

**A STUDY TO ASSESS THE EFFECTIVENESS OF IVY GOURD
(COCCINIA INDICA) LEAVES POWDER IN REDUCTION OF
BLOOD GLUCOSE LEVEL AMONG TYPE-2 DIABETES
MELLITUS PATIENTS AT SELECTED AREAS
OF COIMBATORE**

Reg.No.301225401

**A DISSERTATION SUBMITTED TO THE TAMILNADU
DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN
PARTIAL FULFILLMENT OF REQUIREMENT
FOR THE DEGREE OF MASTER OF
SCIENCE IN NURSING**

APRIL 2014

CERTIFICATE

This is to certify that Dissertation entitled “**A STUDY TO ASSESS THE EFFECTIVENESS OF IVY GOURD (COCCINIA INDICA) LEAVES POWDER IN REDUCTION OF BLOOD GLUCOSE LEVEL AMONG TYPE-2 DIABETES MELLITUS PATIENTS AT SELECTED AREAS OF COIMBATORE**” is submitted to the faculty of nursing, **The Tamilnadu DR.M.G.R. Medical University**, Chennai by **Reg.No.301225401** in partial fulfillment of requirement for the degree of Master of Science in Nursing. It is the bonafide work done by her and the conclusions are her own. It is further certified that this dissertation or any part thereof has not formed the basis for award of any degree, diploma or similar titles.

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F.	Copy of certificate of content validity

LIST OF ABBREVIATIONS

S.NO	ABBREVIATION	EXPANSION
1.	Df	Degrees of freedom
2.	DM	Diabetes mellitus
3.	HbA ₁ C	Glycosylated hemoglobin
4.	HB	Hemoglobin
5.	IDF	International diabetic federation
6.	KMCH	Kovai Medical Center and Hospital
7.	NCD	Noncommunicable disease
8.	R.G pudur	Rangaswamy gounden pudur
9.	T2DM	Type 2 diabetes mellitus
10.	WHO	World health organization

CHAPTER – I

INTRODUCTION

In the history of mankind 20th century shows a fantastic advance in life expectancy and by a change from infectious to chronic degenerative diseases as the prevailing causes of death. According to the WHO reports rather than the communicable, now a days noncommunicable disease are found to be the most common cause of death in the world which represents about 60% of all the deaths. It happens so because of the sudden and drastic change in the person's background, life style and the environment. Among this one of the serious diseases is Diabetes mellitus and India has more diabetes than any other country of the world according to International Diabetes Federation.

WHO (2013) stated that noncommunicable diseases also known as chronic diseases, which will not passes from person to person. These are of long duration and generally slowly progressing. The main four types of these noncommunicable diseases are cardiovascular diseases (CVD), cancers, chronic respiratory diseases and diabetes. About 63% of all deaths are occurring due to the noncommunicable diseases worldwide (36 million out 57 million global deaths). Among them 80% of NCDs deaths occur in under developed and developing countries.

WHO (2013) suggested that more than 9 million of the world's deaths occur due to NCDs occur before onset of 60 years. Around the world these diseases affect both women and men almost equally. These diseases lead many people into, or entrench them in poverty due to increased expenditures for treatment.

Noncommunicable diseases were found to be more than 50% of the world's deaths and 43% of the disability-adjusted life years (DALYs) in India in 2004 and were prevalent across the country. The four leading chronic diseases in India, are in the order: cardiovascular diseases, diabetes mellitus, chronic obstructive pulmonary disease (COPD) and cancer. All these diseases projected to continue to increase in prevalence in the near future. (Prakash upadhyay, 2012)

Diabetes has emerged as a major health problem in India. Diabetes mellitus is a group of metabolic disorders in which the person's blood sugar level increases, either because

the pancreas does not produce enough insulin, (Insulin is the anabolic hormone and is synthesized and secreted by the beta cells of Islets of Langerhans in response to glucose and other secretagogues such as amino acids) or because of the cells do not respond to the insulin that is produced. The onset of diabetes often goes undetected until the later stages where subsequent glucose accumulation in the system is observed and it will leads to serious multi-organ damage, especially to the nerves and blood vessels. (Arunmozhiarasi and Sugunavathi,2012)

The impact of type-2 diabetes mellitus is considerable; it increases the chance of morbidity and mortality and decreases the life quality. The disease and its complications cause an economic burden for diabetic patients, their families and to the society. A good understanding about the cause of a occurring of type-2 diabetes mellitus in Indians is essential for the future planning of healthcare, policy and to deliver in order to know the burdens of diseases (Hoskote and Joshi 2008)

WHO states that more than 346 million people worldwide have DM. This number is likely to increases more than double by 2030 without any intervention. About 80% of diabetes deaths occur in under developed and developing countries. The global burden of type-2 diabetes mellitus for 2010 was 285 million people which will doubled to 438 million in 2030; (a 65 % increase). Similarly, for India the increase was found to be 51 million people in 2010 to 87 million in 2030 (Snehalatha and Ramachnadaran 2009).

WHO (2007) stated that the burden is mainly due to its complications. It is the leading cause of adult blindness, renal diseases, and non-traumatic limb amputations. Diabetes is a major contributing factor for cardiac disease and stroke. Adults with diabetes have higher chance of heart disease; death rates increases two or four times higher than adults without diabetes. 73 % of adults with diabetes have hypertension. There are 11 different classification of the diabetes mellitus by American diabetes association most of these types are rare. The major types are Type I Diabetes Mellitus, Type-2 Diabetes Mellitus, and Gestational Diabetes Mellitus.

IDF (2007) Diabetes has emerged as a major health problem in India. According to Diabetes Atlas report it shows there was 40 million persons were having diabetes in India in 2007, and this will be increased to 70 million people by the year of 2025. India is the country having largest number of diabetic people, which is higher in China and USA by 2030. It states that every one in five will be an Indian by 2030. Due to these increased numbers, the economic burden of

diabetes in India will be highest in the world. The real problems of the disease is due to its associated complications and which lead to increased morbidity and mortality.

In Coimbatore city 10% of population has type-2 diabetes mellitus and about 50% of the affected population were not aware of diabetic, until complications developed. 90% of the known cases are uncontrolled diabetes. Less awareness and uncontrol are the major factors for the development of complications. (Balamurugan 2000).

IDF (2007) stated that the other main reasons are rapid urbanisation and industrialisation it produced an advancement over the social and economic condition in developing countries such as India have resulted in lifestyle changes lead to lifestyle related diseases. This change from a traditional to new lifestyle, consumption of foods rich in fat and calories combined with an elevated level of mental stress has increased the problem further.

A survey of type-2 diabetes in six major cities in India showed the prevalence rate of diabetes in urban adults was 12.1%. Prevalance of impaired glucose tolerance is 14%. This shows there is a great potential for further rise in the prevalence of diabetes by conversion of impaired glucose tolerance to diabetes. The onset of diabetes in India is much less when compared to the other countries it has been noted in many Indian studies. According to a national study report 51% of the persons have diabetes before the age of 50 years, and these persons are having greater chance for developing the chronic complications of diabetes.(Ramachandran, 2008)

Vegetables among the numerous plants can be used for the treatment of Diabetes mellitus. A few number of vegetables that have been commonly consumed in India have possessed anti diabetic potency. In recent years, it has been a renewed interest to screen these plants food materials, for a possible beneficial use. A considerable amount of the work has been done with Ivy gourd (*Coccinia indica*) both in experimental animal group and in human subjects. Majority of the studies says about the beneficial effect of the fruit and leaves of Ivy gourd when administered it orally as a single dose. The hypoglycaemia is mediated through an insulin secreting effect or by an influence on enzymes involve in the glucose metabolism.

The literature quoted that prevalence and incidence of type-2 diabetes mellitus are increased in developing countries like India. For reducing the prevalence and incidence of type-2 diabetes

mellitus, the researcher administered the low cost, locally available, traditional medicine like Ivy gourd leaves powder. The purpose of study is to assess the effectiveness of Ivy gourd leaves powder in reduction of blood glucose level among type-2 diabetes mellitus patients.

NEED FOR THE STUDY

Indian Diabetes Research Foundation (2007) reported that diabetes has emerged as a global health problem. Unfortunately India stands first in the prevalence of Diabetes mellitus in the world. Apart from this there are many people who are yet to be diagnosed. When looking to the alarming statistics, we can see the rising trend of type-2 Diabetes in India. The prevalence of diabetes, contributed mainly by type-2 diabetes, is a global public threat. The prevalence of adults aged between 20-70 years will rise from 285 million in year 2010 to 438 million by the year 2030.

Increasing prevalence of diabetes will increase the ratio of young adults with diabetes. The steeply increasing prevalence of type-2 diabetes in the youth is highlighted in many studies in the Asian populations in India and in migrant countries. The worst affected ages are between 40-59 years. In 2010, 132 million people in this age group were suffered from diabetes. By 2030, this number will increase to 188 million. In southern India, the prevalence of diabetes under the age of 44 years has been increased from 25% of the total prevalence in 2000 to 36% in 2006. (Ambady Ramachandran ,2012)

The major reasons for this increasing rates is sedentary life styles, the change of food patterns especially that of fast foods, junk foods, and regular skipping of food due to jobs and combined intake of food which is commonly known as “brunch”, increased consumption of alcohol, chain smoking among young people and stress related jobs is in turn contributing to the early onset of diabetes. (Ambady Ramachandran,2012)

Asian people with young onset of occurrence of diabetes have a substantial phenotypic heterogeneity, many of them have a positive family history, beta cell function got altered, no islet cell autoantibodies and also with clustering of cardio metabolic disorders. The main cause for the increasing prevalence of type-2 diabetes in the Asian children was the increasing rate of obesity and the decreasing rate of physical activity, and which will lead to insulin resistance. In Asia most of the

countries are largely rural; a sudden change in the lifestyle modification of the rural people will increase the number of people affected with metabolic disorder. (Ambady Ramachandran, 2012)

The impacts of type-2 diabetes mellitus are considerable: as a lifelong disease, it will increase both morbidity and mortality and decrease life quality. The disease and its complications make a heavy burden for diabetic patients themselves, for their families and society. A better knowledge about the cause of occurrence of T2DM for Indians is essential for the future planning of healthcare policy, and in the delivery of health care in order to ensure the burdens of disease were addressed (Hoskote and Joshi 2008)

Type-2 diabetes is frequently associated with many components of the metabolic syndrome. This explains the frequent association with hypertension, dyslipidaemia, cardiovascular and renal risk. The prevention of diabetes by the change of the life style or if necessary some drug become a major concern worldwide. (Halimi 2005).

Even though government is taking so much of action against noncommunicable disease people are not willing to follow the treatment as such. Morbidity and diabetes clinics are run by primary health centres all over the country. On 4th January 2008 Government of India launched national control programme for the prevention and control of Diabetes, Cardiovascular disease and Stroke. Efforts are being made by the government but complete participation from the public is not available (NCD). People are not willing to take drugs lifelong they wanted to control by dietary management.

Type-2 diabetes mellitus can be prevented and controlled to some extent by dietary modifications and regular exercise, the usage to cheaply and easily available foods which can have the ability to control the blood glucose level comes to screen, which will help to reduce the burden of cost of health care. Ivy gourd, which is a cheaply and commonly available vegetable which has the inherent property, can be used for this purpose.

Plant derivatives with the hypoglycemic property have been used as a traditional medicine around the world. Ivy gourd (*Coccinia indica*) is used as a traditional medicine to treat diabetes in many countries. *Coccinia indica* reduce the blood glucose level and it has a hypoglycemic effect in vitro and in vivo. (Potchanapond Graidist 2009)

Coccinia indica the Ivy gourd, it also known as baby watermelon, little gourd or gentleman's toes and it is says to be as tropical vine. The fruit possesses activities like mast cell stabilizing, anti-anaphylactic and antihistaminic potential. There is a research to support that compounds in this plant inhibit the enzyme glucose-6-phosphatase, lactate dehydrogenase. Glucose-6-phosphatase is one of the important key liver enzymes involved in regulating the sugar metabolism. Therefore, Ivy gourd is recommended for diabetic patients for the dietary management of type-2 Diabetes Mellitus. (Manisha Modak, 2006).

A study was done to assess the effectiveness of Ayurveda therapies for diabetes mellitus; it shows that the herbs like coccinia indica, holy basil, fenugreek, gymnema sylvestre, have glucose-lowering effect. Among these the single best-quality randomised control trial reported beneficial result for coccinia indica.(Paul. G. Shekkel.,et al 2005).

A double blind, placebo-controlled trial in which a preparation from the leaves of the coccinia indica plant was administered to patients with uncontrolled type-2 diabetes mellitus for 6 weeks. Of the 16 patients, received the experimental preparations, the 10 shows significant improvement in their glucose tolerance ($P < 0.001$), while none out of the 16 patients in the placebo group showed improvement. No adverse effects were reported. (Robert Lister 2010).

The Ivy gourd leaves powder can be used as a herbal remedy for the treatment of type-2 diabetes mellitus. It is easily available and cheap. By using this blood glucose level can be reduced. Thus the cost of the burden of the disease can be reduced.

We, as nurses even while giving health education about diabetic drugs and diet will not focus on the amount and what particular food has to be taken. During community postings and working in primary health centres, I came across so many middle age diabetic people who shared with me that they are not interested in taking tablets or injections as they need to be taken lifelong. People are willing for dietary modifications and regular exercise as they are more health conscious. This study will help to reduce the bridge between the evidence and practice by providing a proof to diabetic care in future. Hence as a research I had an interest to choose this topic for my study.

STATEMENT OF THE PROBLEM:

A study to assess the effectiveness of Ivy gourd (*Coccinia indica*) leaves powder in reduction of blood glucose level among type-2 diabetes mellitus patients at selected areas of Coimbatore.

OBJECTIVES:

The following are the objectives of the present study:

- To assess the pretest and post test blood glucose level among type-2 diabetes mellitus patients.
- To determine the effectiveness of Ivy gourd leaves powder administration in reduction of blood glucose level.
- To associate the selected demographic variables with post test blood glucose level.

OPERATIONAL DEFINITIONS

Ivy gourd leaves powder: -

Powder made up of dried leaves of Ivy gourd. 1 gm powder administered between 7am and 9am in the empty stomach.

Blood glucose level: -

It's refers to the fasting and post prandial blood glucose level measured with Accu-chek active blood glucose meter.

ASSUMPTION

Ivy gourd leaves powder acts on the glucose metabolism.

HYPOTHESIS

H1: There is a significant reduction in the blood glucose level of the type-2 diabetes mellitus after the administration of Ivy gourd leaves powder

CONCEPTUAL FRAMEWORK

Conceptual framework is a theoretical approach to the study of problems that are scientifically based and emphasize the selection, arrangement and classification of the concepts.

According to Polit and Hungler (1990) conceptual frame work refers to interrelate concept of abstraction that the assembled together in same rational scheme by virtue of their relevance to a common theme.

