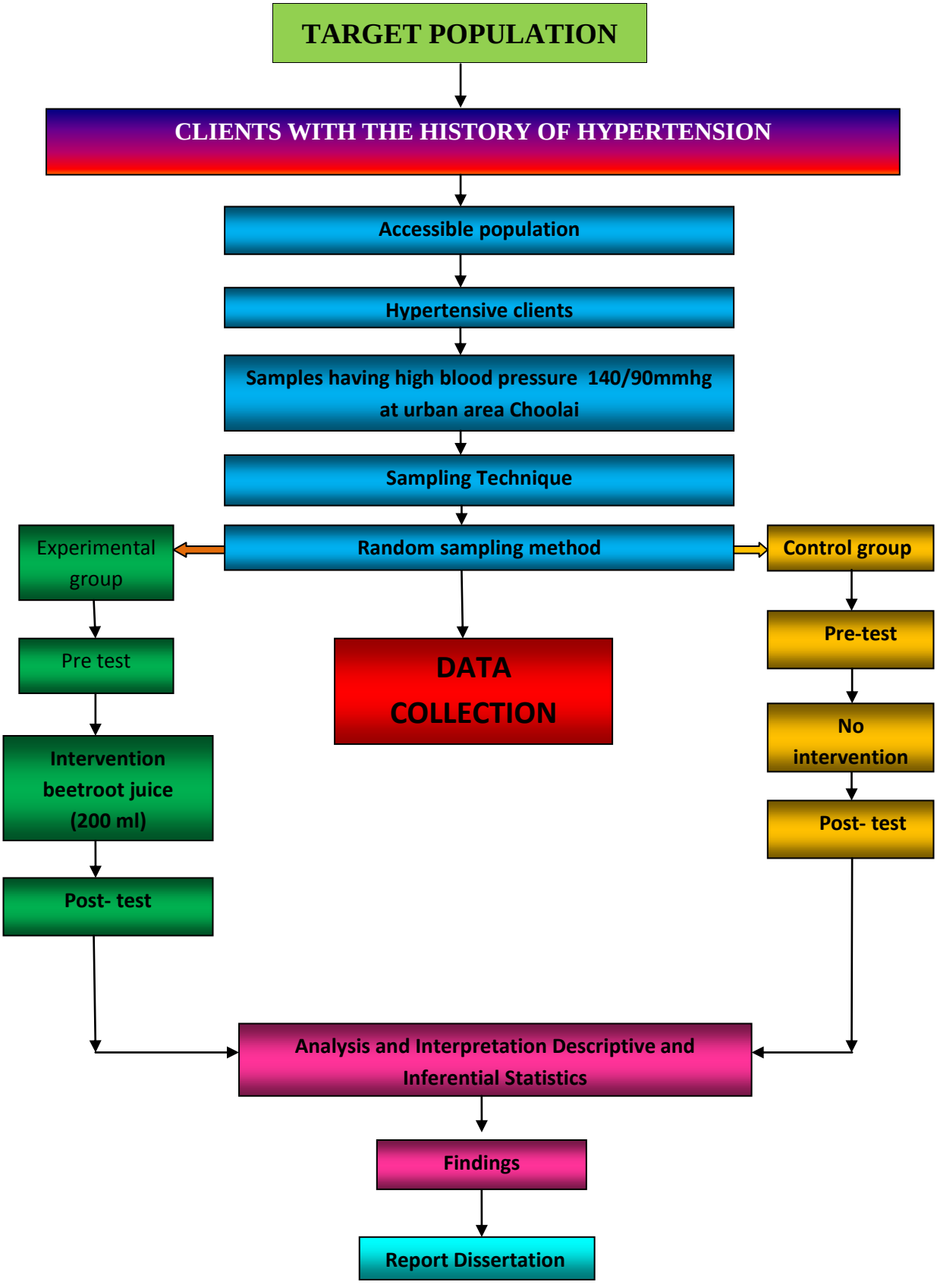
Data analysis may be defined as "The systematic organization and synthesis of research data and in quantitative studies, the testing of hypotheses using those data".

Denise.P.Polit (2010)

This data of the study was analysed by using both descriptive and inferential statistics.

- Organize the data
- Frequency and percentage distribution of the demographic variables.
- Data on blood pressure levels among control and experimental group were analyzed by "t" test.
- Association between groups score was analyzed using Pearson chi square test/ Yates corrected chi square test.
- Difference between groups score was analyzed using student's independent t-test.
- Difference between pretest and posttest score was analyzed using student's paired t-test.

FIG 2: SCHEMATIC REPRESENTATION OF RESEARCH DESIGN



CHAPTER IV

DATA ANALYIS AND INTERPRETATION

Analysis is the appraisal of the data and interpretation of the data consisting of relation between the findings of the study to the research problem and theoretical framework for the study. An important function of the process of interpretation is to link the findings of the study to the main stream of scientific knowledge in the field.

This chapter deals with the analysis and interpretation of the data collected to assess the effectiveness of Beetroot juice in reducing hypertension among women at selected urban area in Choolai, Chennai.

The data collected form 60 samples (30 experimental group and 30 control group) of Hypertensive women are being analyzed and tabulated on the basis of the objectives of the study.

Presentation of the data:

The study findings of the samples are presented in the following sections.

Section A: Frequency and Percentage description of demographic variables of hypertensive women.

Section B: Assessment the pre assessment blood pressure level among hypertension women in experimental and control group.

Section C: Comparison of pre assessment and Post assessment Blood Pressure among Blood Pressure Women in experimental and control group.

Section D: Assessment of effectiveness of Beetroot juice among Hypertensive women in Experimental group.

Section E: To associate the findings with the selected demographic variables among blood pressure women in experimental group.

SECTION A

DESCRIPTION OF DEMOGRAPHIC VARIABLES OF THE HYPERTENSIVE WOMEN.

Table 2: Percentage Distribution of demographic variables of the hypertensive women.

Table 2: DEMOGRAPHIC PROFILE

Demographic variables		Group				Chi square test
		Experiment		Control		
		N	%	n	%	
Age	30 - 45 years	8	26.7%	7	23.3%	
	46 - 60 years	13	43.3%	13	43.4%	$\chi 2$=0.15 p=0.98
	61 - 65 years	4	13.3%	4	13.3%	
	> 65 years	5	16.7%	6	20.0%	
Religion	Hindu	28	93.3%	27	90.0%	$\chi 2$=0.35 p=0.84
	Christian	1	3.3%	1	3.3%	
	Muslim	1	3.3%	2	6.7%	
Education	Primary	5	16.7%	7	23.3%	$\chi 2$=1.58 p=0.63
	Secondary	9	30.0%	11	36.7%	
	Diploma	10	33.3%	9	30.0%	
	Degree	6	20.0%	3	10.0%	
Occupation	Business	16	53.3%	18	60.0%	$\chi 2$=0.27 p=0.87
	Private	7	23.3%	6	20.0%	
	Others	7	23.4%	6	20.0%	
Income	Rs.1590 - 4726	3	10.0%	4	13.3%	$\chi 2$=2.45p=0.48
	Rs.4727 - 7877	7	23.3%	11	36.7%	
	Rs.7878-11816	15	50.0%	13	43.3%	
	>Rs. 11816	5	16.7%	2	6.7%	
Dietary pattern	Vegetarian	6	20.0%	3	10.0%	$\chi 2$=1.23 p=0.54
	Non-vegetarian	6	20.0%	6	20.0%	
	Mixed	18	60.0%	21	70.0%	
Habit of non vegetarian food	Daily	3	10.0%	4	13.3%	
	Alternate day	6	20.0%	5	16.7%	$\chi 2$=3.50 p=0.47
	Once in a week	15	50.0%	18	60.0%	
	Once in a month			1	3.3%	
	none	6	20.0%	2	6.7%	
Habit Of Salty Food	Appalam	11	36.6%	8	26.7%	
	Pickle	8	26.7%	6	20.0%	$\chi 2$=3.03 p=0.38
	Dry fish	3	10.0%	8	26.7%	
	Above all	8	26.7%	8	26.6%	
Weight	30-45 Kg	2	6.7%	3	10.0%	$\chi 2$=2.82 p=0.42
	46-55 Kg	9	30.0%	6	20.0%	
	56-65 Kg	14	46.7%	11	36.7%	
	>65 Kg	5	16.7%	10	33.3%	

Table 2 shows the demographic information of subjects those who are participated for the following study on “Assess the effectiveness of Beetroot juice in reducing hypertension among women at selected urban area in Choolai”.

The above table reveals that majority of the subjects 43.3%(13) were between 46-60 years among experimental and 43.4%(13) were also 46-60 years in control group. Based on the religion majority of the subjects were Hindu 93.3%(28) in experimental group. 90.0%(27) in control group. Based on the education secondary education 33.3%(10) in experimental group, 36.7% (11) in control group. According to occupation majority of the subjects were business 53.3%(16) in experimental group, 60.0%(18) in control group. Majority of the income were between Rs 7878-11816 50.0%(15) in experimental group. On dietary problem most of them practicing Mixed 60.0% (18) in experimental group 70.0%(21) in control group. According to the habit of non-vegetarian food, majority of them were taking once in a week 50.0%(15) in experimental group. 60.0%(18) in control group. Based on habit of salty food, majority of them were taking appalam 36.6%(11) in experimental group 26.7%(8) in control group. Based on the weight majority of them among between 56-65 kg 46.%(14) in experimental group, 36.7%(11) in control group.

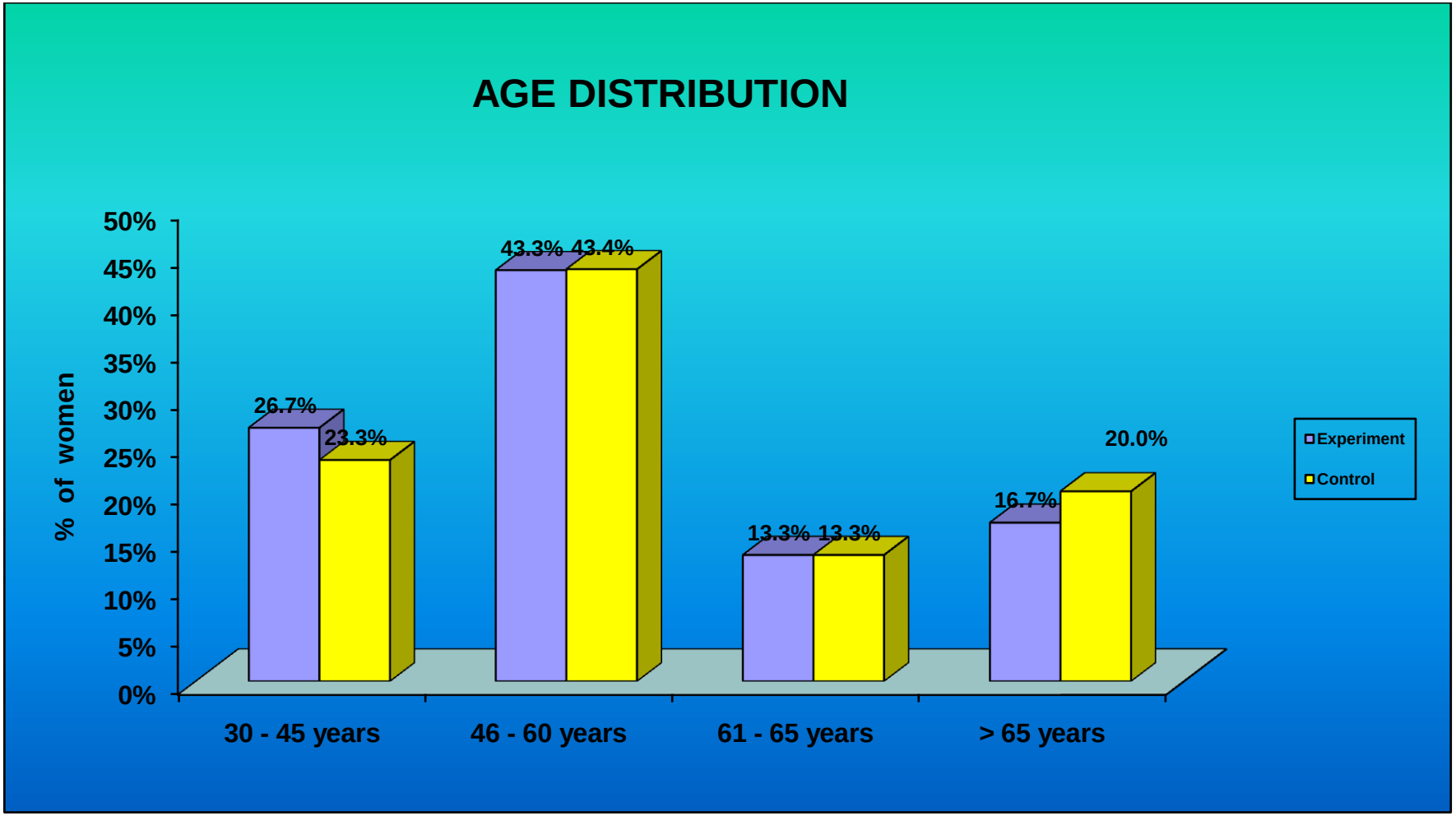


Fig. 3 shows the distribution of subjects in experimental and control group according to their age.

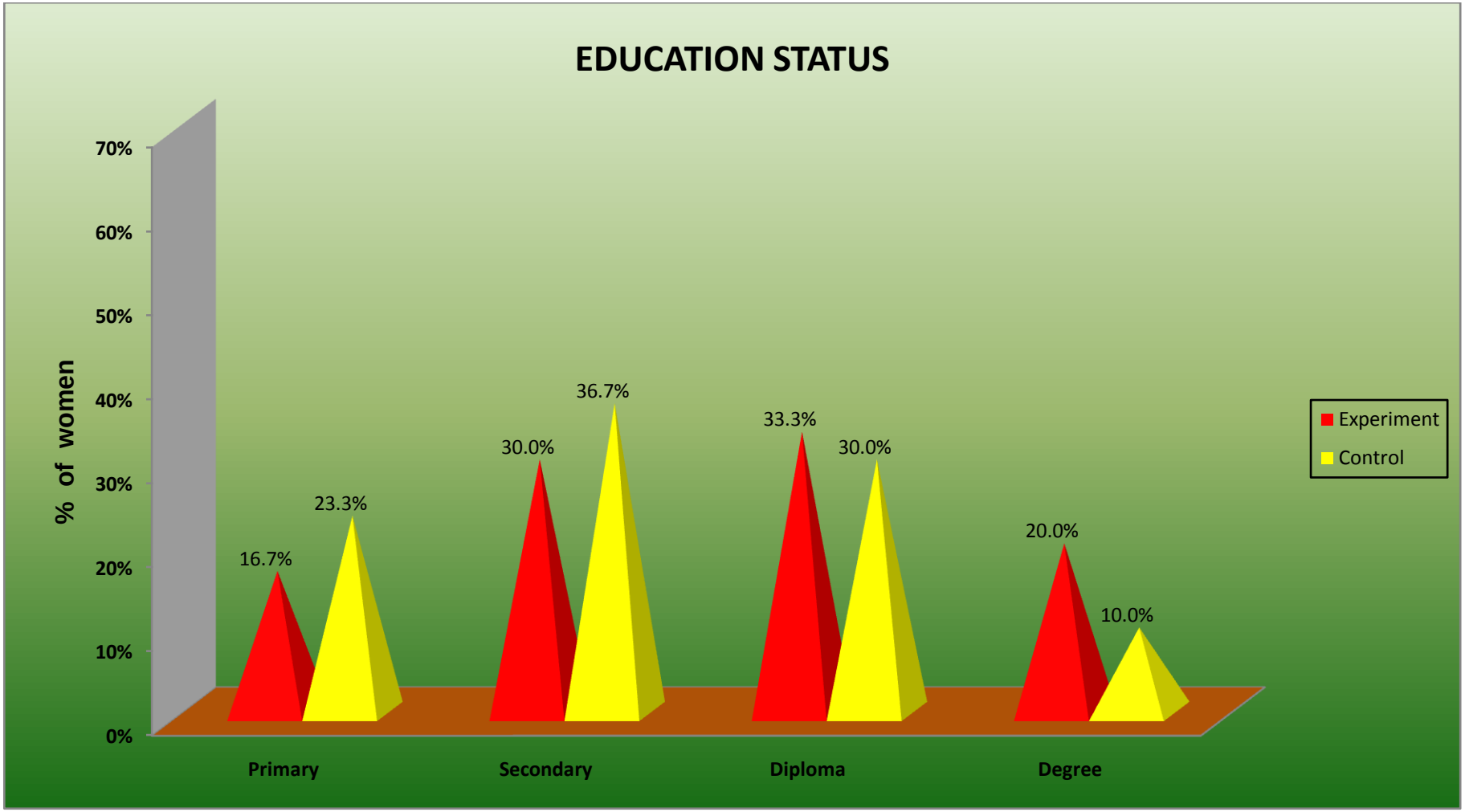


Fig. 4 shows the distribution of subjects in the experimental group and control group according to their educational background.

