DISSERTATION

ON

ASSESS THE EFFECTIVENESS OF COCOA POWDER IN REDUCING CHOLESTEROL LEVELS AMONG THE HYPERTENSIVE CLIENTS AT THE RURAL AREA , MEDAVAKKAM , CHENNAI.

M.SC (NURSING) DEGREE EXAMINATION

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CERTIFICATE

This is to certify that this dissertation titled , **"Assess the effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai"** is a bonafide work done by Miss. G.Grace Jebakani Sweety , College of Nursing , Madras Medical College , Chennai- 600 003 , submitted to The Tamil Nadu Dr.M.G.R. Medical University , Chennai , in partial fulfillment of requirements for the award of the degree of Master of Science in Nursing , Branch – IV , Community Health Nursing under our guidance and supervision during the academic period from 2010-2012.

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ABSTRACT

Hypertension is the major emerging disease of the present era which is combined with Hyperlipidemia which requires home based management to prevent the further cardiac complications. This study focuses on effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai. The Objectives of the study were to assess the pre test and post test cholesterol level of Hypertensive clients in experimental and control group, to identify the effectiveness of cocoa powder on Cholesterol levels in experimental group and to associate the findings with the selected demographic variables. For the study , true experimental design was adopted. 60 samples with Hypertension with Blood Pressure above 140/90 mm Hg and Cholesterol above 200 mg/dl (30 – control group and 30 – experimental group) were selected by simple random sampling method. Cholesterol level was checked for the clients and Cocoa powder was administered for 15 days for the experimental group and the control group didn't get any intervention and data were collected using structured interview schedule and the collected data were analyzed using descriptive and inferential statistics. The clients in the experimental group had good reduction in cholesterol level of about 10 mg/dl on the whole after the administration of cocoa powder regularly for the period of 15 days continuously. Comprehensive Health Education Programme regarding home based management and nutritional measures should be implemented and the further studies can be done with the large samples and urban community people.

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LIST OF ABBREVIATIONS

S.NO	TITLE OF THE ABBREVIATIONS	EXPANSION
1.	HDL	High Density Lipoproteins.
2.	LDL	Low Density Lipoproteins.
3.	KAP	Knowledge , Attitudes and Practice

CHAPTER I

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 blood pressure is a chronic cardiac medical condition in which the systemic arterial Blood Pressure is elevated.

A person is said to be Hypertensive when the Blood Pressure is above 140 mm Hg systolic and 90 mm Hg diastolic. Sedentary lifestyle, smoking, stress, visceral obesity, potassium deficiency, alcohol intake , aging , vitamin D deficiency are all the pre guides for the incidence of Hypertension.

The Sentinel Surveillance Project documented 28% overall prevalence of Hypertension in urban and rural areas. Recent estimates suggests that approximately 1 Billion adults have Hypertension with progressive increase in the prevalence of age – specific and age- adjusted Hypertension with high cholesterol levels. Given that more than 80%of the world's population lives in economically developing nations , it is very

likely that the worldwide burden of illness due to Hypertension will continue to escalate unless measures are to be blunt the expected increase in prevalence of Hypertension.

Cardio vascular diseases account for a large population of all deaths globally where Hypertension and Hypercholestremia plays a major context. 5.2 million deaths are happening in developing countries. Meta – analysis of Indian prevalence studies has shown that there has been a significant increase in Hypertension in both urban and rural areas.

According to the 2011 census, there are 600 million adults in India, of whom 420 million are in rural and 180 million in urban areas and the absolute number of Hypertensives in India shall be 31.5 million rural and 34 million urban subjects, a total of 65.5 million. The rural people need better health facilities to be noticeable to them so that they can reduce the risk of diseases.

Michael Russell (2011) enumerated that the high cholesterol and Hypertension are the two different things , but they often come together with disastrous consequences**.** **Gupta et al., (2011)** confirmed that Stroke , heart attack and an assortment of other coronary heart diseases can be caused by high blood pressure resulting in increased cholesterol levels thereby there is a constant link between hypertension and high cholesterol. Hypertension instantly increases the narrowing of the arteries and causes accumulation of lipids on the wall of the blood pressure causing Hypercholestremia. It is evident that more than 45% risk is there for the Hypertensive clients to get increased cholesterol level in their life time.

Lifestyle modifications, such as smoking cessation, dietary therapy, and physical activity, with or without antilipemic drug therapy, are used to manage hypercholesterolemia and reduce risk of Coronary Heart Disease. Restricting total fat is less important than reducing the intake of saturated fat and cholesterol. Moreover, diets very low in total fat are high in carbohydrates, which may increase triglyceride levels and lower HDL cholesterol levels.

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 cost effective basis so that all can be able to follow at their easiest manner which can reduce the risk of cardio vascular diseases.

The cocoa powder , the naturally available product which is in lot of products still seems to be the hidden valuable treatment for the hypertension and hypercholestremia which the people are still aware of it. **Khan et al (2011)** found out that Regular consumption of cocoa powder with milk increases HDL cholesterol and reduces oxidized LDL levels in subjects at high-risk of cardiovascular disease. **Shrime et al (2011)** proposed that Flavonoid-rich cocoa consumption affects multiple cardiovascular risk factors in a meta-analysis and thereby decreases hypertension and thereby high cholesterol levels.

Cocoa powder:

Cocoa powder is an unsweetened powder produced by grinding cocoa beans and pressing out the cocoa butter(fat). Natural Unsweetened Cocoa Powder tastes very bitter and gives a deep chocolate flavor that makes it very palatable. The odor smells as the chocolate and appears in dusky brown in appearance. It has no side effects. But should not be recommended for the diabetic clients who are having Hypertension. It will not have any addictive effects when taken continuously by the clients.

Health effects of cocoa powder:

- It reduces Blood Pressure.
- It reduces the low density lipoproteins , triglycerides and total cholesterol.
- It improves insulin sensitivity and decreases insulin resistance.
- It has an anti – oxidant capacity.

- Increasing the intake of cocoa powder can also help in reducing the risk for developing type-2 diabetes. It is important, however, to make sure that the purest form is chosen so that it would have the lowest calorie and sugar content. Cocoa powder can help in the manufacturing and the action of insulin.
- Cocoa powder is also a natural source of magnesium which can help in relieving pre-menstrual syndrome

Chocolate and cocoa derive their health benefits from flavonoids,

which are plant pigments capable of acting as antioxidants to counteract some of the cellular damage that can lead to chronic diseases such as cancer and heart disease. Cocoa products are available in all delicious food items like

- Milk, dark, and white chocolate
- Colored and flavored coatings and inclusions
- Ice cream coatings and inclusions
- Sugar-free coatings
- Natural and alkalized powder
- Bulk and liquid caramel
- Cocoa butter, fountain chocolate, chocolate seed, chocolate liquor.

Thus cocoa powder in its purest form can decrease the burden of cardiovascular diseases and a major enemy for cholesterol which the people can easily afford and have in their own dwelling to lead a healthy life.

NEED FOR THE STUDY:

People face challenging situations every day. Often , life situation creates positive challenges and it serves to make the people to meet those challenges. When a person is affected with the Hypertension , they are likely to have negative reactions within themselves. The diagnosis of the Hypertension and Hypercholestremia continues to generate fear and turmoil in the lives of the families. Clearly at the time of diagnosis , patients experience confusion and distress.

So , it is widely advisable to take easily available , feasible measures to reduce the cardio vascular risk whereby the people voluntarily adopt them for their healthy life other than medications. Cocoa is present in their day to day food products which remain unnoticed by all the people of its beneficial effects. Cocoa powder answers the question , whether I can be able to control the cholesterol level by myself?

In May 2010, a literature review of short-term research from eight previous trials demonstrating the impact of cocoa on cholesterol was published in the American Journal of Clinical Nutrition. In fact, the researchers found that chocolate is effective only for reducing cholesterol at low doses and only for people who are already at risk for cardiovascular disease. **Jai et al .,(2010)** performed a study about the Short-term effect of cocoa product consumption on lipid profile which showed that cocoa considerably reduced cholesterol level in hypertensive patients. **Albert et al., (2007)** in their study found out that Continuous intake of poly phenolic compounds containing cocoa powder reduces LDL oxidative susceptibility and has beneficial effects on plasma HDL-cholesterol concentrations in humans**.**

International Journal of Epidemiology (2010) in their study on willingness of the hypertension patients to continue the treatment in china revealed that the Hypertensive clients had very less willingness to pay for the anti- hypertensive drugs for the primary prevention of cardiovascular diseases. Same situation prevails in our country too where the people didn't pay much attention to the medical advice of taking drugs unless until they gets a serious problem which put them into the trouble. Many of them are unaware of the increase in the cholesterol levels though they have some restriction over the salt diet due to persisting Hypertension. Those who are diagnosed with

Hypertension with high cholesterol can have the daily practice of having cocoa powder may decrease their risk of developing cardiovascular diseases with less cost and satisfaction.

People are always worried about the high blood pressure in them and take medications prescribed by the doctor. But the rural people as they are always engaged in daily wages to earn their living fails to visit the doctor for the medications though our Government has been providing free medical services for them and the distribution of the medications in the morbidity clinics. Even when they approach the physician for the diagnosing of the disease once they had some medical symptoms which affects their daily works , they mostly in large proportion fails to continue the medications and the medical advice provided by the physician and the health workers.

The investigator as a Community Health Nurse while moving closely with the people at the rural area in Medavakkam found out that many Hypertensive clients were still unnoticed and not receiving the treatment. The investigator while collecting their history found out that they were not aware of the cholesterol level of them. As the Hypertension and Hypercholestremia goes hand in hand , it was decided to check for the cholesterol level among the Hypertensive clients and found out that 85% of those clients had high cholesterol which they were not aware of that. They expressed the fear that they were under the treatment for hypertension by anti – hypertensive drugs and still taking drugs for decreasing their cholesterol level would be a burden for them too.

During the interview with those clients, the investigator found out that they feared about their increased cholesterol and expressed their willingness to take further treatment to reduce their cholesterol level at the earliest. As they revealed that they could be treated without the medications for reducing the same as they are under the anti – hypertensive drugs too. So , the investigator thought of carrying out an intervention which can be easily affordable and available to the community people in the rural area so that they could be encouraged in their home management. The investigator after the reviews found out that cocoa powder would be very effective in reducing cholesterol levels at the reliable manner. The cocoa powder would be easily available, cost effective, affordable,

palatable and without any side effects may considerably decrease the cholesterol levels which in turn improves the cardiovascular health.

This motivation made the investigator to choose easily available product of cocoa powder to reduce the blood pressure, cholesterol levels and improved cardiac health among the Hypertensive clients so that the community people may have their cardiac health to maintain in their respective healthy community environment itself. The rural people need better health facilities to be noticeable to them so that they can reduce the risk of diseases. So many researchers had revealed that the intervention studies should be concentrated towards the rural areas so that the remote people can be benefited.

STATEMENT OF THE PROBLEM:

Assess the effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai.

OBJECTIVES:

- To assess the pre test cholesterol level of Hypertensive clients in experimental and control group.
- To assess the post test cholesterol level of hypertensive clients in experimental and control group.
- To identify the effectiveness of cocoa powder on Cholesterol levels in experimental group.
- To associate the findings with the selected demographic variables.

OPERATIONAL DEFINITION:

Effectiveness:

It refers to the outcome. In this study, it refers to the effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients.