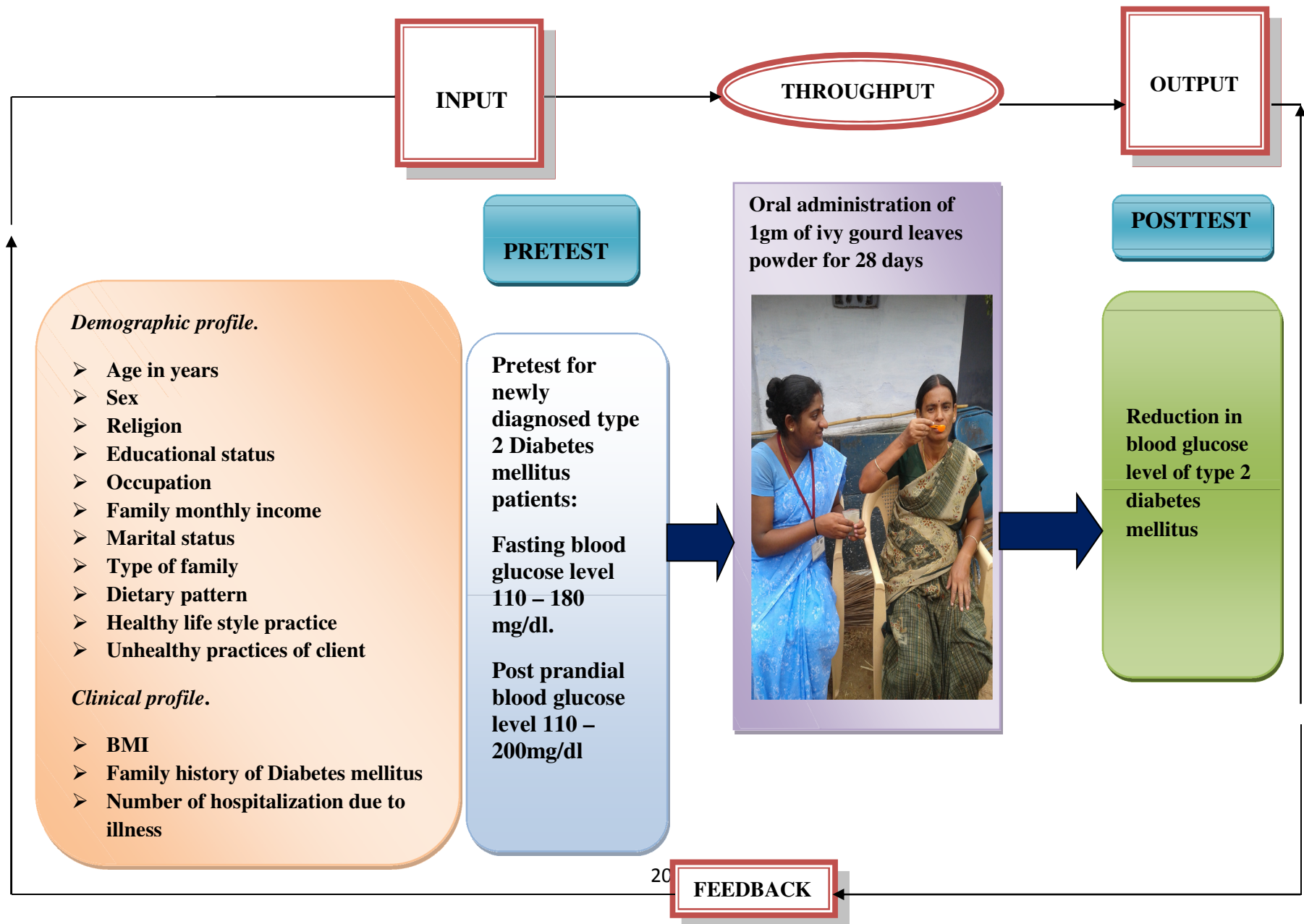
The model was based on 'General system theory 'which was formulated by Mr.Ludwig Von Bertalanffy in the year 1968. He described a set of theories that go together comprise the frame work of the system. A system is a complex of interacting with elements. He also noted that they are open to, and also to interact with their environments. In addition they acquire qualitatively new properties through emergence and thus they are in a continual evolution. All the living systems are open system in which there is a continuous change of matter, energy and information providing input for the system.

The open system mainly includes input, throughput, and output .According to the Ludwig Von's view

Input : It was considered as information, matter energy that the system receives from the environment. In the present study, persons who are newly diagnosed for diabetes within 6 month of period, and not taking any medicine, and having blood glucose level fasting ranges from 110-180mg/dl and post prandial blood glucose level ranges from 110-200 mg/dl.

Throughput : It organizes, transforming the input in a process and in the form of releasing through information, matter and energy into environment. In the present study, administration of coccinia indica leaves powder 1gm orally for reduction of blood glucose level among type-2 diabetes mellitus patients.

Output : According to him output is the final outcome of the total process and the result. In this reduction of fasting and post prandial blood glucose level of the samples.



INPUT

THROUGHPUT

OUTPUT

PRETEST

Oral administration of 1gm of ivy gourd leaves powder for 28 days

POSTTEST

- Demographic profile.*
- Age in years
 - Sex
 - Religion
 - Educational status
 - Occupation
 - Family monthly income
 - Marital status
 - Type of family
 - Dietary pattern
 - Healthy life style practice
 - Unhealthy practices of client
- Clinical profile.*
- BMI
 - Family history of Diabetes mellitus
 - Number of hospitalization due to illness

Pretest for newly diagnosed type 2 Diabetes mellitus patients:

Fasting blood glucose level 110 – 180 mg/dl.

Post prandial blood glucose level 110 – 200mg/dl

Reduction in blood glucose level of type 2 diabetes mellitus

FEEDBACK

CHAPTER II

REVIEW OF LITERATURE

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.

REVIEW OF LITERATURE IS PRESENTED AS FOLLOWS

- ❧ Literature related to prevalence and incidence of type-2 diabetes mellitus
- ❧ Literature relevant to complementary and alternative therapy for type-2 diabetes mellitus.
- ❧ Literature pertaining to effect of Ivy gourd leaves powder on blood glucose level for type-2 diabetes mellitus

Literature related to prevalence and incidence of type-2 diabetes mellitus

World Health Organization (2008) stated that 19.4 million individuals were affected by type-2 diabetes mellitus in India in the year 1995. It will increase to 57.2 million by the year 2025. They state that every fifth diabetic patient in the world is in India and every fifth adult is in urban area. The global number of people with diabetes was 220 million in 2010 and reaching 300 million by the year 2025.

Adriane (2008) conducted a cross sectional study with low risk profile and high risk profile of type-2 diabetes mellitus patients. In that about 85% are in the low risk and 81.2% of them are in the high risk profile perceived diabetes from moderate to serious disease. About 43% of all these subjects reported that they do not know the risk of occurring diabetes. The risk of occurring diabetes was lower for the low risk group compared it with the high risk profile subjects.

James A. Fain, Anne Nettles et al (2008), conducted a study findings on general population summarize that the state of knowledge in the area of diabetes patient education research needs to highlight important issues. About 2-5% of individuals with type-2 diabetes who present at a young age and have mild disease. In this study, it says that diabetes mellitus was recorded in 11.2% of

males and 9.9% of females, the total prevalence being 10.3%. On the basis of body mass index (BMI), obesity was more prevalent in females 15.6% than males 13.3%. In both males and females above 30 years of age, there was a rapid increase in the prevalence of diabetes. Prevalence of obesity, dyslipidemia, diabetes mellitus, substantial increase with body fat, generalized and regional obesity in middle age population, mainly in females, need immediate attention for the prevention; health education in such economically deprived populations.

Neelam Makol, Manisha (2008) stated that in early 1970s, the prevalence of type-2 diabetes among urban Indian population was 2.1% and which has risen to 12-16 per cent. Looking at region-wise prevalence, the prevalence shows a higher rate in southern part of India. Chennai residents (13.5); Bangalore (12.4%); Hyderabad (16.6%). In eastern India, Kolkata (11.7%); Northern India New Delhi (11.6%); and Western India Mumbai (9.3%). It is clear that in past two decades there has been a marked increase in the prevalence of type-2 diabetes mellitus among urban Indians. In rural India, the prevalence of diabetes is much lower than in urban population, even there the occurrence rates are rapidly increasing. There is a prevalence of occurrence of diabetes in children are also increasing because of the effects of globalization affecting in all the societies.

Louise Chang (2006), study findings shows that diabetes diagnosis in middle age was more prominent in the later life than occurring the disease in old age. The chance of occurring diabetes increases with age, the researchers say that there is a little knowledge about the relation of occurrence of age of diagnosis affects diabetes-related complications among the older people. They also lead to much worse blood sugar control. Nearly 60% of the elderly people with middle age-diagnosed diabetes had a very poor blood sugar control when compared with 42% of those people with later-onset diabetes.

Jeffcoat (2004) conducted an interview to 15 patients who diagnosed with type-2 diabetes, about how they came to be diagnosing the disease and about the barrier that might have prevented the diagnosis. Most patients diagnoses of diabetes in these patients are either serendipitous, symptom driven or patient initiated. Patients have only a less knowledge prior to the diagnosis, despite of strong family history of diabetes. Improved education and awareness of individuals is a useful strategy to increase diabetes education.

Lau Cheun –Yen, Scott (2003) conducted a study on the prevalence of type-2 diabetes in southern part of Iran was studied. 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). He concluded that diabetes become more prevalent as the age increased in people 30-39 years 8.3% and in those of age 50 to 64 years 24.8% were affected by the disease

Mohan et al (2008) stated that India leads the worlds with largest number of type-2 diabetes mellitus patients earning the dubious distinction as the “diabetic capital of the world”. According to the diabetes atlas published by the international diabetes federation on 2006 says, the number of people with type-2 diabetes in India currently about 40.9 million is expected to increase 69.9 million by the year 2025

Shah Jayendran et al (2003) stated that in United States of America, diabetes is approaching an epidemic proposition. It is estimated in the year 2002 over 16 million Americans has diabetes mellitus of these; approximately 6 million Americans will have diabetes mellitus of these patients (90%) suffer from type-2 diabetes. The majority of type -2 diabetic patients will fail to respond to diet and oral agent and will eventually require insulin therapy to control hypoglycemia. Diabetes mellitus it is the 7th most prevalent cause of death in the United States of America. The cardiovascular complications were the major cause of mortality and hospitalization with these diabetic patients and diabetes is the leading cause of blindness and account for 50% non-traumatic amputations.

Katarina Hjelm, Esther Mufunda et al (2003), study findings shows that the main reason for the disease are because of the genetic and environmental factors like urbanization and industrialization, as well as an increased longevity and changes in lifestyle occurs from a traditional healthy and active life to a modern, stressful and sedentary life and over-consumption of high calorie foods. The prevalence of diabetes mellitus varies with populations occurs due to the due to differences in genetic susceptibility and the social risk factors such as change in diet, obesity, physical inactivity.

Dorothy A. Rhoades, Yvette Roubideaux et al (2005), study was conducted among older urban American Indians. The objective of the study was, to assess the prevalence, and quality of care for, diabetes mellitus. The study result shows that most of the patients with diabetes were treated with either with insulin (43%) or oral hypoglycemic medication (39%), but 16% received either insulin or medication. About 65% of patients can be referred to a dietitian and 40% need exercise counseling. The number of health problems was mostly associated with quality of life care indicators.

Literature relevant to complementary and alternative therapies for type-2 diabetes mellitus

Manisha.,Modak. (2007) states the traditional medicines derived from the medicinal plants are used for about 60% of world population. This review makes eyesight on the Indian herbal drugs and plants that can be used in the treatment of diabetes, especially commonly in India. Though there are various measures to reduce the occurrence of ill effects of diabetes and its complications, the herbal formulation are preferred due to lesser side effect and low cost.

Krishnaswamy (2008) stated that India is famous all over the world by its spices and about medicinal plants. Both exhibit a wider range of both physiological and pharmacological properties and biomedical efforts mainly focusing on their scientific merits, to provide a science-based evidence for the traditional use and also to develop the use of functional foods. The Indian traditional medicinal system can be used for healing of wounds, rheumatic disorders like arthritis, gastrointestinal symptoms, deworming, rhinitis, and also its delays induced cataract in diabetes

Aggarwal, Sundaram, Malini,(2007) stated that from the times of Ayurveda (1900 BC) numerous therapeutic activities has been assigned to turmeric for its wide variety of the diseases and also conditions, including those with skin dsisease, pulmonary, gastrointestinal system, aches, pains, wound, sprains and liver disorder and have hypoglycemic effect. Extensive research activities within the last century have been proven that most of these activities, which are associated with turmeric, are due to its curcumin effect. It has been shown to have high effects in reduction of blood glucose level.

Leach M J (2012) several studies says that that the use of cinnamon has a significant reduction on hyperglycaemia. A study published in 2009 shows that t a 500 mg capsule of

cinnamon taken twice a day for 90 days improved the glycosylated hemoglobin levels. The reflection of average blood sugar level shows a significant reduction for the past two to three months, in people with less controlled type-2 diabetes (hemoglobin A1C levels greater than 7 percent).

Andallu (2001) conducted a study on the hypoglycemic effect of the mulberry leaves to evaluate the comparison with antidiabetic activity of the standard drug glibenclamide. Total number 24 type-2 diabetic patients were divided randomly into two treatment group; the mulberry agent and glibenclamide administered for 30 days. Result shows that patient given mulberry therapy shows significantly improved their glycemic control with glibenclamide treatment. Both treatments show no apparent effect on the concentrations of the glycosylated hemoglobin.

Helmsterdter (2008) conducted a study on *syzygium cumini* which is used for the treatment of type-2 diabetes. The plant was extensively studied for the past 125 years approximately 100 cases were reported before the discovery of insulin. The literatures starting from the pre insulin era were more focus on the in-vivo and in-vitro. The study results were analyzed for the information still useful and also to compare the result in recent decades with the help of the help of the knowledge summarized. There was a successful clinical study about the *cumini* seeds or fruit from India can be used in controlling the blood sugar level.

Wallad (2007) Asian ginseng which is commonly used as a traditional medicine for the natural treatment for diabetes. It shows it has a greater ability to release insulin from the pancreas and also to increase the insulin reception. It has a direct blood sugar lowering effect. An intake of 200 mg ginseng extract per day improved blood sugar control level in diabetes.

Saeedi, Elzubier (2003) quoted that many patients seek out alternative medicine after they have tried conventional medicine and found it to be ineffective or to result in side effect. Traditional herbal remedies have been used for the treatment of diabetes mellitus in many communities, especially in Asia. The type of traditional therapies used by patients includes prayer, faith healing, unusual diet, herbal treatment, pearl therapy and many others.

Vijay Kumar, Bhat (2008) conducted study to investigate the long-term effects (multiple dose effect) of this fenugreek seeds extract preparation on the blood sugar level and its association

with body weight and short-term effect (single dose effect) on serum insulin and hepatic enzymes. Results of the study conclude that this fenugreek seeds extract preparation corrects metabolic alterations which is associated with diabetes with the exhibition of insulin like properties and has a potential for clinical purpose applications.