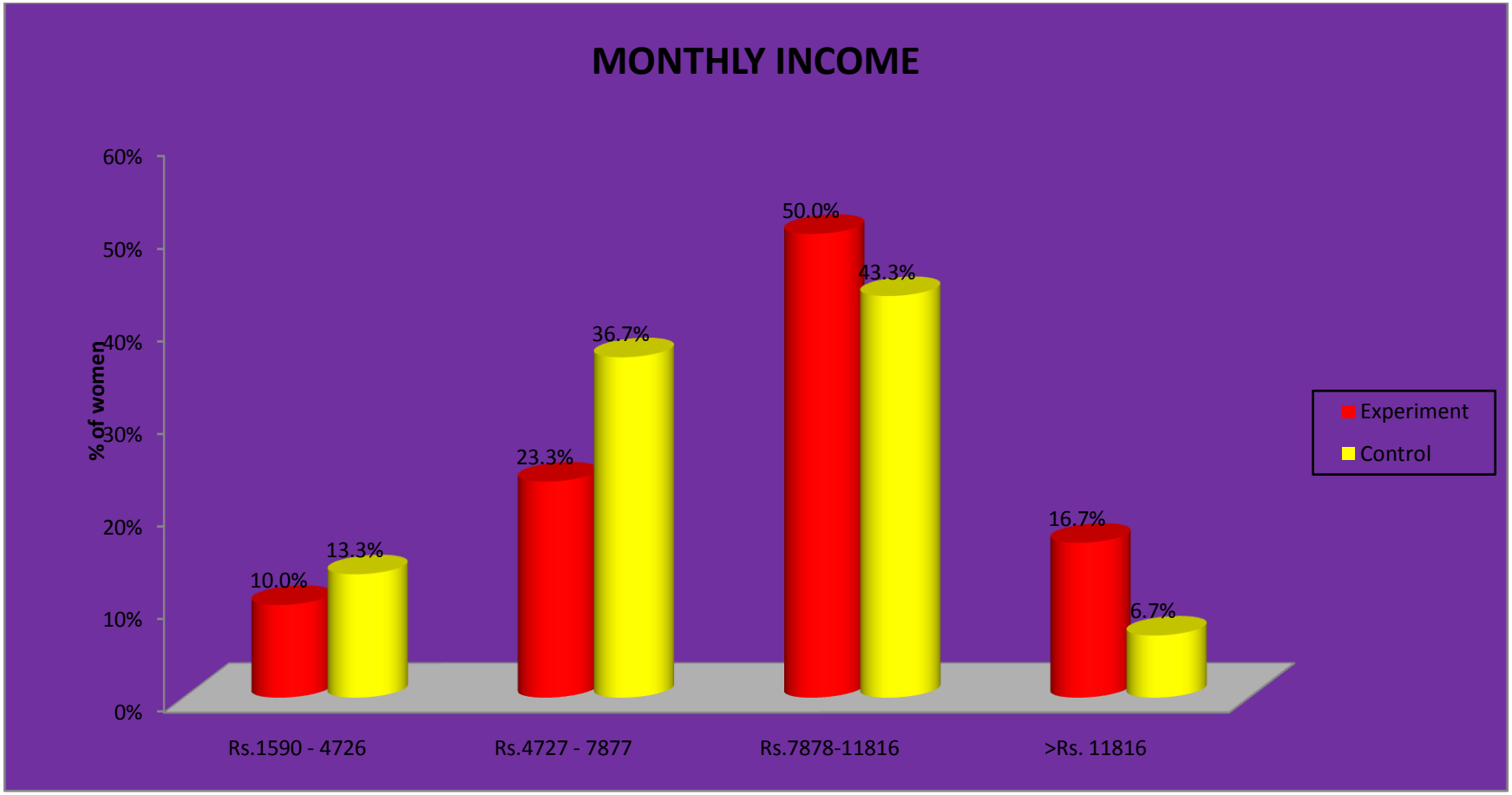


Fig. 5 shows the distribution of subjects in the experimental group and control group according to their monthly income.

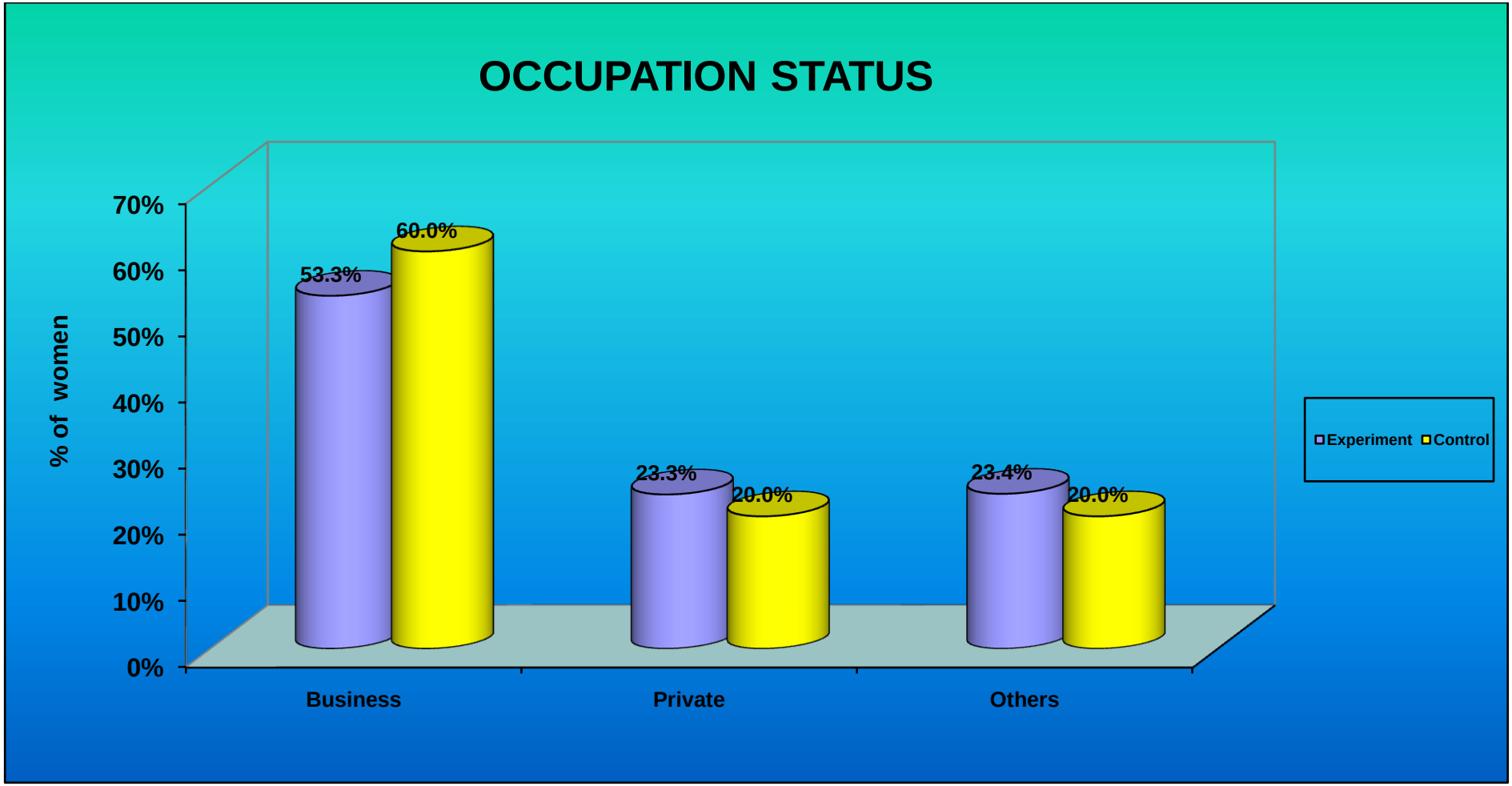


Fig. 6 shows the distribution of subjects in the experimental group and control group according to their occupational status.

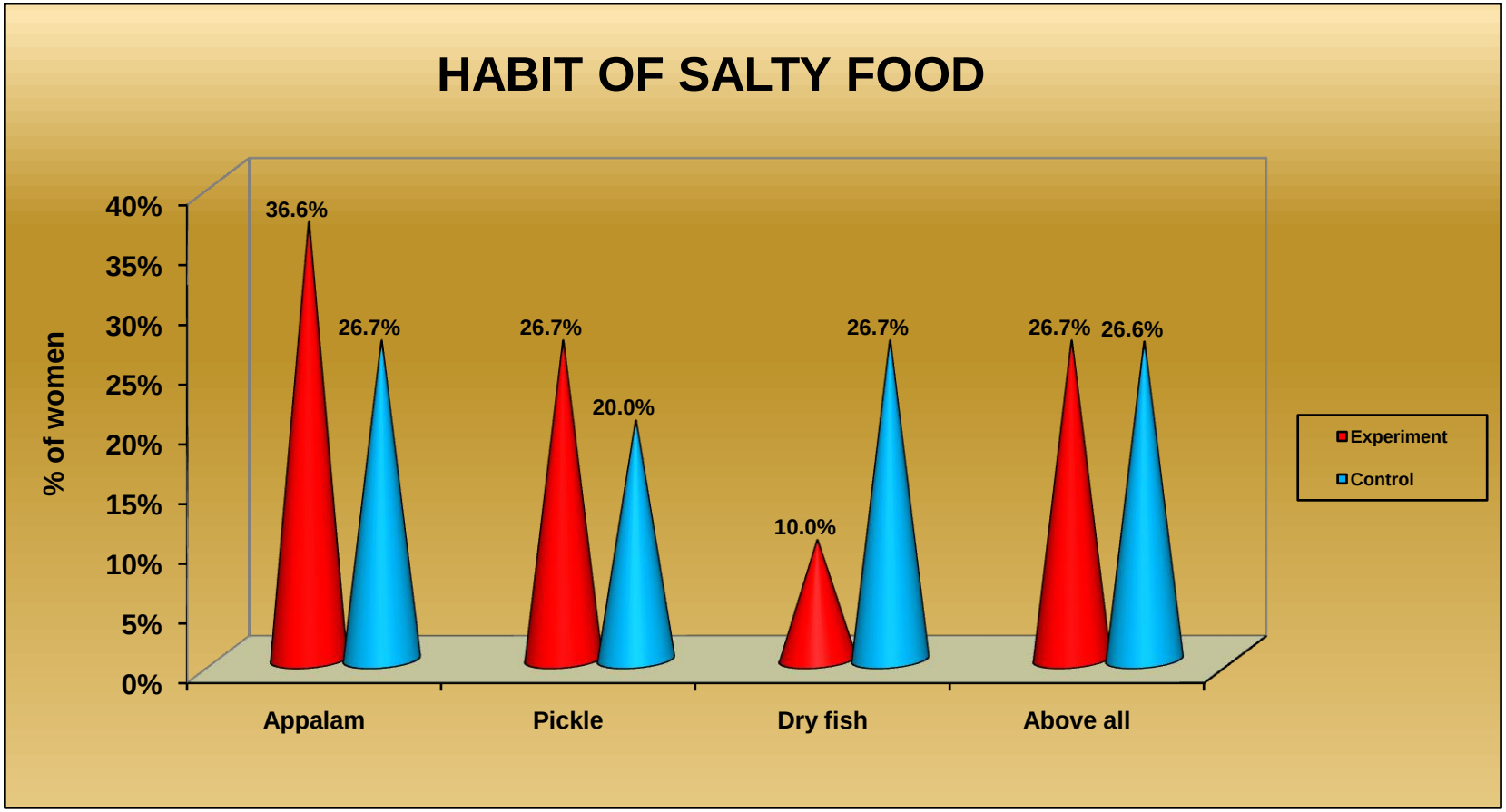


Fig. 7 shows the distribution of subjects in the experimental group and control group according to their Habit of Salty Food.

Table 3: HYPERTESNION RELATED VARIABLES

		Group				
		Experiment		Control		
		Count	%	Count	%	Chi square test
HISTORY OF HT	Yes	12	40.0%	14	46.7%	$\chi 2$=0.27 p=0.60
	No	18	60.0%	16	53.3%	
DURATION OF ILLNESS	< 1 year	5	16.7%	6	20.0%	$\chi 2$=4.37 p=0.22
	2 - 3 years	14	46.7%	8	26.7%	
	4 - 5 years	4	13.3%	10	33.3%	
	> 5 years	7	23.3%	6	20.0%	
SYMPTOMS BEFORE TREATMENT	Head ache	11	36.7%	9	30.0%	$\chi 2$=1.33 p=0.72
	Fatigue	8	26.7%	12	40.0%	
	vision changes	4	13.3%	4	13.3%	
	all the above	7	23.3%	5	16.7%	
TREATMENT FOR HT	Regular	18	60.0%	20	66.7%	$\chi 2$=0.28 p=0.52
	Irregular	12	40.0%	10	33.3%	
HABIT OF EXERCISE	Walking	10	33.3%	11	36.7%	$\chi 2$=0.08 p=0.96
	Jogging	4	13.3%	4	13.3%	
	Others	16	53.4%	15	50.0%	

Based on the history of hypertension majority of them are not known 60.0%(18) in exp group, 53.3%(16) in control group. According to the duration of illness majority of them are between 2-3 years 46.7%(14) in experimental group 4-5 years 33.3% (10) in control group. Based on the symptoms before treatment majority of them were having headache 36.7%(11) in experimental group, fatigue 40.6%(12) in control group. Based on the treatment for hypertension most of them are taking regular 60.0%(18) in experimental group 66.7%(20) in control group. Based on the habit of exercise, majority of them were walking 36.7%(11) in experimental group, 50.0%(15) in control group.

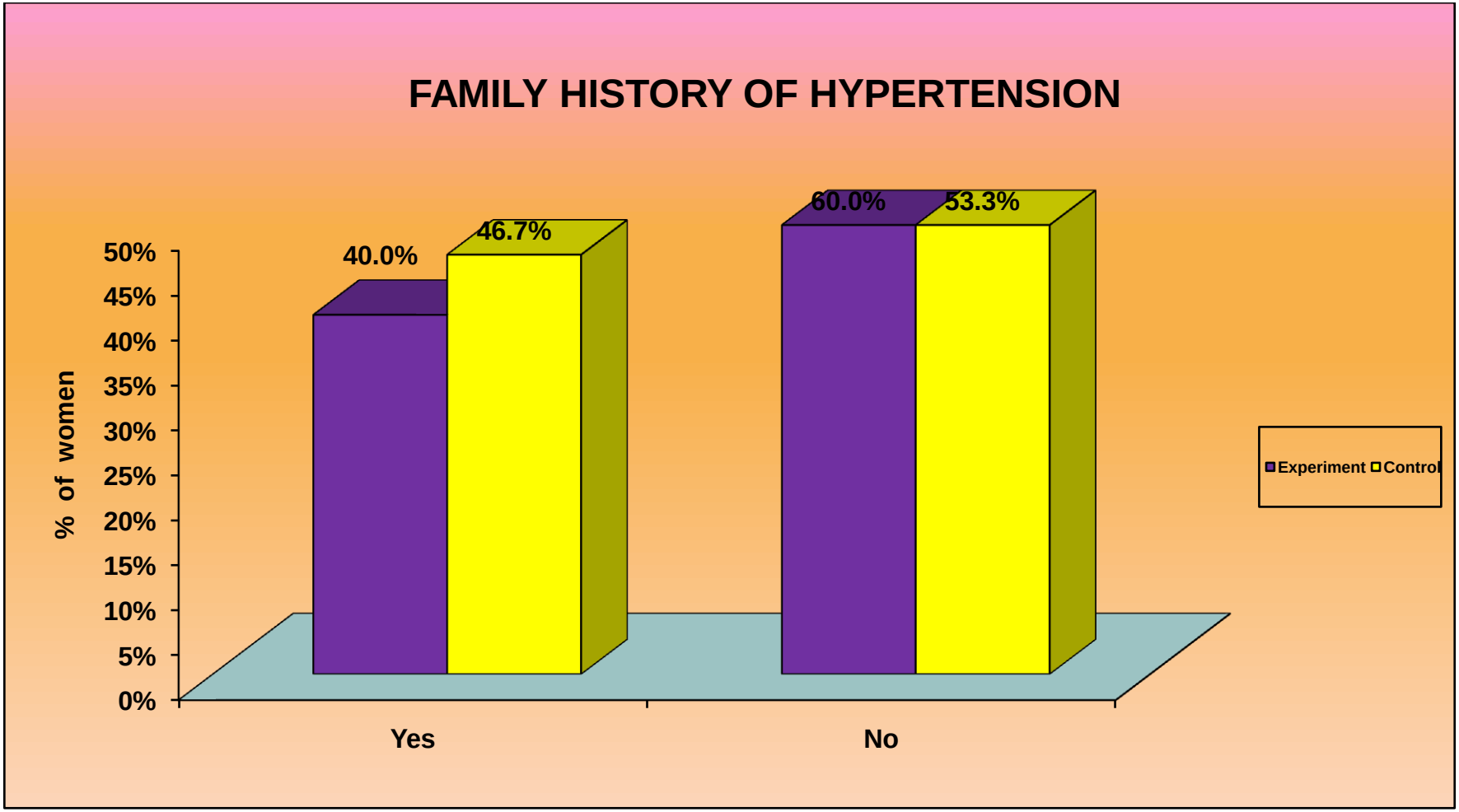


Fig. 8 shows the distribution of subjects in the experimental group and control group according to their Family History of Hypertension .