Cocoa powder:

An unsweetened powder produced by grinding cocoa seeds and pressing out the cocoa butter(fat).

Cholesterol :

Hypertensive clients with the cholesterol level above 200 mg/dl.

Hypertensive clients:

It refers to the clients whose systolic blood pressure is above or equal to 140 mm Hg and diastolic blood pressure above or equal to 90 mm Hg.

ASSUMPTION:

The cocoa powder will considerably decrease the level of cholesterol among the Hypertensive clients.

HYPOTHESIS:

There is a significant association between cocoa powder and the cholesterol levels.

DELIMITATIONS:

- The study is limited to the Hypertensive clients of the selected rural area, Medavakkam.
- The study is limited to the period of one month.

CHAPTER II

REVIEW OF LITERATURE

Review of literature guides the researcher in selecting the research design, conceptual framework , tool development and methodology. It also helps to plan and conduct the study in a systematic way. Review of literature in this study is arranged under the following headings:

PART I:

Section A: studies related to Hypertension.

Section B: Studies related to Hypertension with Hypercholestremia and its management.

Section C:Studies related to effect of Cocoa Powder on Cholesterol levels.

PART II:

Conceptual framework.

PART I

Section A: Studies related to Hypertension.

Guptha et al., (2011) performed a study to depict the twenty – year trends in cardiovascular risk factors in India and the influence of cardio vascular risk factors. Five cross – sectional studies were performed in middle socio economic status (SES) urban locations in Jaipur, India from year 1992 to 2010. Cluster sampling method were performed. Data was obtained by history, anthropometry and fasting blood glucose level and lipids estimation. Response rates vary from 55 to 75%. They found out that there is high prevalence of cardio vascular risk factors. Over a 20 year period body mass index

and overweight increased, High blood pressure, hypercholestremia and diabetes remained stable.

Gupta et al., (2011) conducted a study among the rural populations about the hypertension prevalence using recent criteria first reported in subjects aged 20 years. Hypertension was present in 24% men and 17% women. In 1995, the overall prevalence of hypertension in adults >20 years was 30% in men and 33% in women, while in 2002 the age-adjusted prevalence was 30% in men and 34% in women. Epidemiological studies have shown that hypertension is present in 25% of urban and 10% of rural subjects in India. There is a difference in measurement methodology of BP in epidemiological studies as compared to clinic-based measurements. It has been reported that epidemiological studies that rely on single-session measurements over diagnose hypertension by 20–25%.

Pandey et al., (2011) conducted a study on the high prevalence and low awareness , treatment and control of Hypertension in Asian Indian women. Population based studies among women aged 35-70 years were performed in 4 urban and 5 rural locations. Stratified sampling were performed and 4608 (rural 2604 and urban 2004) were enrolled. Demographic details, diet, physical activity, anthropometry and blood pressure were recorded. Descriptive statistics were reported. The results were revealed that awareness of Hypertension was high in urban women than in rural women, high prevalence of Hypertension in middle aged Asian women, treatment and control status was significantly low.

Kusuma YS (2011) performed a study on the perceptions on Hypertension among the migrants: a qualitative study. Grounded theory approach were used to elicit Explanatory models (EMs) of Hypertension held by neo and settled migrants in Delhi. In – depth interviews with key – informants and focus group discussions with community members were conducted. The study finally came out with the results that Hypertension has been perceived as a common and serious problem in the community. In adequacy of awareness has been acknowledged and there was a felt need for awareness campaigns by addressing the existing gaps , for prevention and control of Hypertension and other

cardio vascular risk factors like Hypercholestremia and screening programmes in the community. There were slight variations by gender and migration status in the perceived pathways to Hypertension.

Bhardwaj et al., (2010) performed a study to assess the prevalence , awareness and control of Hypertension in rural communities of Himachal Pradesh. Population based 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.

Anghel et al., (2010) conducted a study on dyslipidemias , a risk factor of Hypertension in the countryside. 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. They recommended that using proper programmes of prophylaxis, there can be hope for a decrease of the mortality and morbidity of cardio vascular diseases.

Gupta et al., (2009) performed a study on coronary heart disease in low socio economic status subjects in India : " an evolving epidemic". They revealed in their study that mortality data from Global Burden of the disease are important causes of death. Case control studies have reported that being illiterate and poor is an independent risk factor for cardio vascular diseases. Many of the standard coronary risk factors such as smoking and tobacco use , low physical activity , high dietary fat intake , uncontrolled hypertension , uncontrolled hypercholestremia and diabetes are also common among the low socioeconomic individuals. Data shows that access and affordability for acute care managements and long term secondary prevention practices and compliance are lacking in those subjects. These attributes forecast a grim scenario for the evolving epidemic of coronary heart disease in India.

Line Albert et al., (2008) conducted a study on Knowledge, Attitudes, and Practices on Hypertension in a Country in Epidemiological Transition . They examined KAP on hypertension in a random sample of 1067 adults aged 25 to 64 years from the Seychelles Islands (Indian Ocean). KAP were assessed from an administered structured questionnaire. The age-standardized prevalence of hypertension (screening blood pressure [BP] ≥160/95 mm Hg or taking antihypertensive medication) was 36% in men and 25% in women aged 25 to 64 years. Among hypertensive persons, 50% were aware of the condition, 34% were treated, and 10% had controlled BP (ie, BP <160/95 mm Hg). Favorable outcome expectation, positive attitudes, and appropriate practices for hypertension and relevant healthy lifestyles were found in smaller proportions of participants, with little difference between aware hypertensives, unaware hypertensives, and non hypertensives. These data point to the need to maximize the efficiency of hypertension prevention and control programs so that delay in achieving effective hypertension control is minimized in countries experiencing recent emergence of hypertension as a major public health problem.

Kaur et al., (2007) conducted a study on Prevalence and distribution of cardiovascular risk factors in an urban industrial population in south India: a cross-sectional study. Survey of behavioral risk factors using structured questionnaires and anthropometric measurements were done for the study population. Blood samples were collected for the fasting plasma glucose and serum cholesterol. The total study population included 2262 male subjects. Blood samples were collected for 2148 (95.0%) subjects. Age range was 18-69 years. Prevalence of major cardiovascular risk factors was: current smokers 462 (20.2%), body mass index > or = 23 kg/m2 1510 (66.8%), central obesity 1589 (70.2%), hypertension 615 (27.2%), diabetes mellitus 350(16.3%) and total cholesterol > or = 200mg/dl in 650(30.3%). The study results indicated high prevalence of behavioral risk factors, central obesity, hypertension, hypercholestremia and diabetes

Journal of Human Hypertension (2006) published Trends in hypertension epidemiology in India. The country has a wider spread of hypertension in recent years. Although there is generally a lower prevalence of hypertension in the rural Indian population, there has been a steady increase over time in this rural population as well. It

has also increased over the years. In South Indian rural subjects, that are almost urbanized, the prevalence has been reported to be as high as 17.8% (1993) and 12.46% (1994) in recent years. Overall, there is a significant increase in hypertension prevalence in rural areas although the rise is not as steep as in urban populations (r=0.67, P=0.025). It is seen that in urban men aged 40–49 years there is a significant increase in systolic BP (r=0.95, P<0.001) but not in diastolic (r=0.43, P>0.2). This is of obvious clinical significance in light of the recent evidence that systolic BP is more closely linked to cardiovascular events and cardiac mortality.

Section B: Studies related to Hypertension with Hypercholestremia and its management.

George Pararas (2011) performed a study on the effectiveness of alternative therapies on the management of Hypertension. He proposed that dietary approaches to stop Hypertension (DASH) diet , calcium supplements too reduces the risk of developing cardio vascular diseases . Hypertension frequently occurs in conjunction with High blood cholesterol. Multi drug therapy is often prescribed to deal with these parallel conditions. The most effective means to treat both is to create the cause rather than the symptoms.

Chhabra MK et al., (2011) observed in the study that lifestyle modifications play a vital role in the management of Hypertension. Less hours of sleep , avoidance of exercises and avoidance of smoking and alcoholism all play a key role in reducing hypertension and thereby reducing the risk of cardio vascular diseases. As regarding behavioral changes, stopping smoking, regular physical exercise, relaxation therapies like yoga, etc, have definite beneficial effect on hypertensives. The antihypertensive effect of lifestyle modifications may obviate drug therapy. Serum cholesterol level is commonly elevated in hypertensive patients and its reduction reduces the risk of non-fatal coronary events. Thereby due concern should be given for the increase in cholesterol levels.

Nguyen et al., (2011) conducted a study on Awareness, treatment, and control of hypertension and hypercholesterolemia among insured residents. Using data from the 2004 New York City Health and Nutrition Examination Survey, they investigated inequalities in the diagnosis and management of hypertension and hypercholesterolemia

among insured adults aged 20 to 64 years (n = 1,334). They assessed differences in insurance type (public, private) and routine place of care (yes, no), by socio demographic characteristics. One in 10 participants with hypertension and 3 in 10 with hypercholesterolemia were unaware and untreated. Having a routine place of care was associated with treatment and control of hypertension and with awareness, treatment, and control of hypercholesterolemia, after adjusting for insurance type, age, sex, race/ethnicity, foreign birth, income, and education. They concluded that Socio demographic characteristics may influence chronic disease management among the insured through health care access factors such as having a routine place of care.

Shafiq et al., (2010) performed a study on Dietary treatment for familial hypercholesterolemia at Chandigarh, India. Randomized controlled trials, both published and unpublished, where a cholesterol-lowering diet in children and adults with familial hypercholesterolemia has been compared to other forms of dietary treatment or to no dietary intervention were included. Two authors independently assessed the trial eligibility and methodological quality and one extracted the data, with independent verification of data extraction by a colleague. Four new trials have been added making eleven trials with a total of 331 participants eligible for inclusion. Large, parallel, randomized controlled trials are needed to investigate the effectiveness of a cholesterol-lowering diet and the addition of omega-3 fatty acids, plant sterols or stanols, soya protein to a cholesterol-lowering diet.

Sesso (2010) in Journal of American Heart Association explained that high cholesterol may lead to high blood pressure in men. Among 3110 men were randomly selected , they found that positive association between higher levels of total cholesterol , non – High density lipoprotein – cholesterol ration and an increased risk of Hypertension. Highest fifth of total cholesterol were 23% more likely to develop Hypertension , 39% of non-HDL cholesterol ratio were more likely to develop Hypertension.

Niijar et al., (2010) did a study on the role of dietary supplements in lowering low-density lipoprotein cholesterol among the Hypertensive patients. A number of dietary supplements and functional foods have been suggested to reduce the low density

lipoprotein cholesterol levels among the Hypertensive patients by randomized controlled trials. There was a considerable evidence in support of dietary supplements and low density lipoprotein cholesterol lowering effects. This will considerably decrease the risk of cardio vascular diseases.

Kavitha. K (2009) conducted a study to assess the effectiveness of Guided imagery on blood pressure among 30 PIH mothers patients in government hospital, Maduari. Intervention on guided imagery was administered using the Audio CD, and made them to hear the Guided imagery two times a day for 20 minutes for 5 days. Result of this study was concluded that the significant difference between the mean systolic blood pressure before 158.3(S.D=11.4) after 136.7(S.D=5.6),t=15.9(P=0.01) and the mean diastolic blood pressure before 102(S.D=6.1),after 88.3(SD=4.7) and t=13.7(P=0.01).