Awinash Pandey, Poonam Thripathi (2011) states there are a lots of chemical agents that is useful for controlling and treating diabetic patients but a total recovery from it is not is not achieved yet. In addition to other side effect, the drug treatments are not always shows a satisfaction in maintaining euglycemia and avoiding the late stage diabetic complications. Alternative to these synthetic agents, plants provides a reliable source for hypoglycemic drugs and are usually used in several traditional systems of medicine for the prevention of diabetes. Several medicinal plants have been done investigation for their good effect in different type of diabetes. These have less chance to have the adverse effects of new approaches for diabetes.

Literature pertaining to effect of Ivy gourd leaves powder on blood glucose level

Sivani saravanamuttu (2012) had conducted a study on antidiabetic plants and their active ingredients at Chennai. Their study to find the effectiveness of diabetes plants showed coccinia indica, a member of the cucurbitaceae family, had the ability to lower glucose levels. Inhibition of adipocyte differentiation and peroxisome proliferator-mediated receptor- α mediated mechanism might be relevant pathways for the antidiabetic activity.

Dr. Julian Whitaker (2011) has conducted a study on effectiveness of Ivy gourd in reduction of blood glucose at Rajasthan. The results showed that in a double-blind, placebo-controlled clinical trial, 60 newly diagnosed type-2 diabetic subjects (not taking any medications for glucose control) received either 1,000 mg of Ivy gourd extract, or a placebo. Those taking Ivy gourd extract experienced better blood sugar control, with a 15.6 percent decrease in fasting blood glucose level.

Muna singhe (2011) has conducted a double-blind phase I clinical trial. They assessed the effect of coccinia indica leaves as a hypoglycemic agent. 61 healthy volunteers had a meal containing 20g of leaves of coccinia indica and 61 given the placebo meal. The result shows that

the overall blood glucose level of experimental group were significantly lower than the control group.

J.M.Rhodes (1997) has conducted a study with homogenized and freeze-dried leaves of *Coccinia indica*, or placebo tablets prepared with chlorophyll and gave three tablets. Oral glucose tolerance test was done at the beginning and the end; the results shows that out of 16 patients who received tablet showed an improvement while none of these taking placebo showed such an improvement.

Goldy yadav (2010) had conducted a study on medical properties of Ivy gourd at Bhopal; the study revealed that Ivy gourd plant has been used as traditional medicine for the household remedy for various diseases, like biliary diseases, anorexia, cough, diabetic wounds, hepatic diseases etc. Polyprenol (C60-polyprenol) a main yellow bioactive component of Ivy gourd it has been shown to have an anti dyslipidemic biological action. Anti-inflammatory, antioxidant, anti-mutagenic, anti-diabetic, antibacterial, anti-protozoal, antiulcer, hepatic-protective, expectorants, analgesics, anti-inflammatory are the reported pharmacological actions of Ivy gourd.

Platel K (2010) has conducted a study on the antidiabetic property of *Coccinia indica* at Mysore, the study shows the hypoglycemic influence is claimed to be mediated through an insulin secretagogues effect or through an influence on enzymes involved in glucose metabolism.

Robert Lister (2010) had conducted a study on medicinal properties of Ivy gourd at Michigan the results showed at the end of the three month of the clinical trial, the average fasting blood glucose level among the diabetic samples who received Ivy gourd had fallen to 111 mg/dl, while the diabetics who did not received the herb actually had a slight increase in the blood glucose level during morning time. In the group of samples who received the Ivy gourd, post-prandial blood glucose level fell down to average below 150 mg/dl. There was an improvement in blood glucose levels it was about of 0.6 per cent of an average drop out in glycosylated hemoglobin

Gloria Y. Yeh (2009) had conducted a study on systematic review of Herbs and Dietary Supplements for Glycaemia Control in Diabetes at Boston shows that 58 controlled clinical trials involving patients with diabetes or impaired blood glucose tolerance (42 randomized and 16

nonrandomized trials) was given Ivy gourd for a period of 30 days and the meta analysis showed improved glucose control of 76%.

Anura V Kurpad (2008) in their study on The Effect Of Ivy gourd (*Coccinia indica*) extract on diabetic patients at Bangalore the study shows that there was a significant reduction (at day 30) in fasting blood glucose level of the experimental group accounted for a mean change of 15.6 per cent (20.6mg/dl) from the initial value. In the placebo group shows a significant mean increase in fasting blood glucose level of 6 per cent (8 mg/dl) during the period of study. Similarly, there was an 18.5 per cent (34 mg/dl) significant decrease in the post prandial blood glucose of the experimental group (day 30) when compared it with the baseline values, while in the placebo group there was a non-significant 7 per cent (12 mg/dl) increase during the study period

Rebecca Kuriyan (2008) had conducted a study on evidence-based systematic review by the natural standard research for effectiveness of Ivy gourd at Bangalore states that there was a significant reduction in the fasting, postprandial blood-glucose level and glycosylated hemoglobin level of the experimental group when compared it with the placebo group. The fasting and postprandial blood-glucose-levels of the experimental group of day 90 got a significant decrease in 16 and 18%, respectively. There were no significant changes seen in the serum-lipid-levels.

Kumar, G.P., Sudheesh ,S, Vijayalakshmi, N.R.(2010) conducted a study to evaluate effectiveness of the pectin component in Ivy gourd to reduce the serum blood glucose level. This study showed pectin isolated from the fruit of the *coccinia indica* at a dose of 200 mg or 100g body weight per day shows a significant hypoglycaemic activity.

Jeannette Goguen, (2005) conducted a study on alternative medicine for glycaemia control in type-2 Diabetes mellitus. At Toronto one randomized controlled trial studied 32 patients with type-2 DM for 6 weeks; 10 out of the 16 participants who received the experimental preparation of Ivy gourd (1.8 g/day) showed an improved glucose tolerance, while none of the 16 patients in the placebo group show an improvement ($p < 0.001$). On average, fasting blood glucose decreased by 2.4 mmol in the experimental group. No negative effects were noted.

Rao et.al (2005) conducted a study on nutritional attributes of Indian vegetables at Newzeland revealed that a protective effect of Ivy gourd extracts against induced liver damage. According to the various range of parameters, including pentobarbitone sleeping time and biochemical parameters like serum alanine transaminase, aspirate transiminase, serum alkaline phosphate, serum acid, phosphate, serum bilirubin, serum cholesterol, serum blood glucose. It shows significant reduction of serum blood glucose and lipid values.

Donga et al (2011) conducted a study about the oral administration of the pectin extracted from the coccinia indica fruit at a dose of 200 mg, twice/day it shows a reduction in glycaemia and an increase in liver glycogen. Glycogen synthesis activity was significantly increased.

Cathy Wong (2003) in a research review in diabetic care, shows that 60 patients with mild diabetes, each of them took either placebo or extract of Ivy gourd daily for 30 days. The study results show that the members consuming Ivy gourd had a significantly greater improvement in reduction of blood sugar levels (compared to members of the placebo group).

CHAPTER-III

METHODOLOGY

This chapter deals with methodology which was adopted by the investigator to find out the effectiveness of Ivy gourd (*Coccoloba indica*) leaves powder in reduction of blood glucose level among type-2 Diabetes mellitus patients. It includes research design, variables under study, setting of study, population, sample size, sampling technique, criteria for selection of samples, development and description of tool for data collection, procedure for data collection, pilot study, and statistical analysis.

RESEARCH DESIGN

Quasi experimental design, one group pretest post test only design was adopted for the study.

$O_1 \times O_2$

KEY

O_1 : Pretest assessment of blood glucose level.

X : Ivy gourd leaves powder administration.

O_2 : Post test assessment of blood glucose level

VARIABLES UNDER THE STUDY

Independent variable- Administration of Ivy gourd leaves powder.

Dependent variable –Fasting and post prandial blood glucose level

SETTING OF THE STUDY

The study was conducted at Athikuttai, kalapatti, R.G.Pudur, and Veeriyampalayam areas of Coimbatore. These areas are adopted by Sarkarsamakulam Primary Health Centre, which is situated within the radius of 5-7 Kms from KMCH College of Nursing

POPULATION OF THE STUDY

The study population comprising of adults newly diagnosed to have type-2 diabetes mellitus (age 30-60 years) residing at Athikuttai, Kalapatti, R.G.Pudur, and Veeriyampalayam.

Details of total population and number of total diabetic and newly diagnosed diabetic patients were presented

S.NO	Name of the area	Total population	Male population	Female population	Total diabetic patients	Newly diagnosed diabetic patients
1.	Athikuttai	1933	1076	957	123	27
2.	Kalapatti	4711	2402	2309	385	53
3.	RG.Pudur	2688	1378	1310	242	37
4.	Veeriyampalayam	2428	1248	1180	107	49

SAMPLE AND SAMPLE SIZE

The sample size consist of 80 patients with type-2 diabetes mellitus.

SAMPLING TECHNIQUE

Non probability sampling technique (Purposive sampling), was adopted to selected the samples. Sarkarsamakulam PHC covers 13 subcentres of which, the investigator select 4 villages

through lottery method .Through the subcentre of each area the researcher got details about the population in each area and also about the diabetic population.

Athikuttai: Among the 1933 population; 123 were diabetic and from this 27 were checked who fulfilled the inclusion criteria were 15 in number

Kalappati: Among the 4711 population; 385 were diabetic and from this 53 were checked the samples who fulfilled the inclusion criteria were 28 in number

R.G.Pudur: Among the 2688 population; 242 were diabetic and from this 37 were checked the samples who fulfilled the inclusion criteria were 20 in number.

Veeriyampalayam: Among the 2428 population; 107 were diabetic and from this 49 were checked the samples who fulfilled the inclusion criteria were 17 in number.

CRITERIA FOR SELECTION OF SAMPLES

Inclusion criteria

- Patients who were newly diagnosed for type-2 diabetes mellitus within 6 month.
- Both male and female diabetic patients aged between 30-60 years.
- Fasting blood glucose level ranges from 110-180 mg/dl and post prandial blood glucose level ranges from 110 – 200 mg/dl will be included.

Exclusion criteria

- Patient who has type-2 diabetes mellitus for more than 6 months.
- Patient with comorbid condition (hypertension, heart disease, gastro intestinal problems, episode of infection, acute fever).
- Patients who are taking any drugs for type-2 diabetes mellitus.
- Antenatal mothers and post natal mothers.

DETAILS OF INTERVENTION

The primary purpose of Ivy gourd leaves powder administration was to reduce both fasting and post prandial blood glucose level. Pretest fasting and post prandial blood glucose

level was assessed on the 1st day. On the 14th day and on the 28th day both fasting and post prandial blood glucose levels were assessed with the help of Accu-chek active blood glucose meter.

Preparation of Ivy gourd leaves powder

- The Ivy gourd powder was prepared hygienically.
- The researcher collected the fresh Ivy gourd leaves.
- The Ivy gourd leaves are cleaned and foreign materials are removed from Ivy gourd leaves by manually
- The leaves were dried nicely under sunlight shade.
- The dried leaves were finally powdered.
- The powdered form were packed separately.

Administration of Ivy gourd leaves powder

- Administered 1 gm of Ivy gourd leaves powder to the subjects in the group for 28 days.
- The investigator selected 4 areas for the study.
- The first day, investigator administered the Ivy gourd leaves powder 1gm to the subjects.
- The subjects consumed the Ivy gourd leaves powder with the help of water between 7am to 9am in empty stomach with the supervision of investigator.
- The investigator gave 7gms of packed Ivy gourd leaves powder packet to each individual for a week.
- The investigator did follow up in between to watch out whether they are consuming it or not.

Action of Ivy gourd leaves powder

- Ivy gourd powder has a hypoglycaemic effect.
- It acts like insulin by correcting the elevated levels of enzymes like Glucose-6-phosphatase, lactate dehydrogenase and thus control of hyperglycaemia in diabetic patients
- Ivy gourd contains beta-carotene, a major vitamin A precursor from plant sources. It is also considered a good source of protein and fibre

DEVELOPMENT AND DESCRIPTION OF TOOL

SECTION A:

Demographic variables includes age, sex, religion, educational status, occupation, family monthly income, marital status, type of family, dietary pattern, healthy life style practices, un healthy practices among clients.

Clinical profile: Body mass index, family history of diabetes mellitus, number of hospitalization due to illness.

SECTION B:

Record of fasting and post prandial blood glucose level includes the pretest and post test blood glucose level. On the 1st day pretest was done by the investigator 14th day and 28th day post test was done.

TESTING OF THE TOOL

CONTENT VALIDITY

The tool was given to 3 experts in the field of nursing, siddha and medicine to establish content validity based on the experts suggestions and corrections were made and the tool was validated.

PILOT STUDY

Pilot study was conducted in Vazhiyampalayam, Coimbatore. The investigator got permission from the concerned authority prior to pilot study. 20 samples were selected by purposive sampling technique and pretest fasting and post prandial blood glucose level was assessed. 1gm of Ivy gourd leaves powder were administered to the samples for 28 continuous days, and post test blood glucose level were assessed on the 14th day and 28th day.

RELIABILITY

The reliability of the tool was tested by measuring blood glucose level and administrating Ivy gourd leaves powder to the patients. The reliability co-efficient (r) was 0.845 and was found to be valid

PROCEDURE FOR DATA COLLECTION

During the data collection prior permission was obtained from Sarkarsamakulam Primary Health Centre. By submitting an application and giving assurance to abide by the rules and regulations and also no personal or professional inconvenience is created. Similarly permission was obtained from the medical and nursing experts

The study was conducted for a period of 6 weeks. The investigator selected the samples that fulfill the inclusion criteria .The purpose of the study was explained to the patients and oral consent was obtained

Through the subcentre of each area the researcher got details about the population in each area and about the diabetic patients. The investigator initially established rapport with the subject and collected demographic data. On the 1st day, pretest fasting and post prandial blood glucose level was assessed.

1gm of Ivy gourd leaves powder was administered for 28 days with the supervision of investigator. In morning the subjects consume the Ivy gourd leaves powder between 7am and 9am in empty stomach. On the 14th day and 28th day post test fasting and post prandial blood glucose level was assessed.

STATISTICAL ANALYSIS

The collected data were analysed by using descriptive statistics (frequency percentage, mean and standard deviation)and inferential statistics(paired 't' test).paired 't' test was used to determine the difference between pretest and post test .The chi square was used to determine the association between demographic variables with level of blood glucose

CHAPTER-IV

DATA ANALYSIS AND INTERPRETATION.

The collected data regarding Ivy gourd leaves powder administration on blood glucose level among type-2 diabetes mellitus were organised, analysed and interpreted as follows.

Section A: Distribution of subjects according to their demographic variables.

Section B: Distribution of subjects according to their pretest fasting and post prandial blood glucose level.

Section C: Distribution of subjects according to their 14th day and 28th post test fasting and post prandial blood glucose level.

Section D: Comparison between mean pretest and post test blood glucose levels.

Section E: Association of the post test blood glucose levels with selected demographic variables.

