“A Study on Awareness of NAFLD both in Diabetic and General People in Dhaka”

A thesis report submitted to the Department of Pharmacy, East West University, Bangladesh, in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy.

Submitted By

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DECLARATION BY THE CANDIDATE

I, **Kashfia Alam**, hereby declare that the dissertation entitled "A Study on Awareness of NAFLD both in Diabetic and General people in Dhaka", submitted by me to the Department of Pharmacy, East West University, in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy (Honors) is a confide record of original research work carried out by me under the supervision and guidance of **Dr. Mst. Rejina Afrin** Assistant Professor, Department of Pharmacy, East West University.

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CERTIFICATE BY THE SUPERVISOR

This is to certify that the dissertation entitled "A Study on Awareness of NAFLD both in Diabetic and General People in Dhaka", submitted to the Department of Pharmacy, East West University, Dhaka, in partial fulfillment of the requirements for the Degree of Bachelor of Pharmacy, was carried out by Kashfia Alam**, ID No.2014-1-70-079** under my supervision and no part of this dissertation has been or is being submitted elsewhere for the award of any Degree/Diploma.

Dr. Mst. Rejina Afrin

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ENDORSEMENT BY THE CHAIRPERSON

This is to certify that the dissertation entitled "Study on Awareness of NAFLD both in Diabetic and General People in Dhaka" is a genuine research work carried out by **Kashfia Alam**, under the supervision of **Dr. Mst. Rejina Afrin** (Assistant Professor, Department of Pharmacy, East West University, and Dhaka). I further certify that no part of the thesis has been submitted for any other degree and all the resources of the information in this connection are duly acknowledged.

_____

Prof. Dr. Chowdhury Faiz Hossain

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Dedication

This Thesis Paper is Dedicated to

My Beloved Parents,

Who are

My Biggest Inspiration…

List of Tables

List of Figures

ABSTRACT

Non-alcoholic fatty liver disease (NAFLD) is the buildup of extra fat in liver cells that is not caused by alcohol. There is little work done in Bangladesh on NAFLD as well as knowledge and attitude towards awareness of NAFLD in Bangladesh. The purpose of our study was to identify the current statistics of knowledge and attitude towards NAFLD. The study was a survey based study. The survey was performed on 151 people in BIRDEM (Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders) at Shahbag, Dhaka, NHN Hospital, East West University, and Gazipur. The people were selected randomly. In this study 44.4% were male and 55.6% were female participants. We considered factors affecting awareness of NAFLD and knowledge were, level of education, profession, food habit, BMI, high cholesterol level and lifestyle. Both Diabetic patients and general people were selected as study population. Our performed study showed that 50.33% people were related to diabetes mellitus and 49.67% were non- diabetic. Our study also showed that only 3.97% people have NAFLD and 0.66% among them haven't heard about NAFLD at all and 15.23% people hardly heard about this. So Knowledge about NAFLD is very poor and maximum of the study population were not even heard of name of NAFLD. As food habit plays an important role in maintaining healthy life so in our survey more concentration was given on this matter but we found that majority of the people was following a poor diet pattern and people skip their breakfast about 84% where 16% people do not. People several times prefer to eat out about 45.7%, and 35.8% occasionally. Vast of the people eat fast food about 28.5% and occasionally 32.5% where percentage of people prefer to eat fried items about 38.4% and occasionally 43.0%. In our survey among total population only 64.2% people prefer to take exercise and remaining 35.8% are not aware about this. Moreover 78% people prefer walking, only 1% people prefer swimming, 6% people prefer heavy exercise and 15% people prefer light exercise Among the total participants the BMI range was, Normal in only 15%, overweight 27%, pre-obese people 39% and obese people 17%. As diabetes is associated with NAFLD so there is a connection between them and in our survey we found that all of the NAFLD patient are suffering from diabetes. Our data stated that 30.2% people have high cholesterol and 47.4% people have high blood pressure. Adapting modification in lifestyle and daily routine will minimize this increasing problem to some extent. People awareness is the primary concern on this matter, so people should have focused more in their lifestyle and daily food habit. Otherwise it can lead to HCC (Hepatocellular Carcinoma) which is one of the third leading cause of cancer related death which is incurable.