Job. S (2009) conducted a study a study to assess the effectiveness of abdominal breathing exercise on blood pressure among 40 hypertensive patient in Mahajubille Hospital, Edathua. Intervention on abdominal breathing exercise was taught to the experimental group by playing video CD, Abdominal breathing exercise was performed for 21 days. Result of the study was shown that there was a significant difference between the mean systolic blood pressure before 145.5(SD=18.20) after 136.6(S D=19.03) and t=6.52(p=0.01) and significant difference between the mean diastolic blood pressure before 84.7(S D=8.81), after 76.8 (SD=7.96) t= 5.89(p=0.01).

Modesti P.A et al., (2008) conducted a study on slow abdominal breathing combined with music listening among hypertensive patients of sample size 48. Experimental group include patients taking anti-hypertensive drugs and 20 patients served as control group. Experimental group listed to music(raga)for 30 mts while conducting abdominal breathing and control group did not undergo both.The blood pressure among those who listened to music while conducting abdominal breathing dropped by 3 mm of Hg at one week and 4 mm of Hg at one month compared with control.

Mitamins et al., (2007) conducted a study on the effect of garlic in reducing Hypertension with elevated cholesterol levels. The main objective of the study was to evaluate the effectiveness of the garlic in reducing blood pressure with considerable increase in cholesterol levels. Studies showed that garlic was a natural remedy which was found to cause reduced platelet aggregation and reduced the elevation of lipids and low density lipoproteins in the blood which combined with high cholesterol eventually causes atherosclerosis. Reducing risk of heart disease by taking garlic makes the sense as a high Blood Pressure treatment.

Kostis J.B (2007) conducted a study on the management of Hypertension and dyslipidemia to decrease the incidence of cardiovascular diseases. The main objective of the study was to show the importance of the management of Hypertension and dyslipidemia to reduce the incidence of cardiovascular diseases. A brief review of the epidemiology of Hypertension and Hyperlipidemia and of controlled clinical trials of pharmacologic therapy of these conditions in decreasing cardiovascular events were presented. The results shown that risk factors for cardiovascular diseases generally do not occur in isolation and the co – occurrence of Hypertension and dyslipidemia with or without other additional risk factors , greatly increases the risk of cardiovascular diseases. Emerging evidence suggested that lipid management provides clinical benefit in patients at high risk of cardiovascular diseases regardless of their baseline cholesterol levels in Hypertension. They recommended that integrative combination therapies containing antihypertensive and lipid – lowering drugs in a single pill will contribute to better risk factor management with the potential for greater adherence and improved clinical outcomes.

Dhawan et al., (2007) performed a study on Garlic supplementation prevents oxidative DNA damage in essential hypertension at Chandigarh , India. Twenty patients of EH as diagnosed by JNC VI criteria (Group I) and 20 age and sex-matched normotensive controls (Group II) were enrolled in the study. Both groups were given garlic pearls (GP) in a dose of 250 mg per day for 2 months. Baseline samples were taken at the start of the study, i.e. 0 day, and thereafter 2 months follow-up. NO levels and lipid per oxidation were observed in Group I subjects with GP supplementation. Further, a

significant increase in vitamin levels and TAS was also observed in this group as compared to the control subjects. These findings point out the beneficial effects of garlic supplementation in reducing blood pressure and counteracting oxidative stress, and thereby, offering cardio protection in essential hypertensive clients.

Section C: Studies related to the effect of Cocoa powder on cholesterol levels

Dr .penny Kris- Ketherson (2011) conducted a study on the effects of Cocoa powder and dark chocolate on Low density lipoprotein levels. The objective of the study was to evaluate and compare the LDL susceptibility to oxidation when the test subjects , 23 men and women, ate an average American diet properly made low in flavanoids and a diet combined about 38 grams of Cocoa powder and dark chocolate in Hypertensive patients for a period of 2 weeks. The result was found that Cocoa powder had anti – oxidant effect and it inhibited the LDL oxidation thereby reducing cholesterol levels in Hypertensive patients and it decreased the development of atherosclerosis or hardening of arteries.

World Health Organization (2011) in their new study presented at the annual meeting of the International Society on Thrombosis and Homeostasis revealed that the Cocoa powder can prevent potential fatal blood clots from forming and causing strokes or heart attacks. The research showed that Cocoa powder prevents platelets , the cells that helps to create clots from causing blockages.

Westphal et al., (2011) conducted a study on Flavanol-rich cocoa ameliorates lipemia-induced endothelial dysfunction at Germany. Consumption of flavanols improves chronic endothelial dysfunction. They investigated whether it can also improve acute lipemia-induced endothelial dysfunction. In this randomized, placebo-controlled, double-blind, crossover trial, 18 healthy subjects received a fatty meal with cocoa either rich in flavanols (918 mg) or flavanol-poor. Flow-mediated dilation (FMD), triglycerides, and free fatty acids were then determined over 6 hours. Flavanol-rich cocoa can alleviate the lipemia-induced endothelial dysfunction, probably through an improvement in endothelial NO synthase.

Tokede et al., (2011) conducted a study on Effects of cocoa products/dark chocolate on serum lipids: a meta-analysis at Boston. Cocoa products, which are rich sources of flavonoids, have been shown to reduce blood pressure and the risk of cardiovascular disease. Dark chocolate contains saturated fat and is a source of dietary calories. 10 clinical trials consisting of 320 participants were included in the analysis. Treatment duration ranged from 2 to 12 weeks. Intervention with dark chocolate/cocoa products significantly reduced serum low-density lipoprotein (LDL) and total cholesterol (TC) levels (differences in means (95% CI) were -5.90 mg/dl (-10.47, -1.32 mg/dl) and -6.23 mg/dl (-11.60, -0.85 mg/dl), respectively). No statistically significant effects were observed for high-density lipoprotein (HDL) (difference in means (95% CI): -0.76 mg/dl (-3.02 to 1.51 mg/dl)) and triglyceride (TG) (-5.06 mg/dl (-13.45 to 3.32 mg/dl)). These data are consistent with beneficial effects of dark chocolate/cocoa products on total and LDL cholesterol and no major effects on HDL and TG in short-term intervention trials.

Ying Wan et al., (2010) conducted a study on the effects of Cocoa powder and dark chocolate on LDL oxidative susceptibility and prostaglandin concentration in humans. A randomized , 2 period , cross over study was conducted in 23 healthy subjects fed 2 diets. An average American diet (AAD) , controlled for fiber , Caffeine and an AAD supplemented with 22 gm Cocoa powder and 16 gm dark chocolate. Results were found out to be LDL oxidation lag time was *% greater (P=0.01) after the CP-DC diet after the AAD. Serum total anti oxidant capacity measured by oxygen radical absorbance capacity was 4% greater (P=0.04) after the CP-DC diet. HDL cholesterol was 4% grater after the CP-DC diet (P=0.02). Thus it was concluded that Cocoa Powder and dark chocolate may considerably affect cardiovascular disease risk status by modestly reducing LDL oxidation susceptibility , increasing serum total anti oxidant capacity and HDL- cholesterol concentrations and not adversely affecting prostaglandins.

A literature review in American Journal of Clinical Nutrition (2010) of short term research reported the results from 8 previous trials demonstrating the impact of Cocoa powder on cholesterol. Researchers found out that the easily available , feasible , low cost chocolate and Cocoa was very effective in reducing the levels of triglycerides , total cholesterol , low density lipoprotein , blood pressure and increasing the

concentration of high density lipoprotein in blood among Hypertensive patients at a high success rate thereby decreasing the incidence of cardiovascular diseases.

Davide Grassi et al., (2010) conducted a study of Cocoa powder in Hypertension. 20 never – treated patients with essential Hypertension were selected. After a 7 day chocolate – free- run-in-phase , they were randomized to receive either 100 gm per day dark chocolate (containing 88 mg flavanol) for 15 days. The homeostasis model assessment o insulin resistance, quantitative insulin sensitivity check index , cholesterol levels , blood pressure were evaluated .The results were found out the patients have shown best results with reduced blood pressure , reduced cholesterol levels up to about 5-10 mg/dl and ameliorated insulin sensitivity. These results suggested that while balancing total calorie intake , flavanol from Cocoa products may provide some cardiovascular benefits if included as a part of the healthy diet for the patients with Hypertension.

Jia et al., (2010) conducted a study on short – term effect of Cocoa powder products consumption on lipid profile. The main objective of the study is to identify and quantify the effect of Cocoa on total cholesterol , LDL cholesterol and HDL cholesterol. A meta – analysis of randomized controlled trials was used. 8 trials (involving 215 participants having Hypertension as a long term illness with varied lipid profile) were included and evaluated for a period of 2 weeks. Cocoa consumption significantly lowers LDL cholesterol by 5.87 mg/dl (95%, $P<0.05$), LDL by 4.98 mg/dl($P=0.23$) and blood pressure by 20-40 mm Hg. They concluded that short – term Cocoa consumption significantly reduces blood pressure and cholesterol. Future high – quality studies are needed to determine the efficiency of moderate Cocoa consumption on lipid profile in long – term intervention and in subjects with other cardio metabolic risk factors.

Bas Van Den Boggard et al., (2009) performed the study on the effects of Cocoa powder on peripheral and central blood pressure. In a double – blinded placebo – controlled- 3 period cross over trial of 42 healthy individuals with blood pressure of 130-159 mm Hg / 85-99 mm Hg and 106 mg of Cocoa product with natural dose of 106 mg of theobromine – enriched flavanol – rich Cocoa. Treatment duration was 3 weeks with a 2 week washout. In their conclusion, they found out that the Cocoa reduces blood pressure

by 20-40 mm Hg/ 10-20 mm Hg. They recommended that effectiveness of Cocoa may be checked with lipid profile too in large samples of clients with Hypertension.

Gallelano et al., (2009) conducted a study on Cocoa, chocolate, and cardiovascular disease at Argentina. They finalized that the concept that moderate chocolate consumption could be part of a healthy diet has gained acceptance in past years based on the health benefits ascribed to selected cocoa components. Specifically, cocoa as a plant and chocolate as food contain a series of chemicals that can interact with cell and tissue components, providing protection against the development and amelioration of pathological conditions. The most relevant effects of cocoa and chocolate have been related to cardiovascular disease.

Davison et al., (2008) conducted a study on Effect of cocoa flavanols and exercise on cardiometabolic risk factors in overweight and obese subjects at Australia. Overweight and obese adults were randomly assigned to high-flavanol cocoa (HF, 902 mg flavanols), HF and exercise, low-flavanol cocoa (LF, 36 mg flavanols), or LF and exercise for 12 weeks (exercise duration was 3 x 45 min per week at 75% of age-predicted maximum heart rate). Body composition was assessed by dual-energy X-ray absorptiometry at 0 and 12 weeks. Brachial artery flow-mediated dilatation (FMD), supine blood pressure (BP) and fasting plasma insulin, and glucose levels were assessed at 0, 6 and 12 weeks, respectively. Although HF consumption was shown to improve endothelial function, it did not enhance the effects of exercise on body fat and fat metabolism in obese subjects. However, it may be useful for reducing cardio metabolic risk factors in this population.