SECTION –A

TABLE-1 Distribution of subjects according to their demographic variables

n=80

S.No	Demographic variables	No. of subjects	Percentage (%)
1.	Age in years a. Upto 45 b. 46-55 c. Above 56	18 43 19	22.5 53.75 23.75
2.	Sex a. male b. female	47 33	58.75 41.25
3.	Religion a. Hindu b. Muslim c. Christian	68 2 10	85 2.5 12.5
4.	Educational status a. Illiterate b. Primary education c. secondary and above	14 13 53	17.5 16.25 66.25
5.	Occupation a .employed b. unemployed c. business	47 30 3	58.75 37.5 3.75
6.	Family monthly income a. Upto Rs.6500 b. Rs.6501-7500 c.Rs.7501 and above	19 41 20	23.75 51.25 25
7.	Marital status a. Un married b. married	5 75	6.25 93.75
8.	Type of family a. Joint family b. nuclear family	27 53	33.75 66.25

9.	Dietary pattern a. Vegetarian b. Non vegetarian	4 76	5 95
10.	Healthy life style practices a. Walking b. yoga c. None	4 2 74	5 2.5 92.5
11.	Unhealthy practice of client a .None b. Smoking c. Alcoholism d. Substance abuse e. Others	43 21 11 3 2	53.75 26.25 13.75 3.75 2.5
12.	Body mass index a. Upto 23 b. 24to26 c. 27 and Above	29 16 35	36.35 20 43.75
13.	Family history of diabetes mellitus a. Non-significant b. Significant -paternal -maternal	70 5 5	87.5 6.25 6.25
14.	Number of hospitalization due to illness a. None b.one time	73 7	91.25 8.75

- The table No.1 depicts the distribution of demographic variables of 80 subjects. On the basis of age group 43 (53.75per cent) subjects were between 46 to 55 years, 19(23.75 per cent) subjects were above 55 years, 18(22.5per cent) subjects were upto 45 years.
- On the basis of sex 47(58.75 per cent) subjects were male and 33(41.25per cent) subjects were female.
- Based on religion 68(85 per cent) subjects were believing in Hinduism, 10(12.5per cent) subjects were believing in Christianity and 2(2.5 per cent) were believing in Muslim

- On the basis of education 53(66.25per cent) subjects were studied upto secondary and above, 14(17.5 per cent) subjects were illiterate and 13(16.25 per cent) subjects were studied upto primary education.
- Based on the occupation 47(58.75per cent) were employed, 30(37.5 per cent) were un employed, 3(3.75 per cent) were doing business
- Based on the family monthly income 41(51.25 per cent) were having an income between Rs. 6501-7500, 20(25 per cent) subjects has an income above Rs.7501, and 19(23.75 per cent) has an income upto Rs.6500.
- On the basis of marital status 75(93.75 per cent) subjects were married and 5(6.25 per cent) were unmarried.
- Based on the type of family 53(66.25 per cent) subjects were living in nuclear family and 27(33.75 per cent) were living in nuclear family.
- On the basis of the dietary pattern 76(95 per cent) subjects were non vegetarian, and 4(5 per cent) were vegetarian
- Based on the healthy life style practice 74(92.5) were not doing any healthy life style practices, 4(5 per cent) were doing walking and 2(2.5 per cent) were doing yoga.
- On the basis of unhealthy practice of client 43(53.75 per cent) subjects had no bad habits, 21(26.25 per cent) subjects had the habits of smoking, 11(13.75 per cent) had the habits of alcoholism, 3(3.75 per cent) had substance abuse, 2(2.5 per cent) had other types of bad habits.
- Based on the BMI 29(36.35 per cent) subjects were having BMI of above 27 and above, 29(36.35 per cent) had BMI upto 23 and 16(20 per cent) had BMI between24 to 26.
- On the basis of family history of diabetes mellitus 70(87.5 per cent) subjects had no significant history, 5(6.25 per cent) subjects had significant history (paternal and maternal).
- Based on the number of hospitalizations due to illness 73(91.25 per cent) subjects had no history of hospitalization and 7(8.75 per cent) had a history of one time hospitalization.

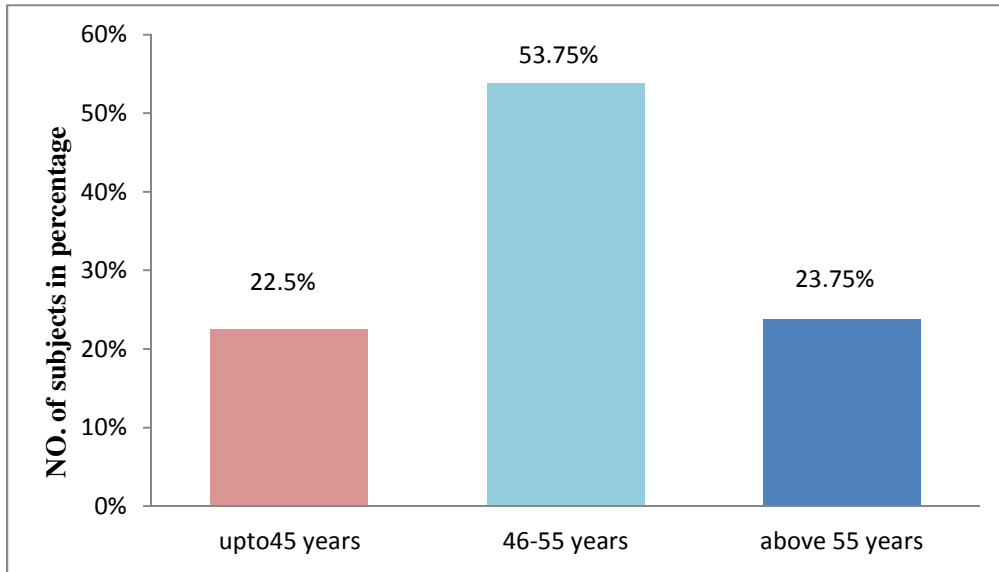


Figure 2: Distribution of subjects according to their age

Fig.2 depicts that majority of subjects were between 46-55 years

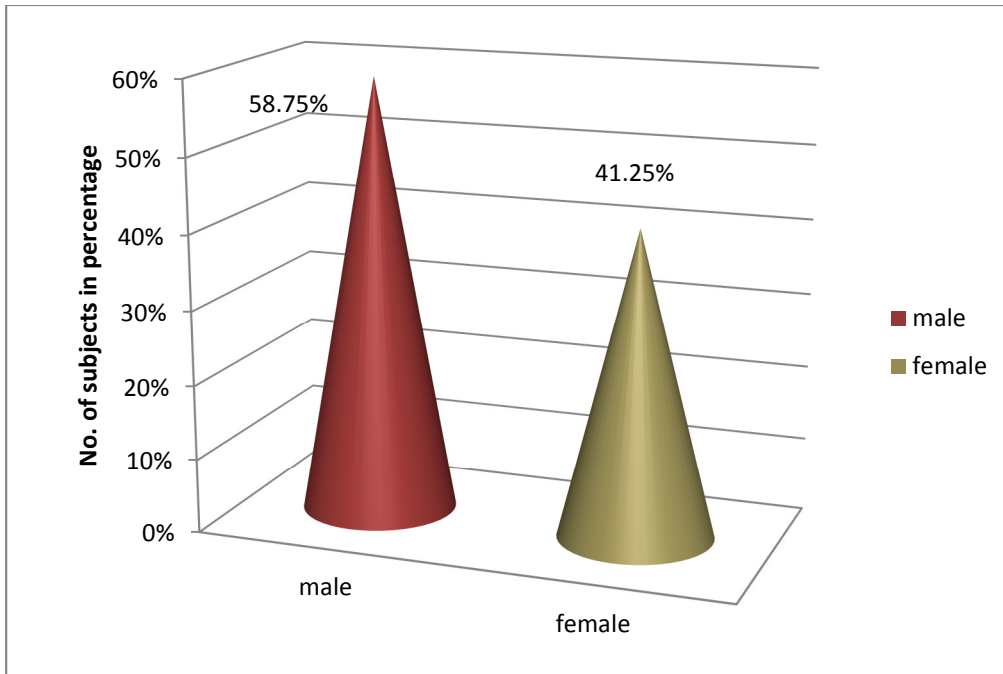


Figure 3: Distribution of subjects according to their sex

Fig.3 depicts that majority of the subjects were male

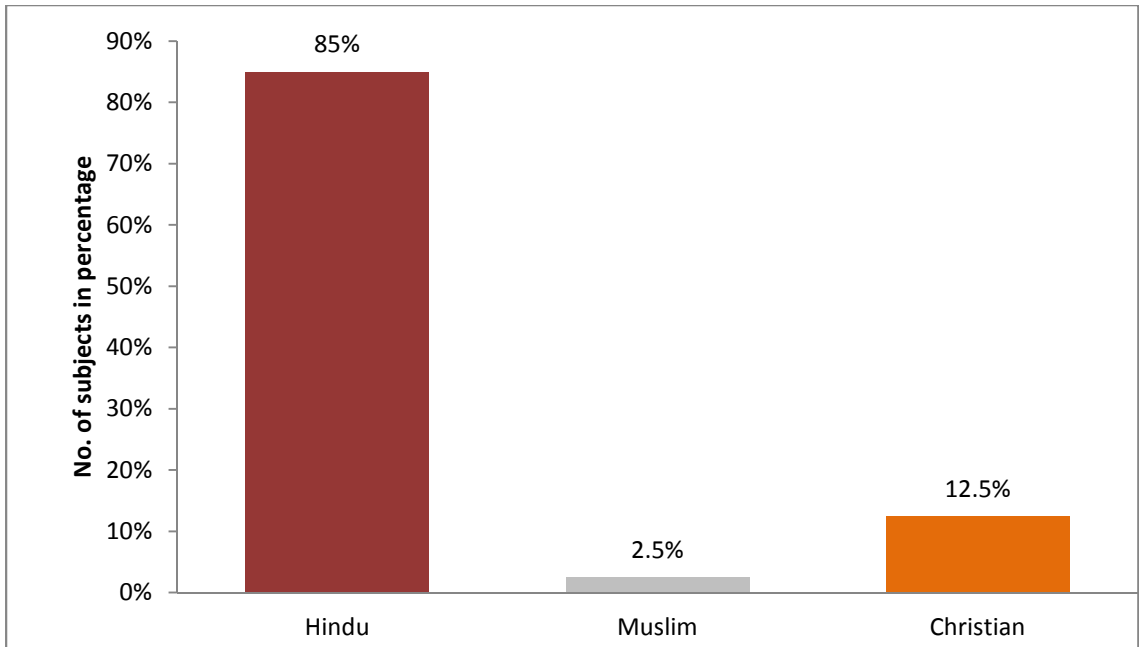


Figure 4: Distribution of subjects according to their religion

Fig 4: depicts that majority of the subjects were believing in Hinduism

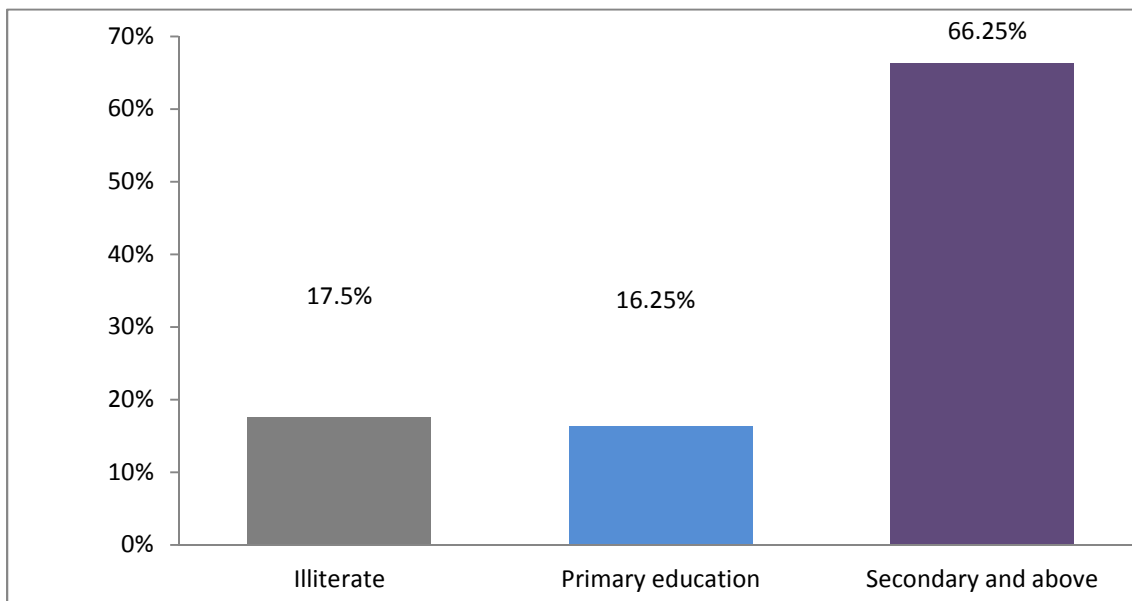


Figure 5: Distribution of subjects according to their education

Fig 5: depicts that majority of subjects were having secondary and above education

