# "A STUDY TO ASSESS THE EFFECTIVENESS OF GUAVA LEAF TEA IN REDUCING THE BLOOD GLUCOSE LEVEL AMONG TYPE II DIABETIC ADULTS  RESIDING  AT SELECTED URBAN AREA CHOOLAI, CHENNAI."

**M.SC. (NURSING) DEGREE EXAMINATION**
**BRANCH-IV COMMUNITY HEALTH NURSING**

**COLLEGE OF NURSING**
**MADRAS MEDICAL COLLEGE, CHENNAI-3**



*A Dissertation submitted to*

**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY,**
**CHENNAI-600 032.**

*In partial  fulfillment of the  requirements or the degree of*

**MASTER OF SCIENCE IN NURSING**

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# "A STUDY TO ASSESS THE EFFECTIVENESS OF GUAVA LEAF TEA IN REDUCING THE BLOOD GLUCOSE LEVEL AMONG TYPE II DABETIC ADULTS RESIDING AT SELECTED URBAN AREA CHOOLAI, CHENNAI."

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# CERTIFICATE

This is to certify that this dissertation titled, **"A study to assess the effectiveness of guava leaf tea in reducing blood glucose level among Type II Diabetic Adults residing at selected urban area Choolai, Chennai"** is a bonafide work done by **Ms.S.Umadevi, M.Sc (N) II year,** College of Nursing, Madras Medical College Chennai-3, submitted to **The Tamil Nadu Dr. M.G.R. Medical University, Chennai- 32,** in partial fulfillment of the University rules and regulations towards 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 **2012-2014.**

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# ABSTRACT

India leads the world with the largest number of diabetic subjects earning the dubious distinction of being termed the "diabetes capital of the world". According to the Diabetes Atlas 2006 published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken. The main objective of the study was to compare the pre and post blood glucose level in relation to intake of guava leaf tea among clients in both experimental and control group. An experimental study with pre test post test research design was used and a sample of 60 Type II Diabetic Adults (30 in experimental and 30 in the control group) is selected by using simple random sampling technique. 50 ml of guava leaf tea was given to the clients in experimental group half hour after breakfast daily for 14 days. The conceptual framework was based on a modified model of wiedenbach's helping Art of clinical nursing theory. The tool used for the study includes structured interview schedule and observation method using a glucometer. The obtained data were analyzed by using descriptive and inferential statistics. Result The findings of the study showed that there was a significant ($p \leq$, 0.05) level with a confidence interval of 95% reduction in blood glucose level after administering guava leaf tea in the experimental group. The study reveals that greater significance of guava leaf tea was observed in the age group of 30-40 yrs ,less duration of illness 0-1yr, and habit of doing exercise when compared to others. Guava leaf is cost effective, easily available, known by all people and improves the general well being of the clients, prevents them from developing complications and reduces the dosage of the drug.

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# CHAPTER -- I

# INTRODUCTION

**"Man may be the captain of his fate, but he is also the victim of his blood sugar"**

**(Wilfrid Oakley)**

India leads the world with the largest number of diabetic subjects earning the dubious distinction of being termed the "diabetes capital of the world". According to the Diabetes Atlas 2006 published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken. The most disturbing trend is the shift in age of onset of diabetes to a younger age in the recent years. This could have long lasting adverse effects on the nation's health and economy. Early identification of at-risk individuals using simple screening tools like the Indian Diabetes Risk Score (IDRS) and appropriate lifestyle intervention would greatly help in preventing or postponing the onset of diabetes and thus reducing the burden on the community and the nation as a whole.

Consequently, diabetes is rapidly emerging as a global health care problem that threatens to reach pandemic levels by 2030; the number of people with diabetes worldwide is projected to increase from 171 million in 2000 to 366 million by 2030. Millions of Cases of Diabetes in 2000 and Projections for 2030, with Projected Percent Changes.This increase will be most noticeable in developing countries, where the number of people with diabetes is expected to increase from 84 million to 228 million.

According to the WHO, Southeast Asia and the Western Pacific region are at the forefront of the current diabetes epidemic, with India and China facing the greatest challenges. In these countries, the incidence and prevalence of type II diabetes among children are also increasing at an alarming rate, with potentially devastating consequences.

The so called "Asian Indian Phenotype" refers to certain unique clinical and biochemical abnormalities in Indians, which include increased insulin resistance, greater abdominal adiposity i.e., Higher waist circumference despite lower body mass index, lower adiponectin and higher high sensitive C-reactive protein levels. This phenotype makes Asian Indians more prone to diabetes and premature coronary artery disease. Diabetes is the rapid epidemiological transition associated with changes in dietary patterns and decreased physical activity as evident from the higher prevalence of diabetes in the urban population. Even though the prevalence of microvascular complications of diabetes like retinopathy and nephropathy are comparatively lower in Indians, the prevalence of premature coronary artery disease is much higher in Indians compared to other ethnic groups. The most disturbing trend is the shift in age of onset of diabetes to a younger age in the recent years. This could have long lasting adverse effects on the nation's health and economy.

In addition, Type II Diabetes Mellitus and obesity is becoming increasingly more prevalent among people in India.. The serious spread of disease can cripple the nation's fiscal and human resources; therefore, it's the time to act now and do as much as possible to cover almost all aspects of the disease. The overwhelming burden of the disease threatens to stunt economic growth and undermine the benefits of improved standards of living and education. Proper education and awareness programs developed according to the need of the society can improve the knowledge of patients and change their attitude.

**EPIDEMIOLOGY AND STATISTICS**

**WHO (1999***)* reported that globally there were approximately 135 million adults with diabetes in 1995. By the year 2025 the figure is expected to go up to 300 million. Approximately 30 Million people in India suffer from this disorder, but less than 12 lakhs take treatment.

The **National Diabetes Information Clearing House** estimates that Diabetes cost US 132 Billion in the Unites States alone every year.  About 5% - 10% of Diabetes cases in North America are Type I, with the rest being Type II, the Factor of Type I in other parts of the world differs.  This is likely due to both differences in the rate of Type I and differences in the rate of other types, most prominently Type II, most of this difference is not currently understood.

**Snehalatha et al (2009)** showed in their study  that an increase in Type II Diabetes mellitus  in India is estimated to be 58%, and from 51 million people in 2010 to 87 million by 2030.

**The world health organization** reports showed that the estimation of Type II Diabetes Mellitus in India is

| In the year | | |
|---|---|---|
| 2000 | - | 32 million |
| 2006 | - | 38.9 million |
| 2010 | - | 40.09million |
| 2025 | - | 69.9 million |
| 2030 | - | 80-87 million |

## INCIDENCE AND PREVALENCE

**The 42nd World Health Assembly** noted that Type-II Diabetes Mellitus has been already a significant public health concern and the problem is growing especially in the developing country.  Various studies have shown that the highest incidence of diabetes in India is mainly because of a sedentary lifestyle, lack of physical activity, obesity, stress and consumption of diet rich in fat, sugar and calories.  With the advent of highly addictive computer with Video games, sedentarinism is now affecting the children and youth, as they tend to spend more time in front of Television sets or computers than playing out- doors.

The results of prevalence studies of diabetes mellitus in India were systematically reviewed with emphasis on those utilizing the standard WHO criteria for diabetes diagnosis. The prevalence of disease in adult was found to be increasing currently 4 to 11.6% of India's urban dwellers and 2.4% to 3% of rural population potential for further rise in prevalence of Diabetes Mellitus in the coming decades.

**Oldroyd, Banerjee, Heald, Cruickshank (2007)** stated that the global prevalence of diabetes for all age group is estimated to be 2.8 %. Type-II diabetes accounts for at least 90% of diabetes worldwide.

**Prevalence of Type II Diabetes Mellitus in Chennai is**

2000      -      11.6 %

2004      -      13.5 %

2010      -      14.3%

2012      -      15.2%

**DEATH AND DISABILITY**

**WHO (2004)** reported that there were 1.2 leaks diabetes related deaths in India in 1999 to 2000.  Also a Survey of Chennai based Diabetes Research Centers reported that **by 2025 every 5th diabetic in the world will be an Indian. For every 10 seconds, 2 new diabetic cases are diagnosed and every 10 seconds a person dies from diabetes related causes in the world**. An estimation given by American Diabetes Association, its incidence is increasing rapidly and it is estimated that by 2030, this number will almost double**.** People with Diabetes are **25** times more likely to develop blindnes*s*, **17** times more likely to develop kidney disease, **30-40** times more likely to undergo amputation**, 2-4** times more likely to develop Myocardial Infarction and **twice** as likely to suffer a stroke as non-diabetics.

## 1.1  NEED FOR THE STUDY

An estimated 135 million people worldwide had diagnosed diabetes in 1995, and this number is expected to rise to at least 300 million by 2025. The number of people with diabetes will increase by 42% (from 51 to 72 million) in industrialized countries between 1995 and 2025 and by 170% (from 84 to 228 million) in industrializing countries. Several potentially modifiable risk factors are related to diabetes, including insulin resistance, obesity, physical inactivity and dietary factors. Diabetes may be preventable in high-risk groups, but results of ongoing clinical trials are pending. Several efficacious and economically acceptable treatment strategies are currently available (control of glycemia, blood pressure, lipids; early detection and treatment of retinopathy, nephropathy, foot-disease; use of aspirin and ACE inhibitors) to reduce the burden of diabetes complication.

Diabetes is a major public health problem and is emerging as a pandemic. While prevention of diabetes may become possible in the future, there is considerable potential now to better utilize existing treatments to reduce diabetes complications. Many countries could benefit from research aimed at better understanding the reasons why existing treatments are under-used and how this can be changed.

Prevalence of Type II Diabetes has rapidly increased in native and migrant Asian populations, hence the morbidity and mortality associated with the disease and its complications are also common in young Asian people. Several distinctive features are apparent in pathogenic factors for diabetes and their thresholds in Asian populations. **The economic burden due to diabetes at personal, societal, and national levels is huge.** National strategies to raise public awareness about the disease and to improve the standard of care and implementation of programs for primary prevention are urgently.

**( Parvez Hossain, M. University of  Sheffield.)**

Type II Diabetes Mellitus is most commonly prevailing disease and a growing problem in world wide. It is a major burden for the health care department and also it is a disease which progression may lead to multi system disorder. It is estimated that diabetes accounts for 5% to 10% of the nation's health budget. Due to its chronicity and severity of its complications and the means required to control them, diabetes is a costly disease, not only for affected individuals and their families, but also for the health system.

Indians had the highest prevalence of (68 million) Diabetes among Asian countries**. Chennai**, the largest city in southern India with an estimated population of 5 million (2012) is now having an increased incidence of diabetes population. The rapid increase in population, increased longevity and high ethnic susceptibility to diabetes coupled with rabid urbanization and changes from traditional life styles almost likely to trigger a diabetes epidemic.

The incidence and prevalence rate of Type II Diabetes Mellitus in Choolai is increasing in an alarming state and shown as follows:

| Year | Incidence Rate | Prevalence Rate |
|------|----------------|-----------------|
| 2008 | 60 | 305 |
| 2009 | 90 | 500 |
| 2010 | 130 | 790 |
| 2011 | 200 | 930 |
| 2012 | 370 | 1050 |
| 2013 | 420 | 1150 |

There is an urgent need to implement preventive measures to reduce the high morbidity and mortality and to reduce the cost burden to patients and to the society..

As Diabetes Mellitus affects all age group of people and the economic burden is increasing day by day and also because of urbanization and changes in their dietary habits are prevailing among the people in choolai.Which create

more attention to control this disease and also there is a need to reduce the treatment expense of Diabetes mellitus by using any Home remedy .

As a community health nurse the investigator has selected the" **GUAVA   LEAF TEA"** for reducing blood  glucose level among Type II diabetic mellitus adults, as it is an easily available, rich in fiber, having a low glycemic index, low cost food item and has an increased effect in reducing blood glucose level.

## 1.2  STATEMENT OF THE PROBLEM

**" A Study to Assess the effectiveness of guava leaf tea in reducing the blood glucose level among Type II Diabetic Adults  residing at selected urban area  choolai, Chennai".**

## 1.3   OBJECTIVES OF THE STUDY

1. To  assess  the  pre test  blood  glucose  level  among  Type II Diabetic adults    in experimental and control group.

2. To assess the effectiveness  of  guava leaf  tea  among  Type II  diabetic adults among  experimental group.

3. To  compare the pretest and post test blood glucose level among Type II diabetic   adults  in  experimental and control  group.

4. To  associate the findings with the selected demographic  variables  among Type II   Diabetic  adults in  experimental  group.

## 1.4  OPERATIONAL  DEFINITION

**EFECTIVENESS**

In  this   study  it refers to the outcome of  guava leaf  tea in reducing blood glucose level  among  Type II Diabetic Adults.

**GUAVA LEAF TEA**

This is a tea prepared from extract of 10 fresh guava leaves added in 250 ml of boiling water with 0.5mg of salt.

**BLOOD GLUCOSE LEVEL**

It is the amount of glucose in the blood. In this study the standard kept for fasting blood glucose level was >120 mg/dl and postprandial blood glucose level ranging from > 120 mg/dl and within160 mg /dl.

**TYPE II DIABETES MELLITUS**

As per the study, it refers to the clients who are diagnosed to have non- insulin dependent diabetes mellitus by a diabetologist.

**1.5  ASSUMPTION**

The study assumes that

❖     Type II diabetes adults will participate in the study willingly.

❖     Guava leaf tea is effective in reducing blood glucose level in Type II Diabetic adults.

❖      Community Health Nurses play a vital role in the administration of guava leaf tea for diabetic adults.

❖     Complications of diabetes are preventable

**1.6  HYPOTHESIS**

$H_1$: There will be a significant difference in the blood glucose level among Type- II Diabetic adults between the experimental and control group.

$H_2$: There will be a significant difference between pre and post test mean blood glucose level among Type II Diabetic adults

$H_3$: There will be a significant association between the mean difference in blood glucose level and selected demographic variables among Type II Diabetic adults in the experimental group.

# CHAPTER II

# REVIEW OF LITERATURE

A synthesis of existing published writings that describe what is known or has been studied regarding the particular research question/ purpose.

**Carol L. Macnee, 2004**

This chapter deals with the information collected with relevant to the present study through published and unpublished materials. These publications are the foundation to carry out the research work. Highly extensive review of literature pertaining to research topic was done to collect maximum information for laying foundation of the study.

This section has two parts:

2.1    :    Review of related literature

2.2    :    Conceptual framework

## 2.1 REVIEW OF RELATED LITERATURE

It was divided into 4categories:

I  Literature related to prevalence and incidence of  Type II Diabetes mellitus.

II  Studies related to Guava Leaf Tea

III Studies related to Guava Leaf Tea and Diabetes Mellitus

IV Studies  related to Diabetes Mellitus on selected variables

# 1. Literature related to prevalence and incidence of type II diabetes mellitus.

**Andrew Grandinetti et al., (2011)** conducted a study in rural community Hawaii to assess the Prevalence of diabetes. A cross sectional study was done among the samples of 1452 men and non pregnant women who were above 18 years of age. The results revealed that the prevalence of diabetes is three fold higher among Asian and Hawaiian groups than among Caucasians, even after adjusting for other risk factors.

**Sudheer, B et al., (2011)** conducted a study of prevalence of known diabetes in Tirupathi urban population and to find out the role of other factors a cross sectional study was conducted and the results revealed that out of 220 known diabetic patients 16% (35) were Type I diabetes and 84% (185) were Type II Diabetic patients and the majority of them 75% (32) fall in the age group between 46-55 years.

**Misra p et al., (2011)** conducted studies on extent of problem of diabetes in rural India. A systematic search was performed using electronic as well as manual methods for a period of 15 years and the results revealed that 2.02 per1000 population per year increase in diabetes prevalence. The rate of increase was higher in males (3.33/1000/year) as compared to females (0.88/1000/year).

**Constantine GR (2010)** studied the prevalence of diabetes and pre-diabetes in adults in Srilanka, in the cross sectional study among 4532 patients, the results revealed that the prevalence of overall urban and rural diabetes and pre-diabetes was 11.5%. 13.6%, respectively.

**Nohomi clement (2009)** stated in his study the prevalence of Type II Diabetes among urban Indians was reported to be 2.1 % which has risen to 12-16%. Looking at the region-wide prevalence, the prevalence of diabetes in southern parts of India was found to be higher -13.5 % among Chennai residents; Bangalore 12.4%; Hyderabad 16.6% than eastern India 11.7 %

(Kolkata) Northern India 11.6% (New Delhi) and Western India 9.3% (Mumbai) and has concluded that in the last two decades there has been a marked increase in the prevalence of diabetes.

**Ohison L.O et al., (2009)** conducted the study on risk factors for Type II Diabetes Mellitus, a homogenous sample of randomly selected 54 samples from a Swedish population with the diabetes incidence 6.1%, the results shows that those with a positive family history of diabetes have 2.4 fold higher risk for developing diabetes than without such history.

**World Health Organization (2008)** has stated in their a study to assess the prevalence of Type II Diabetes Mellitus in India, estimated that 19.4 million individuals are affected by type2 diabetes mellitus in India in the year 1995. It is likely to go up to 57.2 million by the year 2025. Every fifth diabetic patient in the world is in India and every fifth adult in urban area and the global number of people with diabetes is expected to be at least 220 million in 2010 and reaching 300 million by the year 2025.

**Oldroyd, Banerjee, Heald, Cruickshank (2007)** stated that the global prevalence of diabetes for all age group is estimated to be 2.8%. Type-II diabetes accounts for at least 90% of diabetes worldwide. Diabetes incidence, prevalence and disease progression vary by ethnic group and concluded that although the origin of the ethnic difference in incidence need further clarification.

**Lau cheun-yen, Qureshi, Scott. (2003)** in their study prevalence of Type II Diabetes in the southern part of Iran, prevalence of diabetes and glucose tolerance was found to be 13.6% and 15.6% respectively. Also, age-adjusted prevalence for both genders was calculated 12% (10.2 for men, 12.9% for women) and concludes that diabetes becomes more prevalent 8.3 % in people of age 30-39 years, and 24.8 % in those of age 50 to 64 years and concluded that prevalence of diabetes increases with that of age.

**Leslie Sue Lieberman (2003)** has conducted a perspective study on dietary, evolutionary, and modernizing influences on the prevalence of Type II Diabetes to elucidate the etiology of the current epidemic of Type II Diabetes estimated at 151 million people and concluded that the processes of modernization or globalization include the availability and abundance of calorically dense/low-fiber/high-glycemic foods and the adoption of sedentary Western lifestyles, leading to obesity among both children and adults in developed and developing countries.

**Zimmet (1991)** in his study on Type II (non-insulin-dependent) Diabetes an epidemiological overview study have shown that Type II (non-insulin dependent) Diabetes has a global distribution and its prevalence varies from country to country, in different ethnic groups in the same country, and between the same ethnic group undergoing internal or external migration. Rural-urban and migration studies indicate that change towards a ⸢Westernized ⸥ lifestyle is associated with a dramatic increase in the prevalence rates for Type II Diabetes, low prevalence rates of Type II Diabetes are seen in Eskimos and populations of the Far East, while the highest are seen in American Indians, urbanized Pacific Island populations, and migrant Asian Indians. Available evidence suggests that these latter groups have a genetic susceptibility to Type II Diabetes ( ⸢diabetes genotype ⸥) and that the disease is unmasked by environmental factors.

## II  Studies related to Guava Leaf Tea

**Ochiai et al (2010)**  Have demonstrated that treatment of T2DM patients with Acarbose for 2 weeks improves both hypoadiponectinemia and hyperglycemia, showing an increase in serum adiponectin level and a decrease in HbA1c% in blood. These findings suggest that Guava leaf tea has similar therapeutic potential to Acarbose for improving hypoadiponectinemia and hyperglycemia. Moreover, there is a good inverse correlation between adiponectin and HbA1c% in the blood of the patients treated with Guava leaf tea.

**Deduce and Miyazaki ( 2010)** conducted a study and find out, Top 10 Amazing Health Benefits of Guava leaf tea. Guava leaves used are as medicine for long times. These young leaves are abundant with many beneficial bio-chemicals such as quercetins and vitamin C including many antioxidants. Guava leaf tea is useful in curing of diabetes, diarrhea and reduces cholesterol. Guavas folate helps in the metabolism of protein and carbohydrate for fuel.

**Deduce and Miyazaki (2010)** conducted a study and find out, Guava leaves are beneficial against bacteria such as Micrococcus pyogenes and Escherichia coli. Fruits extract of guavas is useful against Salmonella. The vitamin C contents develop an immune system which prevents fungal, bacterial and viral infections. The foliage of guava is good for pregnant women as it reinvents defects in new born baby.

**Nurt Metab (Lond) ( 2010) Feb** : Anti hyperglycemic effects of guava Leaf extract. Psidium guajava linn.(guava) is used not only as food but also as folk medicine in subtropical areas around the world because of its pharmacological activities. Particularly, the leaf extract of guava has traditionally been used for the treatment of diabetes in East Asia and other countries. Moreover, the anti- hypoglycemic activity of the extract has been reported in some animal models. However, little is known regarding the therapeutic activity of the extract in human clinical trials as well as its underlying therapeutic mechanisms and safety.

**Japanese Ministry of Health, Labor and Welfare first published "Foods for Specified Health Uses" (FOSHU) (2009)** FOSHU lists foods whose claims of their physiological effects on the human body have been officially approved and such foods were legally permitted to be used as dietary products for health preservation. Guava Leaf Tea (Bansoureicha^®, Yakult Honsha, Tokyo, Japan), which contains the aqueous guava leaf extract (GvEx), has been approved as FOSHU and recommended for subjects with pre-diabetes; it is presently commercially available in Japan.