Allen et al., (2008) performed a study on daily consumption of a dark chocolate containing flavanols and added sterol esters affects cardiovascular risk factors in a normotensive population with elevated cholesterol at USA. This double-blind, placebo-controlled, cross-over study evaluated the efficacy of daily consumption of a cocoa flavanol-containing dark chocolate bar with added PS on serum lipids, blood pressure, and other circulating cardiovascular health markers in a population with elevated serum cholesterol. They recruited 49 adults (32 women, 17 men) with serum total cholesterol

concentrations of 5.20-7.28 mmol/L and blood pressure of < or = 159/99 mm Hg. Following a 2-wk lead-in utilizing the AHA style diet, participants were randomized into 2 groups and instructed to consume 2 cocoa flavanol-containing dark chocolate bars per day with (1.1 g sterol esters per bar) or without PS.. Blood pressure and serum lipids were measured every 2 wk. Regular consumption of the PS-containing chocolate bar resulted in reductions of 2.0 and 5.3% in serum total and LDL cholesterol ($P < 0.05$), respectively. Consumption of CF also reduced systolic blood pressure at 8 wk (-5.8 mm Hg; $P < 0.05$). Results indicate that regular consumption of chocolate bars containing PS and CF as part of a low-fat diet may support cardiovascular health by lowering cholesterol and improving blood pressure.

Many research findings draws a close association of Cocoa powder in reducing blood pressure and the cholesterol levels of Hypertensive clients thereby reducing cardiovascular mortality and morbidity.

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 model(1966) which included context evaluation , input evaluation , process evaluation and product evaluation.

CONTEXT EVALUATION:

It includes the selected factors such as age , sex , education , occupation , family history of Hypertension , dietary habits , duration of illness , drugs regimen , sleeping and exercise pattern. The setting was at the rural area , Medavakkam.

INPUT EVALUATION:

It specifies the resources used in the study process. In this study , input evaluation includes measuring pre – test cholesterol level by cholesterol kit ,the selection of experimental and control group Hypertensive clients.

PROCESS EVALUATION:

It refers to the evaluation of implementation process including the interaction between the client and the care giver. In the process , regular administration of Cocoa powder before taking breakfast for 15 days. 2.5 gm of Cocoa powder is mixed with warm water and served daily in the morning before food.

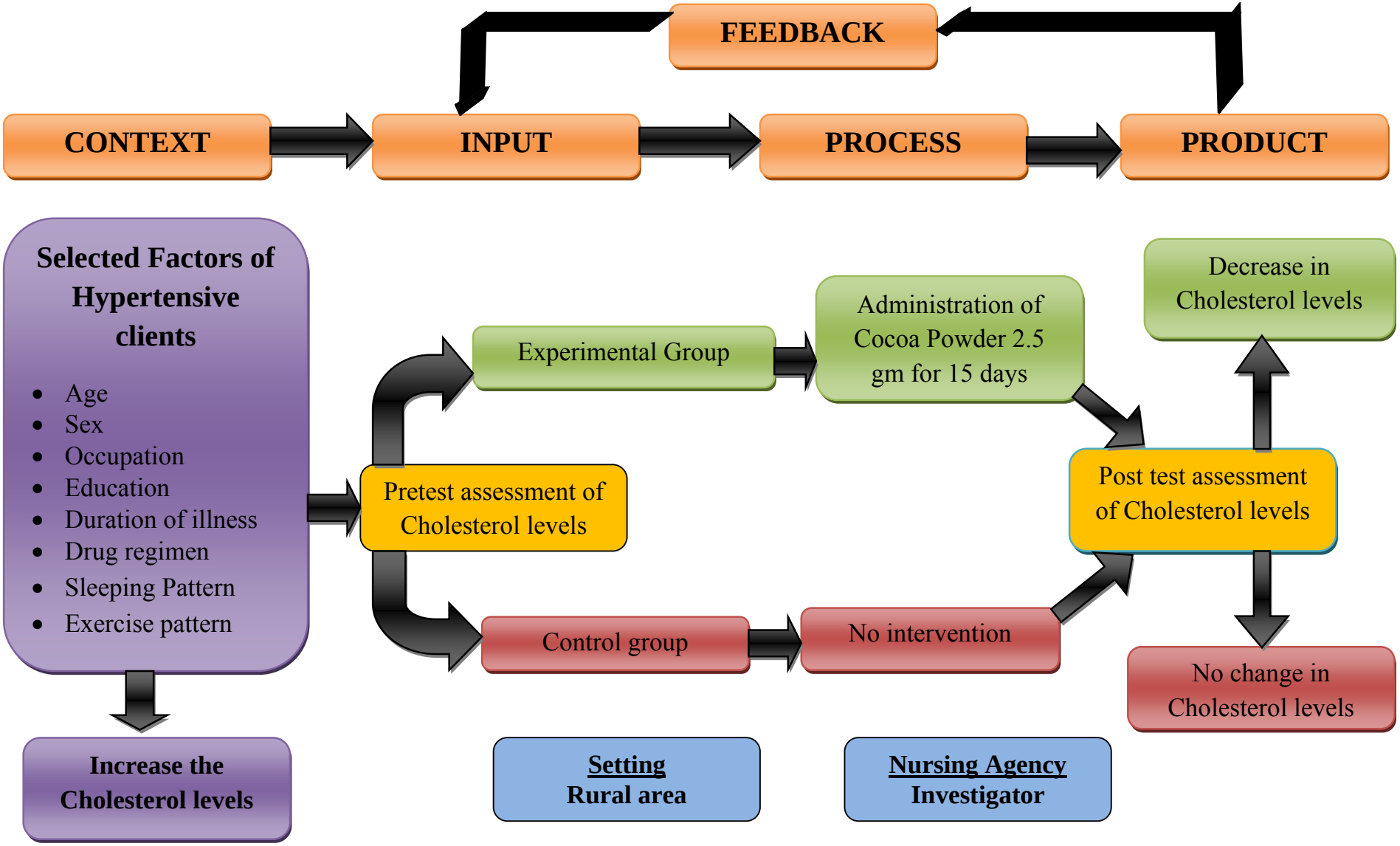
PRODUCT EVALUATION:

This refers to the output as a result of the intervention. It includes measuring post test cholesterol level for both groups after the intervention of 15 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: MODIFIED DANIEL L.STUFFLEBEAM'S CIPP MODEL (1966)



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 and 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 cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai.

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.

RESEARCH DESIGN:

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

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 co operation from the authority. The study was conducted in the rural area Medavakkam. Medavakkam is a rural area , which belongs to St.Thomas Mount Block , kancheepuram District and is located around the Upgraded Primary Health Centre , Medavakkam. It has 9 village panchayats covering a population of 1,01,527.

Among the 9 village panchayat which has 24 streets. The department of Community Health Nursing , College of Nursing , Madras Medical College adopted Kalaingar Nagar and Vanathurai to provide the curative and preventive care. These areas were selected for the study.

VARIABLES:

Variables included in the study were:

Dependant variables : Cholesterol levels.

Independent variables : Cocoa powder administration .

POPULATION:

The study population includes all the Hypertensive clients who were residing at the rural area , Medavakkam. The areas of Kalaingar Nagar and Vanathurai were selected for the study. The total population was 6710 in Kalaingar Nagar and 6222 in Vanathurai. The Hypertensive clients with cholesterol above 200 mg/dl in each area were 44 in Kalaingar Nagar and 72 in Vanathurai

SAMPLE AND SAMPLE SIZE:

The study sample comprises of Hypertensive clients with the Blood pressure above 140/90 Mm Hg and high cholesterol of above 200 mg / dl at the rural area , Medavakkam. The experimental group 30 and control group 30 were selected from Kalaingar Nagar and Vanathurai.

SAMPLING TECHNIQUE:

The sampling technique employed to recruit the samples for the study was simple random sampling. Simple random sampling entails selection by numbering the samples who had met the inclusion criteria and by the sampling framework the participants were selected randomly and labeled as experimental and control group. The samples were selected as follows:

Table 1: Experimental and control group in Kalaingar nagar and Vanathurai

Name of the street	Number of Hypertensive clients with cholesterol above 200 mg/dl	Experimental group	Control group
Kalaingar Nagar	44	11	11
Vanathurai	72	19	19
Total	116	30	30

CRITERIA FOR SAMPLE SELECTION:

Inclusion criteria:

- Clients who are willing to participate in the study.
- Clients who are having Hypertension above 140/90 mm Hg residing at the rural area , Medavakkam.
- Hypertensive clients having high cholesterol levels of above 200 mg / dl who are not taking anti lipedimic drugs.
- Clients who are able to understand English and Tamil.

Exclusion criteria:

- Hypertensive clients with the history of Diabetes Mellitus.
- Clients with complication related to Hypertension like Myocardial infarction.
- Male clients who are alcoholic.

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 clients which included the age , sex , educational status , marital status, occupation , family history of Hypertension , dietary habits , duration of illness , drugs taken by the clients , frequency of taking the drugs , reason for missing the dose if any , average hours of sleep , nap in the afternoon and the history of practicing exercises

Section B : Observation schedule of Cholesterol levels before and after the administration of Cocoa powder of the Hypertensive clients with High cholesterol.

CONTENT VALIDITY:

The study tool was validated by experts from Community Health Nursing Department. Experts were requested to judge the items for their clarity, relevance, comprehensiveness and appropriateness of the content, suggestions were noted and modifications were done.

RELIABILITY:

The reliability of the present study was established by test retest method. The score was found to be 0.8283.The tool was highly reliable. The tool was feasible and practicable.

PILOT STUDY:

A formal permission was obtained from the Director , Department of Public Health and Preventive Medicine. Pilot study was conducted at Nesavalar Nagar , at rural area Medavakkam from 21.03.2011 to 25.03.2011 which includes 6 clients with Hypertension having high cholesterol; above 200 mg/dl (3 control group and 3 experimental group) after obtaining informed consent from them. Daily the clients of the experimental group were observed of their intake of cocoa powder 2.5 mg in the morning by home visit. Control group were not given the intervention. Demographic factors were collected by interview method. Pre test cholesterol level was checked for

both groups , cocoa powder was given for the experimental group whereas control group didn't receive any intervention and the post test cholesterol level was checked for both the groups. The post test cholesterol level for the experimental group had a decrease of 2-4 mg/dl from their pre test level which showed significant result for the final study. After pilot study, reliability of the tool was assessed by using test retest method. Reliability correlation coefficient is 0.82. This reliability coefficients are very high and it is good tool for assessing effectiveness of effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients.

DATA COLLECTION PROCEDURE:

The data collection was done for a period of one month from 29.08.2011 to 29.09.2011 after getting the formal permission from the authorities. Clients who were having Hypertensive adults were interviewed by the tool. Samples were selected by simple random sampling technique who had met the inclusion criteria and were informed about the research process. They were checked for cholesterol by collecting the blood samples in their respective areas in separate test tubes and was taken to the Upgraded Primary Health centre. The serum cholesterol level was checked with cholesterol reagent for the samples and was noted. The cholesterol findings were informed to the clients 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 clients with high cholesterol above 200 mg / dl were informed about the cocoa powder and was demonstrated about the method of taking cocoa powder daily that Cocoa powder (2.5 g) should be added with hot water and should be taken for a period of 15 days in the morning. The measured cocoa powder (2.5 g) was given in separate packet for a day on the previous day evening by the investigator. Pre test cholesterol level was checked for the control and experimental group. The experimental group subjects were monitored by the home visit by the investigator for the better compliance daily in the morning and the clients had taken the cocoa powder before the investigator during the home visit daily in the morning whereas control group didn't receive any intervention. The level of cholesterol was checked for the experimental group after the administration of cocoa powder after 15 days. The post test cholesterol level was also checked for the control

group after 15 days. The samples co operated well and participated willingly in the study.