CHAPTER -1

INTRODUCTION

1.1 NAFLD (Non-Alcoholic Fatty Liver Disease)

Nonalcoholic fatty liver disease (NAFLD) is an umbrella term for a range of liver conditions affecting people who drink little or no alcohol. NAFLD is the buildup of extra fat in liver cells that is not caused by alcohol. It is normal for the liver to contain some fat. However, if more than 5%
- 10% percent of the liver's weight is fat, then it is called a fatty liver (steatosis). As the name implies, the main characteristic of NAFLD is too much fat stored in liver cells. NAFLD includes a spectrum of liver disease that ranges from simple fat accumulation in the liver to necroinflammation (which is called NASH, nonalcoholic steatohepatitis), fibrosis, cirrhosis, and hepatocellular carcinoma (HCC), which in essence represent the stages of the natural history of NAFLD. NAFLD is dramatically increasing around the world, especially in Western nations. In the United States, it is the most common form of chronic liver disease, affecting an estimated 80 to 100 million people (Angulo 2002).

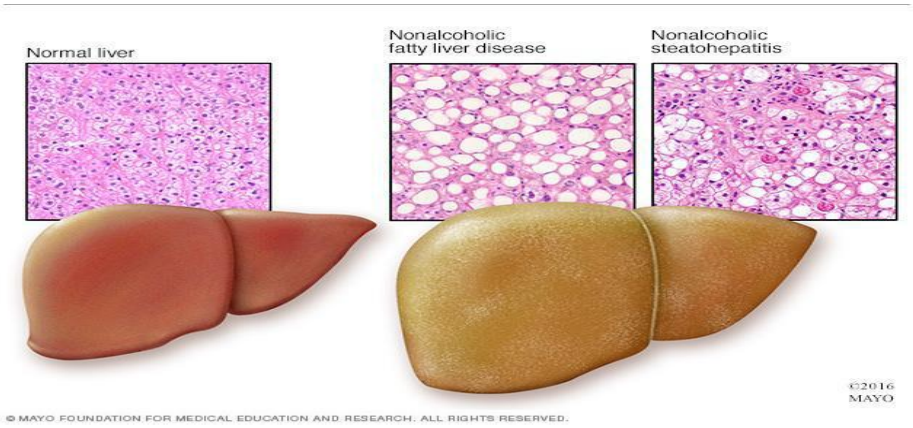

Figure: Nonalcoholic fatty liver disease (NAFLD)

1.2 History of Nonalcoholic Fatty Liver Disease

Liver-related mortality is the third cause of death in patients with NAFLD, but the long-term prognosis basically depends on the presence and severity of liver damage. Thus, life expectancy in patients with simple steatosis is not different from the general population, but liver-related mortality is significantly higher in patients with NAFLD, particularly in those with advanced fibrosis (Satapathy and Sanyal 2015). NAFLD is the second leading etiology of liver disease among adults awaiting liver transplantation in the United States (Musso, Gambino, and Cassader 2009). Early-stage of NAFLD doesn't usually cause any harm, but it can lead to

serious liver damage, including cirrhosis, if it gets worse. Non-alcoholic steatohepatitis, a potentially serious form of the disease, is marked by liver inflammation, which may progress to scarring and irreversible damage. This damage is similar to the damage caused by heavy alcohol use. At its most severe, Non-alcoholic steatohepatitis can progress to cirrhosis and liver failure (Marengo, Jouness, and Bugianesi 2016).

1.2.1 Epidemiology and Prevalence of NAFLD

NAFLD is a major cause of liver disease worldwide. The global prevalence, incidence, progression, and outcomes of NAFLD and nonalcoholic steatohepatitis (NASH), involving epidemiology and progression of NAFLD .The prevalence of NAFLD has increased worldwide in recent years, pathophysiology and risk factors associated with progression of NAFLD are at the focus of many studies. NAFLD is related to cardiovascular disease (CVD), type 2 diabetes mellitus (T2DM), obesity, and metabolic syndrome (Farrell and Larter 2006). Prevalence of NAFLD has been increasing in parallel with the prevalence of obesity, diabetes, and metabolic syndrome. The prevalence of NAFLD in the United States (U.S.) has risen from 18% in 1988–1991 to 31% in 2011–2012 of general population. Estimates of NAFLD prevalence for adults in Western countries is 20–30%, with much higher prevalence in adults with obesity (80–90%), diabetes (30–50%), and hyperlipidemia (90%) (Baffy, Brunt, and Caldwell 2012).

1.2.2 Symptoms

Nonalcoholic fatty liver disease usually causes signs and symptoms. When it does, they may include:

- Enlarged liver
- Fatigue
- Pain in the upper right abdomen
- Abdominal swelling (ascites)
- Enlarged blood vessels just beneath the skin's surface
- Enlarged breasts in men

- Enlarged spleen
- Red palms
- Yellowing of the skin and eyes (jaundice). (Rinella 2015)

1.2.3 Stages of NAFLD

NAFLD may progress into several severe stages. Most people will only ever develop the first stage, usually without realizing it. In a small number of cases, it can progress and eventually lead to liver damage if not detected and managed (Rinella 2015).