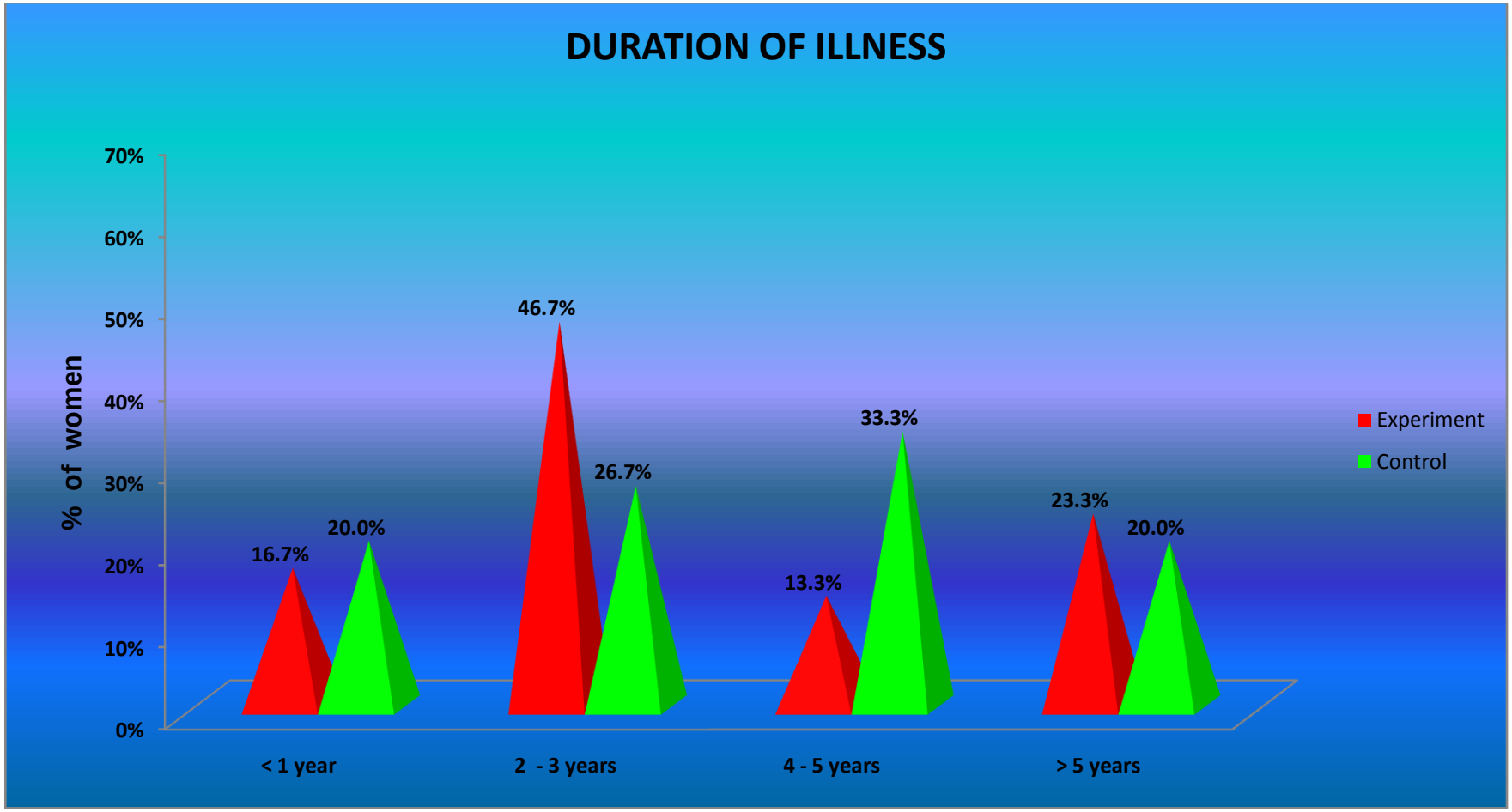


Fig. 9 shows the distribution of subjects in the experimental group and control group according to their duration of illness

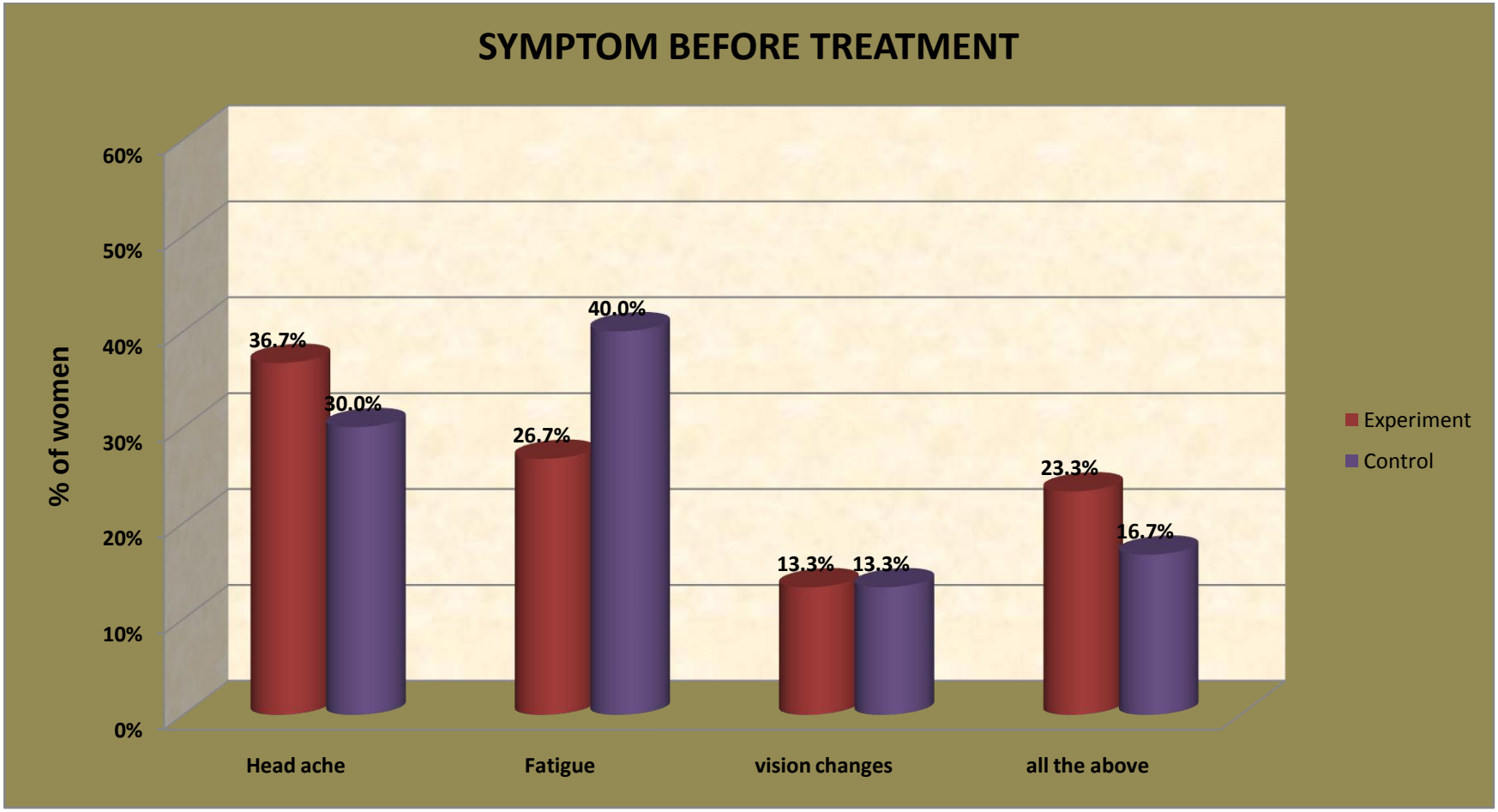


Fig. 9 shows the distribution of subjects in the experimental group and control group according to their symptoms before treatment

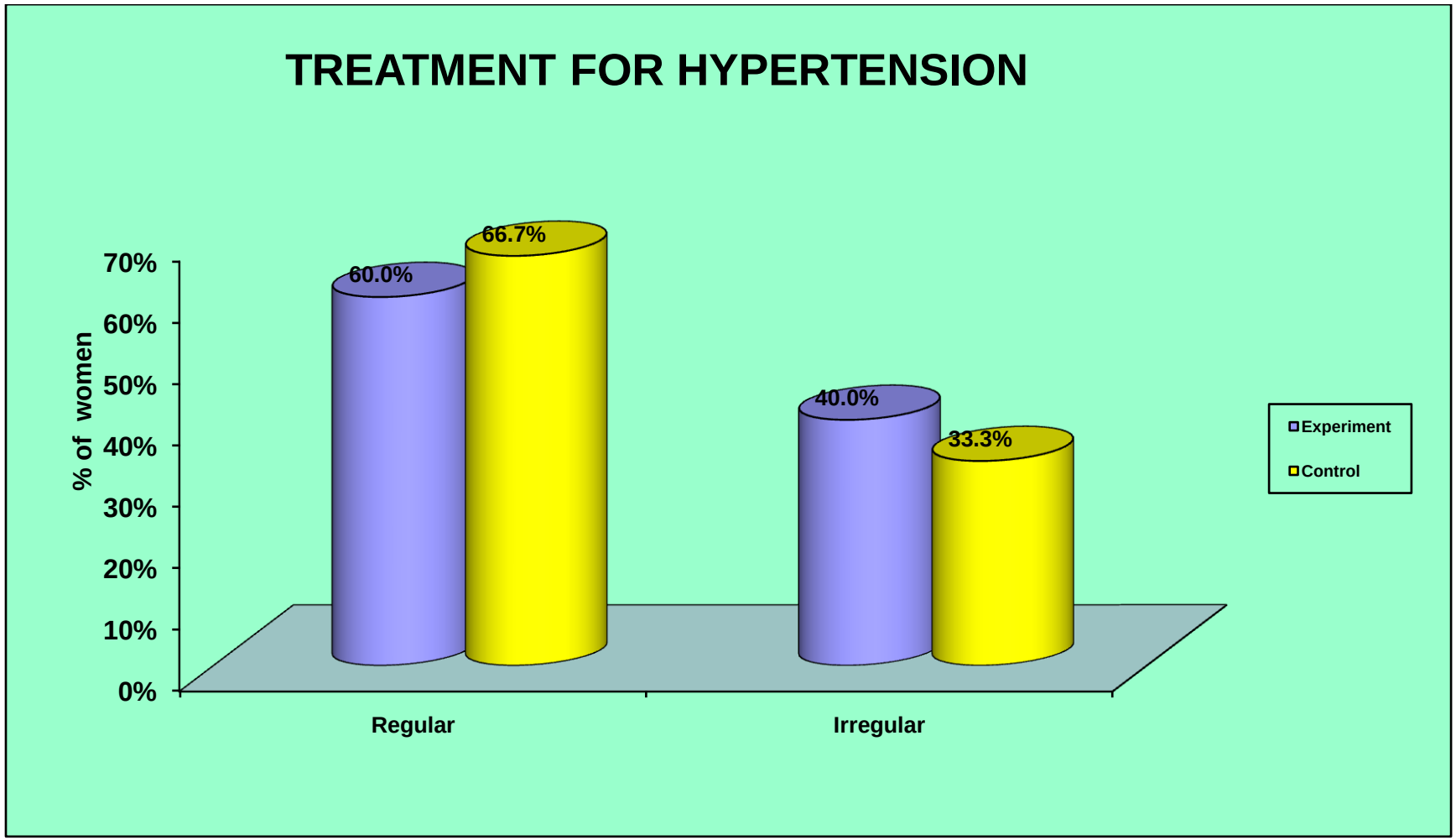


Fig. 10 shows the distribution of subjects in the experimental group and control group according to their treatment for hypertension.

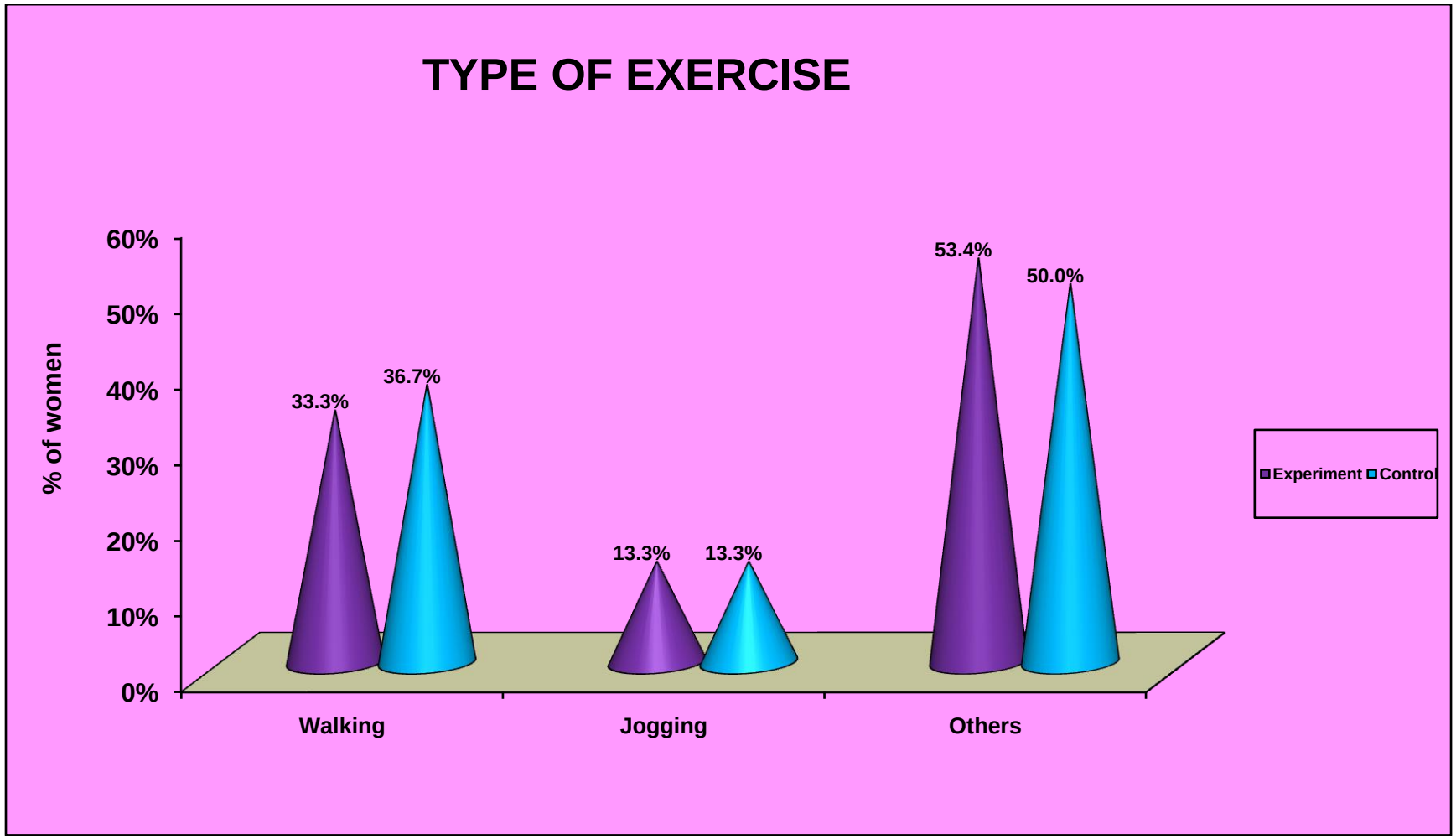


Fig. 11 shows the distribution of subjects in the experimental group and control group according to their types of exercise

SECTION B

Objective 1: To assess the level of blood pressure among hypertensive women before the intervention

Table 4: PREASSESSMENT LEVEL OF HYPERTENSION

		Experiment		Control		Chisquare test
		No. of women	%	No. of women	%	
SBP	Mild	7	23.3%	6	20.0%	χ^2=0.66 P=0.71 Not Significant
	Moderate	16	53.4%	19	63.3%	
	Severe	7	23.3%	5	16.7%	
DBP	Mild	7	23.3%	8	26.7%	χ^2=1.52 P=0.47 Not Significant
	Moderate	14	46.7%	17	56.6%	
	Severe	9	30.0%	5	16.7%	

Table no.4 shows the preassessment level of hypertension

Considering SBP

Among Experiment, before intervention, 23.3% of women are having mild SBP, 53.4% of them having moderate SBP and 23.3% of them are having severe SBP

Among Control, before intervention, 20.0% of women are having mild SBP, 63.3% of them having moderate SBP and 16.7% of them are having severe SBP

There is no statistically significant difference between experiment and control. Statistical significance was calculated using chisquare test.

Considering DBP

Among Experiment, before intervention, 23.3% of women are having mild DBP, 46.7% of them having moderate DBP and 30.0% of them are having severe DBP

Among Control, before intervention, 26.7% of women are having mild DBP, 56.6% of them having moderate DBP and 16.7% of them are having severe DBP

There is no statistically significant difference between experiment and control. Statistical significance was calculated using chisquare test.