**Japanese Ministry of Health, Labor and Welfare first published "Foods for Specified Health Uses" (FOSHU) (2009)**. Effect of consecutive ingestion of Guava Leaf Tea on serum lipid parameters in subjects with hypercholesterolemia Moreover, the ingestion of Guava Leaf Tea significantly reduced blood $HbA_{1c}$ % in diabetic subjects (initial $HbA_{1c}$%: >6.5%), and significantly increased serum adiponectin level in each subject with hypoadiponectinemia and hyperglycemia. The nutritional intake of all the subjects showed no significant variation in the results of the questionnaires that were designed for 1 week in the first, middle and last weeks of the trial period. This suggests that the trial findings were due to the effects of ingestion of Guava Leaf Tea and not from nutritional intake. There were no abnormal changes in the parameters of liver and kidney function, blood chemistry and doctor's health interviews during the entire trial period. Also, side effects such as hypoglycemia due to the abnormal interaction between Guava Leaf Tea and an HMG-CoA reductase inhibitor, colestimide (an inhibitor of cholesterol absorption) or ethyl icosapentate were not observed.

**Japanese Ministry of Health, Labor and Welfare first published in (2009)** conducted a study and demonstrated that the consecutive ingestion of Guava Leaf Tea together with every meal improved hypertriglyceridemia and hypercholesterolemia. It is speculated that the chronic suppression of postprandial blood glucose elevation is one of the underlying mechanisms involved in the improvement of not only hyperglycemia and hypoadiponectinemia but also hypertriglyceridemia and hypercholesterolemia.

**Japanese Ministry of Health, Labor and Welfare first published "Foods for Specified Health Uses" (FOSHU) (2009)**. Confirm efficacy and safety, further large-scale clinical trials employing a larger number of subjects with metabolic syndrome are included. It demonstrated that the consecutive ingestion of Guava Leaf Tea together with every meal improved hyper-triglyceridemia and hypercholesterolemia.

**III Studies Related Guava Leaf Tea and Diabetes Mellitus.**

     **Am J Chin MED. (2011) .** have conducted a study regarding Hypoglycemic effect of Guava Leaf Tea in mice and human subjects. Guava is plentiful fruit in Taiwan and it was taken from the plants pisidium guajava Linn. In present study ,acute treatment with Guava leaf tea produced a marked hypoglycemic action in normal and alloxan treated diabetic mice. Although effective duration of guava leaf tea is more transient and it is less potent than chlorpropamide and metformin, blood glucose lowering effect of guava also can be obtained by oral administration in maturity –onset diabetic and healthy volunteers. Thus, it is suggested that guava leaf tea may employ to improve and or prevent the disease of diabetes mellitus.

     **Torch Italy: Am J chin (2011):** A crossover study was designed to evaluate the effects of a single ingestion of Guava leaf tea on postprandial blood Glucose elevation in normal and pre-diabetic subjects (15)'The single ingestion of guava leaf tea significantly reduced postprandial blood glucose elevation at 30,90 and 120 mgs. In addition, the evaluation of the glucose level after carbohydrate loading (ingestion of cooked rice) was significantly reduced by about 20% compared with the control.

     **Methods Find Exp Clin Pharmacol. (2011) Dec:** This study was undertaken to investigate the hypoglycemic of p. guajava leaf aqueous extract. The numerous tannins, polyphenolic compounds, flavonoids, pentacyclic triterpenoids, guiajaverin, to account for the observed hypoglycemic effects, and thus lend pharmacological credence to the suggested folkloric, ethnomedical uses of the plant in the management or control of adult onset, type II diabetes mellitus in some rural African communities.

     **Deguchi and Miyazaki; ( 2010) .** Have conducted a study Psidium guajava Linn. [Guava] is used not as food, but also as folk medicine in subtropical areas around the world because of its pharmacological activities. In particular, the leaf extract of guava has traditionally been used for the treatment

of diabetes in East Asia and other countries. However, little is known regarding the therapeutic activity of the extract in human clinical trials as well as its underlying therapeutic mechanisms and safety.

**Nurt Metab (Lond) (2010) Feb.** This review describes the active component of the aqueous guava leaf extract and its inhibition of alpha-glucosidase enzymes in vitro , safety of the extract and Guava Leaf Tea, reduction of post prandial Blood glucose elevation, and improvement in several clinical trials. It is suggested that the chronic suppression of postprandial Blood Glucose elevation is important in preventing type II diabetes mellitus.

**"Nutrition and Metabolism" in (2010)** conducted a study by the Yakult Central Institute for Microbiological Research in Tokyo, Japan that Guava leaf tea may be effective in lowering blood glucose levels. Consumption of guava leaf tea inhibits alpha-glucosidase enzymes. The inhibition of these enzymes results in reduction of blood glucose levels; the suppression of elevated blood glucose levels is critical in the prevention of Type II diabetes. Guava leaf tea may be effective in lowering blood glucose levels.

**Oyama et al(.2006)** Investigated the mutagenic activity of both GvEx and Guava Leaf Tea. They found that Guava Leaf Tea had a lower mutagenic activity than commercial green tea and black tea in a DNA repair test (Rec-assay); however, these teas showed no mutagenic activity in a bacterial reverse mutation test (Ames test). Moreover, GvEx did not induce chromosomal aberrations in a micro nuclear test using peripheral blood erythrocytes, which were prepared from mice by a single oral administration of GvEx (2000 mg/kg). From these findings, it is suggested that Guava Leaf Tea and these commercial teas have no genotoxicity. After the approval as FOSHU, Guava Leaf Tea has been taken by not only subjects with pre-diabetes, but also patients with mild and moderate T2DM.

**Deguchi et al(2006)** Investigated the effects of GvEx in To further examine the effects of drinking excessive amounts of Guava Leaf Tea, human healthy subjects in a previous study ingested a 3-fold volume (600 ml) of the tea. Notably, neither diarrhea nor hypoglycemia was observed. Furthermore, single ingestion and the consecutive ingestion of Guava Leaf Tea for 8 or 12 weeks with or without anti-diabetic and anti-hyperlipidemia drugs in human clinical trials demonstrated no side effects or abnormal changes.

**FOSHU in March (2000)** conducted a study in long term clinical trial they investigated the effects of consecutive ingestion of Guava Leaf Tea for 8 weeks on the parameters of diabetes symptoms and safety in diabetic patients receiving therapy, that is, anti-diabetic medication with or without an inhibitor of HMG-CoA reductase. Taken together, it is suggested that the consecutive ingestion of Guava Leaf Tea with every meal improves diabetes symptoms, such as hyperglycemia, hyperinsulinemia, insulin resistance as well as hyperlipidemia in pre-diabetic and Type II diabetic clients with or without hyperlipidemia. Moreover, it is indicated that the consecutive ingestion of Guava Leaf Tea in addition to anti-diabetic and anti-hypercholesterolemia medications show no side effects due to the abnormal interaction

## IV Studies Related To Diabetes And Demographic Variables

**Rostam Golmohammadi and Bahrami Abduirabman (2009)**The study aimed o identify the relation between occupation stress and the development of Type II Diabetes Mellitus. We selected 123 employees among 3229 people that diagnosed as Type II diabetes mellitus as subject group and also 150 people, that has normal blood sugar level as control group. First questionnaire has 55 questions about work condition, job environment and personal feeling. This research suggested that occupational stress is related to the development of Type II diabetes mellitus and stress related to interpersonal relationship, physical demands and lack of job interest.

**Morikawa y (2008)** to investigate the relation between the occupation and the development of Type II Diabetes Mellitus, We undertook a 10—year follow –up survey of male employees of a zipper and aluminum sash factory in japan. Of 1,218 employees, we followed 1,087 subjects. We classified the subjects into five occupations: managers, technical workers, workers in transport, and labors. The age-adjusted incidence of the workers in transport was the highest and that in laborers was the lowest. We used a multiple logistic analysis for adjustment with baseline characteristics such as age, BMI, FSATING PLASMA GLUCOSE, AND FAMILY HISTORY OF DIABETES MELLITUS. Adjusted relative risk of the workers in transport compared with laborers was scientifically, high (3.95) Our work suggests that occupation is related to the development of type II Diabetes mellitus.

**Estate and Schrier, (2005)** the study aimed to identify the association between diabetes complications and exercise capacity in non insulin dependent diabetmellitus clients. It has been demonstrated previously in Type 11 diabetes mellitus that several risk factors (i.e., Obesity, smoking, hypertension, and African-American race) are associated with an impaired exercise capacity. We studied 265 male and 154 female clients who under went graded exercise testing with expired gas analyses to determine the possible influences of diabetes nephropathy, and retinopathy, on exercise capacity. The results were obtained controlling for age, sex, length of diagnosed diabetes, hypertension, race, and BMI. Thus the findings in this large Type II Diabetes mellitus population without a history of coronary artery disease indicate a potential pathogenic relationship between micro vascular disease and exercise capacity.

**Dieren Susan vanaJoline W.J. Beulensa et al (2005)** conducted a study that the number of patients with type II diabetes is increasing rapidly in both developed and developing countries around the world. The emerging pandemic is driven by the combined effects of population ageing, rising levels of obesity and inactivity, and greater longevity among patients with diabetes that is attributable to improved management. The vascular complications of

Type II diabetes account for the majority of the social and economic burden among patients and society more broadly. This review summarizes the burden of Type II diabetes, impaired glucose tolerance, and their vascular complications. It is projected that by 2025 there will be 380 million people with Type II diabetes and 418 million people with impaired glucose tolerance. Diabetes is a major global cause of premature mortality that is widely underestimated, because only a minority of persons with diabetes dies from a cause uniquely related to the condition. Approximately one half of patients with Type II diabetes die prematurely of a cardiovascular cause and approximately 10% die of renal failure. Global excess mortality attributable to diabetes in adults was estimated to be 3.8 million deaths.

**J. Lawton, N. Ahmad , et al (2004)** conducted a qualitative study explored Pakistani (n = 23) and Indian (n = ,patients') perceptions and experiences of undertaking physical activity as part of their diabetes care. Although respondents reported an awareness of the need to undertake physical activity, few had put this lifestyle advice into practice. For many, practical considerations, such as lack of time, were interwoven with cultural norms and social expectations. Whilst respondents reported health problems which could make physical activity difficult, these were reinforced by their perceptions and understandings of their diabetes, and its impact upon their future health. Education may play a role in physical activity promotion; however, health promoters may need to work with, rather than against, cultural norms and individual perceptions. We recommend a realistic and culturally sensitive approach, which identifies and capitalizes on the kinds of activities patients already do in their everyday lives.

## 2.2 CONCEPTUAL FRAME WORK

A conceptual framework is a process of ideas which are framed and utilized for the development of a research design. It helps the researcher to know what data needs to be collected and gives direction to an entire research process.

The study is based on the concept that administration of 50 ml of guava leaf tea to Type II Diabetic Patients will reduce blood glucose level. The investigator adopted the Wiedenbach's Helping Art of Clinical Nursing Theory (1964) as a base for developing the conceptual framework. Ernestin Widenbach proposes helping the art of clinical nursing theory in 1964 for nursing which describes a desired situation and way to attain it. It directs action towards the explicit goal.

## THIS THEORY HAS 3 FACTORS

1)      Central purpose
2)      Prescription
3)      Realities

### i) Central Purpose

It refers to what the nurse wants to accomplish. It is the overall goal towards which a nurse strives.

### ii)    Prescription

It refers to the plan of care for patients. It will specify the nature of action that will fulfill the nurse's central purpose.

### iii)   Realities

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

The conceptual framework of the nursing practice according to this theory consists of three steps as follows:

Step I:     Identifying the need for help

Step II:    Ministering the needed help

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


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

This step involves determining the need for help. The Type II Diabetic adults were identified based on demographic variables (Age, Sex, Education, Occupation, Family Income, Family history, duration of illness, medication used and exercise) inclusive and exclusive criteria, simple random sampling technique was used to assign the adults in experimental and control group.

**Step II:  Ministering the needed help**

50 ml of guava leaf tea was given to experimental group daily in the morning half an hour after breakfast for 14 days.

Agent            : Investigator

Recipient      : Type II Diabetic adults

Goal             : To reduce blood glucose level

Means :          :  50 ml of guava leaf tea

Framework    : Selected urban areas of Chile, Chennai

**Step-III:    Validating that need for help was met.**

It is accomplished by means of post assessment of blood glucose level. It is followed by an analysis of the findings.
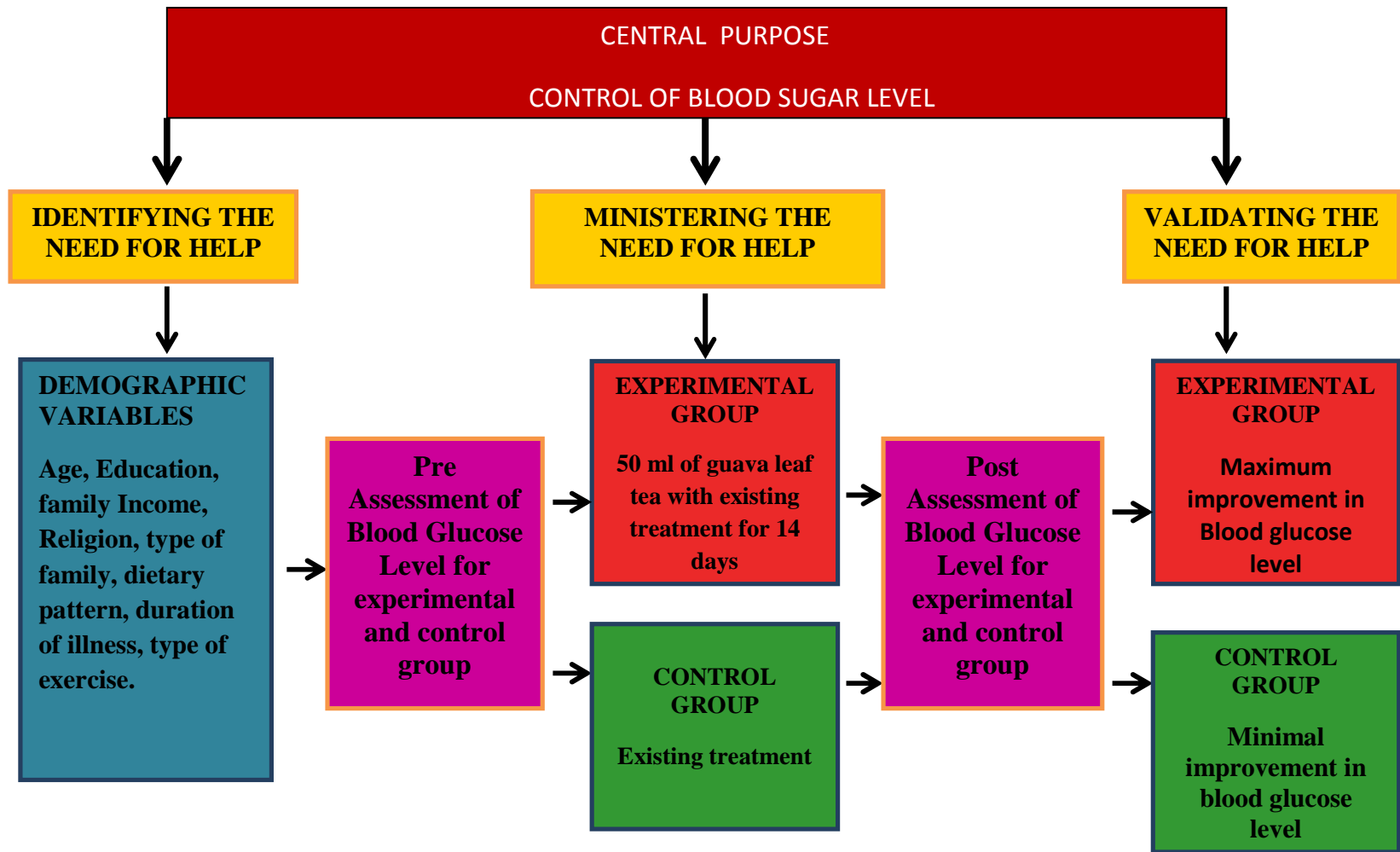
**Fig -1Conceptual framework based on modified model of Wiedenbach's helping art of clinical nursing theory (1964)**

# CHAPTER III
# METHODOLOGY

## INTRODUCTION

The research methodology is a way to solve the problems systematically. It may be understood as a science of studying how research is done scientifically. It explains why a particular method or technique is used in the study**.**

**(Dense F. Polity, 2004)**

Research methodology provides a brief description of the method adopted by the investigator in the present study and it refers to the principles and ideas on which researcher bases their procedures and strategies.

This chapter deals with the description of the methods and different steps used for collecting and organizing data, such as  the  research approach, research design, variables, setting of the study, population, sample, sample size, sampling technique,  criteria for sample selection, developing and description of the tool, ethical consideration, content validity, pilot study, reliability, data collection procedure and plan for data analysis.

The present study was done to assess the effectiveness of guava leaf tea in reducing the blood glucose level among Type II Diabetic adults residing at the urban area  Choolai, Chennai."

## 3.1 Research Approach:

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

## 3.2 Research design:

The overall plan for addressing a research question, including specifications for enhancing the study's integrity is referred to as Research Design.

The Pretest-Post test only design.

$$RE \qquad O_1 \qquad X \qquad O_2$$
$$RC \qquad O_3 \qquad -- \qquad O_4$$

R        (Randomization)

E        (Experimental Group)

C        (Control Group)

X        (Intervention)

O        (Observation)

| Group | Pretest $O_1$ | Treatment $X$ | Post test $O_2$ |
|---|---|---|---|
| Experimental Group | Blood glucose level assessed | 50 ml of guava leaf tea | Blood glucose level assessed |
| Control Group | Blood glucose level assessed | - | Blood glucose level assessed |

## 3.3 Research Variables

Variables included in the study are:

Dependent variable        ---        Level of Blood sugar

Independent variable        ---        Guava leaf tea

Demographic variables        ----        Age, Sex, Education, Occupation, income,

Family history, diet pattern, exercises,

Regular intake of drug

**3.4 SETTING**

The study was conducted in urban areas of Choolai, Chennai, 4 kms away from the College of Nursing, Madras Medical College, Chennai, which comes under the corporation of Chennai. It has 9 zones and covers the population of 54,500. The setting was selected based on the feasibility of conducting the study, availability of sampling and proximity of setting to the investigator.

**3.5 POPULATION**

Population is the entire aggregation of cases that meet a designed set of criteria. In this present study population  is subjects who are having type II Diabetes Mellitus residing at Choolai. The total clients with Type II diabetic mellitus from the selected streets in Choolai were 116.

**3.6 SAMPLE**

A subset of a population, selected to participate in the study. The study sample consists of 60 subjects who are having Type II Diabetic Mellitus, who fulfilled the inclusion and exclusion criteria.

**3.7 SAMPLE SIZE:**

In this study the sample comprises of 60 Type II Diabetic adults who are residing at Choolai, in which 30 patients were in experimental and 30 were selected in the control group.

**3.8 SAMPLING TECHNIQUE**

The simple random sampling technique was used for the study. The researcher conducted a survey in the study areas of Choolai to identify the total number of Type II Diabetic Patients. The list of the patients  with known diabetes and on regular treatment with oral hypoglycemic drugs, duration of illness within 5 years and without any other diseases were  collected with the

total of 116 patients, using the lottery method, 60 samples were selected from the sampling frame based on the inclusion and exclusion criteria.

## 3.9 CRITERIA FOR SAMPLE SELECTION

### Inclusion Criteria

❖ Type-II Diabetic adults who are residing at choolai and are able to understand Tamil and English.

❖ Type-II Diabetic adults those who are willing to participate in the study.

❖ Type-II Diabetic adults whose age group between 30-60 yrs.

❖ Duration of illness within 5 yrs and on regular oral hypoglycemic medication.

### Exclusion criteria

❖ Type II Diabetic adults with other systemic problems like Renal failure, malignant HT, Cardiac failure.

❖ Type II Diabetic adults other than oral hypoglycemic medication.

## 3.10 DEVELOPMENT AND DESCRIPTION OF THE TOOL

A structured interview schedule was developed by the investigator, based on the objectives of the study and the tool was developed after an extensive review of literature, internet sources and opinion of the experts in the field, journals and books.

## 3.11 DESCRIPTION OF THE TOOL

The instrument consists of two sections. The tool used in this study was an interview and observation schedule on blood glucose for Type II Diabetic adults.

**Section-A***:* Demographic data of Type II Diabetic Patients  which consists of 13 questions  such as age, sex,  religion, education, occupation, family income, the nature of the work, duration of illness, family history of disease, relationship with the client, etc.

 **Section-B***:* Observation schedule includes pre test assessment of fasting and postprandial blood glucose level of both experimental and control group and there after post Interventional assessment of blood glucose on  the 15th day for both the group.

## BLOOD GLUCOSE ASSESSMENT

The investigator is to assess and record blood glucose level before and after administration of  guava leaf tea.

 **Assessment of blood glucose level**

| Group | Pretest O1 | Treatment X | Post test      O2 |
|---|---|---|---|
| Experimental Group | Blood glucose level assessed | 50 ml of guava leaf tea | Blood glucose level assessed |
| Control Group | Blood glucose level assessed | | Assessed |

1)     Maximum reduction of blood glucose level:     10-20 mg/dl

2)     A minimum reduction of blood glucose level:     < 10 mg/dl

## 3.11 ETHICAL CONSIDERATION

Ethical consideration refers to a system of moral values that is concerned with the degree to which research procedure adheres to professional, legal and social obligations to study participants.

The study objectives, intervention, and data collection procedures were approved by the research and ethics committee of the institution. Informed consent was obtained from Type II Diabetic adults. The freedom was given to the client to leave the study at his/her will without assigning any reason. No routine care was altered or withheld. Confidentiality of the subject's information was maintained.