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 (2008)

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

- Organize the data.
- Frequency and percentage distribution of the demographic variables.
- Data on cholesterol among control and experimental group were analyzed by " t" test.
- Association between demographic variables and level of 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**.**

ETHICAL CONSIDERATION:

The proposal of the study was approved by the experts prior to the pilot study by the Ethical 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 he or she was having the freedom to leave the study with their own reason.

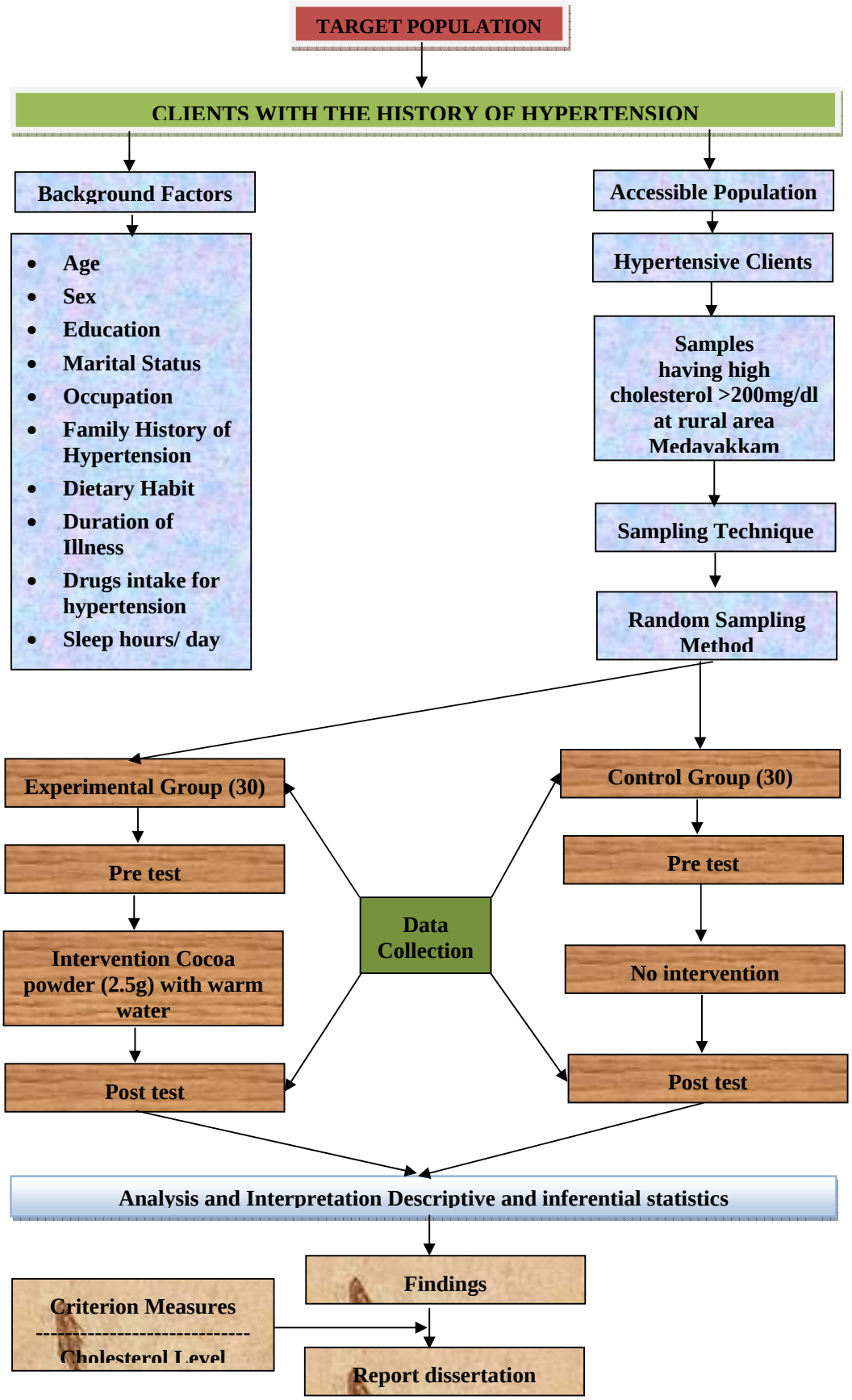


FIG 2:SCHEMATIC REPRESENTATION OF RESEARCH DESIGN

CHAPTER IV

DATA ANALYSIS 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 cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai.

The data collected from 60 samples (30 experimental group and 30 control group) of Hypertensive clients are being analyzed , classified 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 I : Description of demographic variables of the hypertensive clients.

Section II: Assess the pre test cholesterol level among Hypertensive clients in experimental and control group.

Section III: Assess the post test cholesterol level among Hypertensive clients in experimental and control group.

Section IV: Identify the effectiveness of cocoa powder on cholesterol levels among Hypertensive clients.

Section V: Associate the findings with the selected demographic variables.

SECTION I

DESCRIPTION OF DEMOGRAPHIC VARIABLES OF THE HYPERTENSIVE CLIENTS.

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

Demographic variables		Group			
		Experiment		Control	
		n	%	N	%
Age	36 -50 yrs	7	23.3%	6	20.0%
	51 -65 yrs	13	43.3%	10	33.3%
	> 65 yrs	10	33.3%	14	46.7%
Sex	Male	16	53.3%	10	33.3%
	Female	14	46.7%	20	66.7%
Education status	Non formal Education	9	30.0%	10	33.3%
	High school	18	60.0%	15	50.0%
	Higher secondary	3	10.0%	5	16.7%
Marital status	Married	30	100.0%	30	100.0%
Occupation status	Professional	2	6.7%	2	6.7%
	Business	9	30.0%	3	10.0%
	Daily wages	10	33.3%	10	33.3%
	Unemployed	9	30.0%	15	50.0%
Family history	Yes	12	40.0%	15	50.0%
	No	18	60.0%	15	50.0%
Dietary habits	Vegetarian	3	10.0%	2	6.7%
	Non vegetarian	27	90.0%	28	93.3%
Duration of illness	< 2 yrs	7	23.3%	7	23.3%
	2 -5 yrs	11	36.7%	17	56.7%
	> 5 yrs	12	40.0%	6	20.0%
Frequency of drug	Daily morning after food	22	73.3%	26	86.7%
	Daily in the morning and night after food	8	26.7%	4	13.3%
Chance to miss the dose of the drug	No	30	100.0%	30	100.0%
Average hours of sleep per day	<8 hours	14	46.7%	17	56.7%
	8 hours	16	53.3%	13	43.3%
Nap in the afternoon	Yes	11	36.7%	16	53.3%
	No	19	63.3%	14	46.7%
Practicing any exercise regularly	Yes	4	13.3%	5	16.7%
	No	26	86.7%	25	83.3%

The above Table reveals that majority of the clients 43.3% were between 51-65 years among experimental and 46.7% were above 65 years in control group, majority 53.3% were males in experiment and 66.7% were females in control group , 53.3% of the clients among the experimental group had 8 hours and 56.7% were having the sleep hours less than 8 hours , majority of the clients 63.3% among experimental group were not having nap in the afternoon and among control group 53.3% were having nap in the afternoon , majority 86.7% in experimental group and 83.3% in control group were not practicing the exercises regularly.

SECTION II

ASSESS THE PRE TEST CHOLESTEROL LEVEL AMONG HYPERTENSIVE CLIENTS IN EXPERIMENTAL AND CONTROL GROUP

Table 3: Percentage Distribution of pre test cholesterol level among Hypertensive clients in experimental and control group.

S. No	Samples	N	Mean	SD
1.	Experimental group.	30	220.97	10.79
2.	Control group	30	219.37	10.47

The above table shows that the mean cholesterol level for the experimental and control group was above to the normal cholesterol level of 200 mg/dl.

SECTION III

ASSESS THE POST TEST CHOLESTEROL LEVEL AMONG HYPERTENSIVE CLIENTS IN EXPERIMENTAL AND CONTROL GROUP

Table 4: Percentage Distribution of post test cholesterol level among Hypertensive clients in experimental and control group.

S. No	Samples	N	Mean	SD
1.	Experimental group.	30	210.80	15.93
2.	Control group	30	218.37	11.22

The above table shows that the mean cholesterol level was reduced to 10.17 from baseline score in the experimental group after the intake of Cocoa Powder whereas the control group showed no significant difference in the cholesterol level.

SECTION 1V

IDENTIFY THE EFFECTIVENESS OF COCOA POWDER ON CHOLESTEROL LEVELS AMONG HYPERTENSIVE CLIENTS.

Table 5: comparison of pretest and posttest cholesterol level among experimental and control group .

	No. of clients	**Pretest Mean±SD**	**Posttest Mean±SD**	**Student's paired t-test**
Experimental group.	30	220.97±10.79	210.80±15.93	t=6.34 P=0.001*** DF =29
Control group.	30	219.37±10.47	218.13±11.22	t= 0.28 P=0.77 DF =29

The above table shows that the cholesterol level was reduced from the mean of 220.97 to 210.80 in the experimental group. Due to the effect of cocoa powder they are able to reduce 10.17 from base line score. Statistical significance was calculated by using student's paired t – test. **t= 6.34 , p =0.001** which is highly significant that reveals the effectiveness of cocoa powder.

Table 6: Comparison of the cholesterol level among hypertensive clients of experimental and control group.

	Experimental group	**Control group**	**Student's independent t-test**
Pretest	220.97±10.79	219.37±10.47	t=0.52 P=0.60 DF= 58 not significant
Posttest	210.80±15.93	218.13±11.22	t=2.06 P=0.04* DF= 58 significant
Student's paired t-test	t=6.34 P=0.001*** DF =29	t=0.28P=0.77 DF =29	

The above table reveals the comparison of pre test and post test scores and the student's independent t –test was used to find the significant difference. The value of experimental group was found to be t = 2.06 , p=0.04 and DF =58 which is highly significant. This shows that the cocoa powder was found to be effective in reducing cholesterol level among Hypertensive clients.

Table 7 :Mean difference of cocoa powder in pretest and posttest among experimental and control group.

		Mean score	Mean Difference in cholesterol value with 95% Confidence interval
Experiment group	Pretest	220.97±10.79	10.17(3.13 – 17.20)
	Posttest	210.80±15.93	
Control group	Pretest	219.37±10.47	1.24(-4.36 – 6.84)
	Posttest	218.13±11.22	

The above table shows the effectiveness of cocoa powder. On an average, experimental group, clients are reduced 10.17 cholesterol value whereas in control group clients are reduced 1.24 cholesterol value. Difference is 8.93 cholesterol mean difference value .Experimental group clients were benefitted 8.93 mean difference cholesterol value than control group. This 8.93 mean difference cholesterol value is the effectiveness of cocoa powder.