The main stages of NAFLD are:

1. **Simple Fatty Liver (Steatosis)**: **A** largely harmless build-up of fat in the liver cells that may only be diagnosed during tests carried out for another reason.
2. **Non-Alcoholic Steatohepatitis (NASH):** A more serious form of NAFLD, where the liver has become inflamed; ('Steato' means fat, and 'hepatitis' means inflammation of the liver) this is estimated to affect up to 5% of the UK population. NASH is also called silent killing disease, with NASH most of the people cannot understand that they are suffering from NASH.
3. **Fibrosis**: Where persistent inflammation causes scar tissue around the liver and nearby blood vessels, but the liver is still able to function normally.
4. **Cirrhosis:** The most severe stage occurs after years of inflammation. Here the liver shrinks and becomes scarred and lumpy. This damage is permanent and can lead to liver failure (where liver stops working properly) and lead to liver cancer.
5. **Hepatocellular Carcinoma (HCC):** This is one of the third leading causes of cancer related death around the world. This is the progressed form of NAFLD. Known as severe form of NAFLD.

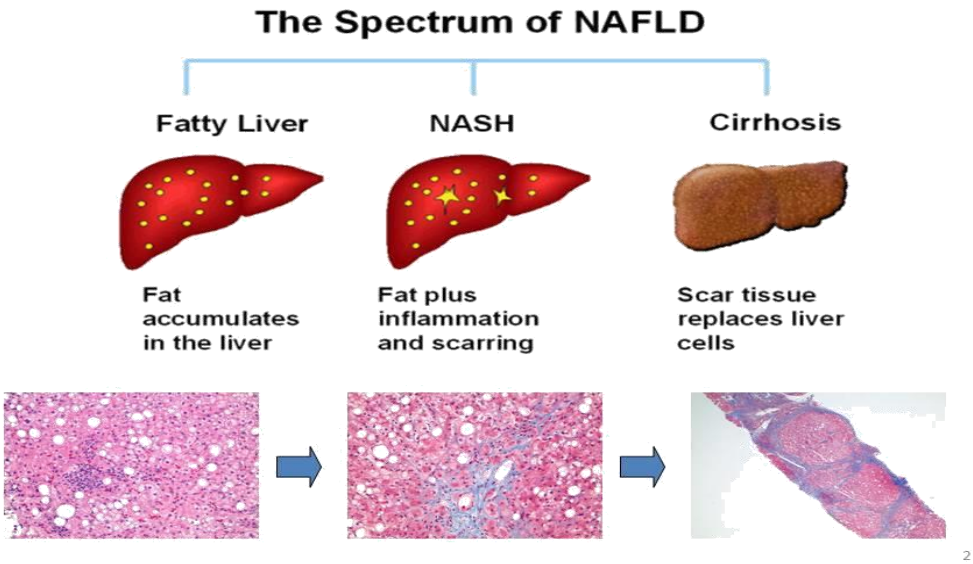

Figure: The spectrum of NAFLD

It can take years to develop fibrosis or cirrhosis from NAFLD. It's important to be award about lifestyle to prevent the disease getting worse (Rinella 2015).

1.3 Risk Factor of NAFLD

There is a wide range of diseases and conditions that can increase the risk of nonalcoholic fatty liver disease, including:

- High cholesterol
- Metabolic syndrome
- Dyslipidemia
- Obesity, particularly when fat is concentrated in the abdomen
- Diabetes
- Life style (Bayard, Holt, and Boroughs 2006)

1.3.1 High Cholesterol

Recent studies investigated NAFLD resulting from hypercholesterolemia. Because cholesterol can accumulate in both arteries and the liver, NAFLD caused by cholesterol overload may be accompanied by atherosclerosis in the arteries. However, it is unclear whether cholesterol accumulation in the liver results in simple first-hit steatosis or whether second-hit inflammation facilitates the progression to steatohepatitis through inflammatory cell infiltration and fibrosis. Therefore, it is unknown if cholesterol accumulation primes the liver for further injury as is observed in cases of triglyceride-induced fatty liver (Kim et al. 2014).

1.3.2 Metabolic Syndrome

Metabolic syndrome (MS) is one of the most prevalent disease states in the so-called developed countries and is closely associated with the incidence of cardiovascular as well as other diseases. Metabolic syndrome is also closely associated with the liver steatosis, mostly benign and reversible liver disease. Nevertheless, uncomplicated steatosis may, under certain conditions, progress to inflammation and the disease may, through the stage of NASH and which may lead to fibrosis, result in liver cirrhosis and HCC (Patton et al. 2010).