## 3.12 TESTING OF THE TOOL

**Validity of the tool**

The content validity refers to the degree to which an instrument measures what is supposed to measure.  The content of the tool was validated by Medical Expert, and  Community Health Nursing Expert. The expert's suggestions were incorporated and the tool was finalized and used by the investigator for the main study.

**Pilot study procedure**

The pilot study was conducted at Choolai, Chennai by obtaining prior permission from the authorities and conducted with six adults, who fulfilled the inclusion criteria. The study in which the pilot study conducted was excluded for the main study.  The data related to the variables were collected. The pre and post assessment of blood glucose level was assessed to both the groups. 50 ml of guava leaf tea was given to the experimental group for 14 days daily by the investigator in person. Results were analyzed. The investigator found that the instrument was feasible to use and further no modifications were needed before the actual implementation of the study.

**Reliability of the tool**

The reliability of the tool was established by an inter rater reliability method. The obtained reliability coefficient was high (r=0. 99).

## 3.13 DATA COLLECTION PROCEDURE

The study was conducted in selected urban area of Choolai, Chennai, after obtaining permission from the City  Health officer , Corporation of Chennai, Zonal Officer and Medical Officer Of  Choolai Health Post. A self-introduction was given by the investigator and the informed written consent was obtained from the adults and benefits of  guava leaf tea was explained to the participants. The objectives and purpose of the study were explained and confidentiality was maintained. The data collection procedure was done for a period of 4 weeks and the time taken for data collection from each patient was 10-15 mts and 5-10 mts for doing blood test for each adults and the investigator selected 60 samples (30 participants in experimental and 30 in control group) by simple random sampling technique using lottery method based on the inclusion and exclusion criteria. Pretest of fasting and postprandial blood glucose level was assessed by Glucometer for both experimental and control group, same instrument was used for both the group and then for experimental group 50 ml of guava leaf tea was given in the morning half an hour after  breakfast daily in person for 14 days and post assessment was conducted on the 15$^{th}$ day for both experimental and control group.

## 3.14 PLAN FOR DATA ANALYSIS PROCEDURE

Data analysis enables the researcher to reduce, summarize, organize, evaluate, interpret and communicate numerical information to obtain answer to research questions. Data analysis was done based on the objectives of the study. The data was analyzed using descriptive statistics like frequency distribution, percentage and inferential statistics like standard deviation, chi-square test, independent t-test. The significant findings were expressed in the form of tables and figures. P<0.05 was considered statistically significant.

**Figure-2: Schematic representation of research methodology**

Research Design – Pre test –Post test only  Design

Setting of the Study:
Selected  urban area,Choolai, Chennai.

Population
Type II Diabetic adults(30-60 years)  in selected area, Choolai. Chennai)

Sampling Technique- Simple Random Technique

Sample Size – 60 Type II Diabetic Adults

| Experimental Group (30) | Data collection tool structured interview and observation schedule | Control Group (30) |
|---|---|---|
| Pre Assessment of Blood Glucose Level | Data analysis and Inter-pretation (descriptive & inferential analysis) | Pre Assessment of Blood Glucose Level |
| Intervention  50 ml of guava leaf tea for 14 days with existing treatment | Findings | Exsisting treatment |
| Post assessment of Blood Glucose Level | Report-dissertation | Post assessment of Blood Glucose Level |

# CHAPTER IV

## DATA ANALYSIS AND INTERPRETATION

A process that pulls information together or examines connections between pieces of information to make a clearer picture of all of the information collected.

**(Carol L Macnee,2004)**

This chapter deals with the analysis and interpretation of data collected from 60 samples of Type II Diabetic adults to evaluate the effectiveness of guava leaf tea on blood glucose level among Type II Diabetic adults residing at urban area choolai, Chennai.

## STATISTICAL ANALYSIS

- ❖ Demographic variables in categorical/dichotomous were given in frequencies with their percentages.
- ❖ The blood glucose level was given in mean and standard deviation.
- ❖ The association between reduction levels of Blood glucose level and demographic variables were analyzed using Pearson chi square test.
- ❖ Difference between experiment and control was analyzed using student independent t-test.
- ❖ The difference between pretest and posttest was analyzed using student dependent t-test
- ❖ Differences between pretest and posttest score was analyzed using proportion with 95% CI and mean difference with 95% CI.
- ❖ Multiple bar diagram, Box-plot were used to represent the data.
- ❖ P<0.05 was considered statistically significant.

# ORGANIZATION OF DATA

The collected data were tabulated and presented according to the objectives under the following sections:

**Section-A** : Frequency and percentage distribution of demographic variables of Type II Diabetic adults in experimental and control group.

**Section-B** : Assessment of blood glucose level among Type II Diabetic adults in experimental and control group.

**Section-C** : Assessing the post test level in experimental and control group

**Section-D** : comparison of pre test and post test blood glucose level among Type II diabetic adults in experimental and control group.

**Section-E** : Effectiveness of guava Leaf in reducing the blood glucose level among Type II diabetic adults.

**Section- F** : Association between demographic variables.

**Section-A -Frequency and percentage distribution of demographic variables of Type II Diabetic adults in experimental and control group.**

**Table 1- Distribution of demographic variables**

| Demographic variables | | Group | | | |
|---|---|---|---|---|---|
| | | Experiment | | Control | |
| | | N | % | N | % |
| Age | 30-40 yrs | 7 | 23.3% | 8 | 26.7% |
| | 41-50 yrs | 13 | 43.3% | 14 | 46.7% |
| | 51-60 yrs | 10 | 33.3% | 8 | 26.7% |
| Sex | Male | 15 | 50.0% | 15 | 50.0% |
| | Female | 15 | 50.0% | 15 | 50.0% |
| Education | 1 - 5 std | 8 | 26.7% | 3 | 10.0% |
| | 6 - 8 std | 11 | 36.7% | 11 | 36.7% |
| | 9 - 10 std | 9 | 30.0% | 12 | 40.0% |
| | 10 -12 std | 2 | 6.7% | 4 | 13.3% |
| Religion | Hindu | 28 | 93.3% | 27 | 90.0% |
| | Muslim | 2 | 6.7% | 3 | 10.0% |
| Occupation | Business | 2 | 6.7% | 2 | 6.7% |
| | Private | 12 | 40.0% | 8 | 26.7% |
| | Government | 6 | 20.0% | 7 | 23.3% |
| | Cooly | 10 | 33.3% | 13 | 43.3% |
| Income | Rs.3000 – 5000 | 12 | 40.0% | 8 | 26.7% |
| | Rs.5001 – 7000 | 4 | 13.3% | 6 | 20.0% |
| | Rs.7001 – 9000 | 6 | 20.0% | 6 | 20.0% |
| | >Rs. 9000 | 8 | 26.7% | 10 | 33.3% |
| Food habit | Vegetarian | 5 | 16.7% | 7 | 23.3% |
| | Non – vegetarian | 5 | 16.7% | 6 | 20.0% |
| | Mixed | 20 | 66.7% | 17 | 56.7% |

Table 1: shows the demographic information of   Type II Diabetic Adults  those who are participated in "A  study to assess the effectiveness of guava leaf tea in reducing the blood glucose level among  Type II Diabetic Adults  residing at selected urban area choolai, Chennai".

The above table shows that majority of the adults 13 (43.3%) were between 41-50 years among Experimental group 14 (46.7%) were above 41-50 yrs in the control group.

By gender 15 (50%) were males, 15 (50%) were females in the experimental group, 15 (50%) were males, 15 (50%) were females in the control group.

On the basis of educational status 11 (36.7%) were between $6^{th}$ to $8^{th}$ standard in the experimental group, 12 (40.0%) were between $9^{th}$ -$10^{th}$ standard in the control group.

On the basis of Religion 28 (93.3%) were in the experimental group and 27 (90.0%) were in the control group.

By considering their occupation 42 (40.0%) were doing private jobs in the experimental group and 13 (43.3%) were doing cooly in the control group.

Regarding their income 12 (40.0%) were earning Rs.3000-5000in experimental group, 10 (33.3%) were earning 9000&above in the control group.

According to their food habits 20 (66.7%) were taking mixed food habits in the experimental group, 17 (56.7%) were taking mixed food habits in the control group.

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

**Figure- 4  shows the distribution of subject in experimental and control group according  to gender.**
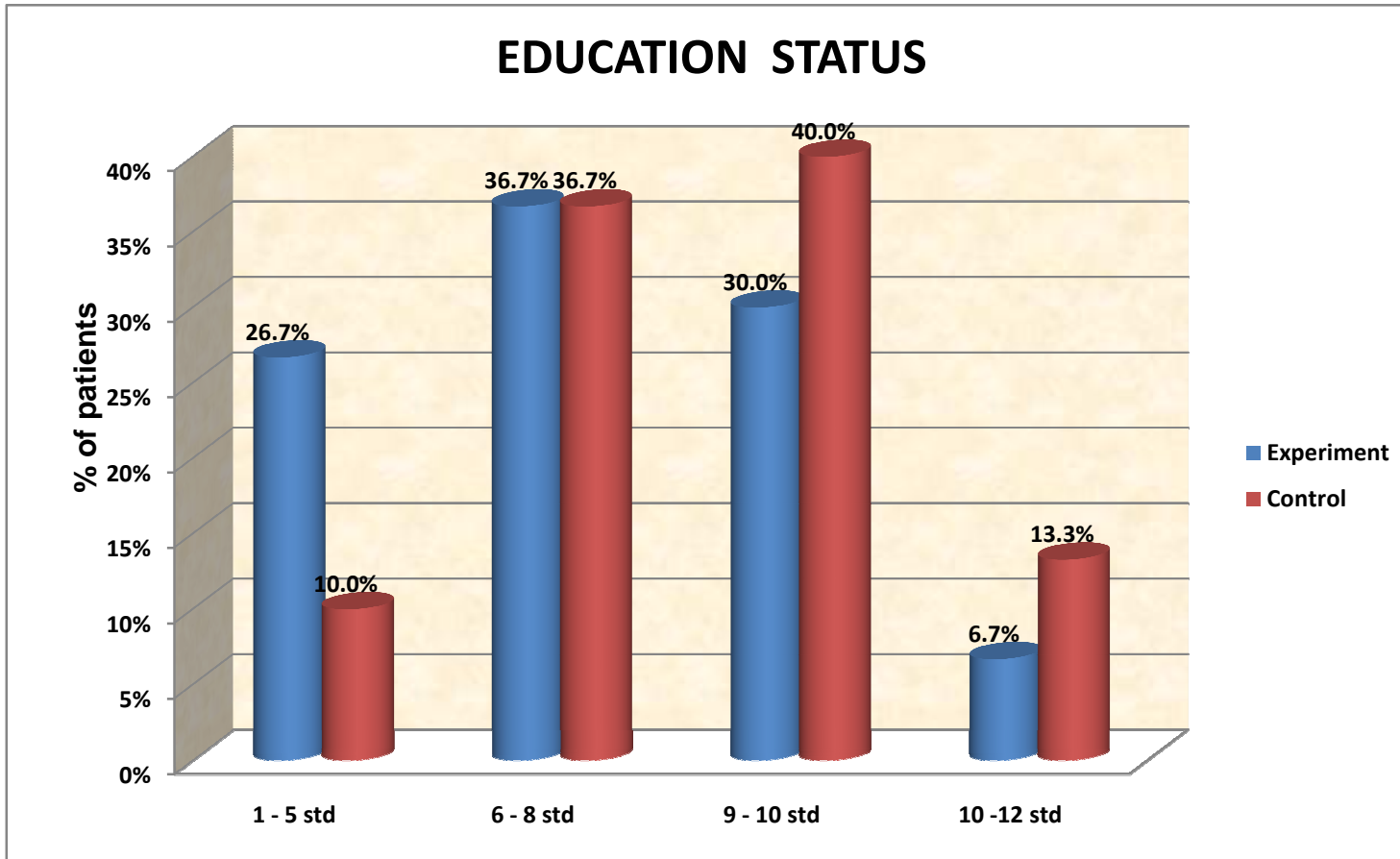
**Figure—5 shows the distribution of subjects in experimental and control group according to their educational background.**

**RELIGIOUS STATUS**

**Figure—6 shows the distribution of subjects in experimental and control group according to their religious status.**

**OCCUPATION STATUS**

**Figure—7 Shows the distribution of subjects in experimental and control group according to their occupational status.**
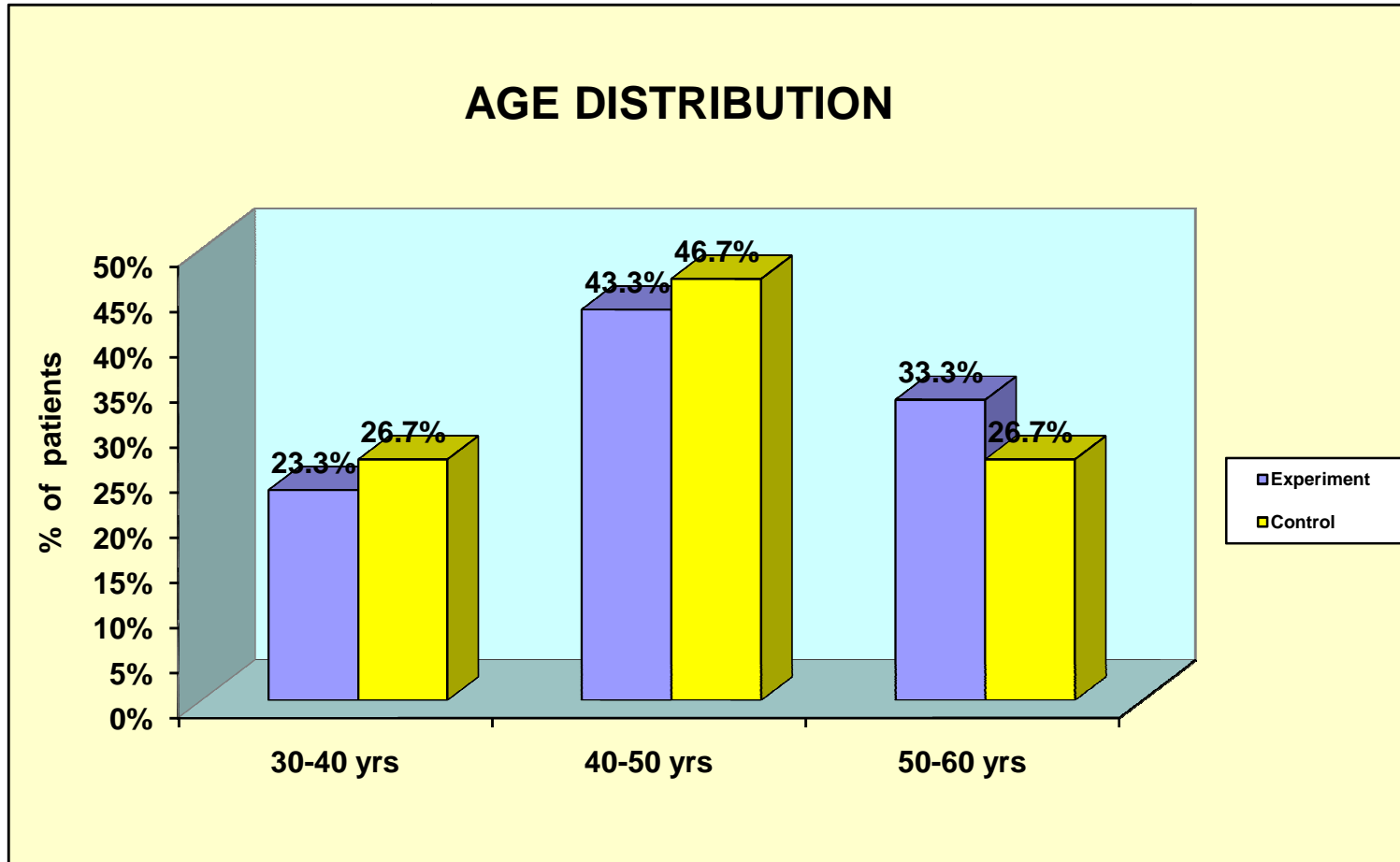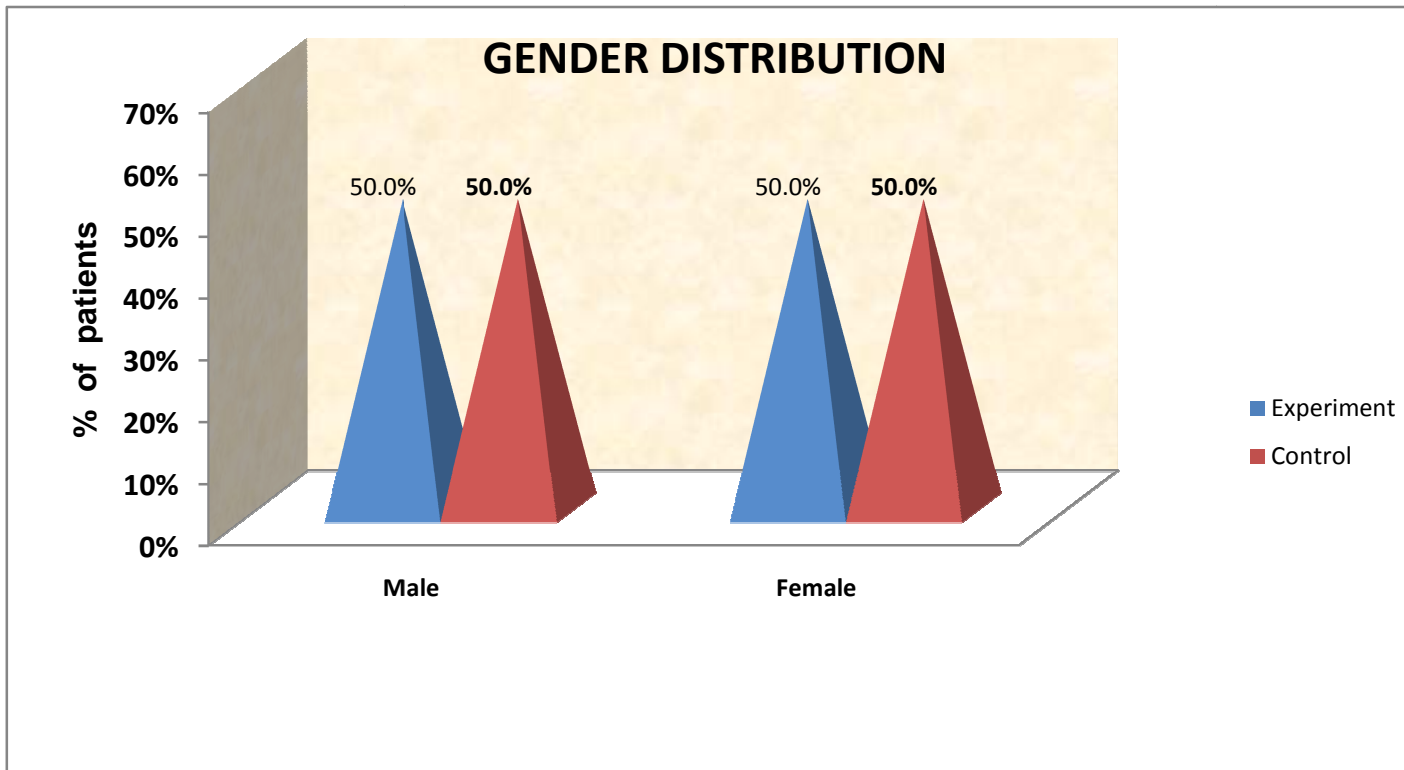
**MONTHLY INCOME STATUS**

Figure- 8 shows the distribution of subjects in experimental and control group according to their monthly income status.
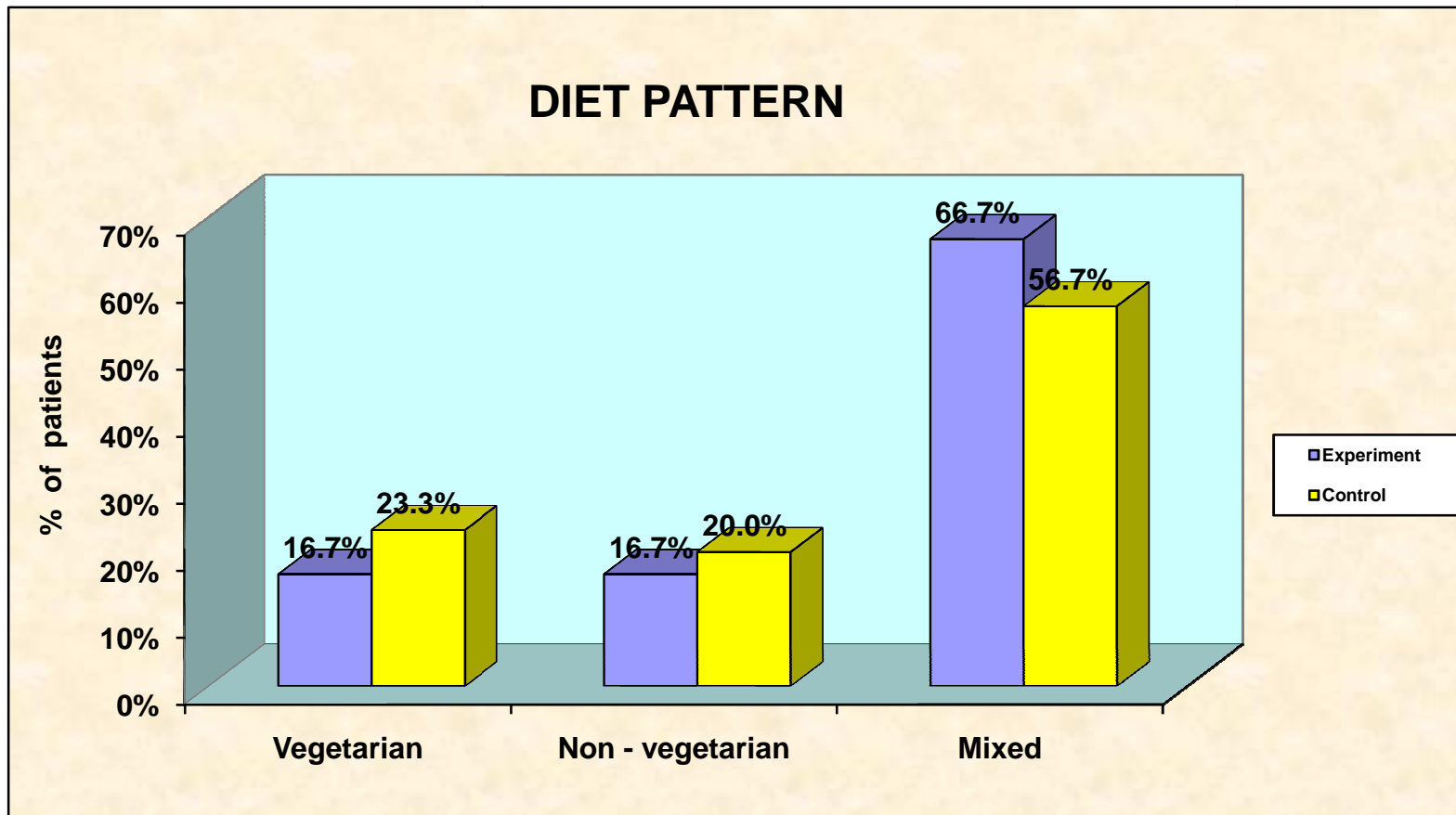
**Figure—9 shows the distribution of subjects in dietary pattern in experimental and control group**