SECTION V

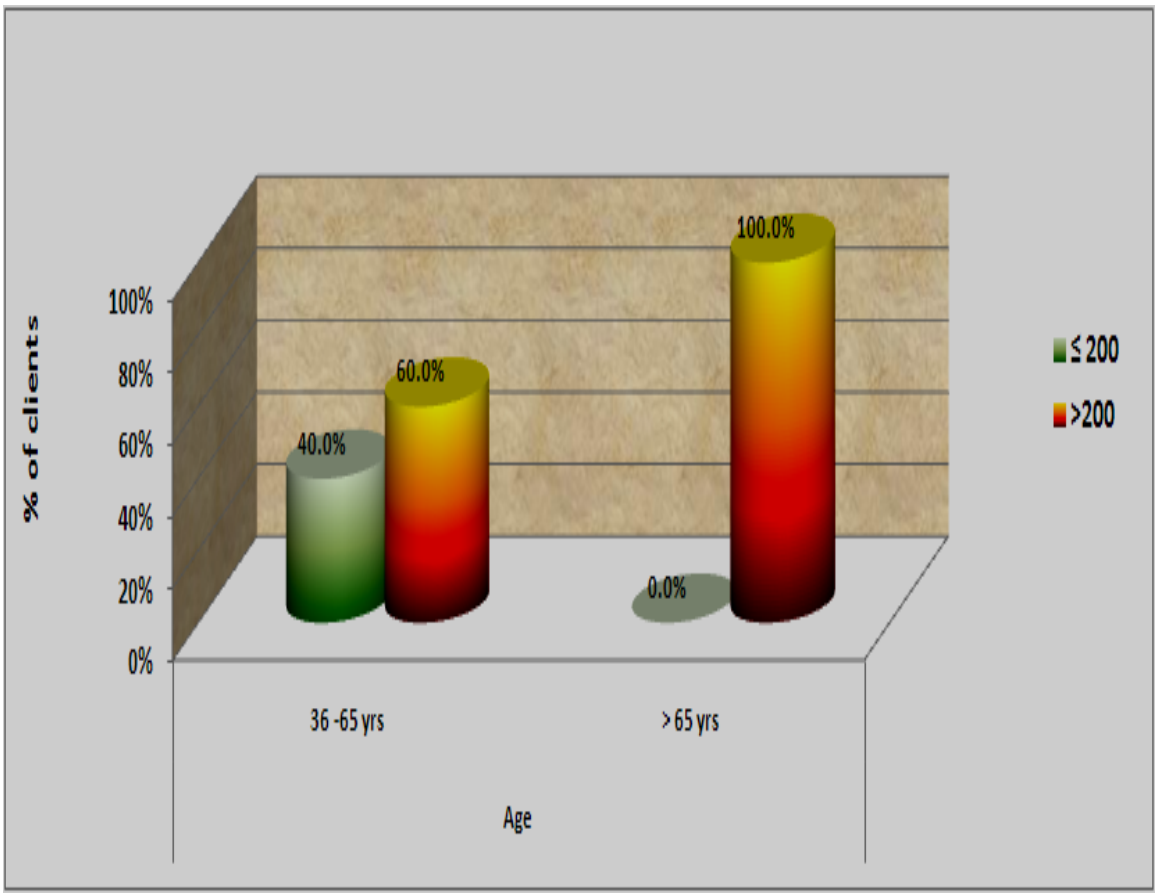
TO ASSOCIATE THE FINDINGS WITH THE SELECTED DEMOGRAPHIC VARIABLES

Table 8: Association between posttest level of cholesterol value and their demographic variables in experimental group.

Demographic variables		Posttest Level of cholesterol				Total	Pearson chi square test /Yates corrected chi square test
		≤ 200		>200			
		n	%	N	%		
Age	36 -65 yrs	8	40.0%	12	60.0%	20	χ2=5.45P=0.02* DF=1
	> 65 yrs	0	0.0%	10	100.0%	10	
Sex	Male	3	18.8%	13	81.3%	16	χ2=1.10 P=0.29 DF=1
	Female	5	35.7%	9	64.3%	14	
Education status	Non formal Education	1	11.1%	8	88.9%	9	χ2=1.59 P=0.20 DF=1
	High school/HSc	7	33.3%	14	66.7%	21	
Marital status	Married	8	26.7%	22	73.3%	30	χ2=0.00 P=1.00 DF=1
Occupation status	Employed	6	28.5%	15	71.5%	21	χ2=0.13 P=0.71 DF=1
	Unemployed	2	22.2%	7	77.8%	9	
Family history	Yes	4	33.3%	8	66.7%	12	χ2=0.45 P=0.50 DF=1
	No	4	22.2%	14	77.8%	18	
Dietary habits	Vegetarian	0	0.0%	3	100.0%	3	χ2=1.21 P=0.27 DF=1
	Non vegetarian	8	29.6%	19	70.4%	27	
Duration of illness	< 5 yrs	5	27.7%	13	72.3%	18	χ2=0.03 P=0.86 DF=1
	> 5 yrs	3	25.0%	9	75.0%	12	
Average hours of sleep per day	<8 hours	1	7.1%	13	92.9%	14	χ2=5.12 P=0.02* DF=1
	8 hours	7	43.8%	9	56.2%	16	
Nap in the afternoon	Yes	5	45.5%	6	54.5%	11	χ2=0.36 P=0.54 DF=1
	No	3	15.8%	16	84.2%	19	
Practicing any exercise regularly	Yes	3	75.0%	1	25.0%	4	χ2=12.69 P=0.001*** DF=1
	No	5	19.2%	21	80.8%	26	

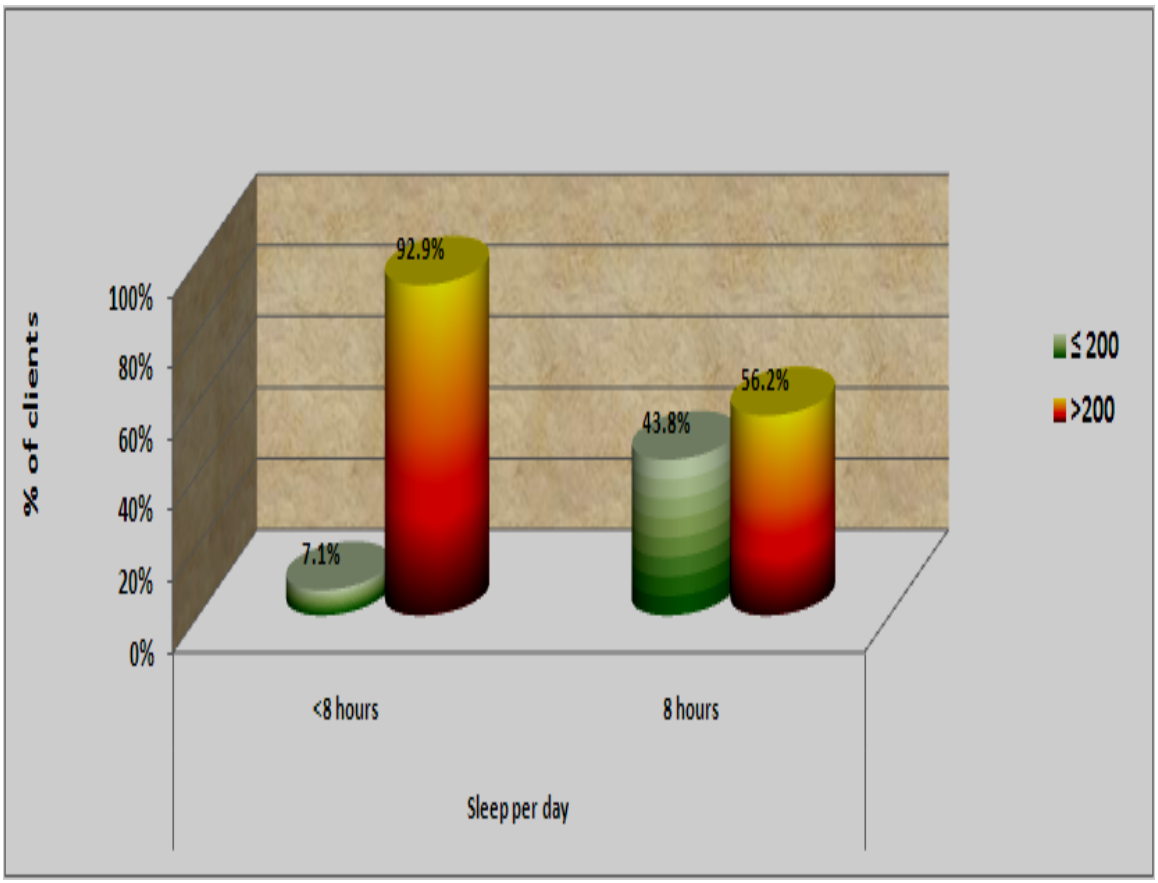
The above table reveals that in the experimental group there is significant association between the selected demographic variables such as age , average hours of sleep per day and the practice of exercises regularly.

Figure 3 : Association between post test level of cholesterol with the age of experimental group:



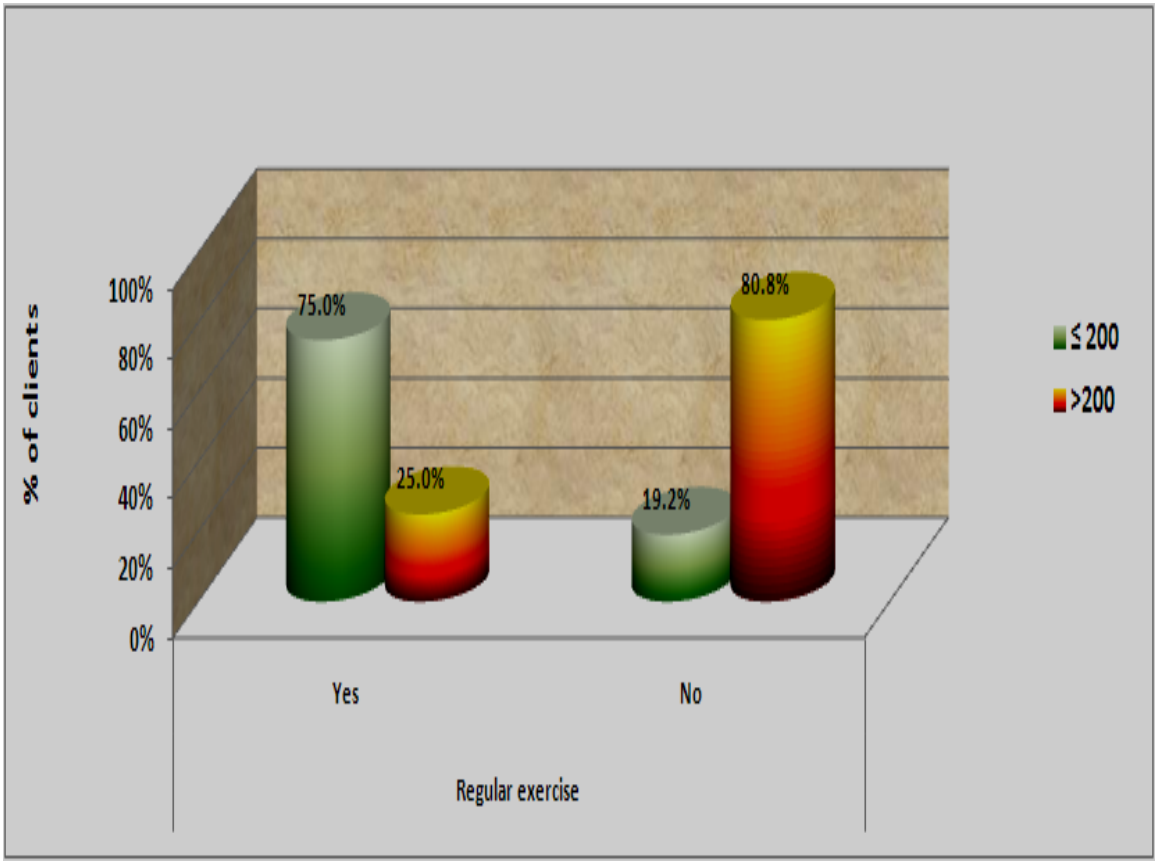
The above figure shows that cocoa powder was found effective in the reduction of cholesterol level in the Hypertensive clients in the age group of 36-65years and it is statistically proved significant , $\chi 2=5.45$, p value = 0.02 and DF=1 significant.