1.3.3 Dyslipidemia

High serum triglyceride (TG) levels and low serum high-density lipoprotein (HDL) levels are also common in patients with NAFLD. The prevalence of NAFLD in individuals with dyslipidemia attending lipid clinics has been estimated to be 50% (Loria et al. 2010) . According to a study which was held in Taiwan conducted a large, cross-sectional study among 44,767 patients who attended a single clinic, the enrollees were stratified into four subgroups based on their total cholesterol to HDL-cholesterol and TG to HDL-cholesterol ratios. The overall prevalence rate of NAFLD was 53.76%; however, the NAFLD prevalence rate for those with the lowest total cholesterol to HDL-cholesterol and TG to HDL-cholesterol ratios was 33.41%, whereas the prevalence rate in the group with the highest ratios was 78.04% (Loria et al. 2010).

1.3.4 Obesity

Traditionally, obesity and its related disease have been considered a problem in Western countries. However, in the past two decades, urbanization in many Asian countries has led to a sedentary

lifestyle and over nutrition, setting the stage for the epidemic of obesity. This include the effects of epidemiological trend of obesity in Asia, with special emphasis on the emerging condition of NAFLD (Loria et al. 2010).

1.3.4.1 Obesity and DM (Diabetes Mellitus)

The liver plays a central role in the regulation of carbohydrate metabolism. Its normal functioning is essential for the treatment of type 2 diabetes and of a continued supply to organs that require a glucose energy source. This central role for the liver in glucose homeostasis offers a clue to the pathogenesis of glucose intolerance in liver disease. Hepatic fat accumulation is a well-recognized complication of DM with reported frequency of 40%-70% (Fan, Kim, and Wong 2017).

1.3.5 Diabetes

Diabetes mellitus refers to a group of diseases that affect how our body uses blood sugar (glucose). Glucose is vital to our health because it's an important source of energy for the cells that make up our muscles and tissues. It's also our brain's main source of fuel (American Diabetes Association 2009).

There are 2 types of Diabetes

- Type 1
- Type 2

1.3.5.1 Type 1 diabetes

Type 1 or insulin-dependent diabetes. It's sometimes called "juvenile" diabetes, because type 1 diabetes usually develops in children and teenagers, though it can develop at any age. With type 1 diabetes, your body does not make insulin (American Diabetes Association 2009).

1.3.5.2 Type 1 diabetes is linked to NAFLD

Hepatic fat accumulation in type 1 DM may be due to lipoprotein abnormalities, hyperglycemia induced activation of ChREBP (Carbohydrate-responsive element-binding protein) and SREBP 1c (sterol regulatory element-binding protein 1), with subsequent intrahepatic fat synthesis or combination of these mechanisms. In an animal model of type 1 DM there is a high incidence of

perisinusoidal hepatic fibrosis, while in human perisinusoidal fibrosis often parallels with diabetic microangiopathy (Feng et al. 2014).

1.3.5.3 Type 2 Diabetes

Type 2 diabetes (diabetes mellitus) is a metabolic disease that causes sugar to collect in the blood stream. The severity of diabetes can lead to a big problem. People only have to make minor changes to their lifestyle after they are diagnosed. Just losing a little weight and getting some more exercise may be enough for them to manage their diabetes. Other people who have type 2 diabetes need more permanent therapy that involves taking tablets or insulin. It is then especially important to have a good understanding of the disease and know what they can do to stay healthy (International Diabetes Federation Guideline Development Group 2014).

1.3.5.4 Type 2 Diabetes: Resistance to the Metabolic Effects of Insulin

Type 2 diabetes is far more common than type 1, accounting for about 90% of all cases of diabetes mellitus. In most cases, the onset of type II diabetes occurs after age 30, often between the ages of 50 and 60 years, and the disease develops gradually. Therefore, this syndrome is often referred to as adult-onset diabetes. In recent years, however, there has been a steady increase in the number of younger individuals, some less than 20 years old, with type II diabetes. This trend appears to be related mainly to the increasing prevalence of obesity, the most important risk factor for type II diabetes in children as well as in adults (Guyton and Hall 2006).

1.3.5.5 Type 2 Diabetes is linked to NAFLD

The links between NAFLD and type 2 diabetes are particularly well documented. Eighty percent of people with type 2 diabetes have fat in the liver. Research indicates that NAFLD may contribute to prediabetes and type 2 diabetes. Because the liver plays such an important role in regulating the body's blood sugar, the buildup of fat in the vital organ makes it harder to control fasting glucose levels. It also makes the body more resistant to insulin, straining the pancreas and its beta cells and speeding up the arrival of type 2 diabetes. Obesity is one indicator that the liver may be fatty, but NAFLD is very hard to detect, often eluding blood tests and physical exams. The most reliable way to diagnose it is a liver biopsy, an invasive and expensive procedure (Cusi 2009).