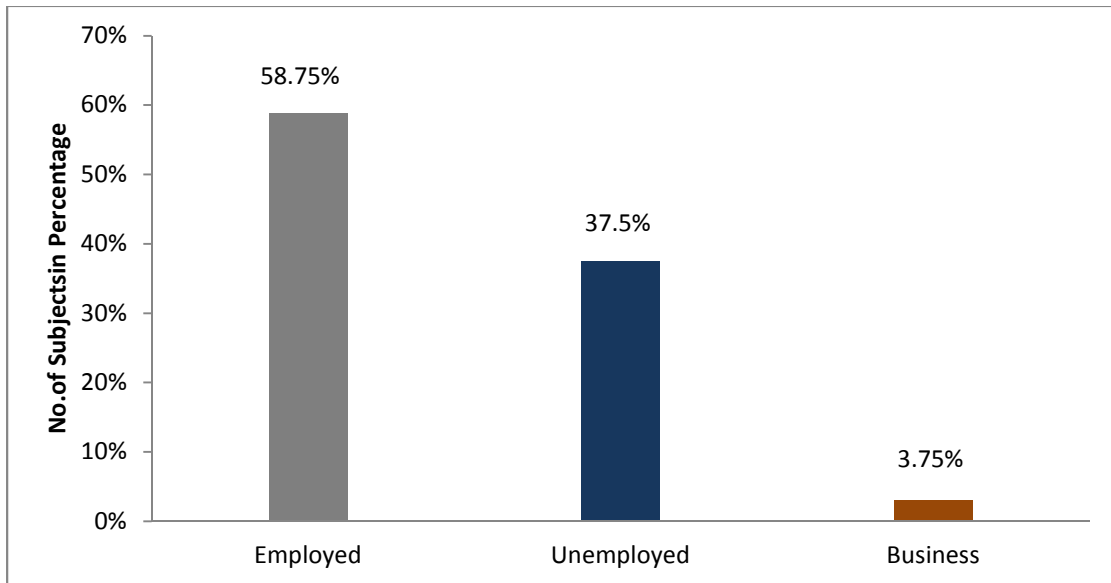


Figure 6: Distribution of subjects according to their occupation

Fig 6: depicts that majority of the subjects were employed

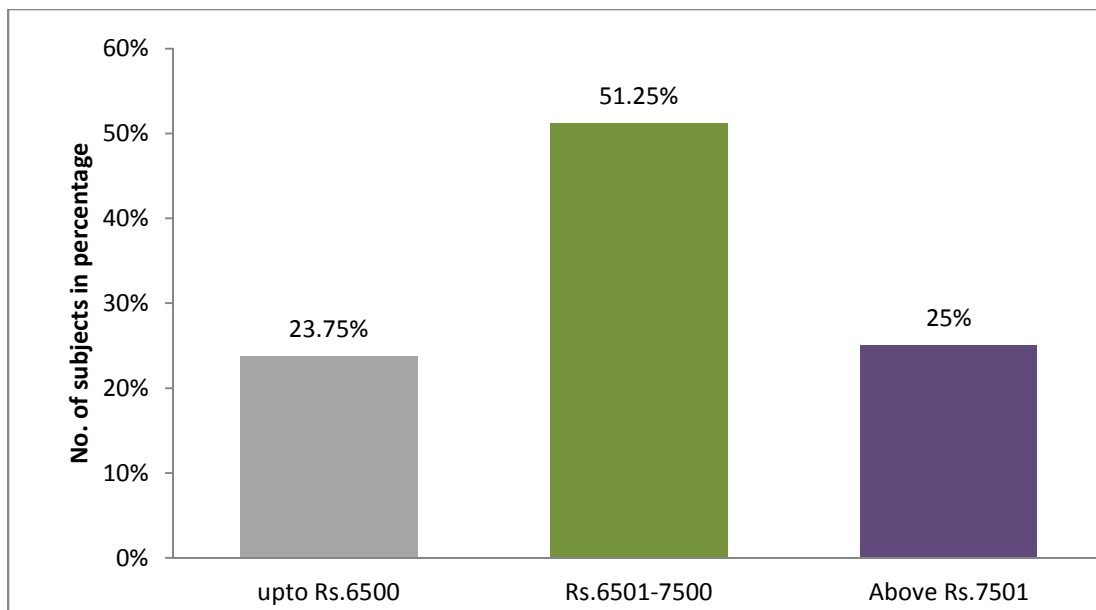


Figure 7: Distribution of subjects according to their family monthly income

Fig 7: depicts that majority of the subjects were having the family monthly income

between Rs.6501-7500

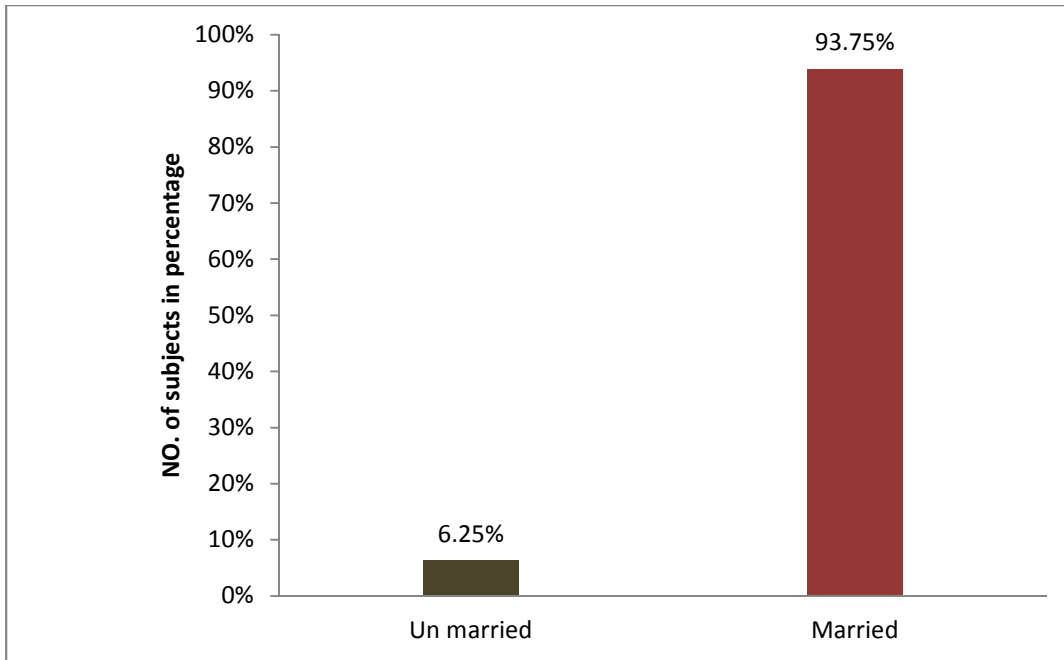


Figure 8: Distribution of subjects according to their marital status

Fig 8: depicts that majority of the subjects were married

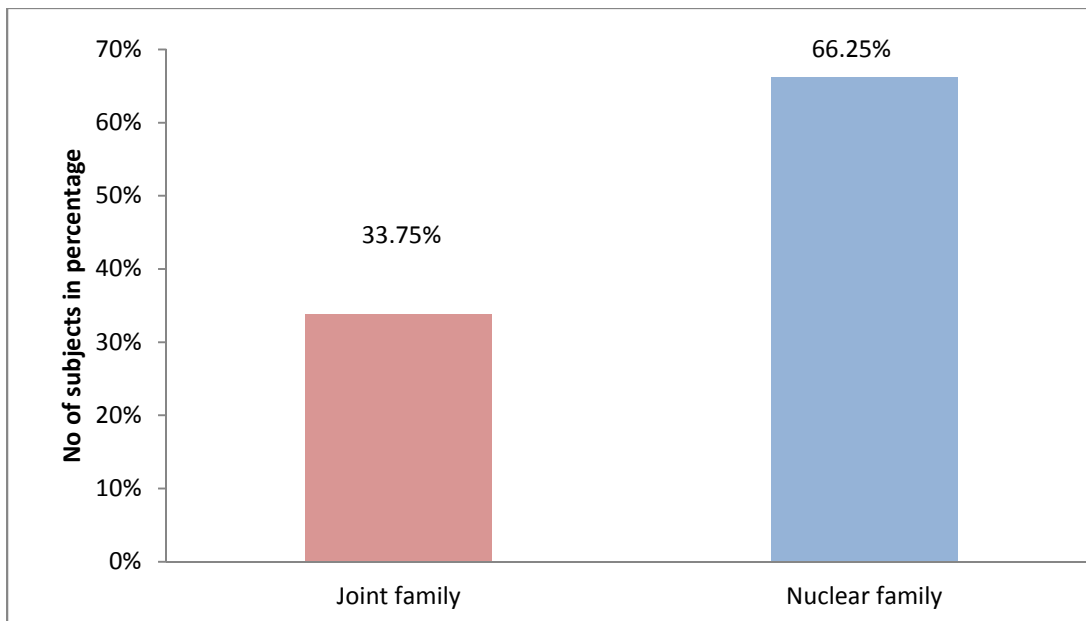


Figure 9: Distribution of subjects according to their family type

Fig 9: depicts that majority of the subjects were in nuclear family

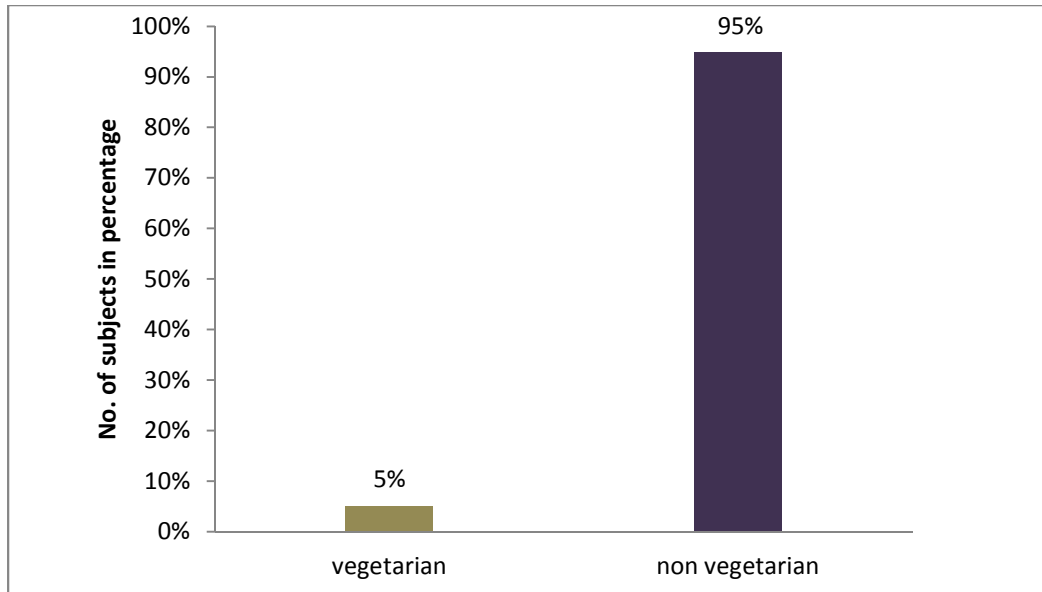


Figure 10: Distribution of subjects according to their dietary pattern

Fig 10: depicts that majority of the subjects were non vegetarian

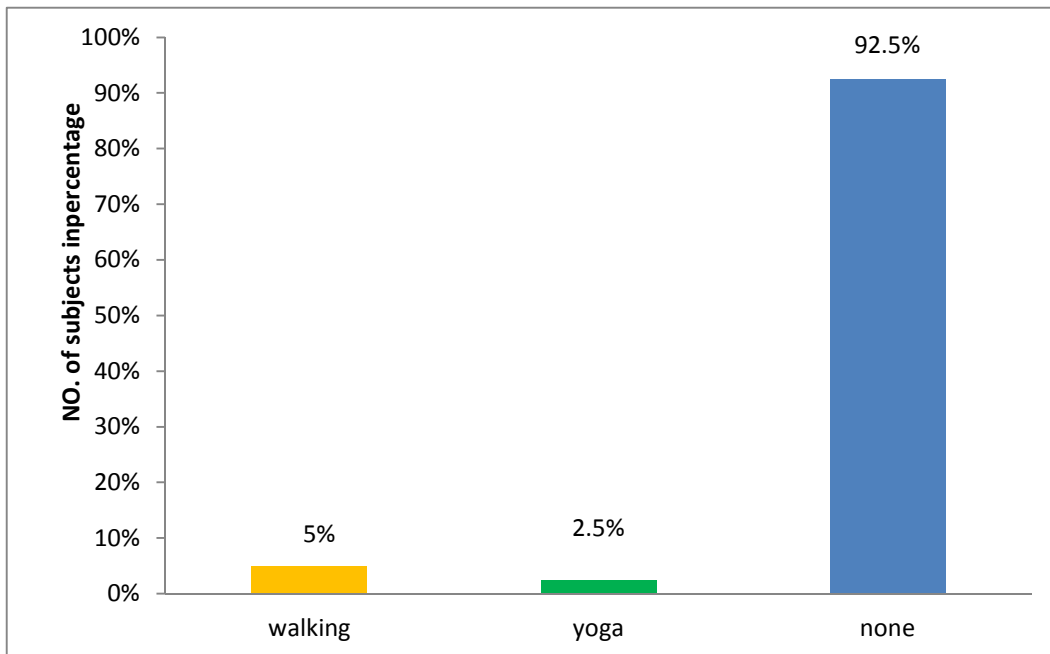


Figure 11: Distribution of subjects according to their life style practises

Fig 11: depicts that majority of the subjects were not doing any healthy life style practice