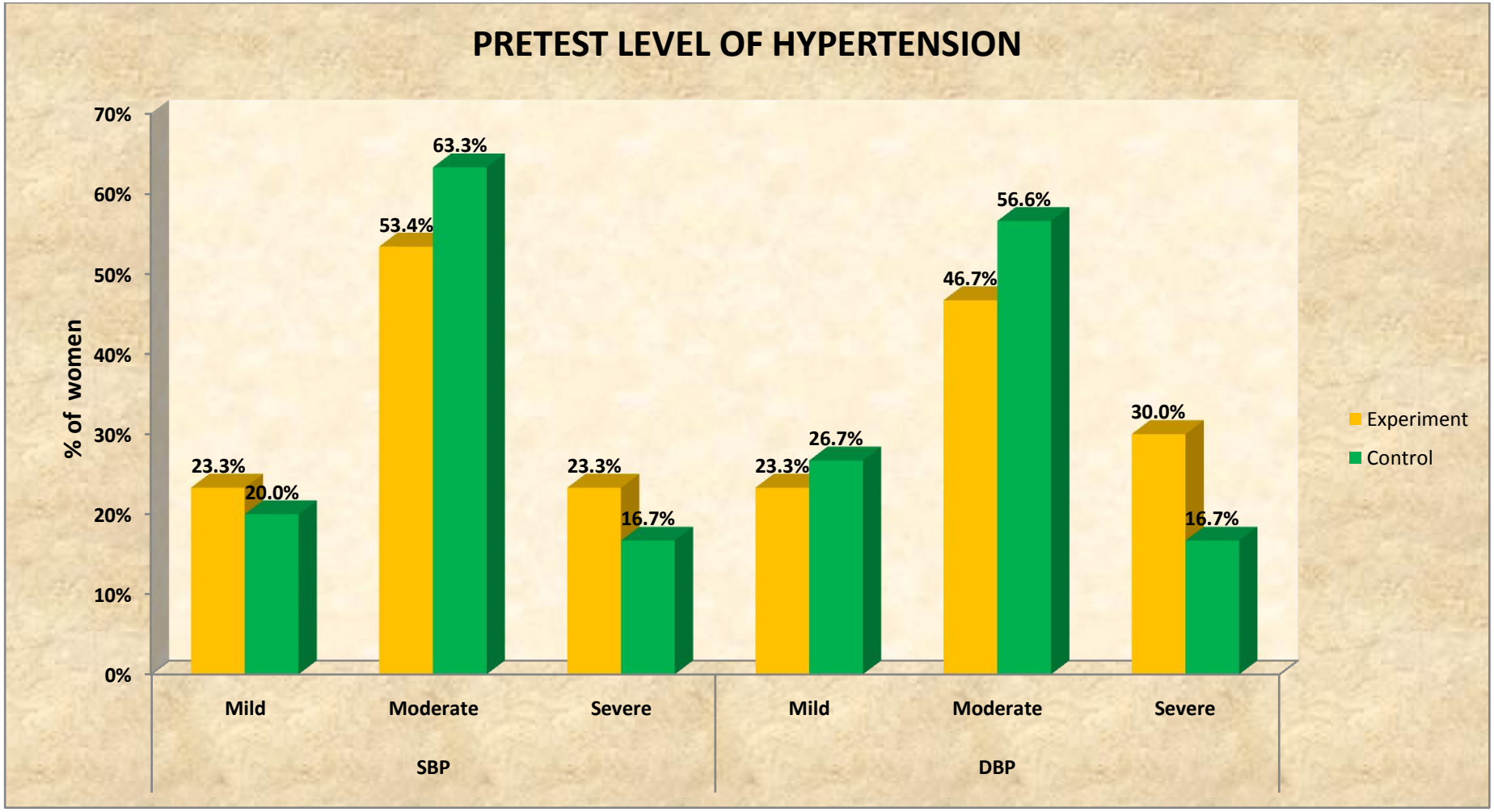


Fig. 11 shows the distribution of subjects in the experimental group and control group according to their pretest level of hypertension.

Objective 2:To assess the level of blood pressure among hypertensive women after intervention

Table 5: POSTASSESSMENT LEVEL OF HYPERTENSION

		Experiment		Control		Chisquare test
		No. of women	%	No. of women	%	
SBP	Mild	18	60.0%	8	26.7%	**χ^2=6.79 P=0.03* Significant**
	Moderate	10	33.3%	18	60.0%	
	Severe	2	16.7%	4	13.3%	
DBP	Mild	19	63.3%	9	30.0%	**χ^2=6.69 P=0.04* Significant**
	Moderate	9	30.0%	17	56.7%	
	Severe	2	16.7%	4	13.3%	

Table no. 5 shows the post assessment level of hypertension

Considering SBP 60.0% of women are having mild SBP, 33.3% of them having moderate SBP and 16.7% of them are having severe SBP

Among Control, before intervention, 26.7% of women are having mild SBP, 60.0% of them having moderate SBP and 13.3% of them are having severe SBP

There is no statistically significant difference between experiment and control. Statistical significance was calculated using chisquare test.

Considering DBP

Among Experiment, before intervention, 63.3% of women are having mild DBP, 30.0% of them having moderate DBP and 16.7% of them are having severe DBP

Among Control, before intervention, 30.0% of women are having mild DBP, 56.7% of them having moderate DBP and 13.3% of them are having severe DBP

There is no statistically significant difference between experiment and control. Statistical significance was calculated using chisquare test.

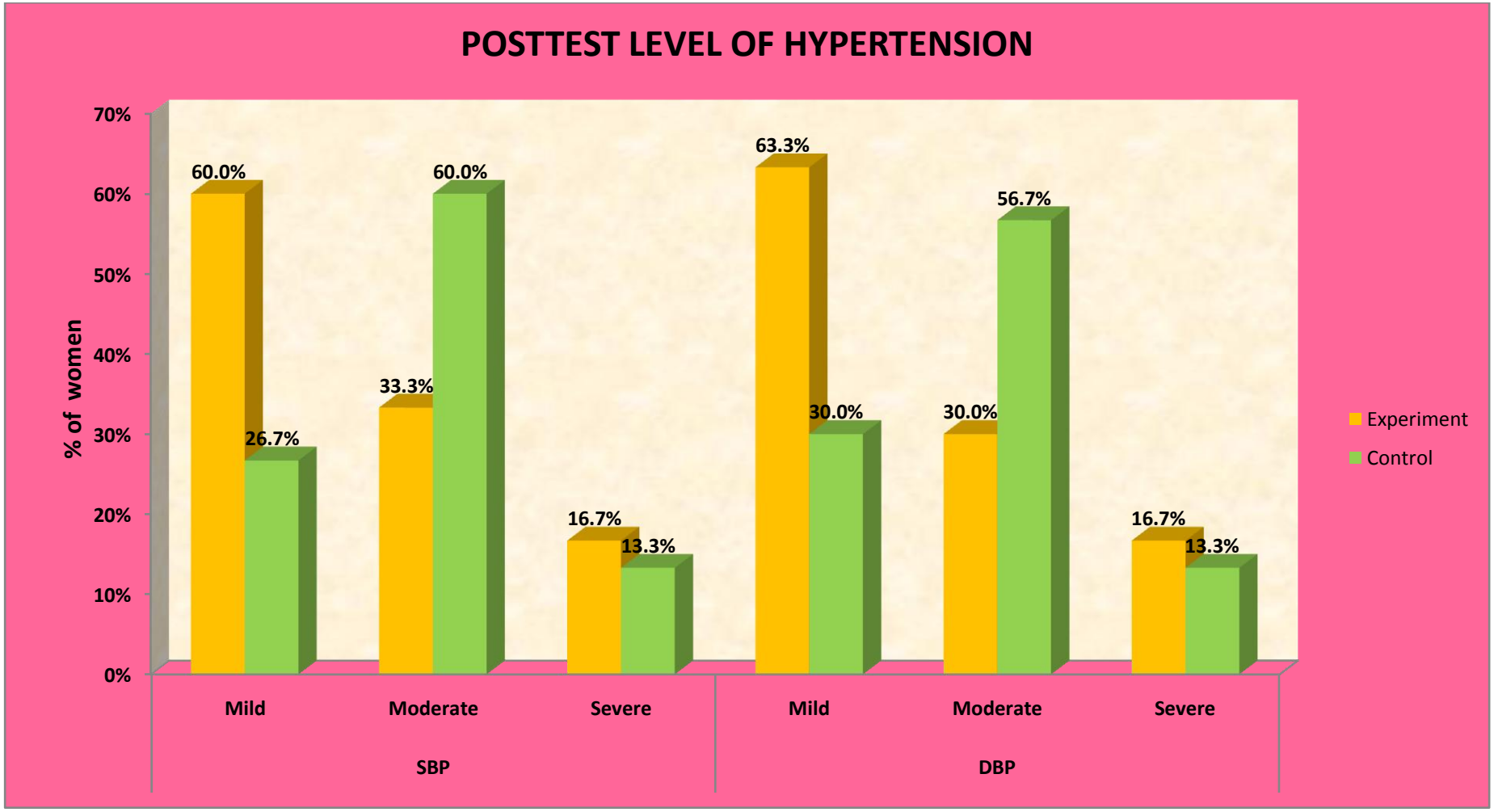


Fig. 12 shows the distribution of subjects in the experimental group and control group according to their posttest level of hypertension.

SECTION C

Objective 3: To find out the effectiveness of beetroot juice on reducing the blood pressure among the hypertensive women

Table 6: COMPARISON OF PREASSESSMENT & POSTASSESSMENT HYPERTENSION

		No. of adults	PRETEST Mean ± SD	POSTTEST Mean ± SD	Mean difference	Student's paired t-test
SBP	Experiment	30	169.17±19.47	154.33±14.48	14.83	t=8.38P=0.001*** significant
	Control	30	171.50±15.15	168.00±15.59	3.50	t=1.89P=0.07 not significant
DBP	Experiment	30	105.46±6.89	94.17±5.58	11.30	t=11.49P=0.01*** significant
	Control	30	106.50±5.58	103.86±6.14	2.63	t=1.90P=0.07 not significant

Table no.6 shows the comparison of overall pretest and posttest.

Considering SBP

In the pretest, experiment adults are having 169.17 and in posttest they are having 154.33. Difference is 14.83 score. The difference between pretest and posttest sbp value is large and it is statistically significant.

In the pretest, control adults are having 171.50 score and in posttest they are having 168.00 score. Difference is 3.50 score. The difference between pretest and posttest sbp score is small and it is not statistically significant.

Considering DBP

In the pretest, experiment adults are having 105.46 and in posttest they are having 94.17. Difference is 11.30 score. The difference between pretest and posttest DBP value is large and it is statistically significant.

In the pretest, control adults are having 106.50 score and in posttest they are having 103.86 score. Difference is 2.63 score. The difference between pretest and posttest sbp score is small and it is not statistically significant.

Differences between pretest and posttest score was analysed using paired t-test.

Table 7: COMPARISON OF EXPERIMENT & CONTROL HYPERTENSION

		No. of adults	Experiment Mean ± SD	Control Mean ± SD	Mean difference	Student's paired t-test
SBP	Pretest	30	169.17±19.47	171.50±15.15	14.83	t=0.51P=0.61 not significant
	Posttest	30	154.33±14.48	168.00±15.59	3.50	t=3.52P=0.001*** not significant
DBP	Pretest	30	105.46±6.89	106.50±5.58	11.30	t=0.68P=0.49 not significant
	Posttest	30	94.17±5.58	103.86±6.14	2.63	t=6.39P=0.001*** significant

Table no.7 shows the comparison of overall experiment and control group hypertension.

Differences between experiment and control group hypertension was analysed using independent t-test.

SECTION D

Table 8: EFFECTIVENESS OF BEETROOT JUICE

			Mean score	Mean hypertension Difference with 95% Confidence interval	Percentage hypertension Difference with 95% Confidence interval
Experiment	SBP	Pretest	169.17	14.83(11.21 – 18.45)	**8.8%(6.6% –10.9%)**
		Posttest	154.33		
	DBP	Pretest	105.46	11.30(9.29 – 13.31)	**10.7%(8.8% –12.6%)**
		Posttest	94.17		
Control	SBP	Pretest	171.50	3.50(0.89– 6.10)	**2.0(0.5 – 3.6)**
		Posttest	168.00		
	DBP	Pretest	106.50	2.63(1.12 – 4.14)	**2.4(1.0 – 3.9)**
		Posttest	103.86		

Table no 8 shows the effectiveness of the study.

Considering SBP, women are **reduced 8.8%** than pretest.

Considering DBP, women are **reduced** 10.7% of than pretest.

Differences between pretest and posttest score was analysed using proportion with 95% CI and mean difference with 95% CI. It shows the effectiveness of beetroot juice.

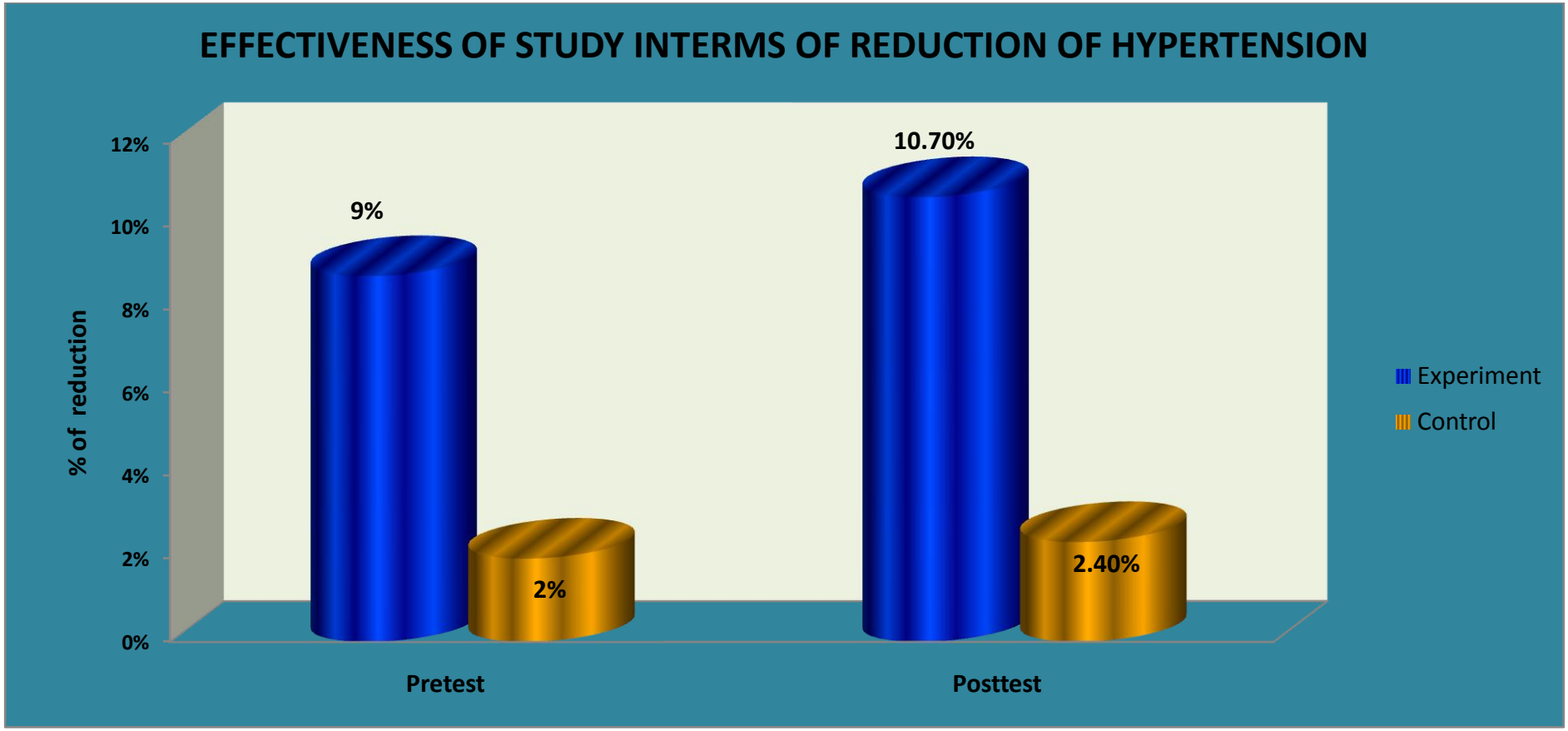


Fig. 12 shows the distribution of subjects in the experimental group and control group according to their posttest level of hypertension.