## Table 2- DIABETIC RELATED VARIABLES

| Variables | | Group | | | |
|---|---|---|---|---|---|
| | | Experiment | | Control | |
| | | N | % | n | % |
| Family history | Yes | 15 | 50.0% | 14 | 46.7% |
| | No | 15 | 50.0% | 16 | 53.3% |
| Relationship | Father | 5 | 33.3% | 7 | 50.0% |
| | Mother | 6 | 40.0% | 2 | 14.3% |
| | Grand father | 3 | 20.0% | 2 | 14.3% |
| | Grand mother | 1 | 6.7% | 3 | 21.4% |
| Years of DM | 0 -1 year | 3 | 10.0% | 7 | 23.3% |
| | 1 -2 years | 6 | 20.0% | 4 | 13.3% |
| | 2 -3 years | 8 | 26.7% | 11 | 36.7% |
| | 3 -4 years | 13 | 43.3% | 8 | 26.7% |
| Use of medicines | Yes | 25 | 83.3% | 26 | 86.7% |
| | No | 5 | 16.7% | 4 | 13.3% |
| Exercise habits | Yes | 20 | 66.7% | 22 | 73.3% |
| | No | 10 | 33.3% | 8 | 26.7% |
| Type of exercise | Walking | 14 | 70.0% | 14 | 63.6% |
| | Jogging | 4 | 20.0% | 3 | 13.6% |
| | Weight lifting | 1 | 5.0% | 3 | 13.6% |
| | Others | 1 | 5.0% | 2 | 9.1% |

**Table 2 shows the diabetic related information of Type II Diabetic adults, those who have participated in this study.**

The above table shows that 15 (50%) were family history of Type II diabetic adults in the experimental group, and 16 (53.3%) are in the control group.

According to their relationship 6 (40.0%) are having a history of diabetes from mother in the experimental group, 7 (50.0%) are having a history of diabetes from father in the control group.

On the basis of duration of illness 13 (43.3%) is having history of 3—4 years duration of illness in the experimental group, 11 (36.7%) is having history of 2—3 years duration of illness in the control group.

According to their usage of medicine 25 (83.3%) are taking medicines regularly in the experimental group, 26 (86.7%) are taking medicines in the control group.

Regarding their habit of exercise 20 (66.7%) are doing exercise in experimental group, 22 (73.3%) are doing exercise in the control group

Regarding the type of exercise 14 (70%) of them were doing exercises in the method of walking in the experimental group, 14 (70%) of them were doing exercise in the method of walking in control group.
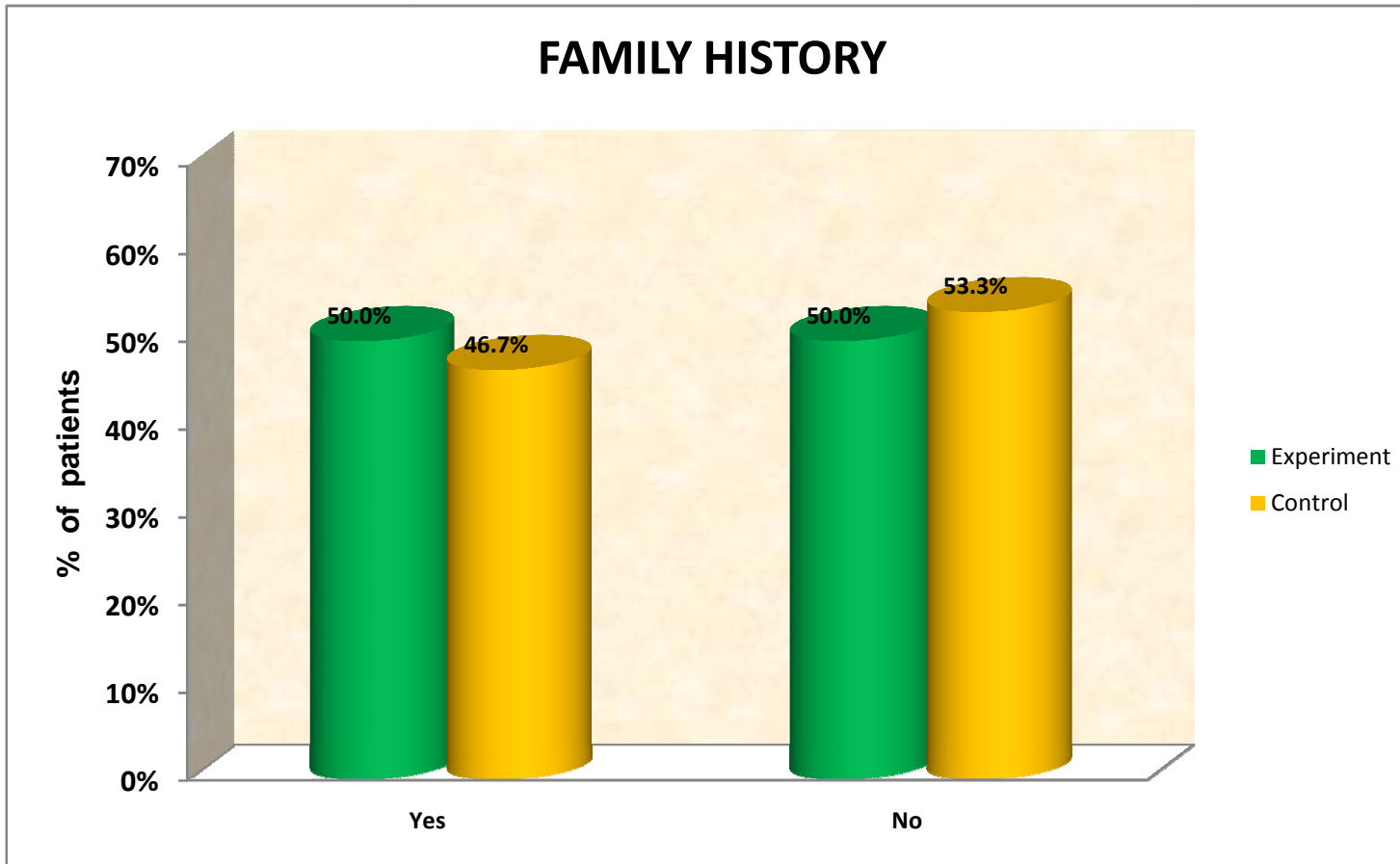
**Figure –10 shows the distribution of subjects in experimental and control group according to their family history.**
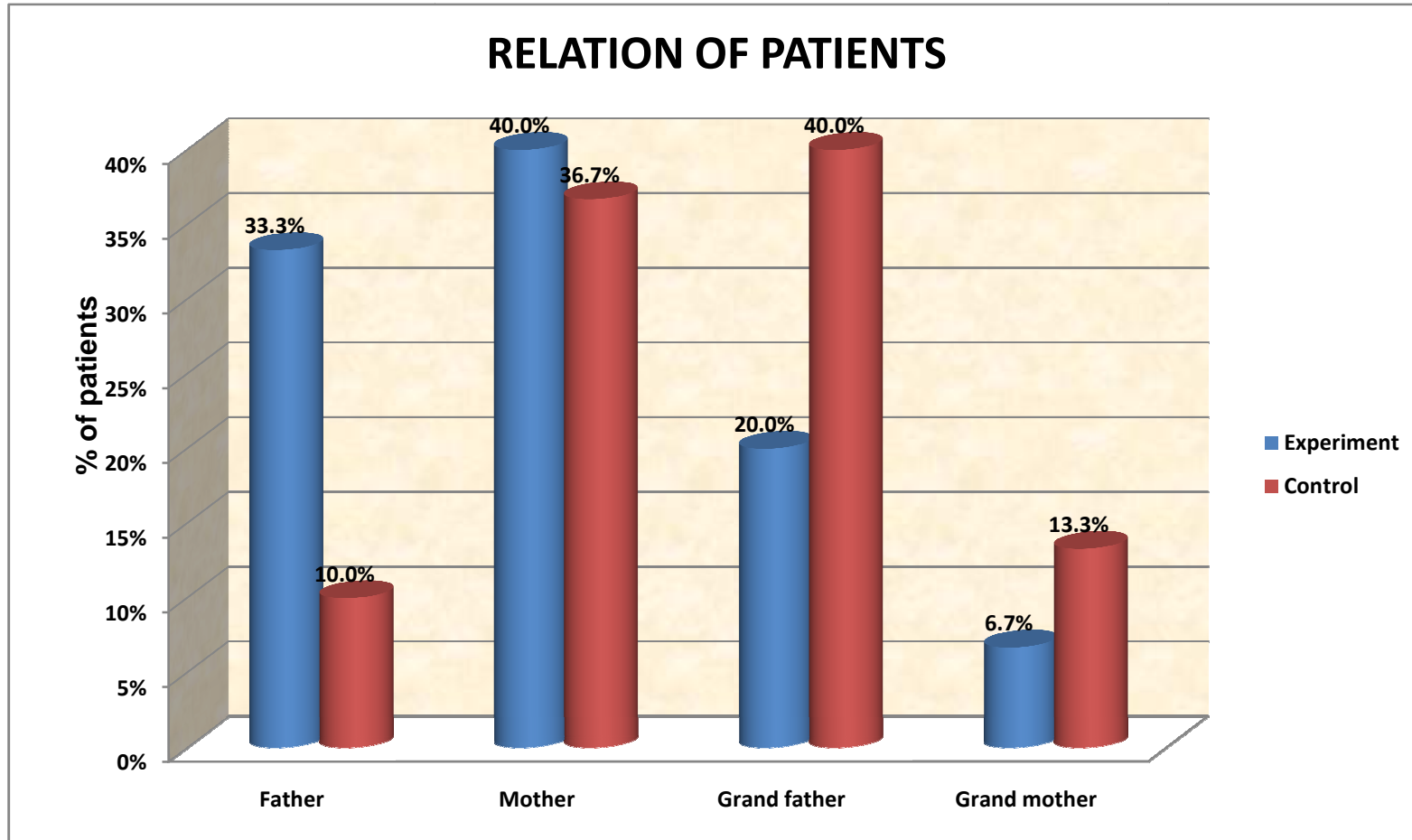
**Figure –11 shows the distribution of subjects in experimental and control group according to their relationship.**
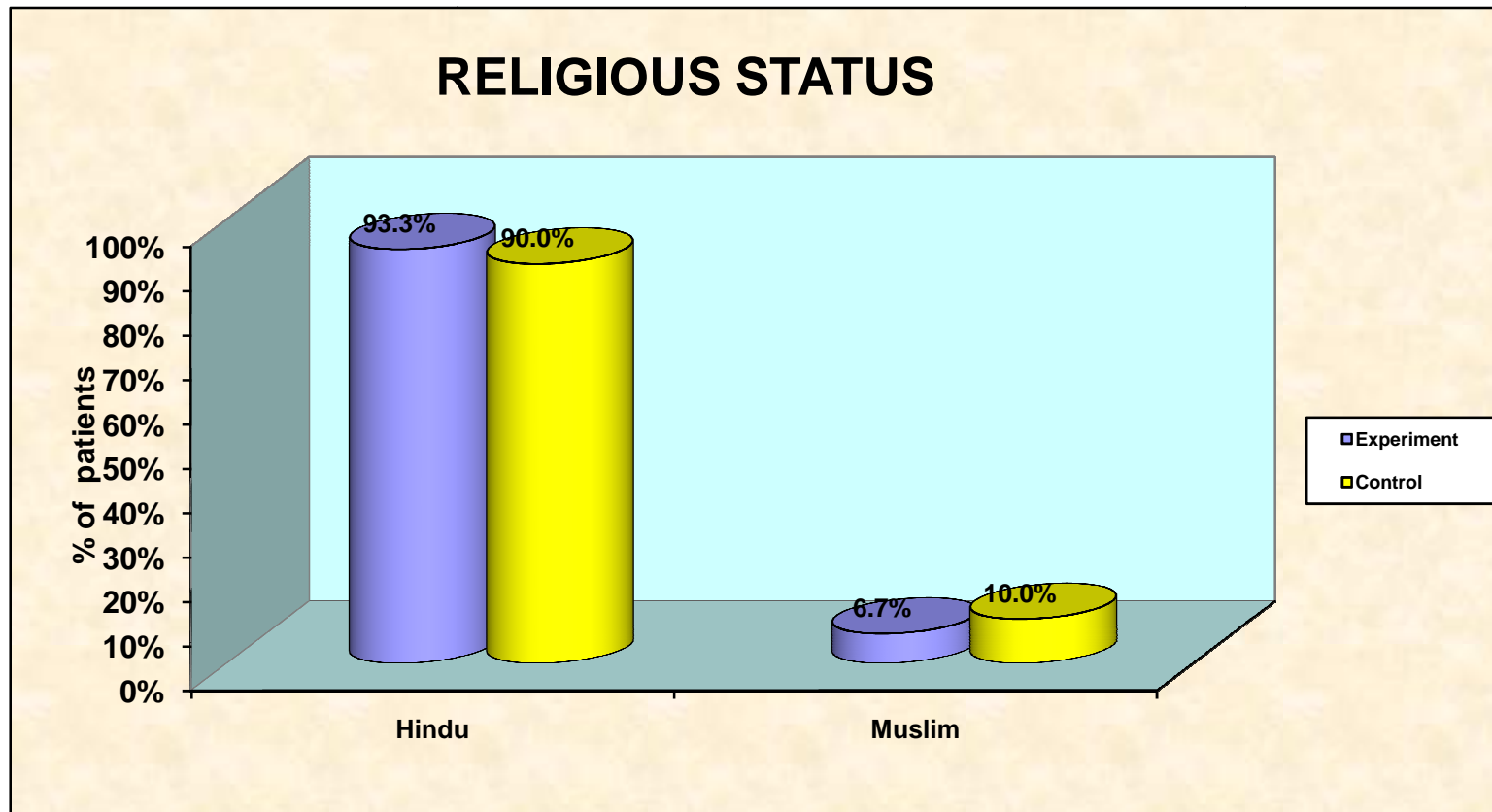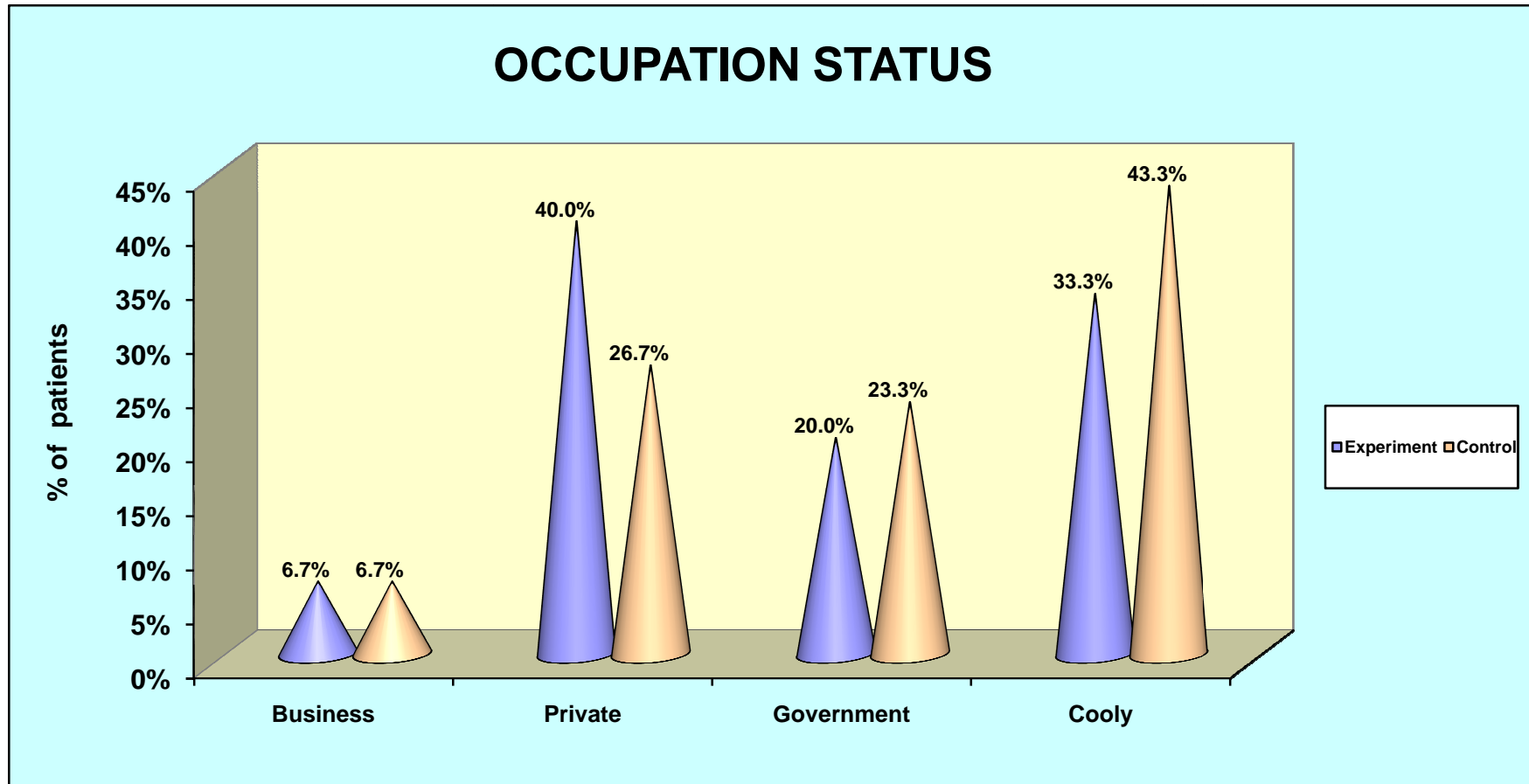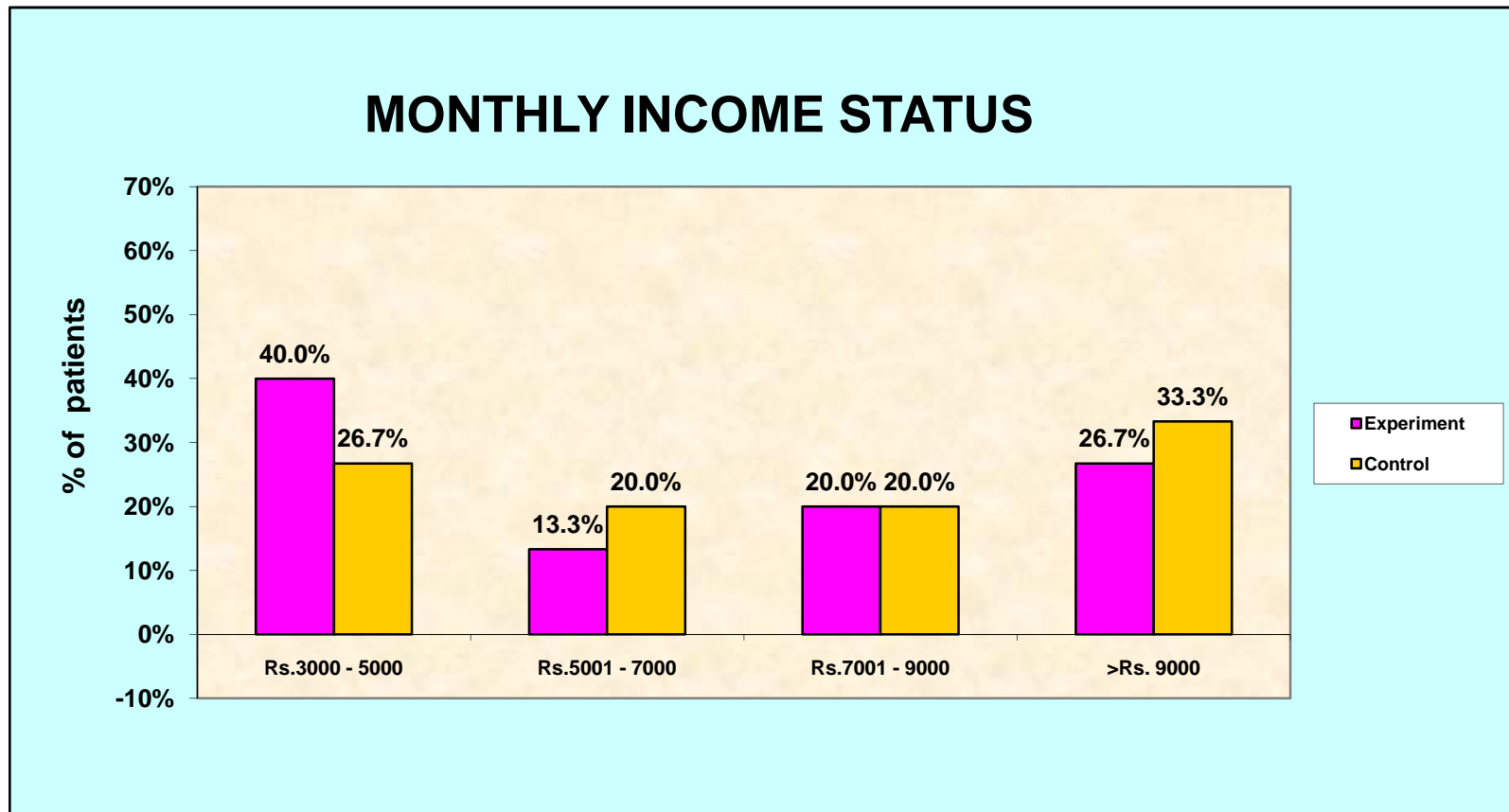
**DURATION OF DIABETES**
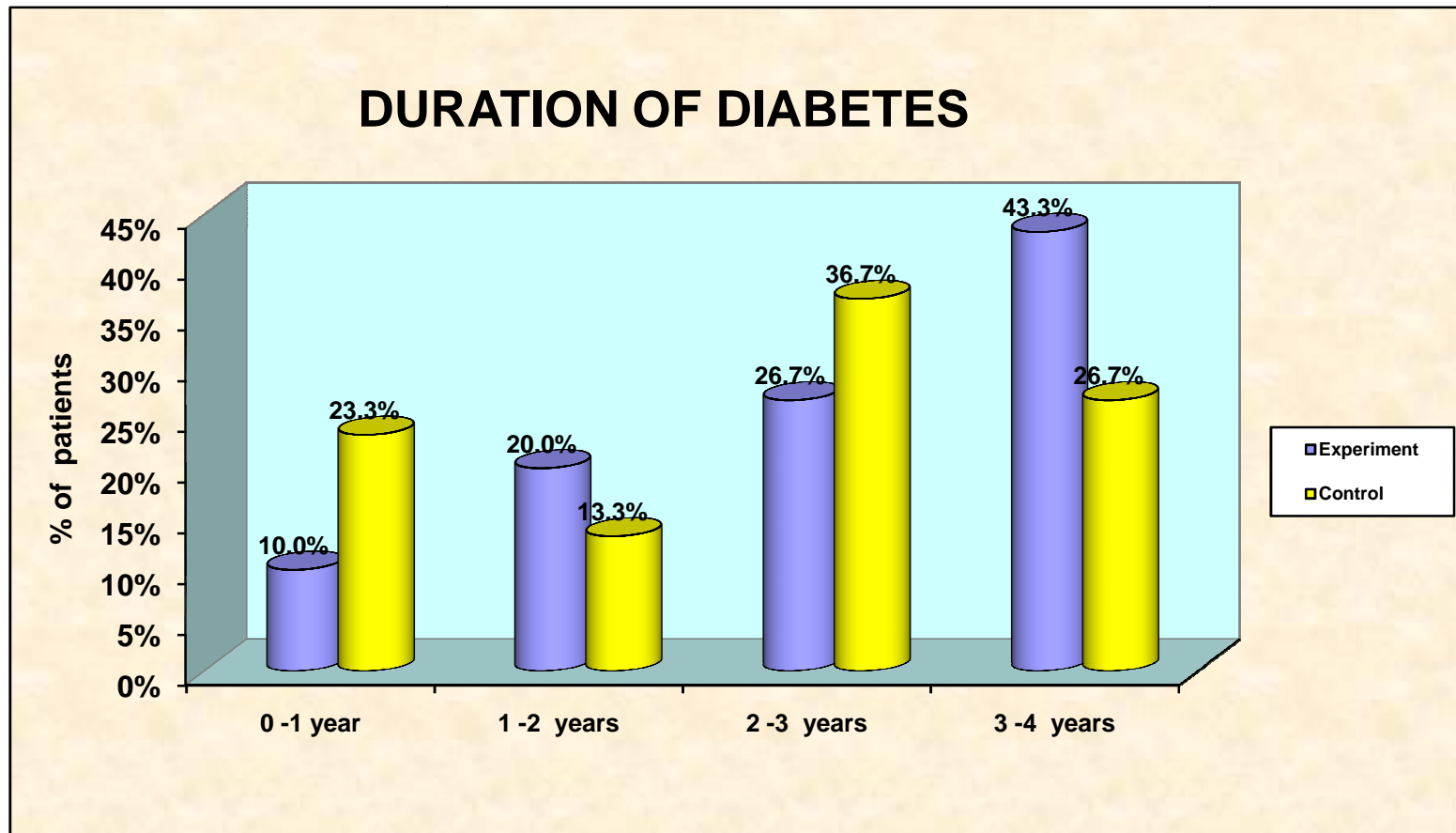
**Figure –12  shows the distribution of subjects in experimental and control group according to their duration.**
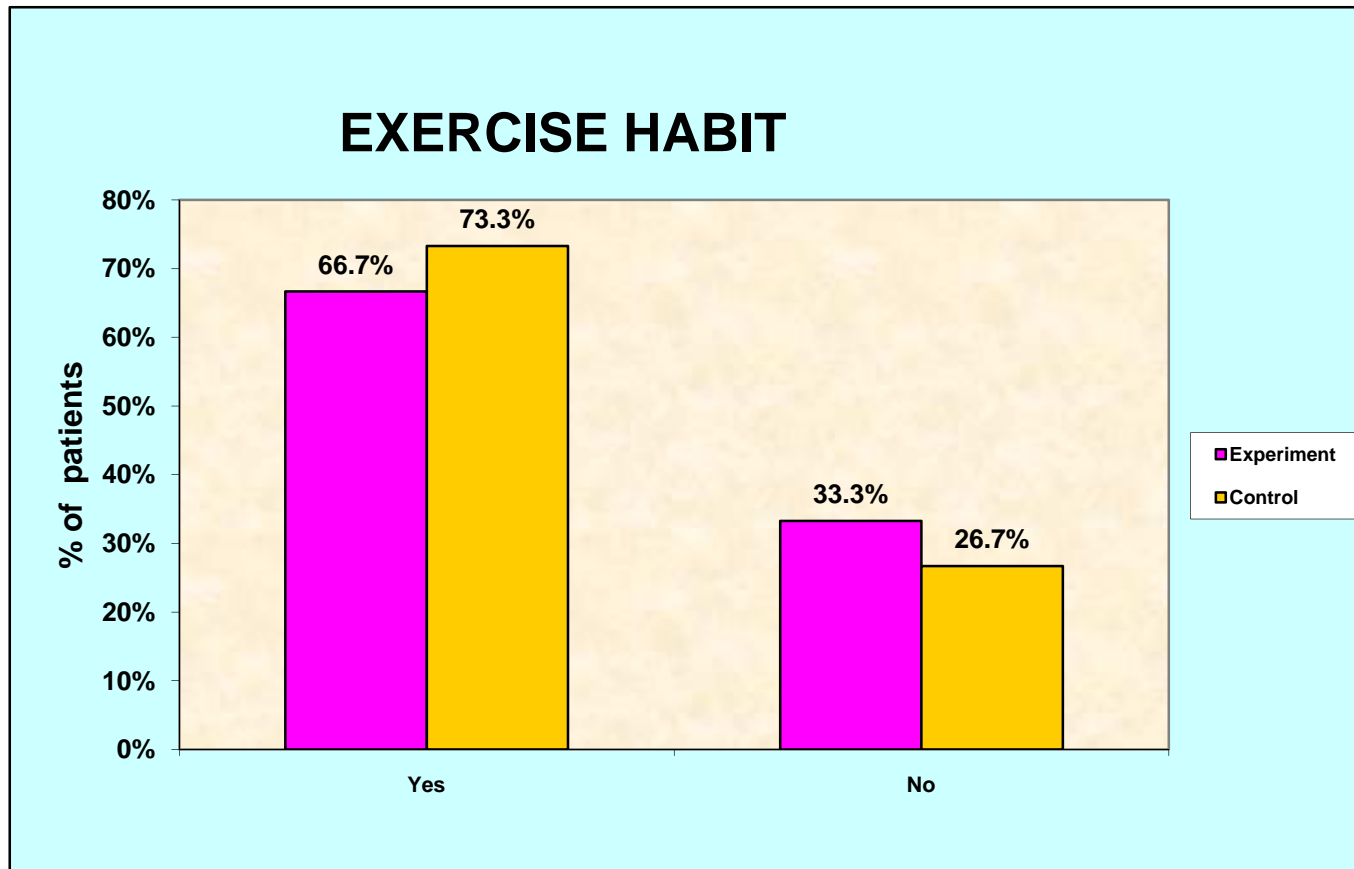
**Figure –13 shows the distribution of subjects in experimental and control group according to their habit of exercise.**
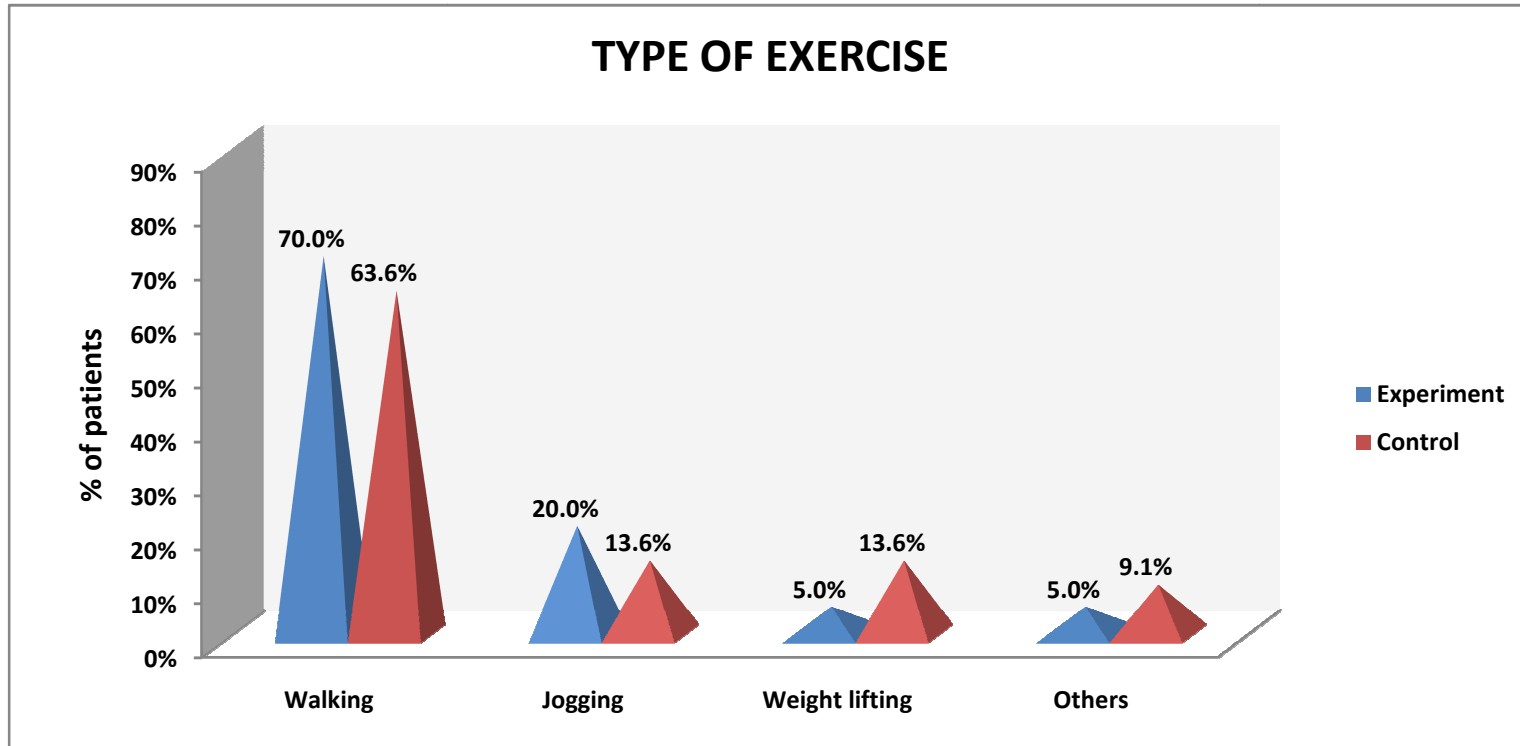
**Figure –14 shows the distribution of subjects in experimental and control group related to their type of exercise.**
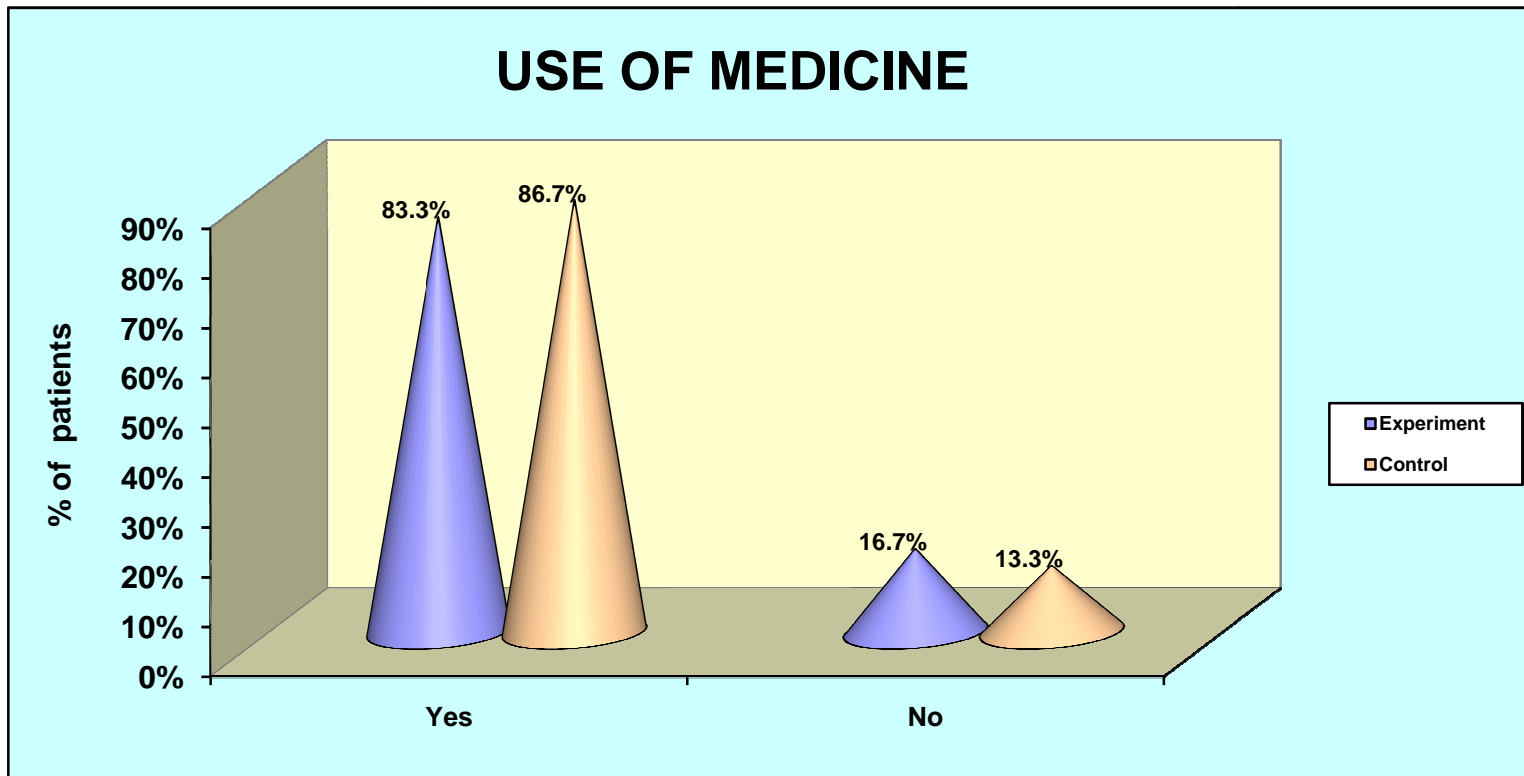
**Figure –15 shows the distribution of subjects in experimental and control group related to their usage of the medicine**