1.4 Life Style

With the Westernization of the lifestyle and increasing prevalence of obesity and diabetes mellitus, (NAFLD) is an emerging health problem in the Asia-pacific region (Nseir, Hellou, and Assy 2014). Population based surveys in China, Japan and Korea indicates that prevalence of NAFLD is between 12% to 24%. There is evidence that the prevalence of NAFLD has increased during the last 15 years in the Asia-Pacific region. Most of the people are not aware about their lifestyle as a result serious health problems are taking place which lead to severe liver disease, cardiovascular disease, Diabetes etc. Liver disease has significant effects on an individual's quality of life (QOL) as well as their life expectancy (Nseir, Hellou, and Assy 2014). The treatment of many of these conditions involves multi-drug regimens which can be associated with a variety of side effects. Although therapy with prescription medication is often unavoidable, maximizing lifestyle interventions can play a key role in maintenance of overall health augmenting medical therapy in patients with chronic liver disease. Lifestyle modifications are strongly recommended for patients with non-alcoholic fatty liver disease (NAFLD) as well as patients who have undergone liver transplantation. Lifestyle changes will likely represent an adjuvant treatment because new drugs are inevitably expensive and may have unanticipated adverse effects after prolonged use. These lifestyle modifications typically encompass both dietary intervention and physical activity goals (Nseir et al. 2014).

1.4.1The following factors have a direct impact on lifestyle

- **Dietary factors:** Lifestyle changes focusing on weight loss remain the ketone of NAFLD. Recent reports indicate that lifestyle modifications based on decreased energy intake/increased physical activity during 6-12 months causes improvement in biochemical and metabolic parameters and reduced steatosis and inflammation. Conversely, increased consumption of sugar containing food and beverages has been associated with NAFLD development and progression (Marchesini et al. 1999).
- **Maintaining a healthy weight:** Being overweight or obese it’s needed to reduce the number of calories. To maintain a healthy weight, work is must to maintain it by choosing a healthy diet and exercising.
- **Exercise:** Exercise is very important. So to lead a healthy life people should exercise regularly (Marchesini et al. 1999).

Most of the people are not aware of NAFLD as a result NAFLD is turning into a fatal disease. The progressive stage of NAFLD is NASH, cirrhosis which is difficult to cure. The knowledge and attitude of the general population toward NAFLD is very low.

1.5 Treatment of NAFLD

The standard of care for patients with NAFLD is life style modification with weight loss as the mainstay therapy. As overall weight loss is difficult to achieve and maintain for most patients, pharmacological therapy is often needed. Treatment of NAFLD includes aggressive cardiovascular risk management, including obesity, dyslipidemia, and diabetes but at present there are no FDA-approved agents with an indication for the treatment of NAFLD. Multiple pharmacological intervention has been attempted foe NAFLD, including thiazolinedones, Dipeptidyl peptidase-4 inhibitors, glucagon-like peptide-1 receptor agonist, sodium/glucose transporter 2 inhibitors, antioxidants, lipid lowering drug, nonselective phosphodiesterase inhibitors. There are no good large randomized controlled trials in humans for many of these compounds, except vitamin E (Taddeo, Egedy, and Frappier 2008)). Treatment strategies for NAFLD aim to improve insulin sensitivity, modify underlying metabolic risk factors, or to protect the liver from further insulin by oxidative stress and inflammation (Taddeo, Egedy, and Frappier 2008).

CHAPTER - 2

AIM AND OBJECTIVE OF

THIS STUDY

2. Aim and Objective of this survey

The aim and objective of this survey was to know the state of awareness of NAFLD among the people of Bangladesg. As NAFLD is progessing in the worldwide necessary steps should be taken to control this problem. Other western countries already know about the adverse effect of NAFLD but in our country , most of the people are still unaware about this fact. As a result they are unable to figure out the harmfull effect of NAFLD. So the main purpose of this survey was to spread knowledge about NAFLD among people. Our aim is To know the current situation and risk of NAFLD and the knowledge & attitude towards NAFLD. We completed this survey by normally asking question to the general people as well as diabetic patients about their daily routine work and the type of physical aciivity they used to perform .The kind of of they eat in breakfast and dinner and how often they go out to eat fast food , what kind of food items thay eat out.

CHAPTER -3
METHODOLOGY

3. Methodology

3.1 Type of Study:

The study was performed to find out about the effect of lifestyle and food habit on the progression of Non-Alcoholic Fatty Liver Disease (NAFLD) and how lifestyle related diseases are also a risk factor for the progression of NAFLD.

3.2 Study Area:

BIRDEM General Hospital, NHN Hospital, East West University, Gazipur.