SECTION E

Objective 4: To find out the association between level of blood pressure reduction with selected demographic variables

Table 9: Association between level of SBP reduction with selected demographic variables(Experiment)

		Level of SBP reduction					
		Below average(≤14.83)		Above average(>14.83)			
		n	%	n	%	Total	Chi square test
Age	30 - 45 years	2	25.0%	6	75.0%	8	
	46 - 60 years	5	38.4%	8	61.6%	13	**χ2=8.69p=0.03***
	61 - 65 years	3	75.0%	1	25.0%	4	
	> 65 years	5	100.0%	0	0.0%	5	
Religion	Hindu	14	50.0%	14	50.0%	28	χ2=2.02 p=0.36
	Christian			1	100.0%	1	
	Muslim	1	100.0%			1	
Education	Primary	4	80.0%	1	20.0%	5	**χ2=10.97**
	Secondary	7	77.7%	2	22.3%	9	**p=0.01****
	Diploma	4	40.0%	6	60.0%	10	
	Degree	0	0.0%	5	100.0%	6	
Occupation	Business	10	62.5%	6	37.5%	16	χ2=1.55 p=0.46
	Private	3	42.9%	4	57.1%	7	
	Others	2	28.6%	5	71.4%	7	
Income	Rs.1590 - 4726	1	33.3%	2	66.7%	3	χ2=0.61 p=0.89
	Rs.4727 - 7877	3	42.9%	4	57.1%	7	
	Rs.7878-11816	8	53.3%	7	46.7%	15	
	>Rs. 11816	3	60.0%	2	40.0%	5	
Dietary pattern	Vegetarian	5	83.3%	1	16.7%	6	χ2=4.55 p=0.10
	Non-vegetarian	3	50.0%	3	50.0%	6	
	Mixed	7	38.9%	11	61.1%	18	
Habit of non vegetarian food	Daily	2	66.7%	1	33.3%	3	χ2=6.16p=0.10
	Alternate day	1	16.7%	5	83.3%	6	
	Once in a week	7	46.7%	8	53.3%	15	
	none	5	83.3%	1	16.7%	6	
Habit of salty food	Appalam	6	54.5%	5	45.5%	11	χ2=0.79 p=0.85
	Pickle	3	37.5%	5	62.5%	8	
	Dry fish	2	66.7%	1	33.3%	3	
	Above all	4	50.0%	4	50.0%	8	
Weight	30-45 Kg	2	100.0%			2	χ2=3.33 p=0.34
	46-55 Kg	6	66.7%	3	33.3%	9	
	56-65 Kg	5	35.7%	9	64.3%	14	
	>65 Kg	2	40.0%	3	60.0%	5	

History of HT	Yes	5	41.7%	7	58.3%	12	χ2=1.42p=0.24
	No	10	55.6%	8	44.4%	18	
Duration of illness	< 1 year	1	20.0%	4	80.0%	5	**χ2=7.77 p=0.05***
	2 - 3 years	5	35.7%	9	64.3%	14	
	4 - 5 years	3	75.0%	1	25.0%	4	
	> 5 years	6	85.7%	1	34.3%	7	
Symptoms before treatment	head ache	6	54.5%	5	45.5%	11	χ2=3.11p=0.37
	Fatigue	2	25.0%	6	75.0%	8	
	vision changes	3	75.0%	1	25.0%	4	
	all the above	4	57.1%	3	42.9%	7	
Treatment for HT	Regular	7	38.9%	11	61.1%	18	χ2=2.22 p=0.13
	Irregular	8	66.7%	4	33.3%	12	
Habit of exercise	Walking	3	30.0%	7	70.0%	10	χ2=1.73 p=0.42
	Jogging	2	50.0%	2	50.0%	4	
	Others	10	62.5%	6	37.5%	16	

Table no 9 shows the association between level of SBP reduction and their demographic variables. Younger, more educated and LESS DURATION OF ILLNESS women reduced more SBP. Statistical significance was calculated using chi square test.

Table 10: Association between level of DBP reduction with selected demographic variables(Experiment)

		Level of DBP reduction					
		Below average(≤11.30)		Above average(>11.30)			
		n	%	n	%	Total	Chi square test
Age	30 - 45 years	1	12.5%	7	87.5%	8	
	46 - 60 years	6	46.8%	7	46.2%	13	**χ2=10.57p=0.01****
	61 - 65 years	3	75.0%	1	25.0%	4	
	> 65 years	5	100.0%	0	40.0%	5	
Religion	Hindu	14	50.0%	14	50.0%	28	χ2=2.00 p=0.37
	Christian			1	100.0%	1	
	Muslim	1	100.0%			1	
EDUCATION	Primary	2	40.0%	3	60.0%	5	χ2=4.57 p=0.20
	Secondary	5	55.6%	4	44.4%	9	
	Diploma	7	70.0%	3	30.0%	10	
	Degree	1	16.7%	5	83.3%	6	
OCCUPATION	Business	8	50.0%	8	50.0%	16	χ2=0.29p=0.87
	Private	3	42.9%	4	57.1%	7	
	Others	4	57.1%	3	42.9%	7	
Income	Rs.1590 - 4726	3	100.0%	0	0.0%	3	**χ2=8.18p=0.05***
	Rs.4727 - 7877	5	71.4%	2	28.6%	7	
	Rs.7878-11816	6	40.0%	9	60.0%	15	
	>Rs. 11816	1	20.0%	4	80.0%	5	
DIETARY PATTERN	Vegetarian	3	50.0%	3	50.0%	6	χ2=3.55 p=0.17
	Non-vegetarian	5	83.3%	1	16.7%	6	
	Mixed	7	38.9%	11	61.1%	18	
HABIT OF NON VEGETARIAN FOOD	Daily	3	100.0%			3	χ2=3.60p=0.30
	Alternate day	3	50.0%	3	50.0%	6	
	Once in a week	6	40.0%	9	60.0%	15	
	none	3	50.0%	3	50.0%	6	
HABIT OF SALTY FOOD	Appalam	5	45.5%	6	54.5%	11	χ2=0.42p=0.93
	Pickle	4	50.0%	4	50.0%	8	
	Dry fish	2	66.7%	1	33.3%	3	
	Above all	4	50.0%	4	50.0%	8	
Weight	30-45 Kg	1	50.0%	1	50.0%	2	χ2=0.59 p=0.89
	46-55 Kg	4	44.4%	5	55.6%	9	
	56-65 Kg	8	57.1%	6	42.9%	14	
	>65 Kg	2	40.0%	3	60.0%	5	
HISTORY OF HT	Yes	5	41.7%	7	58.3%	12	χ2=0.55p=0.45
	No	10	55.6%	8	44.4%	18	

DURATION OF ILLNESS	< 1 year	1	20.0%	4	80.0%	5	χ2=2.22p=0.52
	2 - 3 years	8	57.1%	6	42.9%	14	
	4 - 5 years	2	50.0%	2	50.0%	4	
	> 5 years	4	57.1%	3	42.9%	7	
SYMPTOMS BEFORE TREATMENT	head ache	3	27.3%	8	72.7%	11	χ2=4.41p=0.22
	Fatigue	6	75.0%	2	25.0%	8	
	vision changes	2	50.0%	2	50.0%	4	
	all the above	4	57.1%	3	42.9%	7	
Treatment for ht	Regular	5	27.8%	13	72.2%	18	**χ2=8.88 p=0.01****
	Irregular	10	83.3%	2	16.7%	12	
Habit of exercise	Walking	3	30.0%	7	70.0%	10	χ2=2.60p=0.27
	Jogging	2	50.0%	2	50.0%	4	
	Others	10	62.5%	6	37.5%	16	

Table no 10 shows the association between level of SBP reduction and their demographic variables. Younger, more income and regular treatment women are reduced more DBP. Statistical significance was calculated using chi square test.

Table 11: Association between level of SBP reduction with selected demographic variables(Control)

		Level of SBP reduction					Chi square test
		Below average (≤3.50)		Above average(>3.50)		Total	
		n	%	n	%		
Age	30 - 45 years	3	42.9%	4	57.1%	7	$\chi 2$=1.22p=0.74
	46 - 60 years	6	46.2%	7	53.8%	13	
	61 - 65 years	3	75.0%	1	25.0%	4	
	> 65 years	3	50.0%	3	50.0%	6	
Religion	Hindu	13	48.1%	14	51.9%	27	$\chi 2$=3.30 p=0.21
	Christian			1	100.0%	1	
	Muslim	2	100.0%			2	
EDUCATION	Primary	4	57.1%	3	42.9%	7	$\chi 2$=1.40 p=0.70
	Secondary	4	36.4%	7	63.6%	11	
	Diploma	5	55.6%	4	44.4%	9	
	Degree	2	66.7%	1	33.3%	3	
OCCUPATION	Business	10	55.6%	8	44.4%	18	$\chi 2$=0.88 p=0.64
	Private	3	50.0%	3	50.0%	6	
	Others	2	33.3%	4	66.7%	6	
Income	Rs.1590 - 4726	3	75.0%	1	25.0%	4	$\chi 2$=4.51 p=0.21
	Rs.4727 - 7877	4	36.4%	7	63.6%	11	
	Rs.7878-11816	8	61.5%	5	38.5%	13	
	>Rs. 11816			2	100.0%	2	
DIETARY PATTERN	Vegetarian	2	66.7%	1	33.3%	3	$\chi 2$=4.19 p=0.12
	Non-vegetarian	5	83.3%	1	16.7%	6	
	Mixed	8	38.1%	13	61.9%	21	
HABIT OF NON VEGETARIAN FOOD	Daily	4	100.0%			4	$\chi 2$=6.08p=0.19
	Alternate day	2	40.0%	3	60.0%	5	
	Once in a week	7	38.9%	11	61.1%	18	
	Once in a month	1	100.0%			1	
	none	1	50.0%	1	50.0%	2	
HABIT OF SALTY FOOD	Appalam	4	50.0%	4	50.0%	8	$\chi 2$=1.16p=0.76
	Pickle	2	33.3%	4	66.7%	6	
	Dry fish	5	62.5%	3	37.5%	8	
	Above all	4	50.0%	4	50.0%	8	
Weight	30-45 Kg	2	66.7%	1	33.3%	3	$\chi 2$=6.69p=0.08
	46-55 Kg	5	83.3%	1	16.7%	6	
	56-65 Kg	6	54.5%	5	45.5%	11	
	>65 Kg	2	20.0%	8	80.0%	10	
HISTORY OF HT	Yes	9	64.3%	5	35.7%	14	$\chi 2$=2.14p=0.18
	No	6	37.5%	10	62.5%	16	

DURATION OF ILLNESS	< 1 year	3	50.0%	3	50.0%	6	$\chi 2=0.90 p=0.82$
	2 - 3 years	3	37.5%	5	62.5%	8	
	4 - 5 years	6	60.0%	4	40.0%	10	
	> 5 years	3	50.0%	3	50.0%	6	
SYMPTOMS BEFORE TREATMENT	head ache	2	22.2%	7	77.8%	9	$\chi 2=5.31 p=0.15$
	Fatigue	8	66.7%	4	33.3%	12	
	vision changes	3	75.0%	1	25.0%	4	
	all the above	2	40.0%	3	60.0%	5	
TREATMENT FOR HT	Regular	11	55.0%	9	45.0%	20	$\chi 2=0.60 p=0.43$
	Irregular	4	40.0%	6	60.0%	10	
HABIT OF EXERCISE	Walking	6	54.5%	5	45.5%	11	$\chi 2=0.15 p=0.92$
	Jogging	2	50.0%	2	50.0%	4	
	Others	7	46.7%	8	53.3%	15	

Table no 11 shows the association between level of SBP reduction and their demographic variables. None of the variables are significant.. Statistical significance was calculated using chi square test.

Table 12: Association between level of DBP reduction with selected demographic variables(Control)

		Level of DBP reduction					
		Below average(≤2.63)		Above average(>2.63)			
		n	%	n	%	Total	Chi square test
Age	30 - 45 years	4	57.1%	3	42.9%	7	
	46 - 60 years	6	46.2%	7	53.8%	13	$\chi 2$=1.88
	61 - 65 years	1	25.0%	3	75.0%	4	p=0.59
	> 65 years	4	66.7%	2	33.3%	6	
Religion	Hindu	14	51.9%	13	48.1%	27	$\chi 2$=1.03
	Christian			1	100.0%	1	p=0.59
	Muslim	1	50.0%	1	50.0%	2	
EDUCATION	Primary	3	42.9%	4	57.1%	7	$\chi 2$=4.07
	Secondary	4	36.4%	7	63.6%	11	p=0.25
	Diploma	7	77.8%	2	22.2%	9	
	Degree	1	33.3%	2	66.7%	3	
OCCUPATION	Business	10	55.6%	8	44.4%	18	$\chi 2$=0.88p=0.64
	Private	3	50.0%	3	50.0%	6	
	Others	2	33.3%	4	66.7%	6	
Income	Rs.1590 - 4726	3	75.0%	1	25.0%	4	$\chi 2$=3.16p=0.36
	Rs.4727 - 7877	6	54.5%	5	45.5%	11	
	Rs.7878-11816	6	46.2%	7	53.8%	13	
	>Rs. 11816			2	100.0%	2	
DIETARY PATTERN	Vegetarian	2	66.7%	1	33.3%	3	$\chi 2$=4.19p=0.12
	Non-vegetarian	5	83.3%	1	16.7%	6	
	Mixed	8	38.1%	13	61.9%	21	
HABIT OF NON VEGETARIAN FOOD	Daily	3	75.0%	1	25.0%	4	$\chi 2$=9.10p=0.08

Table no 12 shows the association between level of DBP reduction and their demographic variables. None of the variables are significant. Statistical significance was calculated using chi square test.

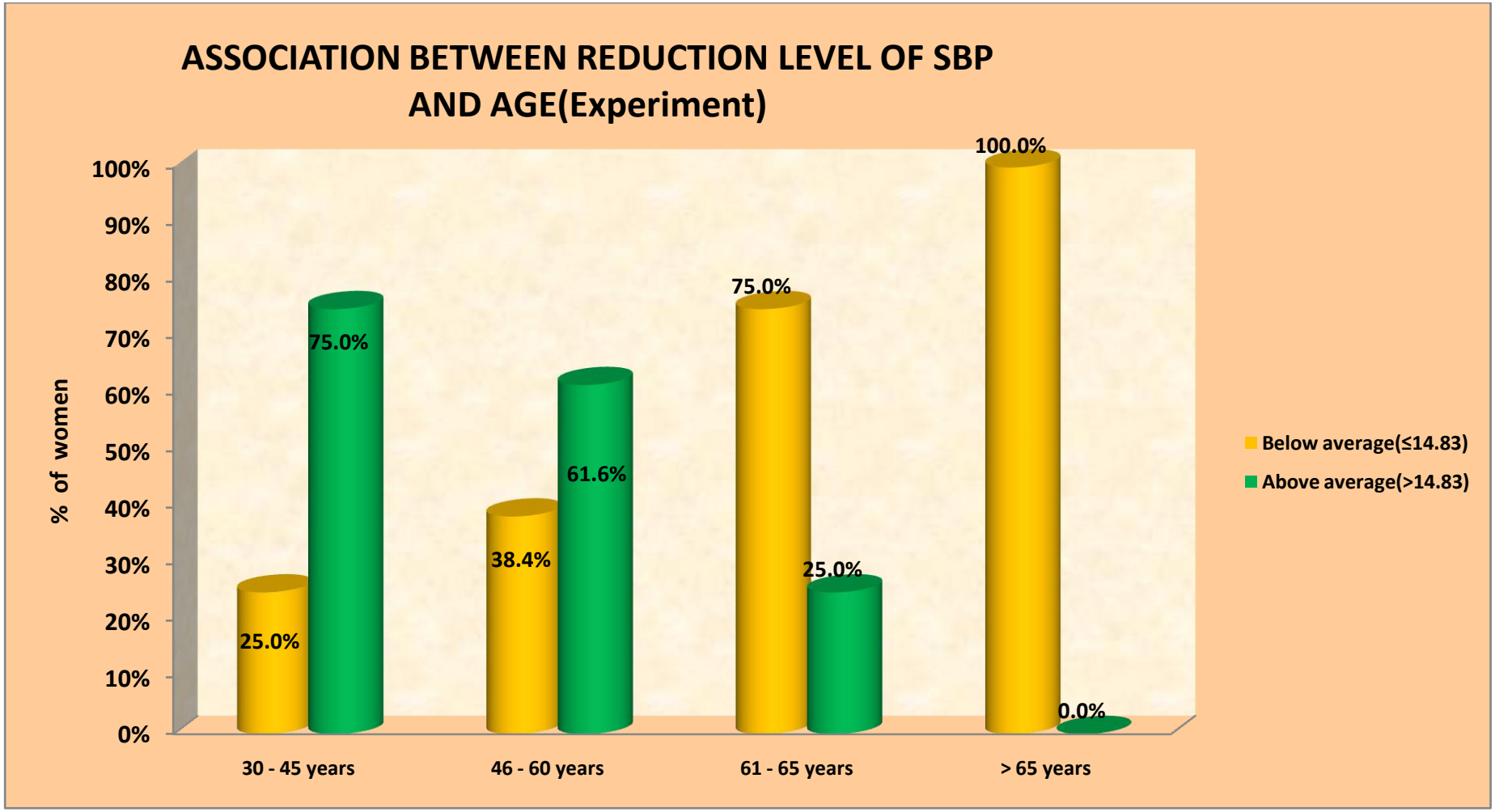


Fig.13 shows the association between reduction level of SBP and Age (Experiment)