**Section B- Assessment of blood glucose level among Type II Diabetic adults in experimental and control group.**

**Table 3-COMPARISON OF PRETEST BLOOD GLUCOSE LEVEL**

| Type of Blood Glucose test | Group | | | | Student independent t-test |
|---|---|---|---|---|---|
| | Experiment | | Control | | |
| | Mean | SD | Mean | SD | |
| Fasting | 133.53 | 5.70 | 132.70 | 9.04 | t=0.42p=0.67 not significant |
| Post prandial | 171.57 | 8.97 | 170.40 | 9.11 | t=0.50p=0.61 not significant |

Table 3: Assess the pre test blood glucose level among Type II Diabetic adults in experimental and control group.

Considering Fasting blood glucose level, In experimental group adults is having 133.53 blood glucose level, whereas in the control group adults are having 132.70. So the difference is 0.83 and this difference is small, statistically not significant difference

Considering Postprandial blood glucose level, In experimental group adults is having 171.57 blood glucose level, whereas in the control group adults are having 170.40. So the difference is 1.17 and this difference is small, statistically not significant difference.

Statistical significance was calculated using student independent t-test

Hypothesis H1: There will be a significant difference in pre & post blood sugar level among Type II diabetic mellitus adults in experimental & control group is rejected.
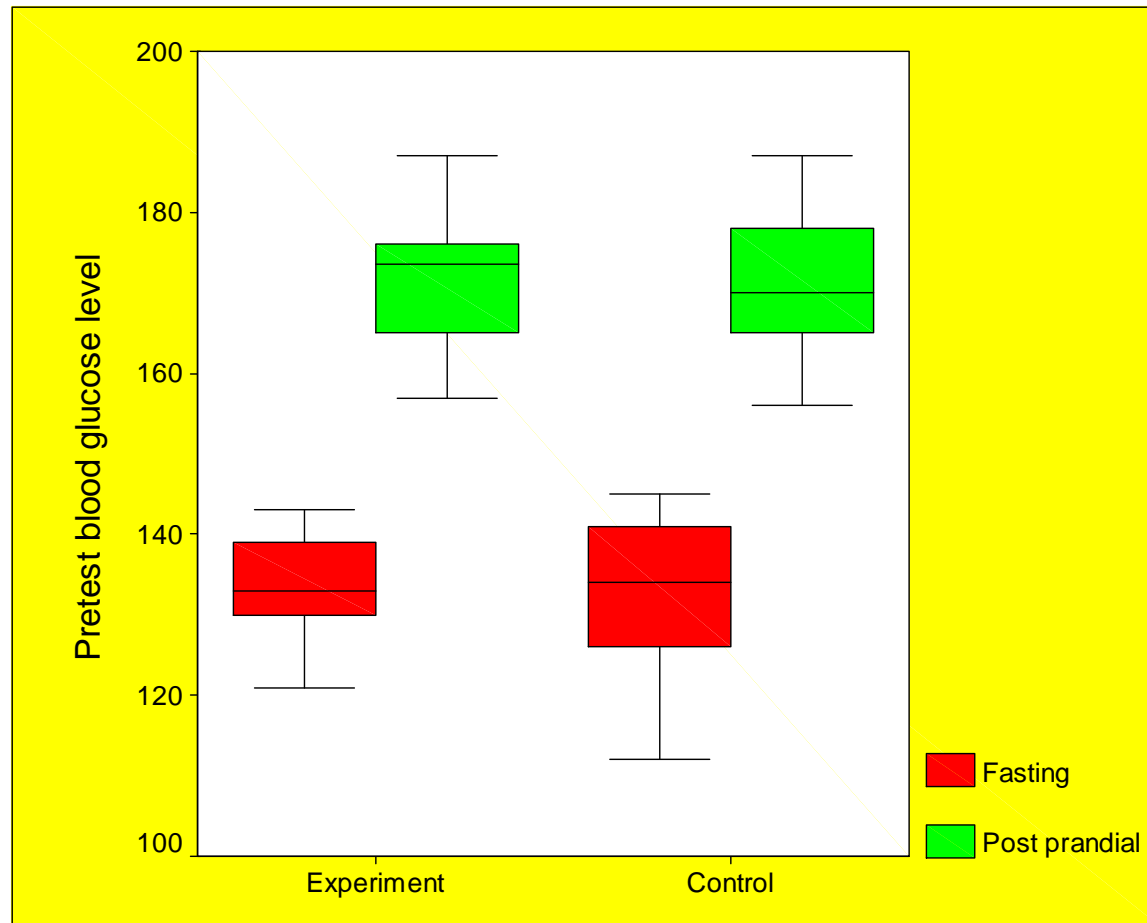
**Fig 16: Box –plot compares the pre-test blood glucose level between experimental and control group Type II diabetic adults.**

**Section-C**: **Assessing the post test level in experimental and control group**

**Table 4-COMPARISON OF POSTTEST BLOOD GLUCOSE LEVEL**

| Type of Blood glucose test | Group | | | | Student independent t-test |
|---|---|---|---|---|---|
| | Experiment | | Control | | |
| | Mean | SD | Mean | SD | |
| Fasting | 119.27 | 7.81 | 131.13 | 7.65 | t=5.94p=0.001* ** significant |
| Post prandial | 156.57 | 10.20 | 168.67 | 8.15 | t=5.09p=0.001* ** significant |

Table 4: Assess the post test blood glucose level among Type II Diabetic adults in experimental and control group.