3.3 Study Population:

In this study, a total number of 151 people were surveyed with a questionnaire to assess the knowledge, perception about the effect of lifestyle and food habit on the progression of NAFLD in both diabetic and obese people around Dhaka city. Only the participants who agreed to join the study were interviewed and provided the required information for the studies.

3.4 Study Duration:

The duration of the study was about six months starting from July to December in 2017.

3.5 Questionnaire Development

The questionnaire was specially designed to collect the simple background data and the needed information. The questionnaire was written in simple English to avoid unnecessary semantic misunderstanding. The questionnaire was pilot tested to ensure it was understandable by the participants.

3.6 Sampling Technique

In this study, purposive sampling technique was followed.

BMI (Body Mass Index) Calculation:

Below are the equation used for calculating BMI in the international system of units (SI).

SI, Metric Units

BMI=mass (kg)/ (height) ^{2} m

3.7 Data Analysis

After collecting, the data were checked and analyzed with the help of Microsoft Excel 2016. The result was shown in pie and column chart and calculated the percentage of the results

CHAPTER - 4

RESULTS

4.1 Gender:

Table 4.1 Gender of the Participants

Gender	Number	Percentage
Male	67	44.4%
Female	84	55.6%

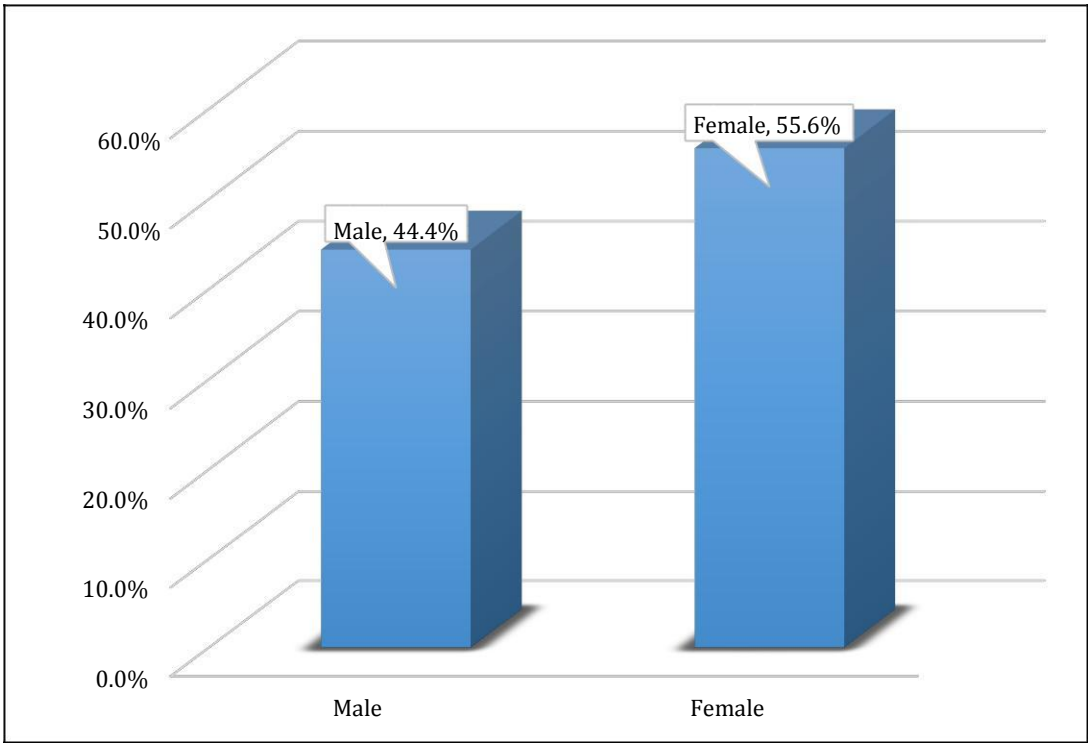

Figure 4.1: Gender Percentage of the Participants

4.2 Age Range

Table 4.2 Age Range of the Participants:

Age Range	Total Number	Number	Percentage
16-25	151	42	27.8 %
26-35		21	13.9 %
36-45		27	17.9 %
46-55		36	23.8 %
56-65		15	9.9 %
65+		10	6.6 %