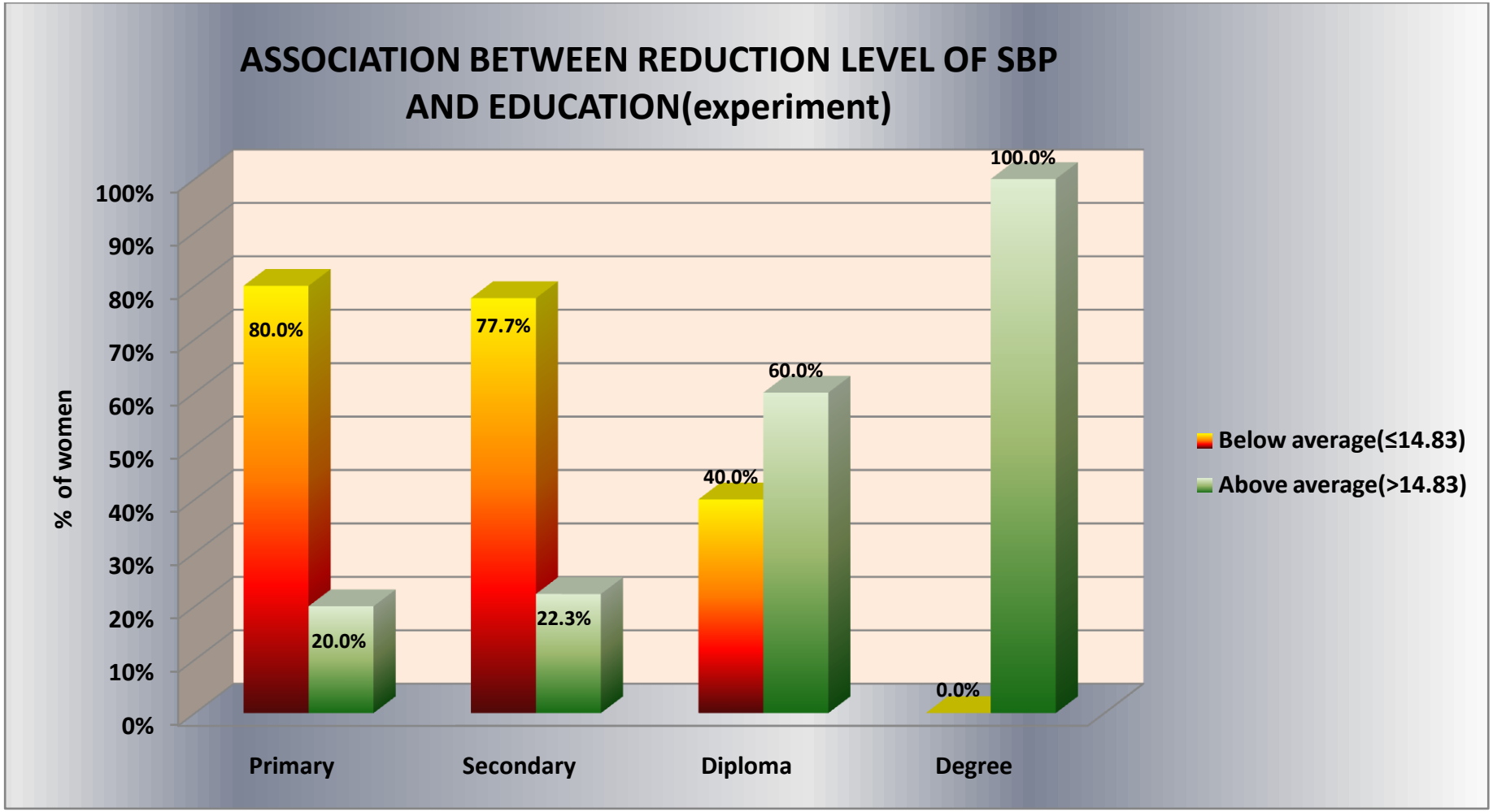


Fig.14 shows the association between reduction level of SBP and education (experiment).

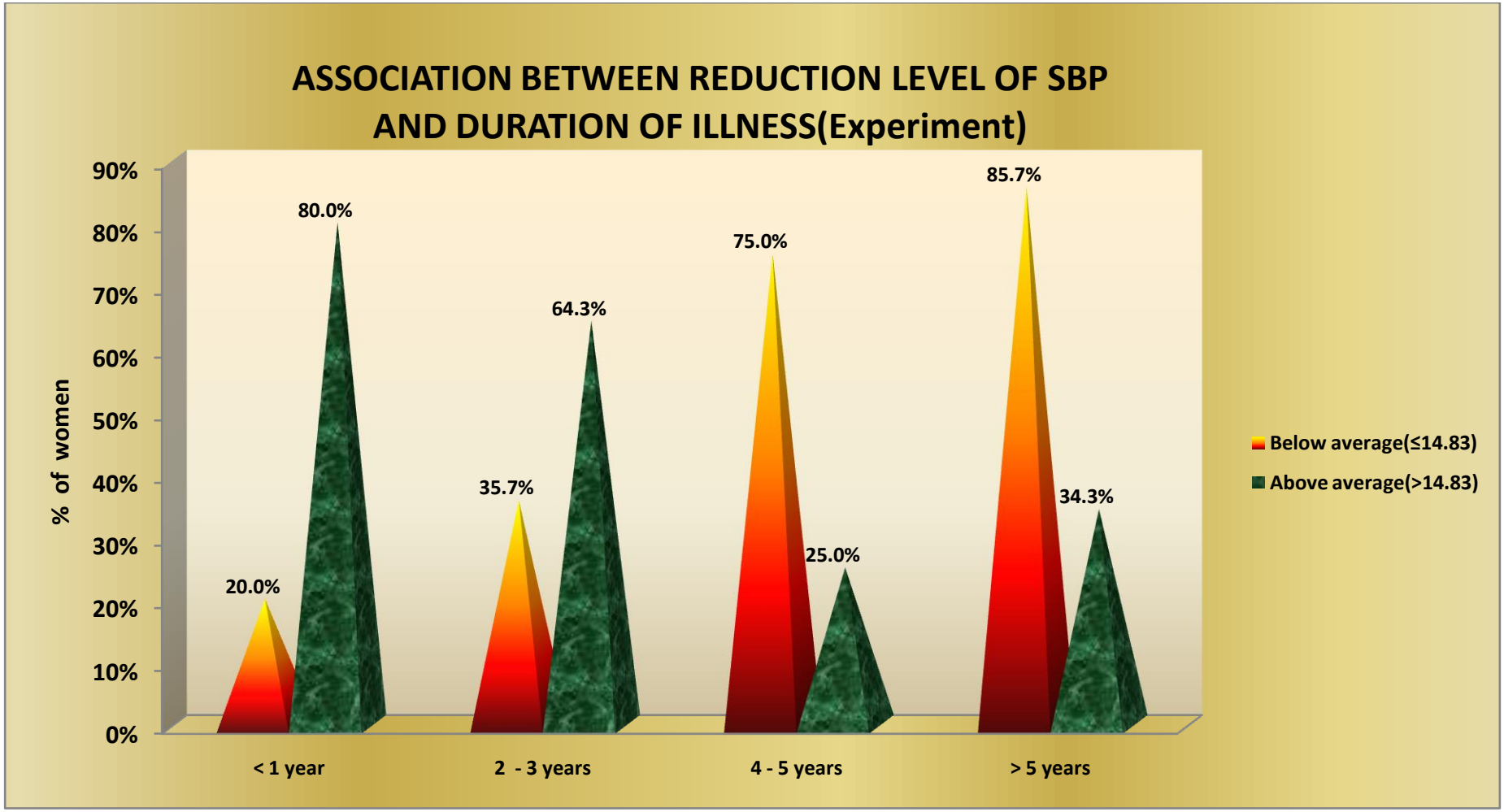


Fig.15 shows the association between reduction level of SBP and duration of illness (experiment)

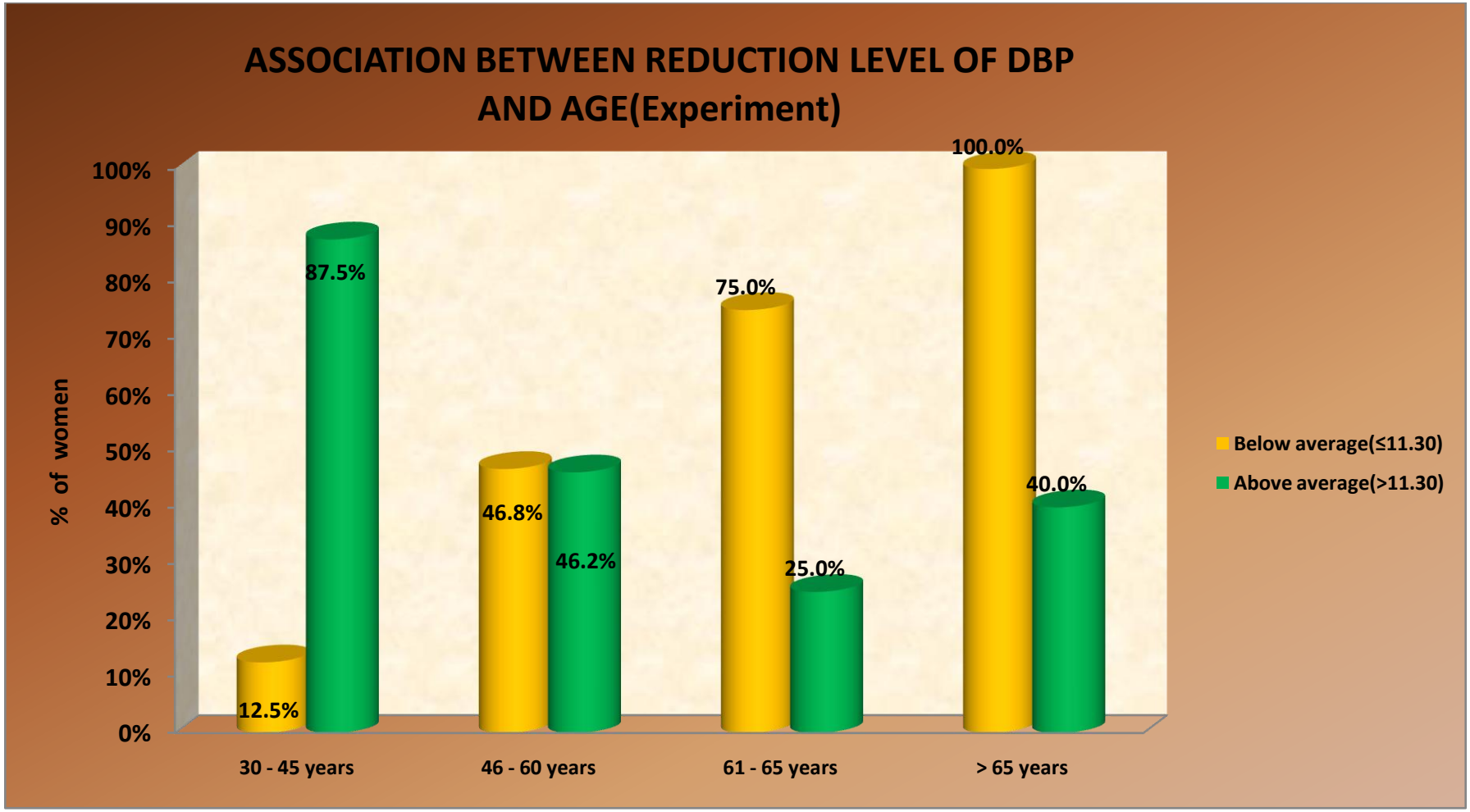


Fig.16 shows the association between reduction level of DBP and Age (Experiment)

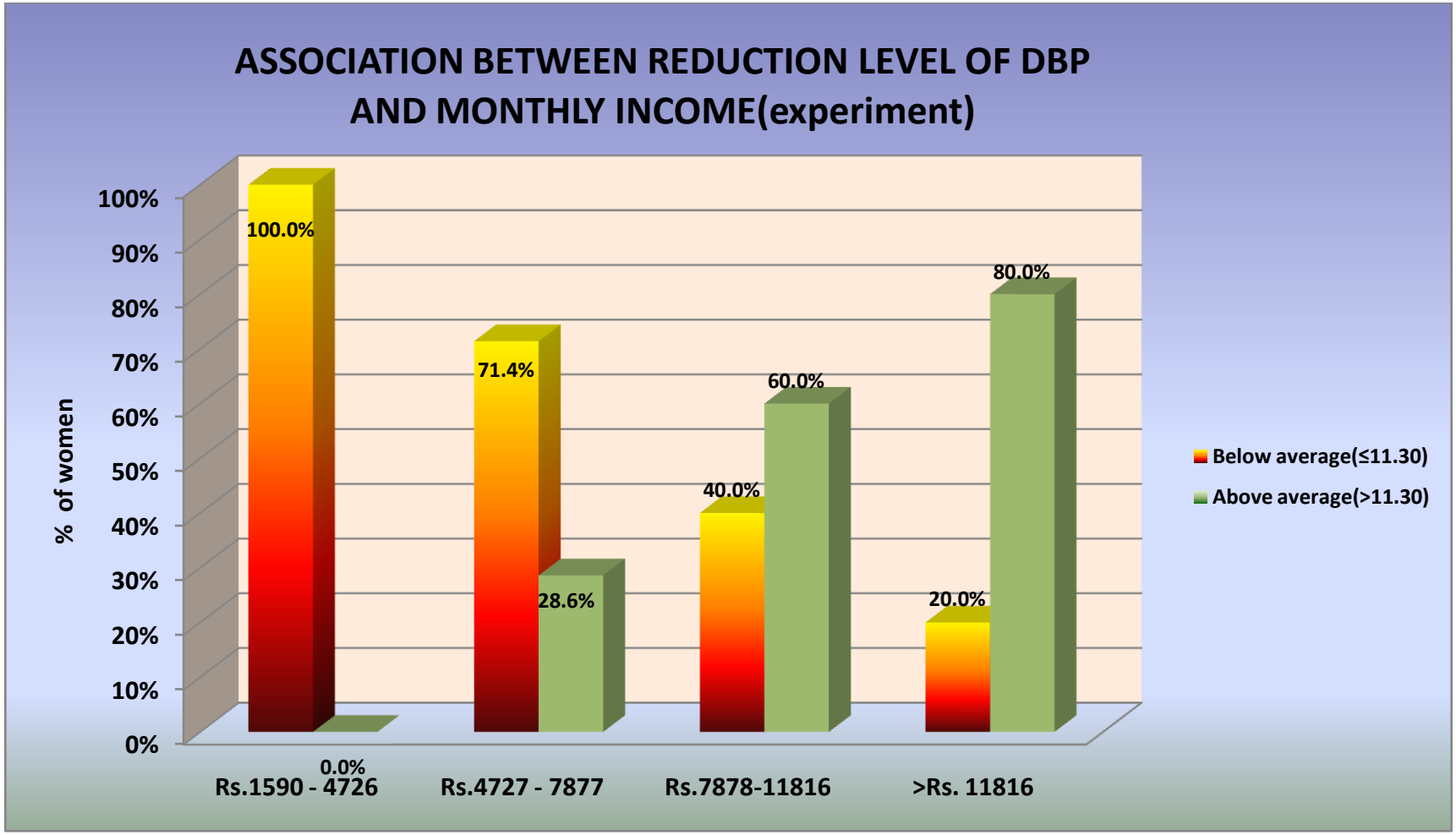


Fig.17 shows the association between reduction level of DBP and monthly income (Experiment)

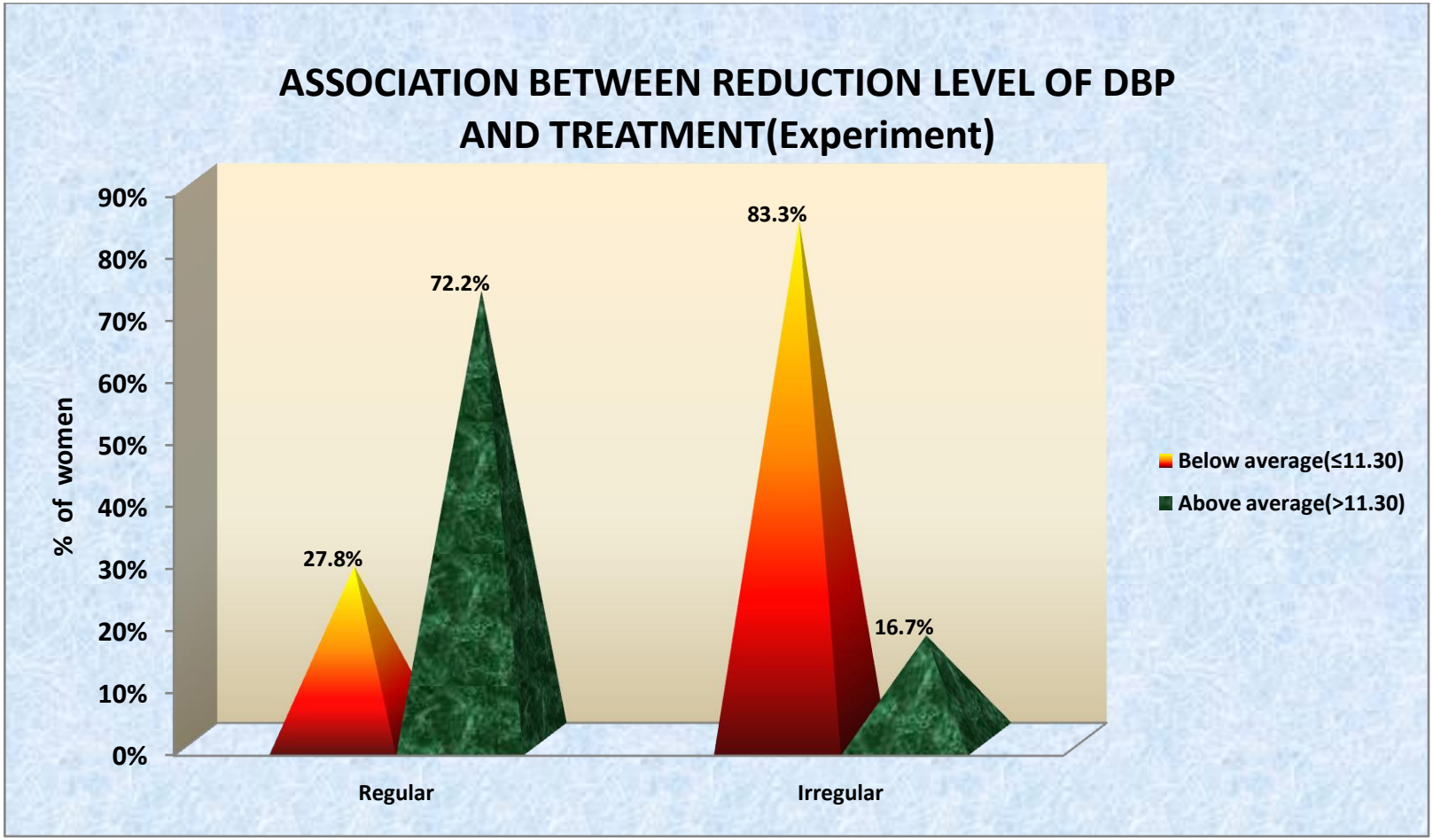


Fig.18 shows the association between reduction level of DBP and treatment (Experiment)

CHAPTER V

DISCUSSION

Hypertension is the worldwide emerging disease that is rocking our Nation. With increasing urbanization, hypertension and its complications are becoming major health problems in our country. In particular, hypertension is a major cause of illness everywhere with some cases remains unnoticed. There is good evidence that an increasing dietary salt intake is partly responsible for this rising incidence of hypertension and possibly restriction of salt may help in prevention. The public health requirements for the prevention, detection and management of hypertension are likely to consume scarce resources where life expectancy is gradually rising due to improved control of communicable disease and malnutrition.