Figure 4 : Association between post test level of cholesterol with the hours of sleep of experimental group:



The above figure shows that cocoa powder was found effective in the reduction of cholesterol level in the Hypertensive clients who sleeps 8 hours a day and it is statistically proved significant , $\chi 2=5.12$, p value = 0.02 and DF=1.

Figure 5 : Association between post test level of cholesterol with the practice of exercise of experimental group:



The above figure shows that cocoa powder was found effective in the reduction of cholesterol level in the Hypertensive clients who practices exercises regularly and it is statistically proved significant , $\chi 2=12.69$, p value = 0.001 and DF=1.

CHAPTER V

DISCUSSION

Hypertension is the worldwide emerging disease which is rocking our Nation. With increasing urbanization, hypertension and its complications are becoming major health problems in many countries. In particular, hypertension is a major cause of illness everywhere with some cases remain 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 in countries 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.

In joining hands with Hypertension , the Hypercholestremia also directs its pathway to cause still emerging significant medical problems. Hypertension frequently occurs in conjunction with metabolic disturbances, most notably hypercholesterolemia. Evidence from studies suggests that hypercholesterolemia contributes to the progression of hypertension. Many cases remain silent regarding the high cholesterol as they are not aware of that. The study conducted was to assess the effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai.

Demographic variables of the clients with Hypertension:

In the demographic variables , the distribution of the age group for the study were majority of the clients (43.3%) were between the age group of 51-65 years in experimental group and (46.7%) were above the age group of 65 years in control group.

The gender status revealed in the study that majority 53% were males in experimental group and 67% were females in control group. With regard to their

Educational status majority of them (60.0%) had finished high school in experimental group and (50.0%) had finished high school education in control group.

With regard to their occupational status majority of them (33.3%) were occupied as daily wages in experimental group and (50.0%) were unemployed in control group. In relation to the family history , majority (60.0%) had the family history of Hypertension in experimental group and equal distribution of family history were seen among control group.

In dietary pattern of the subjects , majority of them (90.0%) in experimental group and (93.3%) in control group were non vegetarian in their dietary pattern. In relation to the duration of illness majority (40.0%) were having the disease for more than 5 years in experimental group and (56.7%) between 2 – 5 years in control group.

In their frequency of drugs intake majority (73.3%) in experimental group and (86.7%) in control group were taking drugs in experimental daily in the morning. In their duration of sleep per day (53%) of the subjects were sleeping 8 hours a day in experimental group and (57%) in control group were sleeping less than 8 hours.

In the subjects of having nap in the afternoon majority (63%) were not having nap in the afternoon in experimental group and (53.7%) in control group were taking nap in the afternoon. In relation to the subjects who are performing exercise majority (86.7%) in experimental group and (83.3%) in control group were not practicing regular exercises daily.

The first objective of the study was to assess the pre test cholesterol level of Hypertensive clients in experimental and control group.

The hypertensive clients were interviewed with the interview questionnaire and the pre test was conducted for the experimental and control group. The pre test showed that the mean cholesterol level was 220.97 (SD=10.79) in experimental group and 219.37 (SD=10.47) in control group.

The present study was supported by **Borghi et al .,(2008)** which signified that Hypertension and Hyperlipidemia frequently co-exist in the same patients and are

responsible for an increase in the extent of cardiovascular risk. The increase in Blood Pressure may significantly increase the lipoprotein and cholesterol levels by the narrowing of the blood vessels and accumulation of fats which leads to deleterious effects.

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 increase in cholesterol which binds the risk of the disease process. Mostly the clients 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 cardio vascular diseases. **Parraga Martinez (2011)** found out that Hypercholestremia and cardiovascular diseases are the co morbidity factors among the Hypertensive clients which needs to be noticed.

As hypertension is the major pre disposing factor for Hypercholestremia, the clients who are hypertensives were found to have increased level of cholesterol which was mostly hidden and they were knowing it for the first time. Thus the investigator thought of using cocoa powder to reduce both hypertension and high cholesterol as a single means of treatment as the cocoa powder has increased flavonoids which helps in preventing and treating cardio vascular diseases

The second objective of the study was to **assess the post test cholesterol level of hypertensive clients in experimental and control group.**

The clients of the experimental group were explained about the intake of cocoa powder for 15 days after explaining the advantages of it in the reduction of cholesterol level. Some clients 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 cocoa powder for the research period.

The post test showed that the mean cholesterol level was 210.80 (SD=15 .93) in experimental group and 218.37 (SD=11.22) in control group with the mean difference of about 6-8 mg/dl from the pre test values.

This objective was supported by the study of **Tokede et al., (2011)** conducted a study on Effects of cocoa products/dark chocolate on serum lipids: a meta-analysis. Cocoa products, which are rich sources of flavonoids, have been shown to reduce blood pressure and the risk of cardiovascular disease.. Intervention with dark chocolate/cocoa products significantly reduced serum low-density lipoprotein (LDL) and total cholesterol (TC) levels to about 5.90 mg/dl and 6.23 mg/dl respectively.

This study was also supported by **Khan et al.,(**2011) who made the conclusion that Regular consumption of cocoa powder increases HDL cholesterol and reduces oxidized LDL levels in subjects at high-risk of cardiovascular disease.

The third objective was to identify the effectiveness of cocoa powder on Cholesterol levels in experimental group.

The study showed the findings that cocoa powder was found effective in reducing cholesterol level among hypertensive clients as the cholesterol level was reduced from the mean of 220.97 to 210.80. Due to the cocoa powder they are able to reduce 10.17 from base line score. This difference is statistically significant. Statistical significance was calculated by using student's paired t – test. t= 6.34 p=0.001.

In post test , the experiment and control group are having statistically significant difference with P value-0.001 and DF=1. The study result showed that the cocoa powder was found to be effective in experimental group in reducing cholesterol level and the student's independent t –test was used to find the significant difference . t-2.06 , p=0.04 and DF =58.

In the finding of the experimental group, clients had reduced 10.17 cholesterol value whereas in control group clients had reduced 1.24% cholesterol value. Difference was 8.93 cholesterol value .Experimental group clients were benefitted 8.93value than control group. This 8.93 cholesterol value difference is the effectiveness of cocoa powder.

This effectiveness of cocoa powder was supported by **Jia et al (2010)** in the study of Short-term effect of cocoa product consumption on lipid profile for a period of 2

weeks . Short-term cocoa consumption significantly reduced blood cholesterol, but the changes were dependent on the dose of cocoa consumption and the healthy status of participants. Cocoa consumption significantly lowered LDL cholesterol by 5.87 -6.27 mg/dL and lowered total cholesterol by 5.82 -7.34 mg/dl.

The study finding was also supported by **Kato et al.,(**2007) which stated that Continuous intake of polyphenolic compounds containing cocoa powder reduces LDL oxidative susceptibility and has beneficial effects on plasma HDL-cholesterol concentrations in humans.

Thus cocoa powder not only was used to make delicious food products which gains lot of support in the markets but also plays a significant role in the health aspects which remains unnoticed. The people who are able to make it useful to them will gain good cardio vascular health by reducing cholesterol and blood pressure accordingly.

The fourth objective of the study was to associate the findings with the selected demographic variables.

In association with the selected demographic variables , the cocoa powder was found effective among the age group of between 36-65 years(40.0%) and statistically proved significant $\chi 2=5.45 P=0.02$.It was effective 43.8% among those who sleeps 8 hours a day with the significant value $\chi 2=5.12$ $P=0.02$. It was effective 75% among those who perform exercises daily which was significantly proved to be significant $\chi 2=12.69$ $P=0.001$.

This study finding was supported by **Chhabra MK et al .,(2011)** observed in the study that lifestyle modifications play a vital role in the management of Hypertension. Less hours of sleep , avoidance of exercises and avoidance of smoking and alcoholism all play a key role in reducing hypertension and thereby reducing the risk of cardio vascular diseases. As regarding behavioral changes, stopping smoking, regular physical exercise, relaxation therapies like yoga, etc, have definite beneficial effect on hypertensives. The antihypertensive effect of lifestyle modifications may obviate drug therapy.

This was also supported by **Shymal kumar et al., (2011)** who interpreted that various factors might have contributed to this rising trend of Hypertension and among them includes change in life style pattern, diet and stress, diminished exercise , increase in age and less hours spent in rest.

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

The Hypothesis of the study stated that there is a significant association between cocoa powder and the cholesterol levels. The cocoa powder considerably reduced the cholesterol levels among the Hypertensive clients to 10 mg/dl 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 , average hours of sleep and the practice of regular exercise. Thus , the stated hypothesis was proved.

Thus the investigator found that there should be proper awareness among the people living in the rural people among their available management of the Hypertension , its co – disease factor cholesterol and thereby the risk of cardio vascular 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 practices.

CHAPTER – VI

SUMMARY, CONCLUSION , IMPLICATION, RECOMMENDATIONS AND LIMITATIONS.

SUMMARY OF THE STUDY:

The study was done to assess the effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai.

The research design used for this study was true experimental design**.** The research approach used for the study was quantitative research approach. Conceptual frame work adopted in the present study was CIPP model. The sample size was 60 Hypertensive clients (30- experimental group and 30- control group). A sample of Hypertensive clients 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 the opinion from the experts and it helped the investigator in the development of the tool. Section A consisted the Demographic data of the Hypertensive clients which included the age , sex , educational status , marital status, occupation , family history of Hypertension , dietary habits , duration of illness , drugs taken by the clients , frequency of taking the drugs , reason for missing the dose if any , average hours of sleep , nap in the afternoon and the history of practicing exercises .Section B consisted of Observation schedule of Cholesterol levels before and after the administration of Cocoa powder of the Hypertensive clients with High cholesterol.

The data collection was done for a period of one month from 29.08.2011 to 29.09.2011. Clients who were having Hypertensive adults were interviewed by the tool. Samples were selected by the inclusion criteria and were informed about the research process. They were checked for cholesterol by collecting the blood samples in their respective areas in separate test tubes and was taken to the Upgraded Primary Health

centre. The serum cholesterol level was checked with cholesterol reagent for the samples and was noted. The cholesterol findings were informed to the clients 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 clients with high cholesterol above 200 mg / dl were informed about the cocoa powder and was demonstrated about the method of taking cocoa powder daily that Cocoa powder (2.5 gm) should be added with hot water and should be taken for a period of 15 days. The measured cocoa powder (2.5 gm) was given in separate packet for a day on the previous day evening by the investigator. Pre test cholesterol level was checked for the control and experimental group. The experimental group subjects were monitored by the home visit by the investigator for the better compliance daily in the morning and the clients had taken the cocoa powder before the investigator during the home visit daily in the morning . The level of cholesterol was checked for the experimental group after the administration of cocoa powder after 15 days. The post test cholesterol level was also checked for the control group after 15 days. The samples co operated well and participated willingly in the study.