*Significant at 0.001 level

Considering Fasting blood glucose level, In experimental group adults is having 119.27 blood glucose level, whereas in the control group adults are having 131.13 So the difference is 11.87 and this difference is large, statistically significant difference.

Considering Postprandial blood glucose level, In experimental group adults is having 156.57 blood glucose level, whereas in the control group adults are having 168.67. So the difference is 12.10 and this difference is large, statistically significant difference which depicts the effectiveness of the intervention in the experimental group.

Statistical significance was calculated using student independent t-test.
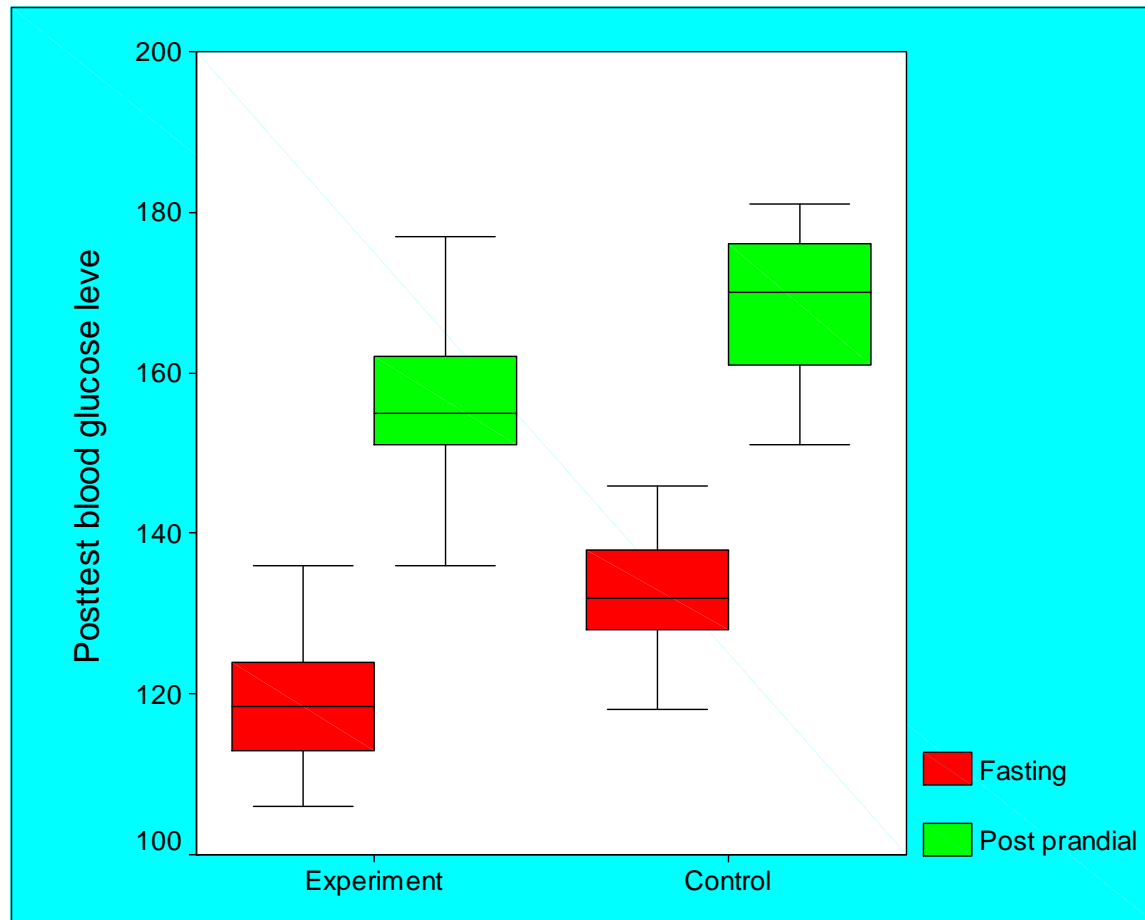
**Figure 17: Box plot compares the post test blood glucose level among Type II diabetic adults in experimental and control group.**

## Table 5- COMPARISON OF PRETTEST AND POSTTEST BLOOD GLUCOSE LEVEL AMONG EXPERIMENT GROUP

| Type of Blood glucose test | Group | | | | Student dependent t-test |
|---|---|---|---|---|---|
| | Pretest | | Posttest | | |
| | Mean | SD | Mean | SD | |
| Fasting | 133.53 | 5.70 | 119.27 | 7.81 | t=9.65p=0.001*** significant |
| Post prandial | 171.57 | 9.11 | 156.57 | 10.20 | t=13.29p=0.001*** significant |

p= 0.001 significant

Table 5 Assess the pre test and post test blood glucose level among Type II Diabetic adults in the experimental group.

Considering Fasting blood glucose level, in pretest, experiment group adults are having 133.53 blood glucose level, whereas in posttest adults are having 119.27 So the difference is 14.27 and this difference is large, statistically significant difference.

Considering Postprandial blood glucose level, in pre test experiment group adults is having 171.57 blood glucose level, whereas in the control group adults are having 156.57. So the difference is 15.00 and this difference is large, statistically significant difference.

Hypothesis 2:There will be a significant in the pre and post test blood sugar level in relation to intake of guava leaf tea among Type II diabetic adults in the experimental group is proved.

Statistical significance was calculated using student dependent t-test.

**Table 6: COMPARISON OF PRETTEST AND POSTTEST BLOOD GLUCOSE LEVEL AMONG CONTROL GROUP**

| Type of Blood glucose test | Group | | | | Student dependent t-test |
|---|---|---|---|---|---|
| | Pretest | | Posttest | | |
| | Mean | SD | Mean | SD | |
| Fasting | 132.70 | 9.04 | 131.13 | 7.65 | t=1.94   p=0.06 not significant |
| Post prandial | 170.40 | 9.11 | 168.67 | 8.14 | t=1.95p=0.06 not significant |

P= 0.001 is significant

Table 6 Assess the pre test and post test blood glucose level among Type II Diabetic adults in the control group.

Considering Fasting blood glucose level, pre test, control group adults are having 132.70 blood glucose level, whereas in post test adults are having 131.13 So the difference is 1.57 and this difference is small, statistically not significant difference.

Considering Postprandial blood glucose level, in pre test control group adults are having 170.40 blood glucose level, whereas in control group adults are having 168.67. So the difference is 1.73 and this difference is small, statistically not significant difference.

Statistical significance was calculated using student dependent t-test.

## SECTION E: EFFECTIVENESS OF GUAVA LEAF ON REDUCING BLOOD GLUCOSE LEVEL

**Table 7 – Effectiveness of Guava leaf tea on reducing fasting blood glucose level**

| Group | Level of assessment | Mean blood glucose level | Mean Difference in effectiveness with 95% Confidence interval | Percentage of effectiveness with 95% Confidence interval |
|---|---|---|---|---|
| Experiment | Pre test | 133.53 | 14.27(11.25 – 17.29) | 10.6%(8.4%12.9%) |
| | Post test | 119.27 | | |
| Control | Pre test | 132.70 | 1.57(-0.08 – 3.21) | 1.2%(-0.6% –2.4%) |
| | Post test | 131.13 | | |

Table 7: shows the effectiveness of guava leaf tea in reducing  the  blood glucose  level  among  Type II Diabetic adults**.**

In experiment group, On an   average,   After guava leaf tea, TypeII Diabetic adults  are reduced 10.6%  of the Fasting blood glucose level.

In the control group, On an  average,  Type II Diabetic adults  are reduced only 1.2%  of the Fasting blood glucose level.

Differences between pretest and posttest   score  was  analyzed  using proportion with 95% CI and mean difference with 95% CI.

**Table 8- Effectiveness Of Guava Leaf On Reducing Postprandial Blood Glucose Level**

| Group | Level of assessment | Mean blood glucose level | Mean Difference in effectiveness with 95% Confidence interval | Percentage of effectiveness with 95% Confidence interval |
|---|---|---|---|---|
| Experiment | Pre test | 171.57 | 15.00(12.69 – 17.31) | 8.7%(7.4% –10.1%) |
|  | Post test | 156.57 |  |  |
| Control | Pre test | 170.40 | 1.73(-0.02 – 3.42) | 1.0%(-0.2% –2.0%) |
|  | Post test | 168.67 |  |  |

Table 8: shows the effectiveness of guava leaf tea in reducing the blood glucose level among Type II Diabetic adults**.**

In experiment group, On an average, After guava leaf tea, Type II Diabetic adults are reduced 8.7% of the postprandial blood glucose level.

In the control group, On an average, Type II Diabetic adults are reduced only 1.0% of the postprandial blood glucose level.

Differences between pre test and post test score was analyzed using proportion with 95% CI and mean difference with 95% CI.

**Table 9-Effectiveness Of Guava Leaf On Reducing Blood Glucose Level**

| Name of the blood test | Name of the group | Reduced % of blood glucose level | Benefit of study |
|---|---|---|---|
| Fasting blood glucose | Experiment | 10.6% | ↓ 9.4% |
| | Control | 1.2% | |
| Postprandial blood glucose | Experiment | 8.7% | ↓ 7.7% |
| | Control | 1.0% | |

Table:9 shows about the Effectivness of guava leaf tea on reducing blood glucose level ( both Fasting and Postprandial blood glucose level)

Due to Guava leaf tea experimental group adults are able to reduce 9.4% of fasting blood glucose level and 7.7% postprandial blood glucose than the control group. This shows the benefit of guava leaf.

**SECTION ---F ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES**

**Table 10- Association Between Reduction Of Fasting Blood Glucose Level And Experiment Group Patients Demographic Variables**

| Demographic variables | | Fasting blood Glucose level reduction | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|
| | | Below average (<14.3) | | Above average(>14.3) | | | |
| | | N | % | N | % | | |
| Age | 30-40 yrs | 1 | 14.3% | 6 | 85.7% | 7 | $\chi2=7.25$    p=0.03* |
| | 40-50 yrs | 6 | 46.1% | 7 | 53.9% | 13 | |
| | 50-60 yrs | 8 | 80.0% | 2 | 20.0% | 10 | |
| Sex | Male | 6 | 40.0% | 9 | 60.0% | 15 | $\chi2=1.20$ p=0. 27 |
| | Female | 9 | 60.0% | 6 | 40.0% | 15 | |
| Education | 1 - 5 std | 4 | 50.0% | 4 | 50.0% | 8 | $\chi2=2.92$ p=0.40 |
| | 6 - 8 std | 7 | 63.6% | 4 | 36.4% | 11 | |
| | 9 - 10 std | 4 | 44.4% | 5 | 55.6% | 9 | |
| | 10 -12 std | 0 | 0.0% | 2 | 100.0% | 2 | |
| Religion | Hindu | 14 | 50.0% | 14 | 50.0% | 28 | $\chi2=0.00$ p=1.00 |
| | Muslim | 1 | 50.0% | 1 | 50.0% | 2 | |
| Occupation | Business | 1 | 50.0% | 1 | 50.0% | 2 | $\chi2=1.00$ p=0.80 |
| | Private | 5 | 41.7% | 7 | 58.3% | 12 | |
| | Government | 4 | 66.7% | 2 | 33.3% | 6 | |
| | Cooly | 5 | 50.0% | 5 | 50.0% | 10 | |
| Income | Rs.3000 – 5000 | 5 | 41.6% | 7 | 58.4% | 12 | $\chi2=1.33$ p=0.72 |
| | Rs.5001 – 7000 | 3 | 75.0% | 1 | 25.0% | 4 | |
| | Rs.7001 – 9000 | 3 | 50.0% | 3 | 50.0% | 6 | |
| | >Rs. 9000 | 4 | 50.0% | 4 | 50.0% | 8 | |
| Food habit | Vegetarian | 2 | 40.0% | 3 | 60.0% | 5 | $\chi2=0.40$ p=0.81 |
| | Non – vegetarian | 3 | 60.0% | 2 | 40.0% | 5 | |
| | Mixed | 10 | 50.0% | 10 | 50.0% | 20 | |
| Family history | Yes | 9 | 60.0% | 6 | 40.0% | 15 | $\chi2=1.20$ p=0.27 |
| | No | 6 | 40.0% | 9 | 60.0% | 15 | |
| Relationship | Father | 3 | 60.0% | 2 | 40.0% | 5 | $\chi2=0.97$ p=0.87 |
| | Mother | 3 | 50.0% | 3 | 50.0% | 6 | |
| | Grand father | 2 | 66.7% | 1 | 33.3% | 3 | |
| | Grand mother | 1 | 100.0% | 0 | 0.0% | 1 | |
| Years of DM | 0 -1 year | 0 | 0.0% | 3 | 100.0% | 3 | $\chi2=9.44$ p=0.02* |
| | 1 -2  years | 1 | 16.7% | 5 | 83.3% | 6 | |
| | 2 -3  years | 4 | 50.0% | 4 | 50.0% | 8 | |
| | 3 -4  years | 10 | 76.9% | 3 | 23.1% | 13 | |
| Use of medicines | Yes | 13 | 52.0% | 12 | 48.0% | 25 | $\chi2=0.24$ p=0.62 |
| | No | 2 | 40.0% | 3 | 60.0% | 5 | |
| Exercise habits | Yes | 7 | 35.0% | 13 | 65.0% | 20 | $\chi2=5.40$ p=0.02* |
| | No | 8 | 80.0% | 2 | 20.0% | 10 | |
| Type of exercise | Walking | 10 | 71.4% | 4 | 28.6% | 14 | $\chi2=3.92$ p=0.26 |
| | Jogging | 2 | 50.0% | 2 | 50.0% | 4 | |
| | Weight lifting | 0 | 0.0% | 1 | 100.0% | 1 | |
| | Others | 0 | 0.0% | 1 | 100.0% | 1 | |

Table 10: shows the association between reduction of fasting blood glucose level of adults and their demographic variables. Younger, less duration

of diabetes and exercise adults are  more reduction. Statistical significance was calculated using chi square test.

Table-10: elicits the association between reduction of fasting glucose level and demographic variables among Type II Diabetic adults in the experimental group. The analysis revealed that there was high significant association of demographic variables such as age, less duration of diabetes and those who are having the habit of doing exercise. As per findings those who are in the age group of 30-40years ($x^2$=7. 25 p=0. 03),  less duration of diabetes 0-1 yr ($x^2$=9. 44, p=0. 02)  and  on the basis of habit of doing exercise  ($x^2$=5. 40 p=0.02)  were  reduced more fasting blood glucose  level  than   others.

Significance was calculated using  chi-square test. This study reveals that there was a significant effect of guava leaf tea on the reduction of fastng blood glucose level.

**ASSOCIATION BETWEEN REDUCTION LEVEL OF FASTING BLOOD GLUCOSE AND PATIENTS AGE**

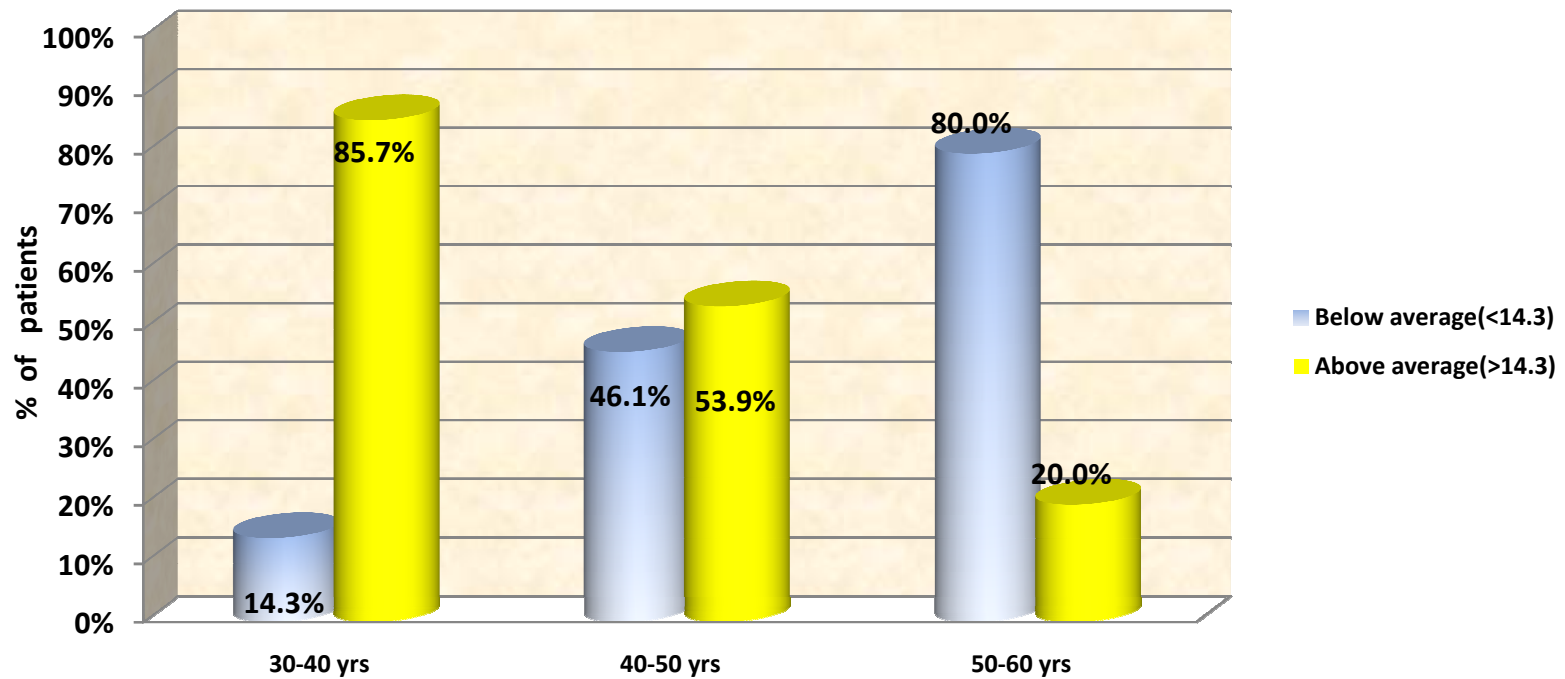Fig:18  Shows the Association between reduction level of Fasting Blood Glucose and patients age