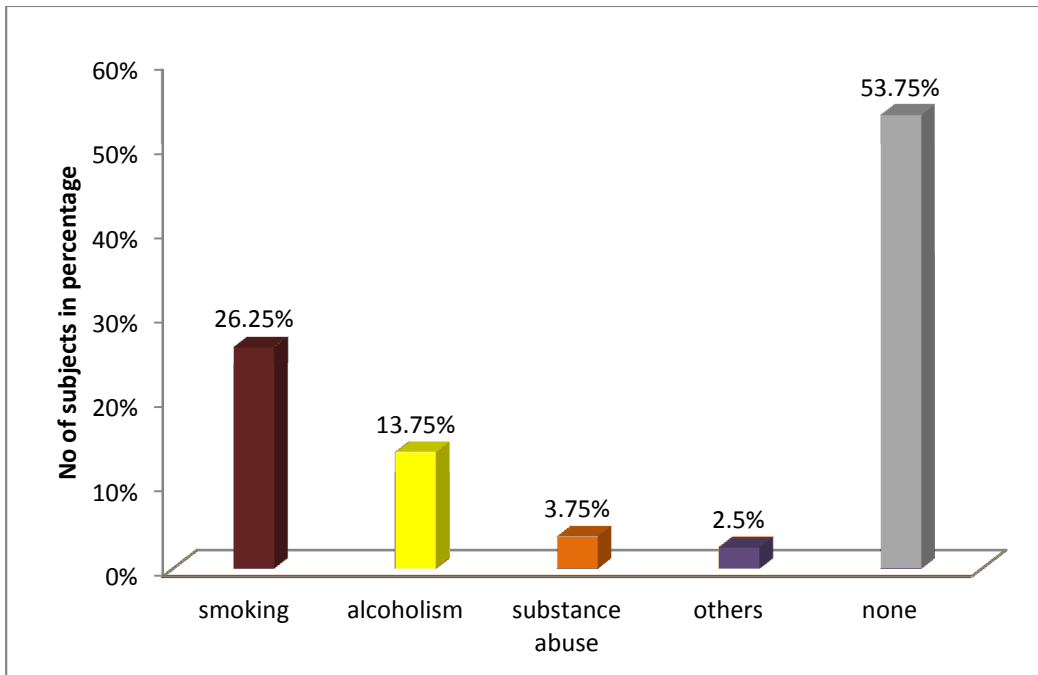


Figure 12: Distribution of subjects according to their un healthy practices

Fig 12: depicts that majority of the subjects had no bad habits

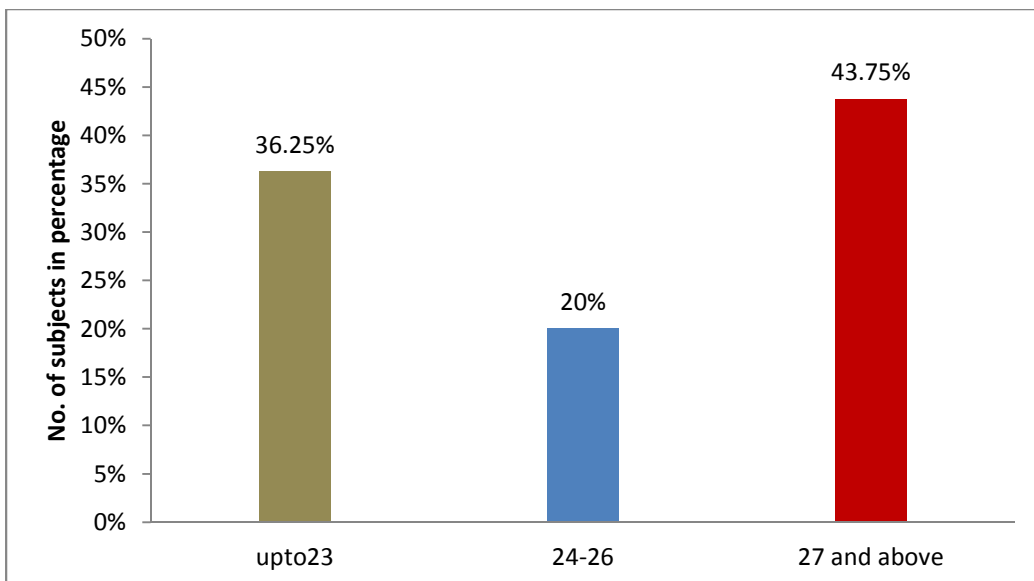


Figure 13: Distribution of subjects according to their Body Mass Index

Fig13: depicts that majority of the subjects were having BMI above 27

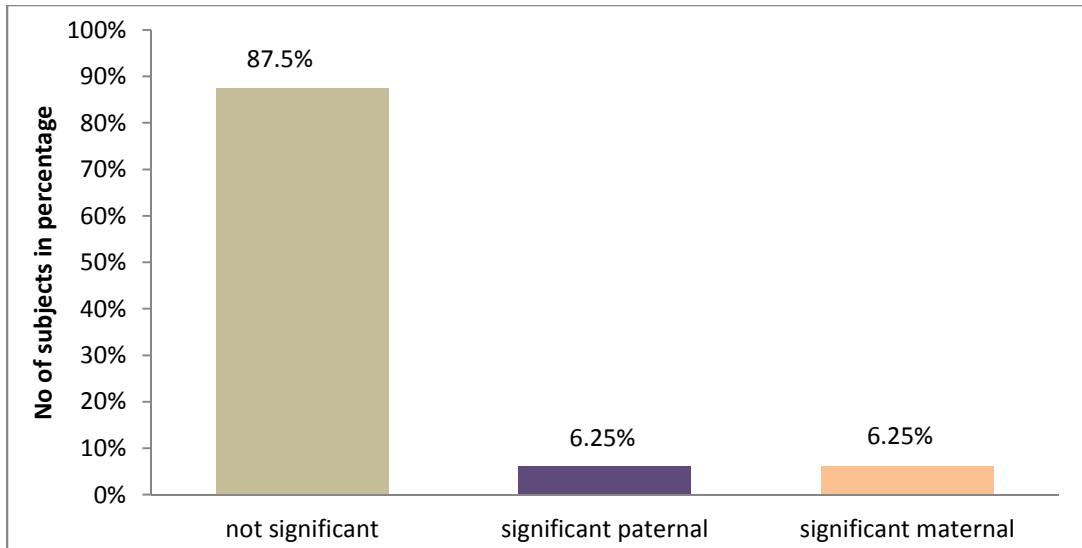


Figure 14: Distribution of subjects according to their family history of diabetes mellitus.

Fig 14: depicts majority of the subjects had no family history of diabetes mellitus.

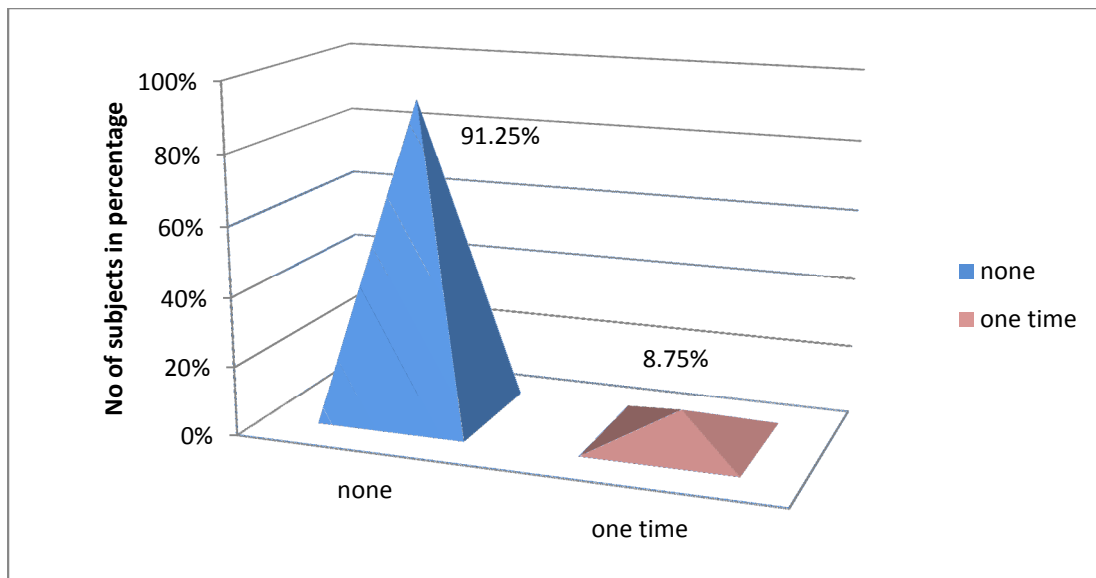


Figure 15: Distribution of subjects according to their number of hospitalization due to illness.

Fig 15: depicts that majority of the subjects was not having the history of hospitalization.

SECTION –B

TABLE-2: Distribution of subjects according to their pretest fasting and post prandial blood glucose. **n=80**

S.NO	Blood glucose level	No. of subjects	Percentage (%)
1	Pretest fasting blood glucose level.		
	a. Upto 130 mg/dl	14	17.5
	b. 131-150 mg/dl	32	40
	c. Above 151 mg/dl	34	42.5
2.	Pretest-post prandial blood glucose level.		
	a. Upto 170 mg/dl	34	42.5
	b. 171-185 mg/dl	21	26.25
	c. Above 186mg/dl	25	31.25

Pretest mean score:

Mean pretest fasting blood glucose level was 145.53

Mean pretest post prandial blood glucose level was 177.50

Table-2 shows that pretest fasting blood glucose level upto130mg/dl for 14 (17.5per cent) subjects, 131-150mg/dl for 32 (40per cent) and remaining 34(42.5per cent) are in the range of above 151 mg/dl.

The pretest post prandial blood glucose level upto170mg/dl for 34 (42.5per cent) subjects, 171-185mg/dl for 21(26.25per cent) subjects and remaining 25(31.25per cent) are in the range above 186.

In the pretest fasting blood glucose level the majority of the subjects 32 (40 per cent) was between 131-150mg/dl.

In the pretest post prandial blood glucose level the majority of the subjects 34 (42.5 per cent) was upto 170mg/dl

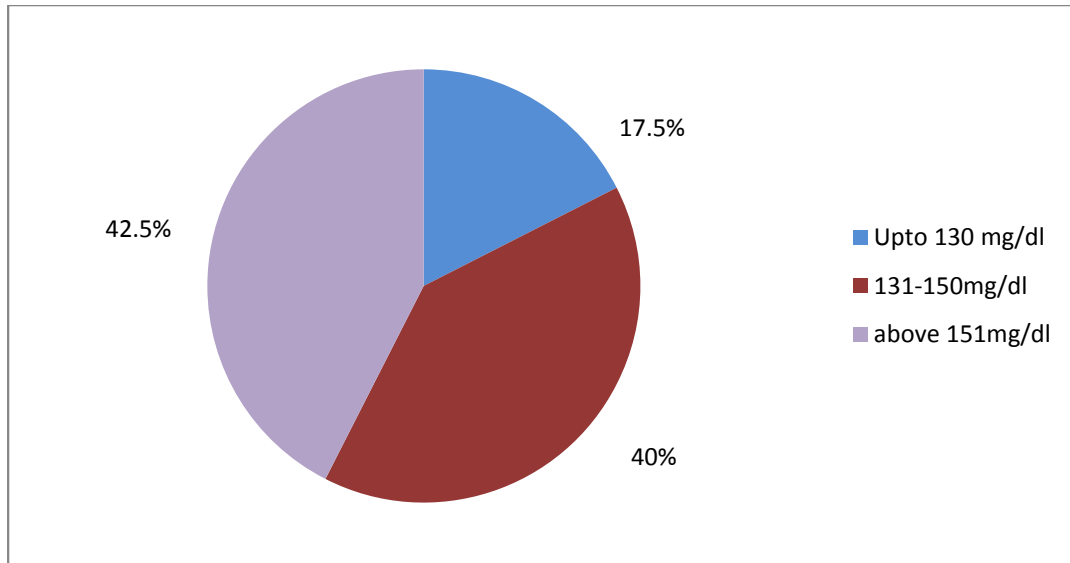


Figure16: Distribution of subjects according to their pretest fasting blood glucose level.

Fig 16: depicts that majority of the subjects has the blood glucose level above 151mg/dl.

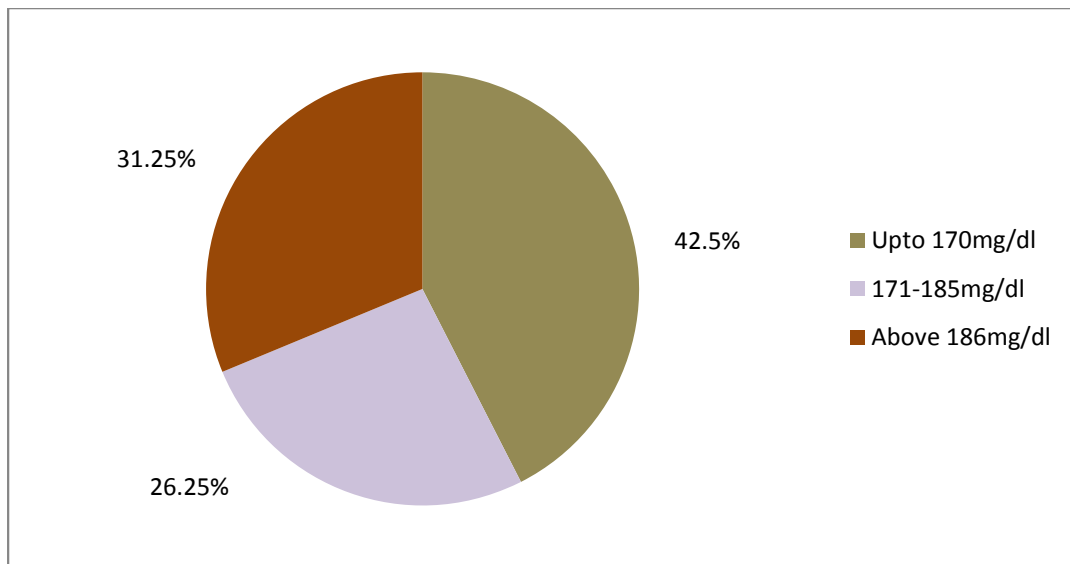


Figure 17: Distribution of subjects according to their pretest post prandial blood glucose level.

Fig 17: depicts that majority of the subjects has the blood glucose level upto 170mg/dl.

SECTION-C

TABLE-3: Distribution of subjects according to their 14th day and 28th day post test fasting and post prandial blood glucose level. n=80

S. No	14th day and 28th day post test fasting and post prandial blood glucose level	No: of subjects	Percentage
14th day post test			
1.	14 th day Post test fasting blood glucose level		
	a.Upto130 mg/dl	42	52.5
	b.131-150 mg/dl	31	38.75
	c.Above151 mg/dl	7	8.75
2	14 th day post test post prandial blood glucose level		
	a. Upto 170 mg/dl	69	86.25
	b.171-185 mg/dl	11	13.75
	c. Above186 mg/dl	–	–
28th day post test			
1.	28 th day post test fasting blood glucose level		
	a.Upto 130 mg/dl	67	83.75
	b.131-150 mg/dl	13	16.25
	c.Above 151mg/dl	–	–
2	28 th day post test post prandial blood glucose level		
	a.Upto170 mg/dl	77	96.25
	b.171-185 mg/dl	3	3.75
	c. Above 186m g/dl	–	–

14th day post test mean score:

Mean 14th day post test fasting blood glucose level was 131.13

Mean 14th day post test post prandial blood glucose level was 157.88

28th day post test mean score:

Mean 28th day post test fasting blood glucose level was119.4

Mean 28th day post test- post prandial blood glucose level was144.11

Table-3 shows that 14th day post test fasting blood glucose level upto130 mg/dl for 42 (52.5 per cent) subjects, 131-150 mg/dl for 31 (38.75per cent) and remaining 7 (8.75 per cent) are in the range of Above 151 mg/dl

The 14th day post test post prandial blood glucose level upto170 mg/dl for 69 (86.25 per cent) subjects, 171-185 mg/dl for 21 (26.25 per cent) subjects.

Table-3 shows that 28th day post test fasting blood glucose level upto130 mg/dl for 67 (83.75 per cent) subjects and 131-150 mg/dl for 13 (16.25 per cent).

The 28th day post test post prandial blood glucose level upto170 mg/dl for 77 (96.25 per cent) subjects and 171-185mg/dl for 3 (3.75 per cent) subjects.

Depicts shows there was a significant reduction in the 14th day fasting and post prandial blood glucose level after the administration of Ivy gourd leaves powder.

Depicts shows there was a more significant reduction in the 28th day fasting and post prandial blood glucose level after the administration of Ivy gourd leaves powder.

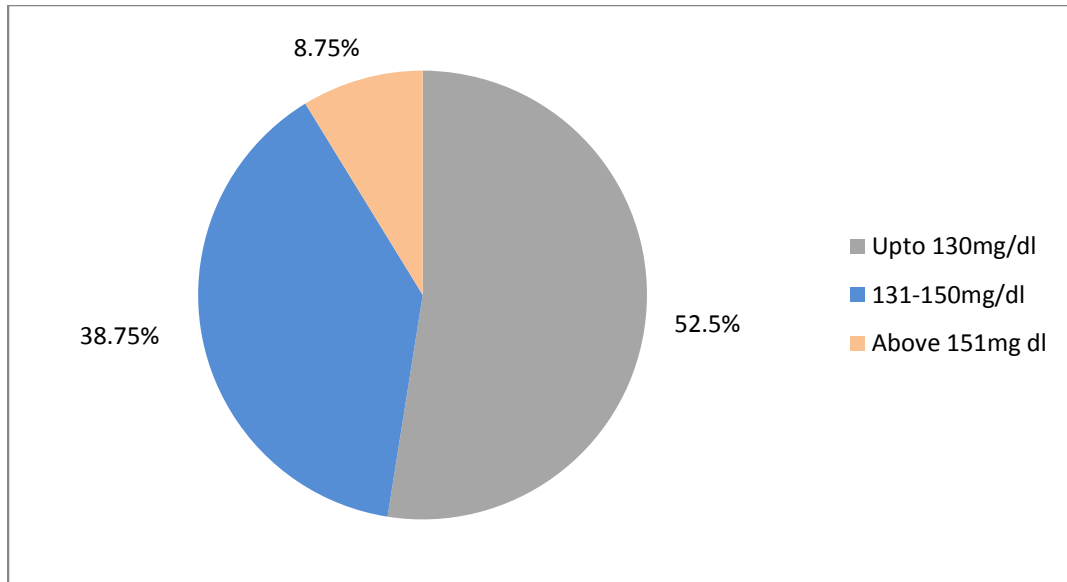


Figure 18: Distribution of subjects according to their 14th day post- test fasting glucose level.