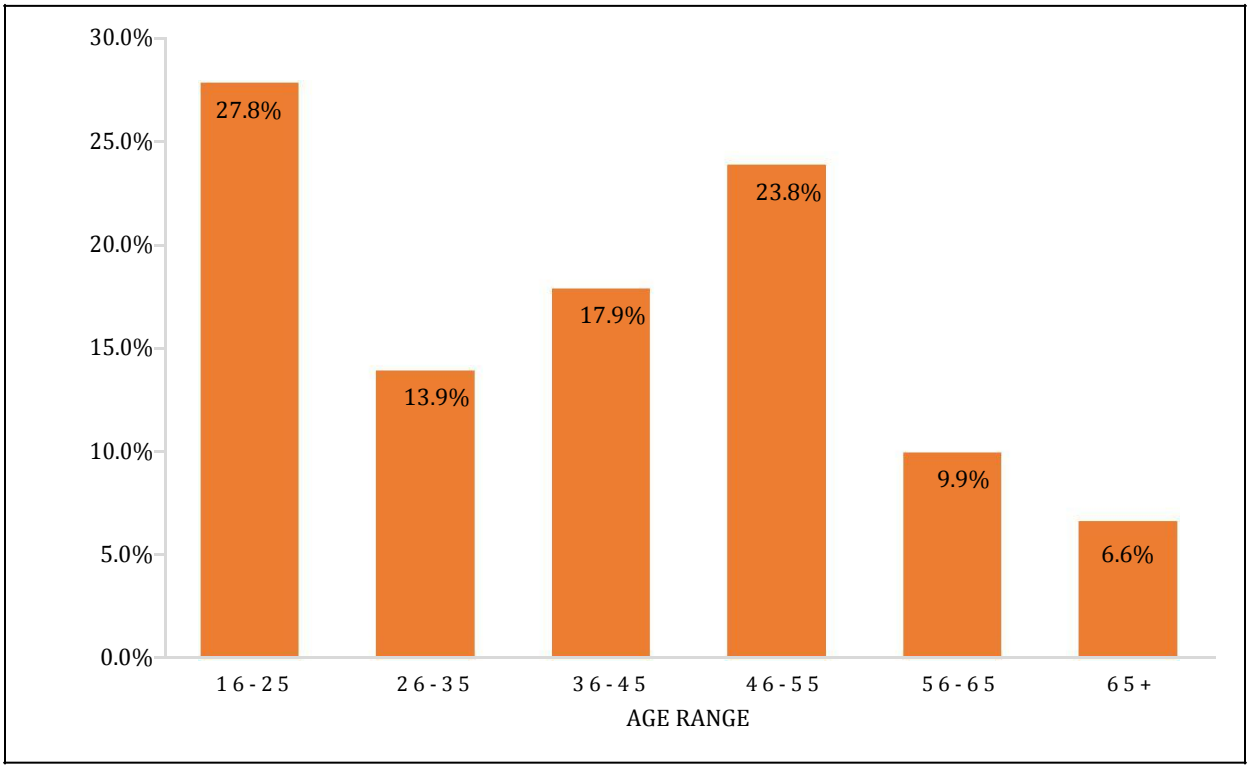

Figure 4.2: Age Range in percentage

4.3 Level of Education

Table 4.3 Education of the Participants

Education	Total Number	Number	Percentage
<S.S.C	151	27	17.9 %
S.S.C		13	8.6 %
H.S.C		31	20.5 %
Graduate		80	53.0 %