MAJOR FINDINGS OF THE STUDY:

With regard to the demographic variables of Hypertensive clients,

- Among the experimental group majority 13 (43.3%) of the clients were between the age group of 51-65 years , 53.3% of the clients were males , 60% of them had finished high school , 33.3% of them were occupied for daily wages , 60% had no family history of Hypertension , 90% of them were non vegetarian ,40% of the hypertensive clients had a history of more than 5 years , majority of them 73.3% were taking drugs daily in the morning after food , 100% of them were not having any chance of missing the drugs , 53.3% of them were sleeping 8 hours a day , 63.3% of them had no nap in the afternoon and majority of them 86.7% were not practicing exercises regularly.
- Among the control group majority 46.7% of the clients were between the age group of above 65 years , 66.7% of the clients were females , 50% of them had finished high school , 50% of them were unemployed , equal of them had no

family history of Hypertension , 93.3% of them were non vegetarian ,56.7% of the hypertensive clients had a history of 2-5 years , majority of them 86.7% were taking drugs daily in the morning after food , 100% of them were not having any chance of missing the drugs , 56.7% of them were sleeping less than 8 hours a day , 53.3% of them had nap in the afternoon and majority of them 83.3% were not practicing exercises regularly.

The major objectives brought out the following findings,

- The mean cholesterol pre test level was 220.97 in experimental group and 219.37 in control group.
- The mean cholesterol pre test level was 210.80 in experimental group and 218.37 in control group.
- Cocoa powder was found effective in reducing cholesterol level among hypertensive clients as the cholesterol level was reduced from the mean of 220.97 to 210.80. Due to the cocoa powder they are able to reduce 10.17 from base line score. This difference is statistically significant. Statistical significance was calculated by using student's paired t – test. t= 6.34 p=0.001.
- There was no significant difference between the pre test and post test cholesterol levels of the control group.
- Comparison level of cholesterol value between experiment and control group showed that , in pretest there are no difference between experiment and control group . In posttest they are having statistically significant difference with p value-0.001 and DF=1.
- The cocoa powder was found to be effective in experimental group in reducing cholesterol level and the student's independent t –test was used to find the significant difference . t-2.06 , p=0.04 and DF =58.
- The effectiveness of cocoa powder was found out to be that in experimental group, clients were being reduced 10.17 of the mean cholesterol value whereas in control group clients were being reduced to 1.24 mean cholesterol value. Difference was about 8.93 Mean difference of the cholesterol value .Experimental group clients were benefitted 8.93 value than control group. This 8.93 cholesterol value difference is the effectiveness of cocoa powder.

- Cocoa powder reduced the cholesterol level from100% to 73.3% in experimental group and no significant reduction in control group.
- The association of the effectiveness of the cocoa powder with the selected demographic variables showed that cocoa powder was found effective among the age group of between 36-65 years(40.0%) and statistically proved significant $\chi 2=5.45 p=0.02$.It was effective 43.8% among those who sleeps 8 hours a day with the significant value $\chi 2=5.12$ $p=0.02$. It was effective 75% among those who perform exercises daily which was significantly proved to be significant $\chi 2=12.69$ $p=0.001$.]

CONCLUSION:

Thus the present study was done to assess the effectiveness of cocoa powder in reducing cholesterol levels among the Hypertensive clients at the rural area , Medavakkam , Chennai. Though the hypertensive clients were taking anti-hypertensive drugs for their treatment , they were unaware of the presence of cholesterol in them and so not taking appropriate treatment to cure it ,as the studies over lined that Hypertensive clients were at the high risk of developing Hypercholestremia at the later stages of life as they both were co related. Thus the chosen home management of easily available and accessible cocoa powder in reducing cholesterol level among the hypertensive clients by the investigator made a drastic changes in the acceptance and comfort of the people in the rural area. The findings also clearly signified that cocoa powder intake considerably reduced the cholesterol level to 8 mg/dl in 15 days which when continued under required conditions will prove a good indicator of cardio vascular health. Many supporting studies are there for this treatment of cases. So this will be the best way to control cholesterol level in turn increasing the cardiac health of the Hypertensive clients.

NURSING IMPLICATION:

NURSING SERVICE:

- The nurse can develop the skill in providing necessary education to the Hypertensive clients in the rural and urban area where they abstain themselves from the continuous treatment.
- The nurse has to develop knowledge regarding Hypertension and the incidence of Hypercholestremia and their treatment without side effects and cost effective manners.
- The result of the study will help the nurses to enlighten their knowledge in various home therapies concerned with the reduction of Hypertension and Hypercholestremia.
- 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 clients 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 un noticed and with cost effective, easily available and accessible manner for Hypertension and Hypercholestremia.
- 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 community, they can also co – ordinate and discuss about the effectiveness of cocoa powder and 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 RESEARCH:

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 and Hypercholestremia.
- This study can be effectively utilized by the emerging researchers for their reference purposes.

RECOMMENDATIONS:

- An information booklet can be prepared as a teaching aid in the health centres and out patient clinics regarding the home management of Hypertension and Hyperlipidemia.
- A longitudinal study can be done using post test after one month, six months and one year to see effectiveness of cocoa powder in reducing cholesterol levels.
- A similar study can be done in urban areas.
- A comparative study can be conducted to assess the effectiveness of cocoa products among urban and rural dwellers.
- Similar study can be replicated on a larger sample.

- Similar study can be conducted in other under served population areas where the people do not seek any treatment facilities due to distance factors and remain un noticed of their disease condition.

LIMITATIONS:

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

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RESEARCH TOOL

INTERVIEW/OBSERVATION SCHEDULE ON CHOLESTEROL AMONG CLIENTS WITH HYPERTENSION

SECTION A: BACKGROUND VARIABLES

1. Age (in years)

a) < 35. ☐

b) 36-50. ☐

c) 51-65. ☐

d) > 65. ☐

2. Sex

a) Male. ☐

b) Female. ☐

3. Educational status

a) Non formal Education ☐

b) High school. ☐

c) Higher secondary. ☐

d) Graduate. ☐

4. Marital status

a)Single. ☐

b)Married. ☐

c)Divorce. ☐

d) Widow / Widower. ☐

5. Occupation

a) professional. ☐

b) Business. ☐

c) Daily wages. ☐

d) unemployed . ☐

6. Do you have any family history of hypertension?

a) yes. ☐

b) no. ☐

7. Dietary habits

a) Vegetarian ☐

b) Non vegetarian ☐

8. Duration of illness

a)<2 years. ☐

b)2-5 years. ☐

c) >5 years ☐

9. Specify the drug and its dosage taken for hypertension?

a) _____, _____ mg

b) _____, _____ mg

10. How frequently you are taking these drugs?

a) Daily morning after food. ☐

b) Daily in afternoon. ☐

c) Daily in the night. ☐

d) Daily in the morning and night after food. ☐

11. Whether you have any chance to miss the dose of the drug?

a) yes. ☐

b) No. ☐

12. If yes , specify _____.

13. State the average hours of sleep per day?

a) <8 hours ☐

b) 8 hours ☐

c) >8 hours ☐

14. Do you take a nap in the afternoon?

a)Yes ☐

b)No ☐

15. Are you practicing any exercise regularly?

a)Yes ☐

b)No ☐

16. If yes. Specify _____

SECTION B: OBSERVATION SCHEDULE OF CHOLESTEROL

S.NO	CHOLESTEROL LEVEL BEFORE THE ADMINISTRATION OF COCOA POWDER.	CHOLESTEROL LEVEL AFTER THE ADMINISTRATION OF COCOA POWDER.

வடிவமைக்கப்பட்ட நேர்காணல் கேள்விகளின் தொகுப்பு

விபரங்கள் யாவும் உங்களைப் பற்றியது, தெளிவாக எழுதவும்.

சரியான விடைகளில் (✓) செய்யவும்– பகுதி-1

1) வயது (வருடங்களில்)

- அ) 20-30 ☐
- ஆ) 31-40 ☐
- இ) 41-50 ☐
- ஈ) 51-60 ☐

2) பாலினம்

- அ) ஆண் ☐
- ஆ) பெண் ☐

3) கல்வித் தகுதி

- அ) அனுபவக் கல்வி ☐
- ஆ) ஆரம்பக் கல்வி ☐
- இ) உயர்நிலைக் கல்வி ☐
- ஈ) மேல்நிலைக் கல்வி ☐
- உ) கல்லூரிக் கல்வி ☐

4) திருமண விபரம்

- அ) திருமணமாகாதாவர் ☐
- ஆ) திருமணமானவர் ☐
- இ) விவாகரத்தானவர் ☐
- ஈ) மனைவியை இழந்தவர் ☐

5) தொழில் விபரம்

- அ) தொழில் சார்ந்த பணி ☐
- ஆ) வியாபாரம் ☐
- இ) தினக்கூலி ☐
- ஈ) வேலையில்லாதவர் ☐

6) உங்கள் குடும்பத்தில் யாருக்கேனும் இரத்தக்கொதிப்பு உள்ளதா?

அ) ஆம் ☐

ஆ) இல்லை ☐

7) உணவு முறை

அ) சைவம் ☐

ஆ) அசைவம் ☐

8) நோயின் கால நேரம்

அ) <2 வருடம் ☐

ஆ) 2-5 வருடம் ☐

இ) >5 வருடம் ☐

9) நீங்கள் உட்கொள்ளும் இரத்தக்கொதிப்பு மாத்திரையை குறிப்பிடுக

அ) ..... மி.கி. ☐

ஆ) ..... மி.கி. ☐

10) நீங்கள் தினமும் மாத்திரையை எப்படி உட்கொள்கிறீர்கள்?

அ) தினமும் காலை உணவிற்கு பின் ☐

ஆ) தினமும் மதியம் ☐

இ) தினமும் இரவில் ☐

ஈ) காலையும் மாலையும் ☐

11) நீங்கள் மாத்திரைகளை தவிர்க்கும் வாய்ப்பு ஏதாவது உள்ளதா?

அ) ஆம் ☐

ஆ) இல்லை ☐

12) ஆம் என்றால், எப்படி?

13) ஒரு நாளில் எத்தனை மணி நேரம் தூங்குவீர்கள்?

அ) <8 மணி நேரம் ☐

ஆ) 8 மணி நேரம் ☐

இ) >8 மணி நேரம் ☐

14) நீங்கள் மதியம் சிறிது நேரம் தூங்குவது உண்டா?

அ) ஆம் ☐

ஆ) இல்லை ☐

15) நீங்கள் தினமும் உடற்பயிற்சி மேற்கொள்கிறீர்களா?

அ) ஆம் ☐

ஆ) இல்லை ☐

16) ஆம் என்றால், குறிப்பிடுக ...

பகுதி-2

கொழுப்பிற்கான நேர்காணல் படிவம்

வ.எண்	கொழுப்பின் அளவு கொக்கோ தூள் உட்கொள்ளும் முன்	கொழுப்பின் அளவு கொக்கோ தூள் உட்கொண்ட பின்