Fig 18: depicts that majority of the subjects has the blood glucose level upto 130mg/dl.

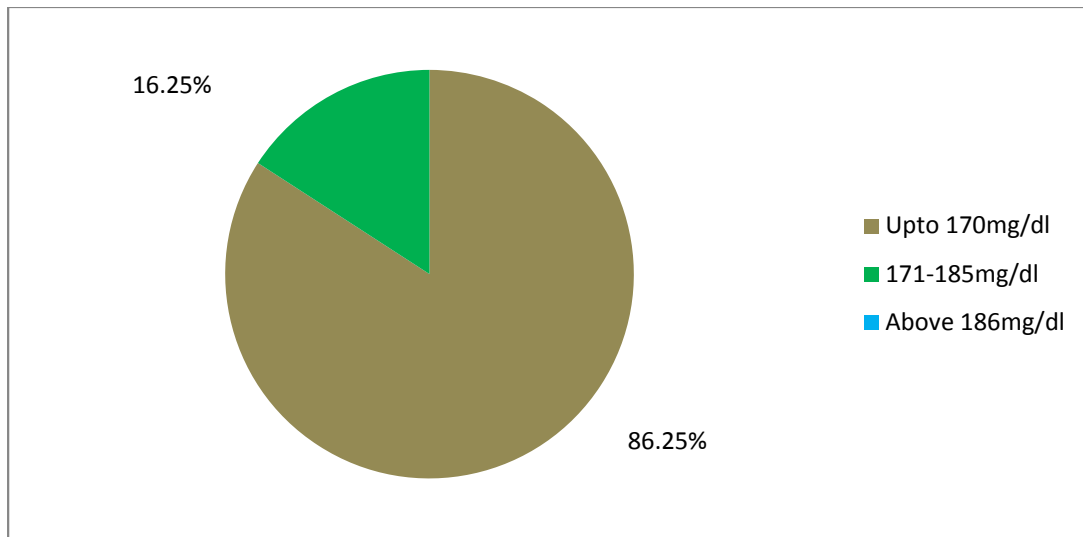


Figure 19: Distribution of subjects according to their 14th day post test post prandial blood glucose level.

Fig 19: depicts that majority of the subjects has the blood glucose level upto 170mg/dl.

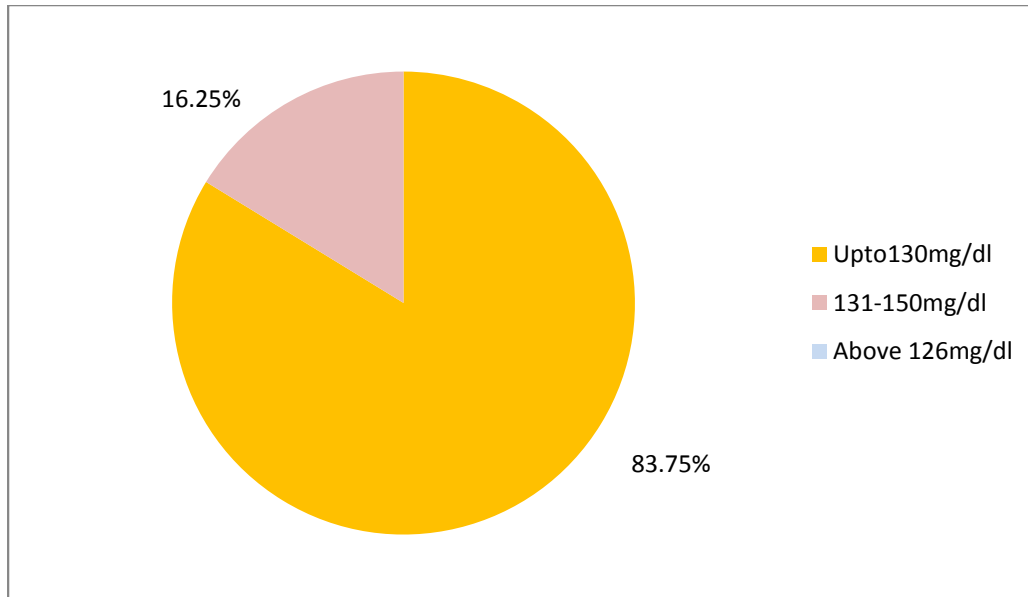


Figure 20: Distribution of subjects according to their 28th day post test fasting blood glucose level.

Fig 20: depicts that majority of the subjects has the blood glucose level upto 130mg/dl.

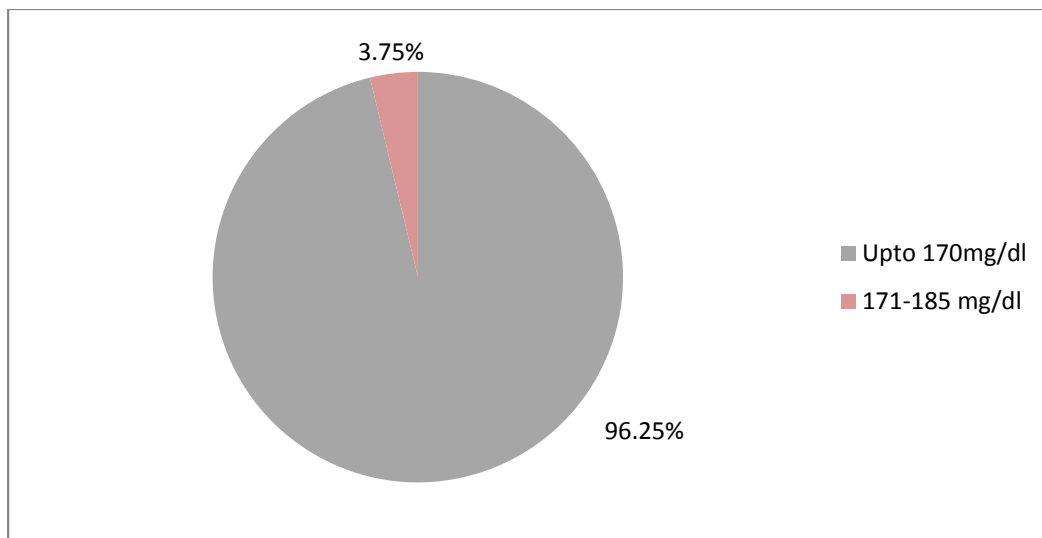


Figure 21: Distribution of subjects according to their 28th day post test post prandial blood glucose level.

Fig 21: depicts that majority of the subjects has the blood glucose level upto 170mg/dl.

SECTION-D

TABLE: 4 Comparison between mean pretest and post test blood glucose levels

S. No	Characteristics	Mean	Standard deviation	't' value	P Value
1.	Pretest Fasting 14 th day Post test Fasting	14.40	7.910	*** 16.282	0.000
2.	Pretest Fasting 28 th day post test fasting	26.075	11.216	*** 20.794	0.000
3.	Pretest post prandial 14 th day post test post prandial	19.613	8.006	*** 21.912	0.000
4.	Pretest post prandial 28 th day post prandial	33.387	12.349	*** 28.183	0.000
5.	14 th day Post test fasting 28 th day post test fasting	11.675	8.731	*** 11.961	0.000
6.	14 th day post test post prandial 28 th day post test post prandial	13.775	9.389	*** 12.522	0.000

***p<0.05 **p<0.01 ***p<0.001 S- Significant**

Table-4 describes the comparison of pretest fasting and 14th day post test fasting blood glucose level, the computed value of 't' is 16.282 is significant at <0.001.

The comparison of pretest fasting and 28th day post test fasting blood glucose level, the computed value of 't' is 20.794 is significant at <0.001.

The comparison of pretest post prandial and 14th day post test post prandial blood glucose level, the computed value of 't' is 21.912 is significant at <0.001.

The comparison of pretest post prandial and 28th day post test post prandial blood glucose level, the computed value of 't' is 28.183 is significant at <0.001

The comparison of 14th day fasting and 28th day post test fasting blood glucose level, the computed value of 't' is 11.961 is significant at <0.001.

The comparison of 14th day post prandial and 28th day post test post prandial blood glucose level, the computed value of 't' is 12.522 is significant at <0.001

The data shows that there is a significant reduction of blood glucose level after the administration of Ivy gourd leaves powder. The longer the period of administration of Ivy gourd shows more significant effectiveness in reduction of blood glucose level. Thus it reveals that the 28th day of administration of Ivy gourd is more significantly effective than the 14th day of administration of Ivy gourd leaves powder.

SECTION-E

TABLE-5: Association of 28th day post test fasting blood glucose level with selected demographic variables.

S. No	Demographic variables	Post test post prandial blood glucose level(mg/dl)			df	X ²	P Values
		Upto130	131-150	151 and above			
1	Age in years a.Upto 45 b.46-55 c.51-60	14 36 17	4 7 2	– – –	2	.929	0.628 (NS)
2	Occupation a. employed b. unemployed c. business	41 23 3	6 7 0	– – –	2	2.107	0.349 (NS)
3.	Family monthly income a. Upto 6500 b. 6501-7500 c. Above 7501	17 32 18	2 9 2	– – –	2	2.011	0.366 (NS)
4.	Dietary pattern a. Vegetarian b. Non vegetarian	3 64	1 12	– –	1	.237	0.626 (NS)
5.	Family history a.no b.yes -paternal -maternal	58 4 5	12 1 –	– – –	2	.328	0.567 (NS)
6.	Life style practice a.Walking b.Yoga c.None	4 1 62	– 1 12	– – –	2	2.450	0.294 (NS)
7.	BMI a.Upto 23 b.24-26 c.Above 27	23 14 30	6 2 5	– – –	2	.685	0.710 (NS)

P<0.05

NS:Non Significant

There is no association between 28th day post test fasting blood glucose level and selected demographic variables.

Association of 28th day post test post prandial blood glucose level with selected demographic variables

S. no	Demographic variables	Post test post prandial blood glucose level(mg/dl)			df	X ²	P value
		Upto170	171-185	186and above			
1	Age in years a.Upto 45 b.46-55 c.51-60	18 41 18	– 2 1	– – –	2	.919	0.632 (NS)
2	Occupation a.employed b. unemployed c. business	46 28 3	1 2 –	– – –	2	1.167	0.558 (NS)
3.	Family monthly income a. Upto Rs.6500 b. 6501-7500 c. Rs.7501and above	18 40 19	1 2 0	– – –	2	.402	0.818 (NS)
4.	Dietary pattern a. Vegetarian b. Non vegetarian	4 73	– 3	– –	1	.164	0.685 (NS)
5.	Family history a.no b.yes -paternal -maternal	67 5 5	3 – –	– – –	2	2.53	0.881 (NS)
6.	Life style practice a.Walking b.Yoga c.None	4 2 71	– – 3	– – –	2	.253	0.881 (NS)
7.	BMI a.Upto 23 b.24-26 c.Above 27	28 16 33	1 – 2	– – –	2	1.005	0.605 (NS)

P<0.05

NS: Non Significant

Table shows that there is no significant association between 28th day post test post prandial blood glucose level and demographic variables.

CHAPTER-V

DISCUSSION, SUMMARY, CONCLUSION, IMPLICATIONS, LIMITATION AND RECOMMENDATIONS

This chapter deals with discussion, summary, and conclusion drawn. It also clarifies the limitation of the study, the implications and recommendations given for different areas of nursing practice, nursing education, nursing administration and nursing research.

DISCUSSION

Diabetes mellitus is a group of metabolic disorders characterized by hyperglycaemia resulting from defects in insulin secretion, insulin action or both (WHO). Diabetes has emerged as a major healthcare problem in India. It states that 40 million persons were diabetic in India in 2007 and this number will rise to almost 70 million people by 2025. It is estimated that every fifth person with diabetes will be an Indian.

IDF (2007) states that the real burden of the disease is however due to its associated complications which lead to increased morbidity and mortality. Rapid urbanization and industrialization have produced advancement on the social and economic front in developing countries such as India which have resulted in dramatic lifestyle changes leading to lifestyle related diseases. This transition from a traditional to modern lifestyle, consumption of diets rich in fat and calories combined with a high level of mental stress has compounded the problem further.

The present study was designed to evaluate the effectiveness of Ivy gourd leaves powder administration in reduction of blood glucose level among type-2 diabetes mellitus patients.

The data collected for the study were analysed statistically and discussed below based on the objectives. The sample size was 80.

1. Demographic variables of subjects on blood glucose level among type-2 diabetes mellitus patients

The distribution of demographic variables of 80 subjects are as follows, majority 43(53.75per cent) are in the age group between 46 to 55 years, regarding sex majority

47(58.75per cent) were male, regarding religion 68(85per cent) believing in Hinduism, regarding educational status 53(66.25per cent) most of them were secondary and above qualified, regarding occupation 47(58.75per cent) most of them were employed, and regarding family monthly income 41(51.25per cent) of them has an income between Rs.6501 and 7500, and related to marital status 75(93.75per cent) were married, related to type of family 53(66.25per cent) were living in nuclear family, regarding dietary pattern 76(95per cent) of them were non-vegetarian, related to healthy life style practices 74(92.5per cent) had not following any healthy life style practices related to un healthy practices of client 43(53.75per cent) of them had no bad habits, regarding BMI 35(43.75per cent) of them are having BMI more than 27 related to family history 70(87.5per cent)of them had no significant family history and related to number of hospitalization due to illness 73(91.25per cent) has no history of hospitalization

2. The first objective of the study was to assess the pretest and post test blood glucose level among type-2 diabetes mellitus patients

The findings of the present study revealed that most of the 80 subjects pretest fasting blood glucose level was above 151 mg/dl for 34(42.5 per cent). The pretest post prandial blood glucose level for 34(42.5 per cent) was upto170 mg/dl.

On the 14th day post test fasting blood glucose level analysis shows that 42(52.5per cent) subjects have a blood glucose level upto 130. The post prandial blood glucose level for 69(83.75per cent) are in the range upto 170 mg/dl.

On the 28th day post test fasting blood glucose level analysis shows that 67(83.75per cent) has a blood glucose level upto 130 mg/dl. The post prandial blood glucose level for 77(96.25 per cent) subjects was upto 170mg/dl.

3. The second objective of the study was to determine the effectiveness of Ivy gourd leaves powder administration on blood glucose level

Dr. Julian Whitaker (2011) conducted a study on effectiveness of Ivy gourd in reduction of blood glucose at Rajasthan the results showed that in a double-blind, placebo-controlled clinical trial, 60 newly diagnosed type-2 diabetic subjects (not taking any medications for glucose control) received either 1,000 mg of Ivy gourd extract, or a placebo. Those taking Ivy

gourd extract experienced better blood sugar control, with a 15.6 per cent decrease in fasting blood glucose level.