**ASSOCIATION BETWEEN REDUCTION LEVEL OF FASTING BLOOD GLUCOSE AND DURATION OF DIABETES**
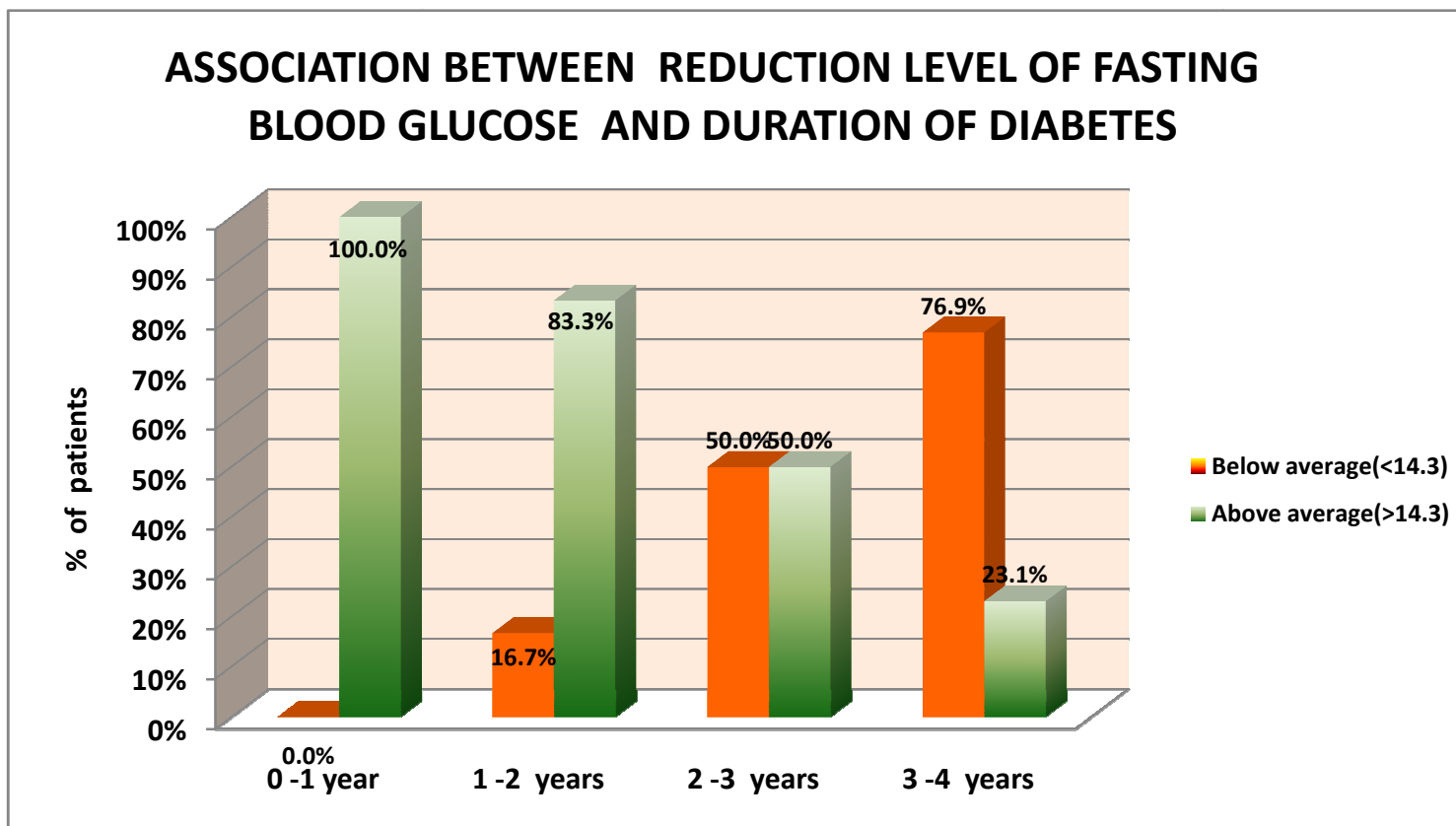
**Fig:19 shows the association between reduction level of Fasting Blood Glucose and duration of diabetes.**
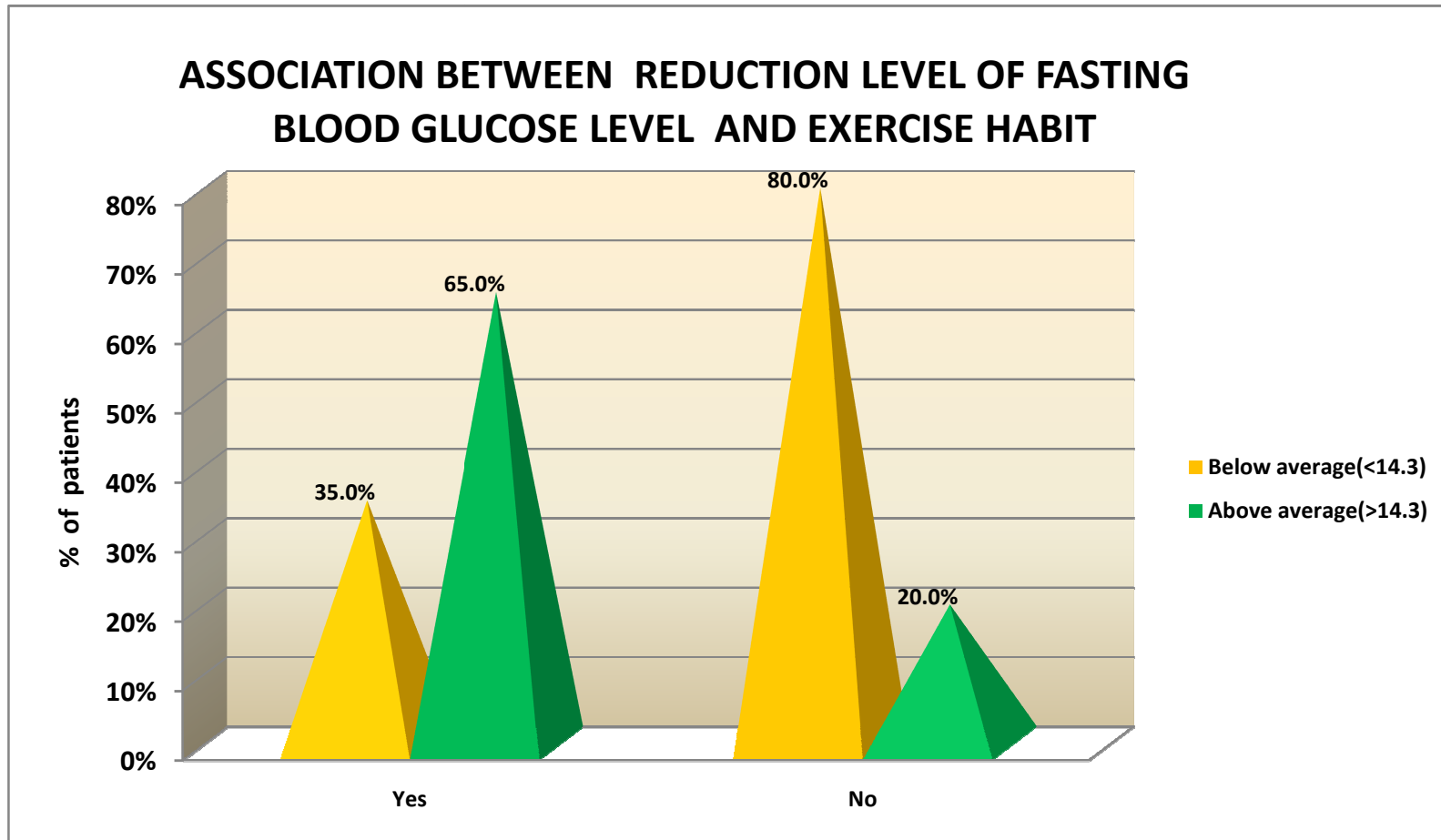
**Fig:20 shows the Association Between Reduction Level of Fasting Blood Glucose Level Exercise Habit**

| Demographic variables | | Postprandial blood Glucose level reduction | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|
| | | Below average(<15.0) | | Above average(>15.0) | | | |
| | | N | % | n | % | | |
| Age | 30-40 yrs | 1 | 14.2% | 6 | 85.8% | 7 | **χ2=7.25 p=0.03*** |
| | 40-50 yrs | 6 | 46.1% | 7 | 53.9% | 13 | |
| | 50-60 yrs | 8 | 80.0% | 2 | 20.0% | 10 | |
| Sex | Male | 7 | 46.7% | 8 | 53.3% | 15 | χ2=0.13 p=0.71 |
| | Female | 8 | 53.3% | 7 | 46.7% | 15 | |
| Education | 1 - 5 std | 4 | 50.0% | 4 | 50.0% | 8 | χ2=0.20 p=0.97 |
| | 6 - 8 std | 6 | 54.5% | 5 | 45.5% | 11 | |
| | 9 - 10 std | 4 | 44.4% | 5 | 55.6% | 9 | |
| | 10 -12 std | 1 | 50.0% | 1 | 50.0% | 2 | |
| Religion | Hindu | 14 | 50.0% | 14 | 50.0% | 28 | χ2=0.00 p=1.00 |
| | Muslim | 1 | 50.0% | 1 | 50.0% | 2 | |
| Occupation | Business | 2 | 100.0% | 0 | 0.0% | 2 | χ2=2.33 p=0.51 |
| | Private | 5 | 28.6% | 7 | 71.4% | 12 | |
| | Government | 3 | 50.0% | 3 | 50.0% | 6 | |
| | Cooly | 5 | 50.0% | 5 | 50.0% | 10 | |
| Income | Rs.3000 – 5000 | 7 | 58.3% | 5 | 41.7% | 12 | χ2=3.50 p=0.32 |
| | Rs.5001 – 7000 | 2 | 50.0% | 2 | 50.0% | 4 | |
| | Rs.7001 – 9000 | 1 | 16.7% | 5 | 83.3% | 6 | |
| | >Rs. 9000 | 5 | 62.5% | 3 | 37.5% | 8 | |
| Food habit | Vegetarian | 3 | 60.0% | 2 | 40.0% | 5 | χ2=0.40 p=0.81 |
| | Non – vegetarian | 2 | 40.0% | 3 | 60.0% | 5 | |
| | Mixed | 10 | 50.0% | 10 | 50.0% | 20 | |
| Family history | Yes | 5 | 33.3% | 10 | 66.7% | 15 | χ2=3.33 p=0.07 |
| | No | 10 | 66.7% | 5 | 33.3% | 15 | |
| Relationship | Father | 1 | 20.0% | 4 | 80.0% | 5 | χ2=2.40 p=0.49 |
| | Mother | 2 | 33.3% | 4 | 66.7% | 6 | |
| | Grand father | 2 | 66.7% | 1 | 33.3% | 3 | |
| | Grand mother | 0 | 0.0% | 1 | 100.0% | 1 | |
| Years of DM | 0 -1 year | 0 | 0.0% | 3 | 100.0% | 3 | **χ2=8.36 p=0.04*** |
| | 1 -2 years | 1 | 16.7% | 5 | 83.3% | 6 | |
| | 2 -3 years | 6 | 75.0% | 2 | 25.0% | 8 | |
| | 3 -4 years | 8 | 61.5% | 5 | 38.5% | 13 | |
| Use of medicines | Yes | 14 | 56.0% | 11 | 44.0% | 25 | χ2=2.16p=0.14 |
| | No | 1 | 20.0% | 4 | 80.0% | 5 | |
| Exercise habits | Yes | 6 | 30.0% | 14 | 70.0% | 20 | **χ2=9.60 p=0.01**** |
| | No | 9 | 90.0% | 1 | 10.0% | 10 | |
| Type of exercise | Walking | 8 | 57.1% | 6 | 42.9% | 14 | χ2=3.11 p=0.37 |
| | Jogging | 3 | 75.0% | 1 | 25.0% | 4 | |
| | Weight lifting | 0 | 0.0% | 1 | 100.0% | 1 | |
| | Others | 0 | 0.0% | 1 | 100.0% | 1 | |

Table 11 shows the association between reduction of the postprandial blood glucose level of adults and their demographic variables. Younger, less duration

of diabetes and habit of doing exercise adults are having more reduction. Statistical significance was calculated using chi square test.

It reveals that in the age group of 30 -40 yrs ($x^2$=7. 25  p=0. 03), duration of years 0-1 year ($x^2$=8. 36 p=0. 04) and according to the  habit of exercise ($x^2$=9. 60  p=0. 01)  are reduced more postprandial glucose level than others. Statistical significance was calculated using Chi square test. This study analysis revealed that there was a significant effect of guava leaf tea on reduction of blood glucose level among Type II Diabetic adults.  Hence  Hypothesis 3:There will be a significant association between the selected  demographic variables and post intervention response of guava  leaf tea among Type II  diabetes mellitus adults in the experimental group is proved.

**ASSOCIATION BETWEEN REDUCTION LEVEL OF POST PRANDIAL BLOOD GLUCOSE AND PATIENTS AGE**

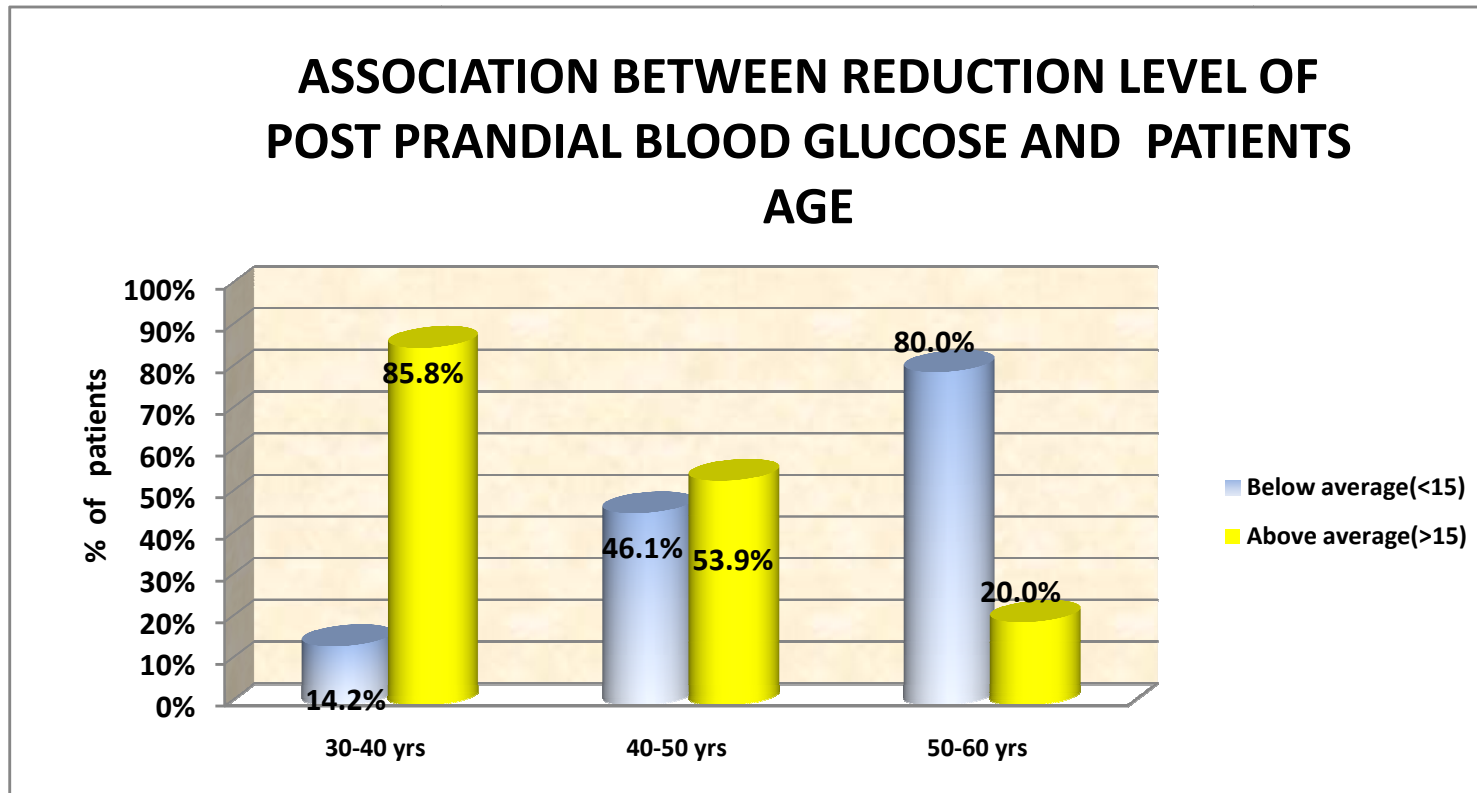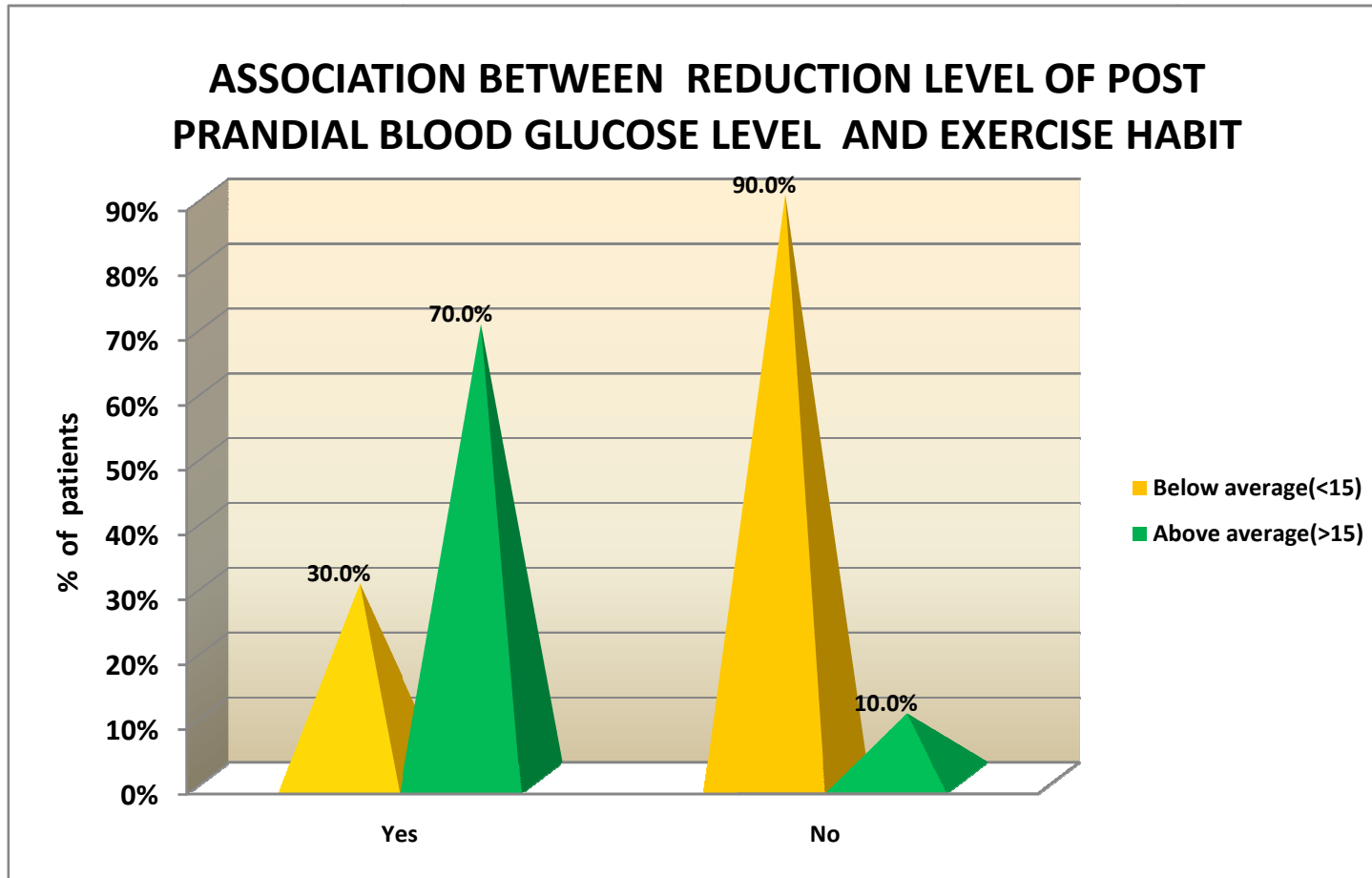**Fig:21 shows the Association Between Reduction Level of postprandial blood glucose and adults age.**

**Fig:22 shows the Association Between Reduction Level of postprandial Blood Glucose Level and Exercise Habit**
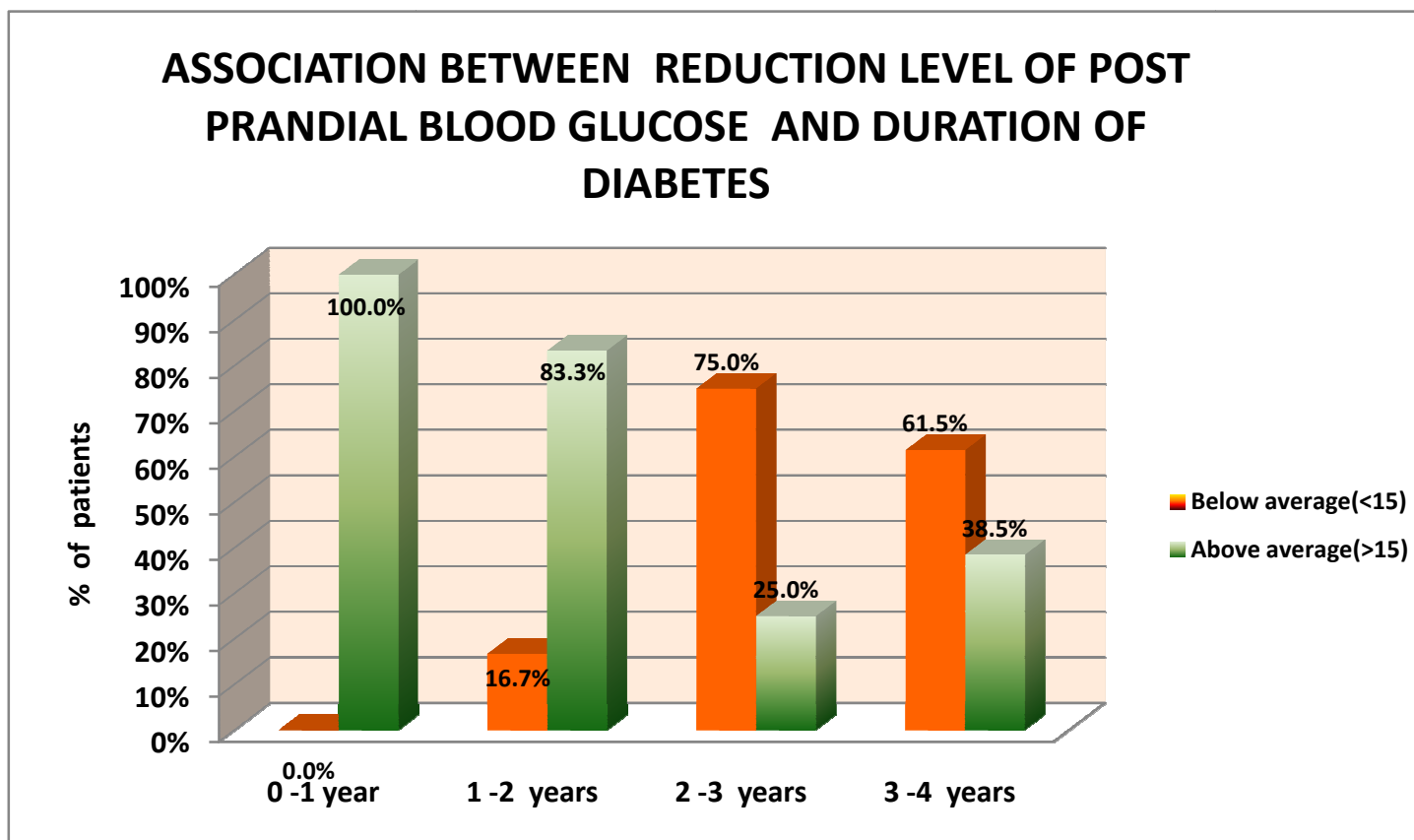
**ASSOCIATION BETWEEN REDUCTION LEVEL OF POST PRANDIAL BLOOD GLUCOSE AND DURATION OF DIABETES**

**Fig:23 Shows the Association between reduction level of postprandial blood glucose and duration of diabetes**

# CHAPTER-V
# RESULTS AND DISCUSSION

India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the "**diabetes capital of the world**". Diabetes is a disease which needs lifelong treatment. Left untreated or improperly treated, it shortens life considerably or debases its quality substantially. They can be largely avoided by taking simple precautions and proper control of the disease which would certainly make it possible to lead a normal, active and healthy life. Research has shown that improved glycemic control reduces the rate and number of diabetes-related complications. To minimize the diabetic complications and to improve the quality of life of diabetic clients this experimental study was done. The purpose of the study was to evaluate the effectiveness of guava leaf tea in reducing the blood glucose level among Type II Diabetic adults.