Failure to address the problem of hypertension could have serious effects on morbidity and mortality of economically active individuals in developing countries. To minimise the hypertensive complications and to improve the quality life of hypertensive clients the experimental study was done. The purpose of the study was to evaluate the effectiveness of beetroot juice in reducing the blood pressure level.

In Hypertension directs its pathway to cause still emerging significant medical problems. Hypertension frequently occurs in conjunction with metabolic disturbances; most notably stress lifestyle, dietary habits contribute to the progression of hypertension. Many cases remain sailent regarding smoking, life style modification as they are not aware of that. This study conducted was to aware that effectiveness of Beetroot juice in reducing hypertension levels among the Hypertensive women at the urban area, Choolai, Chennai.

OBJECTIVES OF THE STUDY

- To assess the pre test blood pressure level among hypertensive women in experimental and control group.
- To assess the effectiveness of beetroot juice among hypertensive women in the experimental group.
- To compare the pre test and post test blood pressure, among women in the experimental group and the control group.
- To associate the findings with the selected demographic variables among blood pressure women in the experimental group.

DEMOGRAPHIC VARIABLES OF THE WOMEN WITH HYPERTENSION:

In the demographic variables, the distribution of the age group in the study was such that 43.3% were between 46-60 years among experimental group and 43.4% were between 46-60 years in the control group.

With regard to religion, 93.3% of women among experimental group and 90.0% in control group were Hindus.

Based on educational status, 33.3% of women in experimental group and 36.7% in control group had completed more educated.

According to the occupation, 53.3% of the subjects in experimental group and 60.0% in control group were undertaking home maker.

Based on income, 50.0% in experimental group and 43.3% in control group had income between Rs 7878 and Rs 11816.

Based on dietary pattern, 60.0% in experimental group and 70.0% in control group were practicing mixed food.

According to the habit of non-vegetarian food, 50.0% in experimental group and 60.0% in control group were taking non vegetarian food once in a week.

Based on the habit of salty food, 36.6% in experimental group and 26.7% in control group were taking appalam.

Based on weight, 46.7% in experimental group and 36.7% in control group were between 56-65 Kg.

The first objective of the study was to assess the pre test blood pressure level among hypertension women in experimental and control group.

The hypertensive women were interviewed with the interview questionnaire and pre-test SBP was conducted for the experimental and control group. The pre-test showed that the mean hypertension level was 169.17 in experimental group and 171.50 in control group, so the difference is 2.33, this difference is small and it is not statistically significant difference. Statistical significance was calculated using students' independent t-test.

In pre assessment DBP experimental group women were having 105.46 and control group were having 106.50 score, so the difference is 1.04. This difference is small and it is not statistically significant difference. Statistical significance was calculated using student's independent t-test.

The present study was supported by Diaz KM, et al., (2013). As the world wide prevalence of hypertension continues to increase, the primary prevention of hypertension has become an important global public health initiative. Physical activity is commonly recommended as an important lifestyle modification that may aid in the prevention of hypertension. Recent epidemiologic evidence has demonstrated a consistent, temporal, and dose-dependent relationship between physical activity and the development of hypertension. Experimental evidence from interventional studies has further

confirmed a relationship between physical activity and hypertension as the favourable effects of exercise on blood pressure reduction have been well characterized in recent years.

As the age increases, the stress also has its own rise with regard to lifestyle changes which increases the incidence of hypertension which on its ongoing process paves the way for the increases in cholesterol which binds the risk of the disease process. Mostly the women are unaware of the cholesterol increase in their body though they have the symptoms related to that which prevents them from preventing the risk of cardiovascular diseases are the co morbidity factors among the hypertensive women which needs to be noticed.

As smoking, age, duration of illness and lack of exercises is the major predisposing factor for hypertension, the clients who are hypertensive were found to have increased blood pressure levels, which was mostly hidden and they knew it for the first time. Thus the investigator thought of using Beetroot juice to reduce both hypertensions as a single means of treatment as the Beetroot juice has increased flavonoids which help in preventing and treating cardiovascular diseases.

The second objective of the study was to assess the effectiveness of Beetroot juice among hypertension patients in experimental group.

The women of the experimental group were explained about the intake of Beetroot juice for 15 days explaining the advantages of it in the reduction of hypertension level. Some women of the experimental group were asking many questions regarding the effectiveness and taste but later by understanding the need in the reduction of risk of cardio vascular diseases, they accepted to take beetroot juice for the research period.

On an average, experiment women are reduced 14.83 of SBP whereas in control group are reduced 3.50. Differences between pre assessment and post

assessment score was analysed using mean difference with 95% CI. This difference shows the effectiveness of Beetroot juice.

On an average, experiment women are reduced 11.30 of DBP whereas in control group are reduced 2.63. Differences between pre assessment and post assessment score was analysed using mean difference with 95% CI. This difference shows the effectiveness of beetroot juice.

British Journal of Nutrition(2013) published in the title of "Beetroot Juice can lower blood pressure by Seven percent" by Elijah Wolfson at April 16,2013. A glass of beetroot juice a day keeps the doctors away. That's what you may start to hear in schools after researchers found that drinking one cup of beetroot juice every day can lead to a seven percent drop in blood pressure readings. A study was conducted at the American heart Association, looked at a small group of eight women and seven men at North America, all of whom had systolic pressure between 140 and 159 mm Hg. The participants were given either beetroot juice or water tested to ensure very low nitrate levels. All the men and women had their blood pressure monitored for 24 hours. Those drinking beetroot juice were able to cut their systolic pressure by 10 mm Hg. The conclusion was continuous intake of beetroot juice an ounce a day will reduce the hypertension and become normotensive.

Lansley KE, Winyard PG, Fulford J(2011) conducted a study to determine the physiological effects of beetroot juice where due to high nitrate content. The subjects consumed 0.5 L of beetroot juice for 6 days. The nitrate rich beetroot juice significantly raised plasma nitrite concentration and decreased systolic blood pressure by 10% (12 mm Hg) compared with placebo. These results indicate that the positive physiological effects of beetroot juice ingestion on blood pressure and exercise performance are due to the high nitrate content rather than other compounds.

The third objective was to compare the pre and post assessment blood pressure among women in experimental group and control group.

In pre-assessment, experiment group women are having 169.17 SBP and control group are having 171.50 SBP, so the difference is 2.33, this difference is small and it is not statistically significant difference. In post assessment, experiment group women are having 154.33 SBP and control group are having 168.00 SBP, so the difference is 13.67, this difference is small and it is not statistically significant difference.

In pre-assessment, experiment group women are having 105.46 DBP and control group are having 106.50 DBP, so the difference is 1.04. This difference is small and it is not statistically significant difference. In post assessment, experiment group women are having 94.17 DBP and control group are having 103.86, so the difference is 9.69. This difference is small and it is not statistically significant difference.

The fourth objective to associate the findings with the selected demographic variables among blood pressure women in experimental group.

Table no 9,10 shows the association between level of systolic blood pressure reduction and their demographic variables age group, education, income, duration of illness,regular treatment.

In association between level of SBP reduction and their demographic variables, the Beetroot juice was found effective among the age group of 30- 45 years(75%) and statistically significant X2 =8.69 P=0.03. It was effective 60.0% among those more educated significant value X2 =10.97P=0.01. It was effective 80% among those duration of illness less than 1 year which was significantly proved to be significant X2 =7.77 P=0.05.

In association between level of diastolic blood pressure reduction and hypertension variations, the Beetroot juice was found effective among the age group of above 30-45 years(87.5%) and statistically significant X2 =10.57 P=0.01. It was effective 80.0% among those having more income significant

value X2 =8.18P=0.05. It was effective 72.2% among regular treatment which was significantly proved to be significant X2 =8.88 P=0.01.

As the people in the community are very engaged with the small and frequent works, they didn't have enough time periods to think over the disease process and concentrate over their health. So the investigator made a conclusion that the easily available beetroot juice when introduced in the normal diet package of the community people may improve the health of them thereby reducing their risk of developing other diseases.

The Hypothesis of the study stated that there is a significant association between beetroot juice considerably reduced the high blood pressure levels among the hypertensive women to 20 mmHg from their stipulated value which found to be very effective. The effectiveness was found to be very significant with the demographic variables such as age, less duration, high income, regular treatment of blood pressure for women reduced more blood pressure. Thus the hypothesis is proved.

Thus the investigator found that there should be proper awareness among the people living in the rural among their available management of the Hypertension, its co-disease factor and there by the risk of other diseases. Thus effective health education programme can be planned for the propaganda of these aspects to improve the wellness of the people by their own efforts and life style modification practices.

CHAPTER VI

SUMMARY, CONCLUSION, IMPLICATION, RECOMMENDATIONS AND LIMITATIONS.

6.1 Summary of the study

The study was done to assess the effectiveness of Beetroot juice in reducing high blood pressure levels among the hypertensive women at urban area, Choolai, Chennai.

The research design used for this study true experimental design. The research approach used for the study was quantitative research approach. Conceptual framework adopted in the present study was CIPP model. The sample size was 60 Hypertensive women (30 experimental groups and 30 control group). A sample of Hypertensive women who met with the inclusion criteria were selected for the study. The samples were selected for the study by using simple random sampling technique.

The development of the tool was developed based on the objectives of the study, review of literature and his opinion from the experts and it helped the investigator in the development of the tool. Section A consisted the Demographic data of the Hypertensive women which included the age, religion, educational status, marital status, occupation, family history of hypertension, dietary habits, duration of illness, symptoms before treatment and the history of practicing exercises. Section B consisted of Observation schedule of blood pressure before and after the administration of beetroot juice of the Hypertensive women.

The data collection was done for a period of one month from 2.8.2014 to 30.8.2014. Women who were having hypertension were interviewed by the tool. Samples were selected by the inclusion criteria and were informed about the research process. They were checked for blood pressure by sphygmomanometer in their respective areas. The high blood pressure findings

were informed to the women under study. Informed consent was obtained from all the samples. The samples were divided into control and experimental group. The experimental group of the hypertensive women with high blood pressure above 140mm Hg was informed about the Beetroot juice (200 ml) which was in the given morning. First take 200 grams of raw beetroot, clean with water and the peel off the outer layer thoroughly. Slice it and mix with 50 ml of drinking water. Grind well for 5-10 minutes, add 5 grams of sugar and stir it. Filter the juice and distribute 200ml of beetroot juice in a measuring cup daily morning after breakfast. Before the procedure pre assessment of blood pressure level will be done. This Beetroot juice is provided for 14 days for experimental group. Totally thirty women will be experimental group and other 30 women will be control group. Pre assesment blood pressure was checked for the control and experimental group. The investigator explained the procedure, advantages and intervention to the samples and got consent from the samples. The experimental group subjects were monitored by the investigator during home visit, for the better compliance daily in the morning. Samples can take their regular diet and medication. 200 ml of beetroot juice was distributed to the samples at free of cost and under direct supervision of investigator. Intervention was done for 14 days. The level of blood pressure was checked for the experimental group after the administration of beetroot juice for 14 days. The post blood pressure level was also checked for the control group for 14 days. The samples co operated well and participated willingly in the study.

6.2 MAJOR FINDINGS OF THE STUDY

With regard to the demographic variables of Hypertensive women,

- Among the experimental group majority 43.3% were between 46-60 years , 93.3% of the women were Hindus, 33.3% of them had completed primary education, 53.3% were undertaking home maker, 50.0% had income between Rs 7878 and Rs 11816, 60.0% practiced mixed dietary pattern, according to the habit of non- vegetarian food, 50.0% were taking once in a

week. Based on the habit of salty food, 36.6% were taking appalam,based on weight, 46.7% were between 56-60 Kg.

- Among the control group , majority 43.4% were between 46-60 years , 90.0% of the women were Hindus, 36..7% of them had completed more educated, 60.0% were undertaking homemaker, 43.3% had income between Rs 7878 and Rs 11816, 70.0% practiced mixed dietary pattern,according to the habit of non- vegetarian food, 60.0% were taking once in a weekbBased on the habit of salty food, 26.7% were taking appalam,based on weight, 36.7% were between 56-60 Kg.

The major objectives brought out the following findings,

- The mean SBP of pre test level was 169.17 in experimental group and 171.50 in control group.
- The mean SBP of post test level was 154.33 in experimental group and 168.00 in control group.
- The mean DBP of pre test level was 105.46 in experimental group and 106.50 in control group.
- The mean DBP of post test level was 94.17 in experimental group and 103.86 in control group.
- Beetroot juice was found effective in reducing blood pressure level among hypertensive women as the blood pressure level was reduced from the mean of 169.17 to 154.33. Due to the Beetroot juice they are able to reduce 14.83 from baseline score. This difference is small and it is not statistically significant.
- There was no significant difference between the pre test and post test blood pressure of the control group.
- Comparison level of blood pressure value between experimental and control group showed that, in pretest, the difference is large and statistically significant. In post test, the difference is small and it is statistically significant with p=0.001.

- The beetroot juice was found to be effective in experimental group in considering SBP level and the student's paired test was used to find out the significant difference t= 3.52, p=0.001.
- The beetroot juice was found to be effective in experimental group in considering DBP level and the student's paired test was used to find out the significant difference t= 6.37, p=0.001.
- The difference between pre test and post test SBP score is small and it is not statistically significant in control group.
- In the experimental group, the difference between pre test and post test is large and is statistically significant.
- The association of the effectiveness of beetroot juice with the selected demographic variables considering SBP among experimental group was found 75 % effective for the age 30-45 years and X_2 = 8.69 and statistically proved significant p=0.03. It was 60% effective among women who completed more educated and have value with significant X_2 = 10.97 and p=0.01. It was 80.0% effective among those who have history of less duration of illness which was significantly proved with a value X_2 = 7.77 and p=0.05.
- The association of the effectiveness of beetroot juice with the selected demographic variables considering DBP among experimental group was found 87.5% effective for the age 30-45 years and X_2 = 10.57 and statistically proved significant with p=0.01 It was 80.0% effective among people with more income with significant value of X_2 =8.18 and p=0.05. It was 72.2% effective for regular treatment of hypertension and significantly proved with a value X_2 = 8.88 and p=0.01.

6.3 NURSING IMPLICATION OF THE STUDY:

NURSING SERVICE:

- The nurse can develop the skill in providing necessary education to the hypertensive women in the urban area where they obtain themselves from the continuous treatment.
- The nurse has to develop knowledge regarding Hypertension and the incidence of Hypertension and their treatment without side effects and cost effective manners.
- The result of the study will help the nurse to enlighten their knowledge in various home therapies concerned with the reduction of Hypertension.
- The nursing supervisors can provide in-service educations to nursing personnel to update their knowledge about various therapies and its valuable benefits to the Hypertensive women and for the personal practice as a means of good healthy practices.

NURSING EDUCATION

- The nurse educator can create awareness to the students about the home management and the treatment options which are available as unnoticed and with cost effective, easily available and accessible manner for Hypertension.
- The nurse educator can include the nutritional health tips and diet therapy aspects in the clinical teaching programme, which can be adopted by the students and the nursing personnel.

NURSING ADMINISTRATION

- Nurses as administrators can influence the quality of nursing care in the community, they can also co-ordinate and discuss about the effectiveness of Beetroot juice and their other dietary products which maintains the cardiac health.

- Nurse administrators can encourage the staffs to conduct various programmes to the various nursing and health personnel related to the home management of cardiac disorders which can be easily managed by the people in the community.