Mean score of pretest fasting blood glucose level was 145.5 and mean score of pretest post prandial blood glucose level was 177.5. Mean score of 14th day post test fasting blood glucose level was 131.13 and mean 14th day post test post prandial blood glucose level was 157.88. Mean score of 28th day post test post prandial blood glucose level was 119.4 and post prandial blood glucose level was 144.11.

The comparison of pretest fasting and 14th day post test fasting blood glucose level, the computed value of 't' is 16.282 is significant at <0.001.

The comparison of pretest fasting and 28th day post test fasting blood glucose level, the computed value of 't' is 20.794 is significant at <0.001.

The comparison of pretest post prandial and 14th day post test post prandial blood glucose level, the computed value of 't' is 21.912 is significant at <0.001.

The comparison of pretest post prandial and 28th day post test post prandial blood glucose level, the computed value of 't' is 28.183 is significant at <0.001.

The comparison of 14th day fasting and 28th day fasting blood glucose level, the computed value of 't' is 11.961 is significant at <0.001.

The comparison of 14th day post prandial and 28th day post prandial blood glucose level, the computed value of 't' is 12.522 is significant at <0.001

The data shows that there is a significant reduction of blood glucose level after the administration of Ivy gourd leaves powder. The longer the period of administration of Ivy gourd shows more significant effectiveness in reduction of blood glucose level. Thus it reveals that the 28th day of administration of Ivy gourd is more significantly effective than the 14th day of administration of Ivy gourd leaves powder.

4. The third objective of the study was to associate the demographic variables with post test blood glucose level .

Cruickshank (2007) stated that the global prevalence of diabetes for all age group is estimated to be 2.8%. Type-2 diabetes accounts for at least 90% of all diabetes worldwide. Diabetes incidence, prevalence and progression varies by ethnic group. This review highlights unique aspects of risk of developing diabetes its overwhelming vascular complications and their management mainly using data among south-Asians and African-Caribbean' in the United Kingdom data. It also concluded that although the origin of the ethnic difference in incidence needs further clarification, many factors should be amenable to prevention and treatment in all ethnic groups worldwide.

The chi-square was used to associate the level of post test blood glucose level with selected demographic variables like age, occupation, family monthly income, dietary pattern, family history of diabetes mellitus, life style practice, and BMI.

There was no association between 28th day post test fasting and post prandial blood glucose level with these selected demographic variables.

SUMMARY

The study was conducted to assess the effectiveness of Ivy gourd (*coccinia indicia*) leaves powder administration on reduction of blood glucose level among type-2 diabetes mellitus patients at selected areas of coimbatore.

The objectives of the study were

- To assess the pretest and post test blood glucose level among type-2 diabetes mellitus patients.
- To determine the effectiveness of Ivy gourd leaves powder administration in reduction of blood glucose level.
- To associate the selected demographic variables with post test blood glucose level.

The study tested the following hypothesis

There is a significant reduction in the blood glucose level of the type-2 diabetes mellitus after the administration of Ivy gourd leaves powder.

The conceptual frame work was based on Mr.Ludwig Von Bertalanffy 'General system theory (1968). The research design used for the study was quasi experimental, one group pretest post test only design. The sample size consisting of newly diagnosed 80 patients with type-2 diabetes mellitus. The tool used for data collection consists of demographic variables, test for clinical variables. The data collected for a period of 6 weeks. Ivy gourd leaves powder 1gm administered orally between 7am and 9am to the patients. Descriptive and inferential statistics were used in statistical analysis. Paired 't' test used to determine the effectiveness of Ivy gourd leaves powder administration in blood glucose level. Chi-square was used to associate the post test with selected demographic variables. The study tested and accepted the hypothesis that there is a significant reduction in the blood glucose level.

MAJOR FINDINGS OF THE STUDY

- In this study among 80 subjects, majority 43(53.75per cent) are in the age group between 46 to 55 years, regarding sex majority 47(58.75per cent) belongs to male, regarding religion 68(85per cent) believing in Hinduism, regarding educational status 53(66.25per cent) most of them are secondary and above qualified, regarding occupation 47(58.75per cent) most of them were employed, and regarding family monthly income 41(51.25per cent) of them has an income between Rs.6501 and 7500, and related to marital status 75(93.75per cent) were married, related to type of family 53(66.25per cent) are living in nuclear family, regarding dietary pattern 76(95per cent) of them were non-vegetarian, related to healthy life style practices 74(92.5per cent) had not following any healthy life style practices, related to un healthy practices of client 43(53.75per cent) of them had no bad habits, regarding BMI 35(43.75per cent) of them are having BMI more than 27 related to family history 70(87.5per cent) of them had no significant family history and related to number of hospitalization due to illness 73(91.25per cent) has no history of hospitalization
- In this study pretest fasting blood glucose level upto130mg/dl for 14(17.5per cent) subjects, 131-150mg/dl for 32(40per cent) and remaining 34(42.5per cent) are in the range of above 151 mg/dl. The pretest post prandial blood glucose level upto170mg/dl for 34(42.5 per cent) subjects, 171-185mg/dl for 21(26.25per cent) subjects and remaining 25(31.25per cent) are in the range above 186.

- In this study the 14th day post test fasting blood glucose level upto 130mg/dl for 42(52.5 per cent) subjects, 131-150mg/dl for 31(38.75 per cent) and remaining 7(8.75 per cent) are in the range of above 151mg/dl. The 14th day post test post prandial blood glucose level upto 170 mg/dl for 69(86.25 per cent) subjects, 171-185mg/dl for 21(26.25 per cent) subjects.
- The 28th day post test fasting blood glucose level upto 130mg/dl for 67(83.75 per cent) subjects and 131-150mg/dl for 13(16.25 per cent) and the 28th day post test post prandial blood glucose level upto 170 mg/dl for 77(96.25 per cent) subjects and 171-185mg/dl for 3 (3.75 per cent) subjects.
- In this study there was a significant difference between the pretest and post test blood glucose levels. Mean score of pretest fasting blood glucose level is 145.5 and mean score of pretest post prandial blood glucose level was 177.5. Mean score of 14th day post test fasting blood glucose level was 131.13 and mean 14th day post test post prandial blood glucose level was 157.88. Mean score of 28th day post test post prandial blood glucose level was 119.4 and post prandial blood glucose level was 144.11, and compared with paired 't' test it shows that it was statistically significant. There was a significant decrease in the mean of the blood glucose level after the administration of Ivy gourd leaves powder.
- The comparison of pretest fasting and 14th day post test fasting blood glucose level, the computed value of 't' is 16.282 is significant at <0.001.
- The comparison of pretest fasting and 28th day post test fasting blood glucose level, the computed value of 't' is 20.794 is significant at <0.001.
- The comparison of pretest post prandial and 14th day post test post prandial blood glucose level, the computed value of 't' is 21.912 is significant at <0.001.
- The comparison of pretest post prandial and 28th day post test post prandial blood glucose level, the computed value of 't' is 28.183 is significant at <0.001
- The comparison of 14th day fasting and 28th day post test fasting blood glucose level, the computed value of 't' is 11.961 is significant at <0.001.
- The comparison of 14th day post prandial and 28th day post test post prandial blood glucose level, the computed value of 't' is 13.775 is significant at <0.001.

- There is no association between 28th day post test fasting and post prandial blood glucose level with selected demographic variables.

CONCLUSION

Consuming Ivy gourd leaves powder is an effective, feasible, low cost method to decrease the blood glucose level. It can be used as a home remedy for the treatment of type-2 diabetes mellitus. The findings of the study were consistent with the literature and have support from the studies conducted in India and in the world. Based on the method of sample selection and support from many studies conducted throughout the world, the findings may be generalized to individuals with type-2 diabetes mellitus.

The study findings provides the statistical evidence which clearly indicates that Ivy gourd leaves is one of the best herbal remedy to lower blood glucose level in type-2 diabetes mellitus patients.

IMPLICATIONS

Nursing is a dynamic process, which involves quality based practice, scientific body of knowledge and dissemination of research knowledge into practice. Nurses can incorporate the Ivy gourd leaves as one of the excellent herbal remedy for effective management of type-2 diabetes mellitus in adults. The present study findings have several implications in Nursing practice, Nursing Education, Nursing Research and Nursing Administration.

Nursing practice

- The nurses working in the community setting should practice the use of low cost effective, acceptant therapy as an integral part of their profession. The present study showed that most of the patients with type-2 diabetes had high blood glucose level.
- Nurses should take initiative in introducing the practice of low cost preparation of Ivy gourd leaves powder in the community setting. The proper dissemination of low cost, effective, acceptant therapy is essential.
- The nurses should place the health in hands of people especially the adults.

Nursing education

- The nursing education can provide education to the nursing personnel to update their knowledge on the alternative methods of treatment like Ivy gourd leaves powder and its valuable benefits to the patients.
- The nurse educator can create awareness about the therapeutic benefit of Ivy gourd leaves powder.
- The nurse educator may include Ivy gourd leaves powder as a means of herbal therapy in the curriculum, its effect in health and wellness which can be adopted by the students and the nursing personnel too.

Nursing administration

- Leaders in nursing practice should take active part in recommending the low cost herbal remedies and illuminate the effectiveness of it to the policy makers to introduce in the community at large scale.
- The nurse administrators have to undertake the health needs of the most vulnerable by effective organization and management.

Nursing research

- Study will serve as a valuable reference and pathway for further researchers.
- The findings of the study would help to expand the scientific body of professional knowledge from which further researcher can be conducted.
- Administration of Ivy gourd leaves powder may be studied more significantly and used as specific nursing intervention.

Limitations

- The intervention was given only for 28 days.
- In present study control group was not included.
- Persons who had diabetes for more than 6 months were excluded.
- Higher blood glucose levels were not included.

Recommendations

- A similar study can be replicated with control group and experimental group
- A similar study can be conducted with different dose and different way of supplement to reduce the blood glucose level
- A study can be conducted with large number of samples.

- Long term effect of Ivy gourd leaves powder can be done by administering for a long period and compare with Hba1c levels
- A comparative study can be done with peoples of different blood glucose level.

ABSTRACT

The present study is to identify an effectiveness of Ivy gourd (*Coccinia indica*) leaves powder administration on blood glucose level among type-2 diabetes mellitus patients at selected areas of Coimbatore. During the year 2013-2014 in partial fulfillment of the requirement of degree of **Master of Science in Nursing at KMCH College of Nursing**, Coimbatore which is affiliated to **THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY, Chennai**.

Objectives of the study was to assess the pretest and post test blood glucose level among type-2 diabetes mellitus patients, to determine the effectiveness of Ivy gourd leaves powder administration in reduction of blood glucose level, to associate the selected demographic variables with post test blood glucose level. Design was quasi experimental, one group pretest post test only design. Setting of the study: The study was conducted in 4 villages at Sarkarsamakulam PHC in Coimbatore. The sample size consist of 80 patients with type-2 diabetes mellitus. Conceptual frame work was based on Mr.Ludwig Von Bertalanffy (1968) 'General system theory'. Intervention of the study was oral administration of Ivy gourd leaves powder given to the samples. Outcome measures were fasting and postprandial blood glucose levels measured by glucometer. Result of the study was subjects who received Ivy gourd leaves powder reported significant reduction in pretest fasting and 14th day post test fasting ($t=16.282, p<0.001$), pretest fasting and 28th day post test fasting ($t=20.794, p<0.001$), pretest post prandial and 14th day post prandial ($t=21.912, p<0.001$), pretest post prandial and 28th day post prandial ($t= 28.183, p<0.001$), 14th day post test fasting and 28th day post test fasting ($t=11.961, p<0.001$), 14th day post prandial and 28th day post prandial ($t=12.522, p<0.001$). There is no significant association between 28th day post test blood glucose level with selected demographic variables. The result supported the Ivy gourd leaves powder administration is a very suitable and practicable remedy of non-pharmacological measure of reduction in high blood glucose level in type-2 diabetes mellitus patients.

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APPENDIX-A

SECTION-I

DEMOGRAPHIC VARIABLES

SAMPLE NUMBER: _____

1. Age in years

- a. Upto 45 years
- b. 46-55 years
- c. Above 56 years

2. Sex

- a. Male
- b. Female

3. Religion

- a. Hindu
- b. Muslim
- c. Christian

4. Educational status

- a. Illiterate
- b. Primary education
- c. Secondary and above

5. Occupation

- a. Employed
- b. Un employed
- c. Business

6. Family monthly income

- a. Upto Rs.6500
- b. Rs.6501-7500
- c. Rs 7501 and above

7. Marital status

- a. Unmarried
- b. Married
- c. Divorced
- d. Widow / widower

8. Type of family

- a. Joint family
- b. Nuclear family

9. Dietary pattern

- a. Vegetarian
- b. Non vegetarian

10. Healthy life style practice

- a. Walking
- b. Yoga
- c. Meditation
- d. None

11. Un healthy practice of client

- a. Smoking
- b. Alcoholism
- c. Drug abuse
- d. Others
- e. None

Clinical profile

12. BMI:

- a. Upto 23
- b. 24 to 26
- c. 27 and above

13. Family history of diabetes mellitus

- a. No
- b. Yes
 - Paternal
 - Maternal

14. Number of hospitalization due to illness

- a. None
- b. One time
- c. 2 time
- d. More than 2 times

SECTION-II

RECORD OF BLOOD GLUCOSE LEVEL

AREA:

SAMPLE NUMBER	DATE	TEST	DAY	VALUES	
				FASTING BLOOD GLUCOSE LEVEL	POSTPRANDIAL BLOOD GLUCOSE LEVEL
1.		PRETEST	1 DAY		
		POST TEST	14 DAY		
		POST TEST	28 DAY		
2.		PRETEST	1 DAY		
		POST TEST	14 DAY		
		POST TEST	28 DAY		
3.		PRETEST	1 DAY		
		POST TEST	14 DAY		
		POST TEST	28 DAY		
4.		PRETEST	1 DAY		
		POST TEST	14 DAY		
		POST TEST	28 DAY		
5.		PRETEST	1 DAY		
		POST TEST	14 DAY		
		POST TEST	28 DAY		

APPENDIX-B

DETAILS OF INTERVENTION

Preparation of Ivy gourd leaves Powder

- The Ivy gourd powder was prepared hygienically.
- The researcher collected the fresh Ivy gourd leaves .
- The Ivy gourd leaves are cleaned and foreign materials are removed from Ivy gourd leaves by manually
- The leaves were dried nicely under sunlight shade.
- The dried leaves were finally powdered.
- The powdered form were packed separately.



APPENDIX – D
LIST OF EXPERTS

- 1. Dr.GEETHA. MBBS.,**

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- 2. Dr.G.Muthu Krishnasamy. BSMS**

Primary Health Centre,
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- 3. Prof. Mrs. SIVAGAMI RAMANATHAN. M.Sc.(N)**

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- 4. Mrs. AMUDHA KATHIRESAN M.Sc.(N)**

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