## OBJECTIVES OF THE STUDY

1. To assess the pre test blood glucose level among Type II Diabetic adults in experimental and control group.

2. To assess the effectiveness of guava leaf tea among Type II diabetic adults among experimental group.

3. To compare the pretest and post test blood glucose level among Type II diabetic adults in experimental and control group.

4. To associate the findings with the selected demographic variables among Type II Diabetic adults in the experimental group.

**The first objective of the study is to assess the pre test blood glucose level among Type II Diabetic adults in experimental and control group.**

In this study, the analysis reveals the pretest level of blood glucose among Type II Diabetic adults in experimental and control group. In experiment group fasting blood glucose level is 133.53 and in control it is

132.70. So the difference is 0.83, and this difference is very small and it is not statistically significant. Considering the postprandial blood glucose level, In experiment group postprandial blood glucose level is 171.57, whereas in the control group patients are having 170.40, so the difference is 1.17, and this difference is very small and it is not statistically significant. Statistical calculation was done using student independent t-test.

**The second objective of the study is to assess the effectiveness of guava leaf tea among Type II Diabetic adults in the experimental group.**

In this study ,the analysis reveals that , In experiment group, after the intake of guava leaf tea, On an average 10.6% of type II Diabetic adults are reduced in their Fasting blood glucose level.

In the control group, On an average 1.2% of type II Diabetic adults are reduced in their Fasting blood glucose level.

Differences between pretest and posttest score was analyzed using proportion with 95% CI (confidence interval) and mean difference with 95% CI. It shows the effectiveness of guava leaf tea in reducing the blood glucose level among Type II Diabetic adults**.**

In experiment group, On an average, after the intake of guava leaf tea, 8.7% of Type II Diabetic adults are reduced in their postprandial blood glucose level.

In the control group, On an average 1.0%, of Type II Diabetic adults are reduced n their postprandial blood glucose level.

Differences between pre test and post test score was analyzed using proportion with 95% CI and mean difference with 95% CI.

Due to Guava leaf tea experiment group adults are able to reduce 9.4% of fasting blood glucose level and 7.7% postprandial blood glucose than the control group. This shows the benefits of guava leaf tea.

This study was supported by a study published **in 2010"Nutrition and Metabolism" and conducted by the Yakult Central Institute for Microbiological Research in Tokyo, Japan,** consumption of guava leaf tea inhibits alpha-glucosidase enzymes. The inhibition of these enzymes results in reduction of blood glucose levels; the suppression of elevated blood glucose levels is critical in the prevention of type II diabetes.

**The third objective of the study is to compare the pretest and post test levels of blood glucose among Type II Diabetic adults in experimental and control group.**

In this present study, The Fasting blood glucose level, in pretest, experiment group adults is having 133.53 blood glucose level, whereas in post test patients are having 119.27 So the difference is 14.27 and this difference is large, statistically significant difference.

Considering Postprandial blood glucose level, in pre test experiment group adults is having 171.57 blood glucose level, whereas in the control group adults are having 156.57. So the difference is 15.00 and this difference is large, statistically significant difference.

Statistical significance was calculated using student dependent t-test.

In this study, The Comparison of pre test and post test blood glucose level among Type II Diabetic adults in control group are as follows.
Considering Fasting blood glucose level, pre test, control group adults are having 132.70 blood glucose level, whereas in post test adults are having 131.13 So the difference is 1.57 and this difference is small, statistically not significant difference. Considering Postprandial blood glucose level, in pre test control group adults is having 170.40 blood glucose level, whereas in the control group adults are having 168.67. So the difference is 1.73 and this difference is small, statistically not significant difference.

Hypothesis 2:There will be a significant in the pre and post test blood sugar level in relation to intake of guava leaf tea among Type II diabetic adults in the experimental group is proved.

Statistical significance was calculated using student dependent t-test.

This present study is **supported by a clinical study In 2010 Yakult Honsha in Nutrition & Metabolism,** "Anti-hypoglycemic and anti-hyperlipidemias effects of guava leaf extract." They reviewed "evidence regarding the anti-hyperglycemias activities and safety of GvEx (guava leaf extract) and Guava Leaf Tea in vitro [petri dish], as well as in animal models and several clinical trials." They also described "the efficacy and safety of Guava Leaf Tea in pre-diabetic and diabetic adults with Type II Diabetes Mellitus. In a clinical trial involving twenty hospitalized patients with T2DM, guava leaf tea was given to patients 2 hours after mealtime, after postprandial glucose levels had been allowed to elevate. The elevated level was "significantly reduced with a single administration of guava leaf tea."

In a continuation of the clinical study, they tested guava leaf tea's effectiveness over a twelve-week period. They found that "insulin resistance significantly decreased in all subjects.

**The fourth objective is to associate the findings with the selected demographic variables among Type II Diabetic adults in the experimental group.**

This study Shows the association between reduction of fasting blood glucose level of adults and their demographic variables. Younger, less duration of diabetes and habit of doing exercise adults, are having more reduction, and also it shows the association between reduction of postprandial blood glucose level of adults and their demographic variables. Younger, less duration of diabetes and habit of doing exercise adults are having more reduction. Statistical significance was calculated using chi square test.

The overall finding of the study showed that the guava leaf tea was effective in reducing blood glucose level among Type II Diabetic adults in the experimental group. Thus, as a community health nurse the researcher has educated the community people about the benefits of guava leaf tea at the end of the study.

The assumption of the study was guava leaf tea may have some effect on blood glucose level is hereby accepted because the present study results also have proved that overall 9.4% in fasting blood glucose level and 7.7% in postprandial blood glucose level of Type II Diabetic  adults with high blood glucose levels in experimental group  have improvement in reduction of blood glucose after the intervention of  guava leaf tea  for 14 days .

# SUMMARY AND CONCLUSION

## 6.1 SUMMARY OF THE STUDY

Diabetes is a disease which needs lifelong treatment. Left untreated or improperly treated, it shortens life considerably or debases its quality substantially. They can be largely avoided by taking simple precautions and proper control of the disease which would certainly make it possible to lead a normal, active and healthy life. The main aim of the study was to evaluate the effectiveness of guava leaf tea in reducing the blood glucose level among the Type II Diabetic adults residing at urban area  Choolai, Chennai.

**Objectives of the study are:**

❖    To assess the pre test blood glucose level among Type-II Diabetic adults in experimental and control group.

❖    To assess the effectiveness of guava leaf tea among Type-II Diabetic adults in experimental group.

❖    To compare the pretest and post test level of blood glucose among Type-II Diabetic adults in experimental and control group.

❖    To associate the findings with the selected demographic variables among Type II Diabetic adults in experimental group.

The assumption of the study was guava  leaf tea may have some effect on  decreased blood glucose level among Type II Diabetic adults.

Extensive review of literature, investigator's professional experience and expert guidance from the field of community health nursing lead the investigator to design the methodology to develop the tool for data collection.

**Literature review was done on the present study and presented in the following headings**:

1)      Literature related to prevalence and incidence of Type II Diabetes mellitus

2)      Literature related to general  information  regarding guava leaf tea

3)      Literature pertaining to effect of guava leaf tea on blood glucose level among type-II diabetes mellitus adults.

4)      Literature related to diabetes and demographic variables

The investigator had developed a conceptual frame work based on modified Model of Wiedenbach's helping Art of Clinical Nursing Theory (1984). It has 3 components which includes pre assessment as identification, providing  guava leaf tea on experimental group as ministration, the effectiveness of guava leaf tea  as the validation of the system. The modified framework portrays that modifying factor such as guava leaf tea   enhances improvements in blood glucose level among type-II diabetic adults as part of dietary nursing intervention.

The present study was an experimental study. The research design was pre-test post-test only design. By using simple random sampling technique 60 type-II diabetic adults between 30-60 years of age were selected (30 in experimental group and 30 in control group) as study samples. The study was conducted in the urban area, Choolai, Chennai, which is situated 4 kms from College of Nursing, Madras Medical College, Chennai the tool developed and used for data collection was structured interview and observation schedule. The content validity of the tool was obtained from the medical expert and nursing experts. The tool was reliable and feasible. The reliability of the tool was established by inter rater reliability method. Data collected from the accessible population based on inclusion and exclusion criteria. Samples were selected  by simple random sampling method. Pre test , fasting and postprandial blood

glucose was measured in experimental and control group before intervention. 50 ml of guava leaf tea was given to experimental group for 14days daily in the morning half an hour  after  breakfast  by the researcher in person. Post interventional fasting and postprandial blood glucose levels were assessed using glucometer and the results were analysed using inferential and statistical analysis.

## 6.2 MAJOR FINDINGS OF THE STUDY

Frequency and percentage distribution of demographic variables of Type II Diabetic Patients in experimental and control group were as follows:

❖ Most of Type II Diabetic adults in experimental group 10(33.3%)were in the age group of 51-60 years, 13(43.3%) of the clients were in the age group of 41-50 years and 7(23.3%) were in the age group of 30-40 yrs in experimental group and 40.0%(12) were in the age group of 51-60 years and 40.0% (10) were in the age group of 41-50 years in the control group.

❖ Majority of the Type II Diabetic clients 15(50%) were females and 15(50%)were males in the experimental group and 15(50%) were females and 15 (50%)were males in the control group.

❖ On the basis  of religion majority of the diabetic clients 28(93.3%) were Hindus,2(6.7%) were muslims in the experimental group  and 27 (90.0%) were Hindus  3(10.0%) were muslims in the control group.

❖ On considering the educational status of the Type II Diabetic Patients 8(26.7%) were studied upto 5$^{th}$ standard  11(36.7%) were studied upto 8$^{th}$ standard  9(30.0%)were studied upto 10$^{th}$ standard 2(6.7%) were studied upto 12$^{th}$ standard in the experimental group and in the control group 3(10.0%) were studied upto 5$^{th}$ standard 11(36.7%0 were studied upto 8$^{th}$ standard 12(40.0%) were studied upto 10$^{th}$ standard 4(13.35) were studied upto were studied up to higher secondary education.

❖ By occupation2(6.7%)were doing business 12(40.0%)were employed in private cocern 6(20.0%) were employed in government set up10(33.3%) were working as coole in experimental group. in the control group 2(6.7%)were doing business 8(26.7%) were employed in private concern 7(23.3%) were employed in government 13(43.3%) were working as coole .

❖ On the basis of income 12(40.0%) were earning upto Rs.5000 per month 4(13.3%) were earning upto Rs.7000 6(20.0%) were earning upto 9000 8(26.7%) were earning above 9000 in experimental group.I n control group 8(26.7%) were earning upto 5000 per month 6(20.0%) were earning upto 7000 6(20.0%) were earning upto 9000 per month 10(33.3%) were earning above Rs.9000 per month.

❖ within On the basis of their food habits in experimental group 5(16.7%) were taking only vegetarian diet 5(16.7%) were taking non vegetarian diet 20(66.7%) were taking mixed diet habits .

❖ On the basis of duration of illness majority of the patients 1 within 3-4 yrs 8(26.7%) are within 2-3 yrs 6(20.0%) within 1-2 yrs 3(10.0%) are within 0-1y in experimental group.7(23.3%) were within 0-1 yr 4(13.3%) were within 2-3 yrs 11(36.7%)were within 2-3yrs 8(26.7%) were within 3-4 years in control group.

❖ According to their usage of medicine 25(83.3%) are taking medicines regularly in experimental group,26(86.7%) are taking medicines in control group.

❖ Regarding their habit of exercise 20(66.7%)are doing exercise in experimental group,22(73.3%) are doing exercise in control group

❖ Regarding the type of exercise 14(70%) of them were doing exercise in the method of walking in experimental group,14(70%) of them were doing exercise in the method of walking in control group.

- ❖ In experiment group, On an average, After guava leaf tea, Type II Diabetic adults are reduced 8.7% of the postprandial blood glucose level.

- ❖ In the control group, On an average, Type II Diabetic adults are reduced only 1.0% of the postprandial blood glucose level.

- ❖ the present study results also have proved that overall 9.4% in fasting blood glucose level and 7.7% in postprandial blood glucose level of Type II Diabetic adults with high blood glucose levels in experimental group have improvement in reduction of blood glucose after the intervention of guava leaf tea for 14 days .

## 6.3 IMPLICATIONS OF THE STUDY

The implications of this study can be seen in areas of nursing practice, nursing education, nursing administration and nursing research.

## NURSING PRACTICE

- ❖ The community health nurse plays an important role in providing information regarding diabetes its prevention and its control methods to the people in the community .

- ❖ The community health nurse as a service provider should periodically organize and conducts mass education programme regarding diabetes awareness.

- ❖ Guava leaf tea being cost effective ,easily available and effective in reducing the blood glucose level, the community health nurse must implement information education and communication (IEC) to create awareness to the community about the benefits of guava leaf.

- ❖ She has to educate family members about the importance of guava leaf and its beneficiary effect against diabetes.

## NURSING EDUCATION

❖ As a nurse educators, we must strengthen the concept of non-pharmacological methods for management of diabetes mellitus.

❖ Nursing education should emphasize more on preparing the nurses to impart current changes in health information and to update the knowledge in all fields.

❖ Nursing curriculum to be equipped with knowledge regarding various health information.

## NURSING ADMINISTRATION

❖ The community health nurse as an administrator should design formal teaching programme on diabetes mellitus and its prevention using pharmacological and various non-pharmacological methods in reducing blood glucose levels in the community.

❖ The nurses posted in the Primary Health Centers for control and prevention of non-communicable disease should take active part in identifying the risk peoples and preventing the occurrence of disease in its earlier stage.

❖ She should organize for diabetes camps with collaboration with nursing students attending the Primary Health Centre and along with other NGO'S and it should be properly communicated to the public through mass medias.

❖ The diabetes training programme to be continued and opportunities must be provided to all the nurses for the effective training in control and prevention of diabetes mellitus.

**NURSING RESEARCH**

Nurses should conduct periodic review of research findings and disseminate the findings through conferences, seminars and publication in professional, national and international journals and in the web site also.

## 6.4 RECOMMENDATIONS FOR FURTHER STUDY

On the basis of the present study the following recommendations have been made for further study

❖ A comparative study can be conducted using guava leaf tea in control of Type II Diabetes mellitus adults among urban and rural people.

❖ A similar study can be conducted in other population in hospital set up.

❖ This study can be replicated with larger samples for better generalization.

❖ The adolescent boys and girls should be educated by means of mass health awareness programs on diabetes mellitus.

❖ Help line to be provided to diabetic patients.

❖ The public should be educated with the help of community leaders and involvement of college students may strengthen the study.

## 6.5 CONCLUSION

The study proves that guava leaf tea is effective in controlling  blood glucose level more specifically post prandial blood glucose level  among Type II Diabetes Mellitus adults  and prevents them from developing complications.These young leaves are abundant with beneficial bio-chemicals such as quercetins and vitamin-c including many antioxidants. Tender guava leaf tea is useful in cure diabetes. As  it is cheaper, easily available, it is applicable to be used even by low socio economic group peoples. It is one of the cost effective alternative source of reducing blood glucose level among Type II Diabetic adults in the community.

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## RESEARCH TOOL
### PART - A

### DEMOGRAPHIC DATA

**INSTRUCTIONS:**

- Please be frank and free in answering the question.
- Read each item carefully and answer all the questions.
- Answers will be used only for research purpose and will be confidential.
- Please put a tick mark at the appropriate option.
- Please return back the questionnaire after answering all the questions.

Sample no:

Name       :

Address   :

**SECTION- A**

DEMOGRAPHIC  PROFILE

1. **Age**
   a) 30 – 40   ☐          c) 51 – 60   ☐

   b) 41 – 50   ☐

2. **Sex**

   a) )Male   ☐

   b) )Female   ☐

3. **Education**

   a) 1—5 std,   ☐          c) 9—10 Std   ☐

   b) 6—8 std   ☐          d) 11—12 std   ☐

   e) Diploma   ☐          f) Degree   ☐

**4. Occupation**

    a) Business ☐      c) Government employment ☐

    b) Private employment ☐      d) cooly ☐

    e) Others ☐

**5. Family income per month in rupees**

    a) 3000 – 5000 ☐      c) 7001-9000 ☐

    b) 5001 – 7000 ☐      d) > 9001 ☐

**6. Religion**

    a) Hindu ☐      c) Christian ☐

    b) Muslim ☐      d) Others ☐

**7. Dietary pattern**

    a) Vegetarian ☐      c) Mixed ☐

    b) )Non – vegetarian ☐

**8. Do you have the family history of diabetes mellitus?**

    a) Yes ☐

    b) No ☐

**9. If yes, specify the relationship of the family member**

    a)Father ☐      c)Grand father ☐

    b)Mother ☐      d)Grand mother ☐

    e) )Sibling ☐

**10. Duration of illness**

    a ) 0 – 1year ☐      d) 3 – 4 years ☐

    b) 1 - 2 years ☐      e) 4 – 5 years ☐

    c) 2- 3 years ☐

**11. Are you taking your medications daily?**

    a) Yes        ☐

    b) )No        ☐

**12. Are you having the habit of doing exercise daily?**

    a)Yes        ☐

    b)No        ☐

**13. If yes,- type of exercise**

    a) Walking     ☐      c) weight lifting    ☐

    b) Jogging     ☐      d) others         ☐

# வினாத்தாள்

## புள்ளி விவர ஆய்வு மாற்றுரு

மாதிரி எண். -------          பெயர்:          விலாசம்:

1.வயது(வருடங்களில்)

    அ) 30 – 40 ☐

    ஆ) 41 – 50 ☐

    இ) 51 – 60 ☐

2.பாலினம்

    அ) ஆண் ☐

    ஆ) பெண் ☐

3.கல்வித்தரம்

    அ) 1 – 5 வரை ☐

    ஆ) 6 – 12 வரை ☐

    இ) தொழிற்பயிற்சி ☐

    ஈ) பட்டப்படிப்பு ☐

4. மதம்

    அ) இந்து ☐

    ஆ) முஸ்லீம் ☐

    இ) கிருஸ்துவ மதம் ☐

    ஈ) மற்றவை ☐

5. தொழில்

    அ) அரசு வேலை ☐

    ஆ) தனியார் வேலை ☐

    இ) சுயத் தொழில் ☐

    ஈ) மற்றவை ☐

6. மாத வருமானம்

    அ) 3000 – 5000 ☐

    ஆ) 5001 – 7000 ☐

    இ) 7001 – 10000 ☐

    ஈ) >10000 ☐

7. உணவு முறை

    அ) சைவ உணவு ☐

    ஆ) அசைவ உணவு ☐

    இ) இரண்டும்

8) குடும்பத்தில் யாருக்கேனும் நீரிழிவு நோய உள்ளதா?

    அ) ஆம் ☐

    ஆ) இல்லை ☐

9. ஆம், எனில் உறவுமுறை

    அ) தாய் ☐

    ஆ) தந்தை ☐

    இ) பாட்டி ☐

    ஈ) தாத்தா ☐

10. உடல் நலமின்மை காலவரம்பு

    அ) ஒரு வருடத்திற்குள் ☐

    ஆ) 1 - 2 வருடத்திற்குள் ☐

    இ) 3 - 4 வருடத்திற்குள் ☐

    ஈ) 4- 5 வருடத்திற்குள் ☐

11. நீரிழிவு நோய் மருந்துகளை தினமும் தவறாமல் எடுத்துக்கொள்கிறீர்களா?

    அ) ஆம் ☐

    ஆ) இல்லை ☐

12. தினமும் உடற்பயிற்சி செய்யும் பழக்கம் உள்ளதா

    அ) ஆம் ☐

    ஆ) இல்லை ☐

13. ஆம் என்றால் உடற்பயிற்சி வகைகள் யாவை?

    அ) நடைப்பயிற்சி ☐

    ஆ) ஓட்டப்பயிற்சி ☐

    இ) பளுதூக்குதல் ☐

    ஈ) இதர முறைகள் ☐

<div align="center">

**PROCEDURE**

**PREPARATION OF GUAVA LEAF TEA**

</div>

## Definition

This is a tea prepared from 10 fresh guava leaves added in 250ml of boiling water with 0.5mg of salt.

## purpose

To reduce the blood glucose level in Type II diabetic adults.

## preparation of the client

Explain the procedure to the client and his family members, and explain about the action of guava leaf tea.

## Sources of guava leaf tea

10 fresh guava leaves

250 ml of water

0.5mg of salt

## Preparation of guava leaf tea

Wash fresh guava leaves, pounded it fine, and add it in 250 ml of water and boil it for 15 minutes.Make it into 50ml ,filter the extract ,add 0.5mg of salt and drink half an hour after breakfast daily for 14 days.

**Action of guava leaf tea**

Guava leaf has been used as folk remedy in subtropical countries around the south east Asia ,because of its pharmacological activities. Guava leaf tea is taken to promote health and prevents diabetes as this helps to absorb Maltose and Sucrose thereby control blood sugar levels. These young leaves are abundant with beneficial bio-chemicals such as quercetins and vitamin-c including many antioxidants, which is very useful in curing diabetes.

**Documentation**

Record the procedure with date and time.

**BLOOD GLUCOSE LEVEL ASSESSMENT**

The investigator is to assess and record blood glucose level before and after administration of guava leaf tea.

**Assessment of blood glucose level**

| Group | Pretest O1 | Treatment X | Post test O2 |
|---|---|---|---|
| Experimental Group | Blood glucose level assessed ( Fasting and Postprandial) | 50 ml of guava leaf tea with existing treatment | Blood glucose level assessed ( Fasting and Postprandial) |
| Control Group | Blood glucose level assessed ( Fasting and Postprandial) | Existing treatment | Blood glucose level assessed ( Fasting and Postprandial) |

1) Maximum reduction of blood glucose level:    10-20 mg/dl

2) Minimum reduction of blood glucose level:    < 10 mg/dl