IMPLICATIONS IN NURSING RESSEARCH:

Currently nursing practice is based on evidence based practice. So it is important to do research to equip the community health nurses to be an independent practitioner in various health care settings.

- Nurses and nursing students should undertake more research activities in easily available and acceptable food products in improving cardiac health rather than insisting on the regular medications.
- Nurses can assist researchers of other disciplines in the maintenance and improvement of new modalities in the treatment of hypertension.
- Develop network for new directions in research and collaboration with other Health care professionals for the effective treatment of Hypertension.
- This study can be effectively utilized y the emerging researchers for their reference purposes

6.4 RECOMMENDATIONS:

- An information booklet can be prepared as a teaching aid in the health centers and outpatient clinics regarding the home management of Hypertension.
- A longitudinal study can be done using post test after one month, six months and one year to see effectiveness of Beetroot juice in reducing high blood pressure levels.
- A similar study can be in rural areas.
- A comparative study can be conducted to assess the effectiveness of beetroot products among urban and rural dwellers.

- Similar study can be replicated on a larger sample.
- Similar study can be conducted in other underserved population areas where the people do not seek any treatment facilities due to distance factors and remain unnoticed of their disease.

LIMITATIONS:

- The investigator divided the 60 samples as 30 samples for 14 days (15-control and 15- experiment group) for the proper supervision by home visit daily.
- Some samples hesitated to accept the taste of Beetroot juice and refused to take on daily, so these samples were excluded from the study.

6.5 CONCLUSION

Thus the present study was done to assess the effectiveness of Beetroot juice in reducing blood pressure levels among the Hypertensive women at the urban area, Choolai, Chennai. Though the hypertensive women were taking antihypertensive drugs for their treatment, they were unaware of the presence of high blood pressure in them and so not taking appropriate treatment to cure it, as the studies over lined that hypertensive women were at the high risk of developing Hypertensive complications at the later stages of life as they both were co-related. Thus the chose home management of easily available and accessible Beetroot juice in reducing high blood pressure level among the hypertensive women by the investigator made drastic changes in the acceptance and comfort of the people in the urban area. The findings also clearly significant that Beetroot juice intake considerably reduced the high blood pressure level. Many supporting studies are there for this treatment of cases. So this will be the best way to control high blood pressure level in turn increasing the cardiac health of the Hypertensive women.

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SOCIO DEMOGRAPHIC DATA

Section A

Sample no: Name: Address:

1) Age :

a) 30 – 45 years
b) 46 – 60 years
c) 61 – 65 years
d) Above 65 years

2) Religion :

a) Hindu
b) Christian
c) Muslims
d) Others

3) Educational status :

a) Primary education
b) Secondary education
c) Diploma
d) Degree

4) Occupational Classification

a) Homemaker
b) Government employment
c) Private employment
d) Business

5) Family income per month in Rupees

a) < 1589
b) 1590 – 4726
c) 4727 – 7877
d) 7878-11816
e) Above 11816

6) Dietary pattern

a) Vegetarian
b) Non-vegetarian
c) Mixed

7) Habit of taking non-vegetarian food

a) Daily
b) Alternate day
c) Once in a week
d) Once in a month

8) Habit Of Taking Salty Food

a) Pickle

b) Dryfish

c) Appalam

d) All the above

9) Body weight

a) 40-50 kg

b)51-60 kg

c)61-65 kg

d) >65 kg

SECTION B

1) Family history of hypertension

   a) Yes
   b) No

2) Duration of illness

   a) Below one year
   b) 2 - 3 years
   c) 4 - 5 years
   d) Above 5 years

3) Symptoms before treatment

   a) Headache

   b) Fatigue

   c) Vision changes

   d) All the above

4) Treatment

   a) Regular(daily)as prescribed

   b) Irregular

5) Are you having the habit of doing daily exercise? If yes, types of exercise

   a) Walking
   b) Jogging
   c) Weight lifting
   d) Others

SECTION C

Pre assessment blood pressure

Post assessment blood pressure on 15th day

SCORING KEY:

Pre assessment blood pressure:

140-159/90-99	Mild hypertension – 1
160-179/100-109	Moderate hypertension – 2
Above 180/110	Severe hypertension – 3

Post assessment blood pressure:

No Reduction	- 1
< 5 Reduction	- 2
6-10 Reduction	- 3
11-15 Reduction	- 4
>15 Reduction	- 5

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI – 3.

EC Reg No.ECR/270/Inst.TN/2013
Telephone No : 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Ms. S.Thankaleelal
M.Sc Nursing I Year
College of Nursing
Madras Medical College, Chennai – 3

Dear Ms. S.Thankaleelal,

The institutional Ethics committee of Madras Medical College reviewed and discussed your application for approval of the proposal entitled **"A study to assess the effectiveness of Beetroot Juice reducing hypertension among women residing at selected urban area choolai Chennai."** No.16022014.

The following members of Ethics Committee were present in the meeting held on 24.02.2014 conducted at Madras Medical College, Chennai – 3.

1.	Dr.G.Sivakumar, MS FICS FAIS	-- Chairperson
2.	Dr.Kalai Selvi, MD Prof. of Pharmacology, MMC, Ch-3	-- Member Secretary
3.	Thiru. S. Govindasamy, BABL	-- Lawyer
4.	Tmt. Arnold Saulina, MA MSW	-- Social Scientist
5.	Prof. V. Padmavathi, MD I/C Director of Pathology, MMC, Ch-3	-- Member
6.	S. Ramesh	-- Lay Person

We approve the proposal to be conducted in its presented form

Sd/. Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information / informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Committee

VICE PRINCIPAL
MADRAS MEDICAL COLLEGE
CHENNAI-3.

From

The City Health Officer,
Public Health Department,
Corporation of Chennai,
Ripon Building,
Chennai - 600 003

To Ms. S. Thankaleelal

The Nursing Students,
M.Sc., (Nursing) I Year,
College of Nursing,
Madras Medical College,
Chennai – 600 003

H.D.C.No.C2/1814/2014 Date : .03.2014

Sub: Corporation of Chennai – Public Health Department – Requisition for permission to conduct research study in Choolai, Chennai – Reg.

Ref: 1.Letters received from 11 Students studying M.Sc.,(Nursing) I Year, College of Nursing, Madras Medical College, Chennai-600 003. Dated: 07.03.2014.

2. Orders of the Deputy Commissioner, Dated. 18.03.2014

*****

As per the Orders of the Deputy Commissioner in the reference 2nd cited above 11 Nursing students studying M.Sc., (Nursing) I Year, College of Nursing, Madras Medical College, Chennai-600 003 are permitted to conduct Research Study on their topics.

The names of the students and their topics are mentioned below:

Sl. No.	Name of the Student	Topic
1	Ms. S. Sharmila	A study to assess the effectiveness of soya milk in reducing the malnutrition among malnourished children between 3-5 years of age in selected urban area at Choolai, Chennai.
2	Ms. M. Sakuntala	Assess the effectiveness of massage with ginger and orange essential oil among elderly women with knee pain residing at selected urban area of choolai, Chennai.
3	Ms. C. Lathapriya	Assess the effectiveness of Onion Juice in reducing Blood Glucose level among type II Diabetic adults residing at selected urban area Choolai, Chennai.
4	Ms. K. Kokilarani	A study to assess the effectiveness of amla juice with elemental iron versus elemental iron supplementation to increase the level of haemoglobin on anemic antenatal mother in selected urban area at Choolai, Chennai.
5	Ms. S. Thankaleelal	Assess the effectiveness of Beetroot Juice reducing hypertension among women residing at selected urban area Choolai, Chennai.
6	Ms. P. Revathi	A study to assess the effectiveness of foot reflexology in reducing the severity of menopausal symptoms among menopausal women in selected urban area Choolai, Chennai – 112.
7	Ms. J. Kayalvizhi	A study to assess the effectiveness of acupressure on dysmenorrhea among adolescent girls in selected Urban High School, Choolai, Chennai 112.

8	Ms. S. Benazeer	A study to assess the effectiveness of cauliflower leaves on anaemia among women residing at selected community area Choolai, Chennai 112.
9	Ms. T. Jayasakthi	A study assess the effectiveness of cinnamon powder with Honey in reducing cholesterol among adults at selected urban area in Choolai, Chennai.
10	Ms. D. Lily Hannah Vinnarasi	A study to assess effectiveness of video assisted teaching programme on preventive measures regarding respiratory problem among cotton mill workers in selected urban industry at (Ramapuram) Chennai.
11	Ms. R. Myvizhi	Assess the effectiveness of psycho education module on knowledge regarding dementia among caregivers of old age people residing in selected community area Choolai, Chennai.

Deputy Commissioner (Health) has permitted the 11students with the conditions as detailed below:

1. All Publications should have reference to Corporation of Chennai, Public Health Department and the City Health Officer as Co-Author
2. Reports should be well informed to the Deputy Commissioner (Health) and City Health Officer
3. Negative Reporting about Corporation will be viewed seriously as per the relevant acts.

City Health Officer

Copy Submitted to:

Deputy Commissioner (Health)
City Health Officer
Copy to:

1. Individuals
2. The Zonal Officers, Zone I to XV
3. Zonal Health Officers, Zone I to XV

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool constructed by Ms.S.Thankaleelal, M.Sc Nursing II year, College of Nursing, Madras Medical College which is to be used in her study titled **"Assess the effectiveness of beetroot juice reducing hypertension among women residing at selected urban area choolai, Chennai".** has been validated by the undersigned. The suggestions and modifications given by me will be incorporated by the investigator in concern with their respective guide. Then she can proceed to do the research.

SIGNATURE WITH SEAL

NAME : S MANJU

DESIGNATION : LECTURER

COLLEGE : MADHA COLLEGE OF NURSING

MADHA COLLEGE OF NURSING
26 JUN 2014
CHENNAI - 600 069

PLACE : KUNDRATHUR, CHENNAI

DATE : 26/6/14

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool constructed by Ms.S.Thankaleelal, M.Sc Nursing II year, College of Nursing, Madras Medical College which is to be used in her study titled **"Assess the effectiveness of beetroot juice reducing hypertension among women residing at selected urban area choolai, Chennai".** has been validated by the undersigned. The suggestions and modifications given by me will be incorporated by the investigator in concern with their respective guide. Then she can proceed to do the research.

SIGNATURE WITH SEAL

Director
Institute of Community Medicine
Madras Medical College & RGGGH
Chennai 600 003

NAME :

DESIGNATION :

COLLEGE :

PLACE :

DATE :

INSTITUTE OF COMMUNITY MEDICINE
MADRAS - 600 003
MADRAS MEDICAL COLLEGE

ஆராய்ச்சி தகவல் தாள்

பங்கேற்பாளர் பெயர் :
ஆராய்ச்சியாளர் பெயர் :
ஆராய்ச்சி தலைப்பு : உயர் இரத்த அழுத்த பெண்களுக்கு பீட்ரூட் சாறு மூலம் உயர் இரத்த அழுத்தத்தை குறைப்பது பற்றிய ஓர் திறனாய்வு

இந்த ஆய்வு சென்னையில் உள்ள சூளை பகுதியில் மேற்கொள்ளப்பட உள்ளது.

உங்களை இந்த ஆய்வில் பங்கேற்க அழைக்கின்றோம். நீங்கள் இந்த ஆய்வில் பங்கேற்கலாமா அல்லது வேண்டாமா? என்பதை முடிவு செய்ய இந்த ஆவணத்தில் உள்ள தகவல் உதவியாக இருக்கும். உங்களுக்கு ஏதேனும் சந்தேகம் இருந்தால் நீங்கள் எங்களிடம் வெளிப்படையாக கேட்கலாம்.

எங்களுடைய அடிப்படை தகுதிகளில் நீங்கள் திருப்தியாக இருப்பதால் உங்களை இந்த ஆய்வில் பங்கேற்க அழைக்கின்றோம்.

ஆய்வின் நோக்கம் மற்றும் செயல்பாடு

உயர் இரத்த அழுத்த பெண்களுக்கு பீட்ரூட் சாறு மூலம் உயர் இரத்த அழுத்தத்தை குறைப்பது பற்றிய ஓர் திறனாய்வு.

முதலில் உங்களின் இரத்த அழுத்தத்தை பதிவு செய்வேன். அதன்பின் 400மி.லி. பீட்ரூட் சாறு காலை உணவிற்கு பின் வழங்கப்படும். நீங்கள் வழக்கமாக எடுத்துக்கொள்ளும் மாத்திரைகளை எடுத்துக்கொள்ளலாம். இவ்வாறு 14 நாட்கள் தரப்படும். பீட்ரூட் சாறு முற்றிலும் இலவசமாகவும் ஆய்வாளரின் நேரடியான கண்காணிப்பிலும் வழங்கப்படும். இதனால் உங்களுக்கு எந்தவிதமான பாதிப்பும் வராது. இரத்த அழுத்தம் 8வது மற்றும் 15வது நாட்களில் அளவு செய்யப்படும்.

இந்த ஆய்வில் உங்களது பெயர், வயது, இருப்பிடம், இரத்த அழுத்தத்தின் அளவு, உணவு முறைகள் ஆகிய தகவல்களை பெற்றுக்கொள்வோம்.

சில தகவல்கள் உங்களிடம் பெறப்படும்

உங்களுக்கு உங்களுடைய தகவல்களை இரகசியமாக வைத்துக்கொள்ளும் உரிமை உண்டு. நீங்கள் இந்த ஆய்வில் கையொப்பமிடுவதால் நீங்கள் உங்களுடைய தகவலை, ஆய்வுக்குழு மற்றும் நிறுவனத்திடம் காட்ட வேண்டும். இந்த ஆராய்ச்சியின் தகவல்களை விஞ்ஞான இதழ்கள் மற்றும் விஞ்ஞான கூடத்தில் வெளியிடப்பட்டாலும் உங்களுடைய அடையாளங்கள் காட்டப்படமாட்டாது.

ஆராய்ச்சியாளர் கையொப்பம் தேதி:

பங்கேற்பாளர் கையொப்பம் தேதி :

ஆராய்ச்சி ஒப்புதல் படிவம்

ஆராய்ச்சி தலைப்பு : உயர் இரத்த அழுத்த பெண்களுக்கு பீட்ரூட் சாறு மூலம் உயர் இரத்த அழுத்தத்தை குறைப்பது பற்றிய ஓர் திறனாய்வு

ஆய்வாளர் பெயர் : செ.தங்கலீலாள்

பங்கேற்பாளர் பெயர் :

தேதி :

வயது/ பால் :

ஆராய்ச்சி சேர்க்கை எண் :

- ஆய்வாளர் மேற்கொள்ளும் ஆராய்ச்சியில் பங்கேற்க யாருடைய கட்டாயமுமின்றி, முழு மனதுடனும், சுய நினைவுடனும் சம்மதிக்கிறேன்.
- ஆய்வாளர் மேற்கொள்ள போகும் பரிசோதனைகளை மிக தெளிவாக விளக்கிக் கூறினார்.
- எனக்கு விருப்பமில்லாத பட்சத்தில் ஆராய்ச்சியிலிருந்து எந்நேரமும் விலகலாம் என்பதையும் ஆய்வாளர் மூலம் அறிந்துகொண்டேன்.
- **இந்த ஆராய்ச்சி ஒப்புதல் கடிதத்தில் உள்ள விவரங்களை நன்கு புரிந்துகொணேடேன். எனது** உரிமைகள் மற்றும் கடமைகள் ஆராய்ச்சியாளர் மூலம் விளக்கப்பட்டது.
- நான் ஆராய்ச்சியாளருடன் ஒத்துழைக்க சம்மதிக்கிறேன். எனக்கு ஏதேனும் உடல்நலக்குறைவு ஏற்பட்டால் ஆராய்ச்சியாளரிடம் தெரிவிப்பேன்.
- நான் வேறு எந்த ஆராய்ச்சியிலும் தற்சமயம் இடம்பெறவில்லை என்பதை தெரிவித்துக்கொள்கிறேன்.
- இந்த ஆராய்ச்சியின் தகவல்களை வெளியிட சம்மதிக்கிறேன். அப்படி வெளியிடும்போது என் அடையாளம் வெளிவராது என்பதை அறிவேன்.
- **எனக்கு இந்த ஒப்புதல் கடிதத்தின் நகல் கொடுக்கப்பட்டது.**

ஆய்வாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

தேதி தேதி

PREPARATION OF BEETROOT JUICE:

Ingredients:

- Beetroot – 200 gms
- Water - 50 ml
- Sugar - 5 gms

Preparation:

Take 200 grams of raw beetroot, clean with water and peel off the outer layer thoroughly. Slice it, mix with 50 ml of drinking water and grind well for 5 to 10 minutes. Add 5 grams of sugar and stir it. Filter the juice and distribute 200 ml of beetroot juice in a measuring cup.

CERTIFICATE OF ENGLISH EDITING

To whom so ever it may concern

This Is To Certify That The Dissertation Work, "Assess The Effectiveness Of Beetroot Juice Reducing Hypertension Among Women Residing At Selected urban Area Choolai, Chennai" Done By Ms.S.Thankaleelal M.Sc (Nursing) II Year Student Of College Of Nursing, Madras Medical College,Chennai-600003 Is Edited For English Language Appropriateness By K. RADHAKRISHNAN.

23.1.2015

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