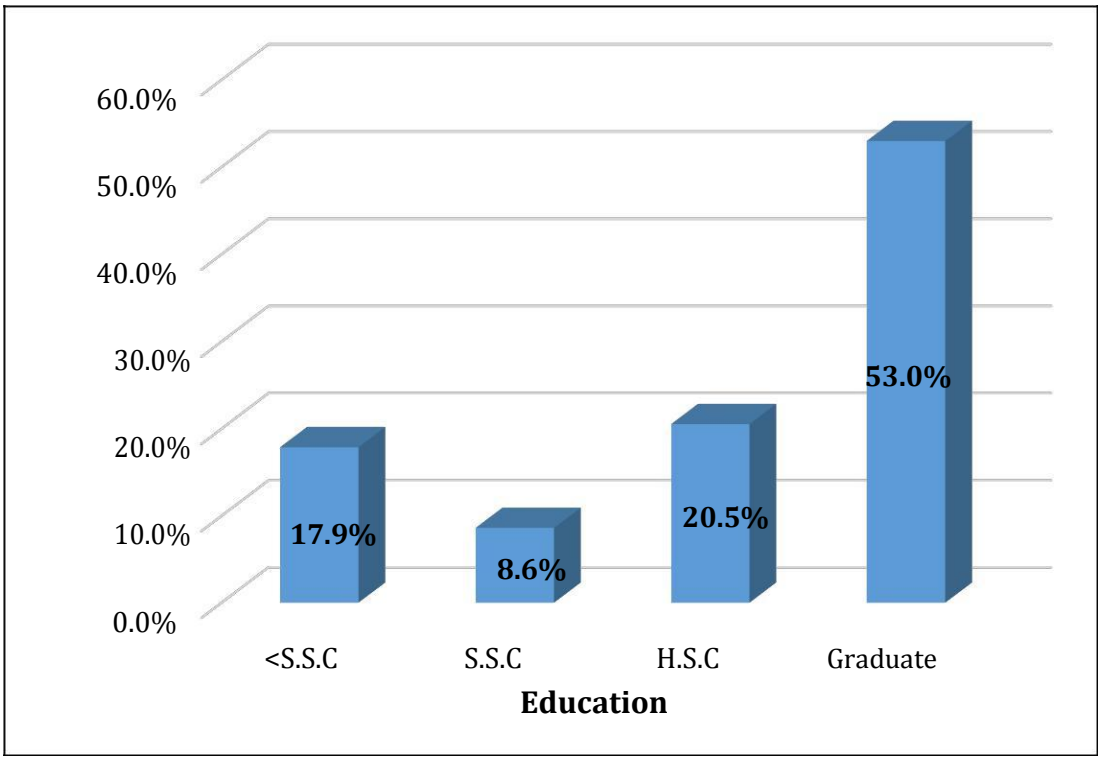

Figure 4.3: Percentage of Education of the Participants

4.4 Respondents Performing Exercise

Table 4.4 Percentage of Respondents Performing Exercise:

Exercise	Yes	No
Number	97	54
Percentage	64.2%	35.8%

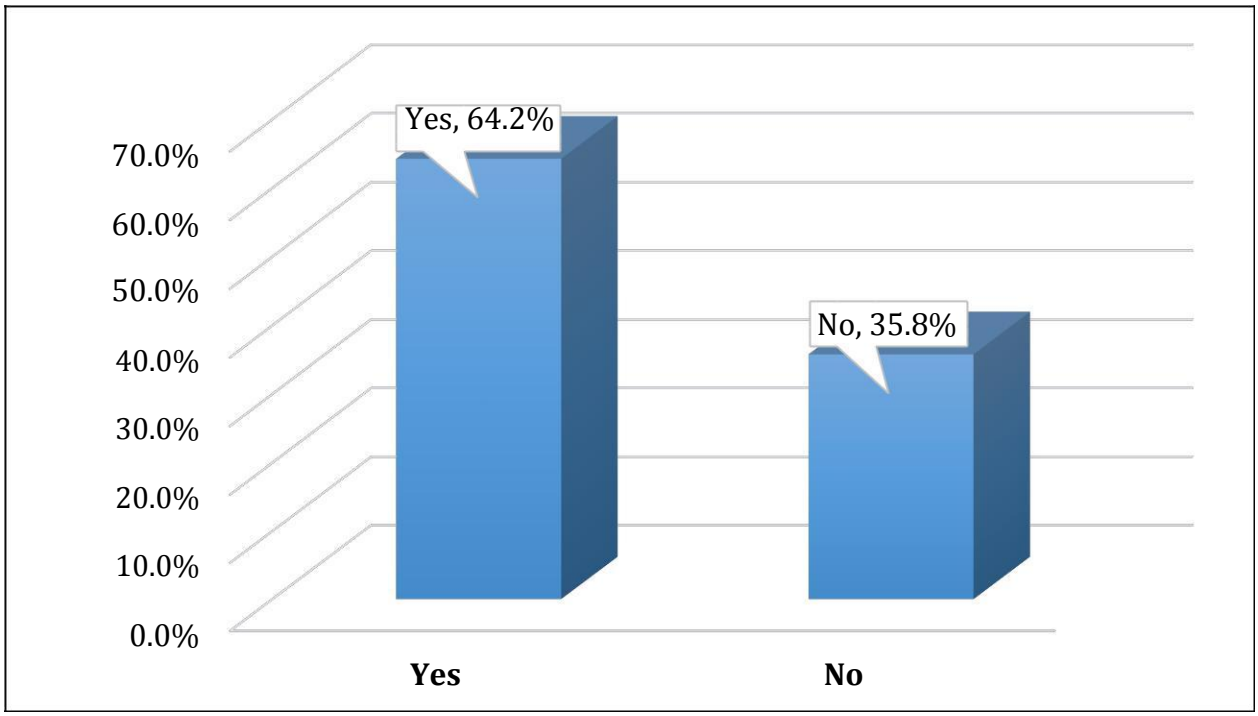

Figure 4.4: Percentage of Respondents Performing Exercise

4.5 Respondents Performing Different Types of Exercise

Table 4.5 Percentage of Respondents Performing Different Types of Exercise

Exercise Type	Total Number	Number	Percentage
Walking/Running	151	73	75.3 %
Swimming		1	1.0 %
Heavy Exercise		6	6.2 %
Light Exercise		14	14.4 %

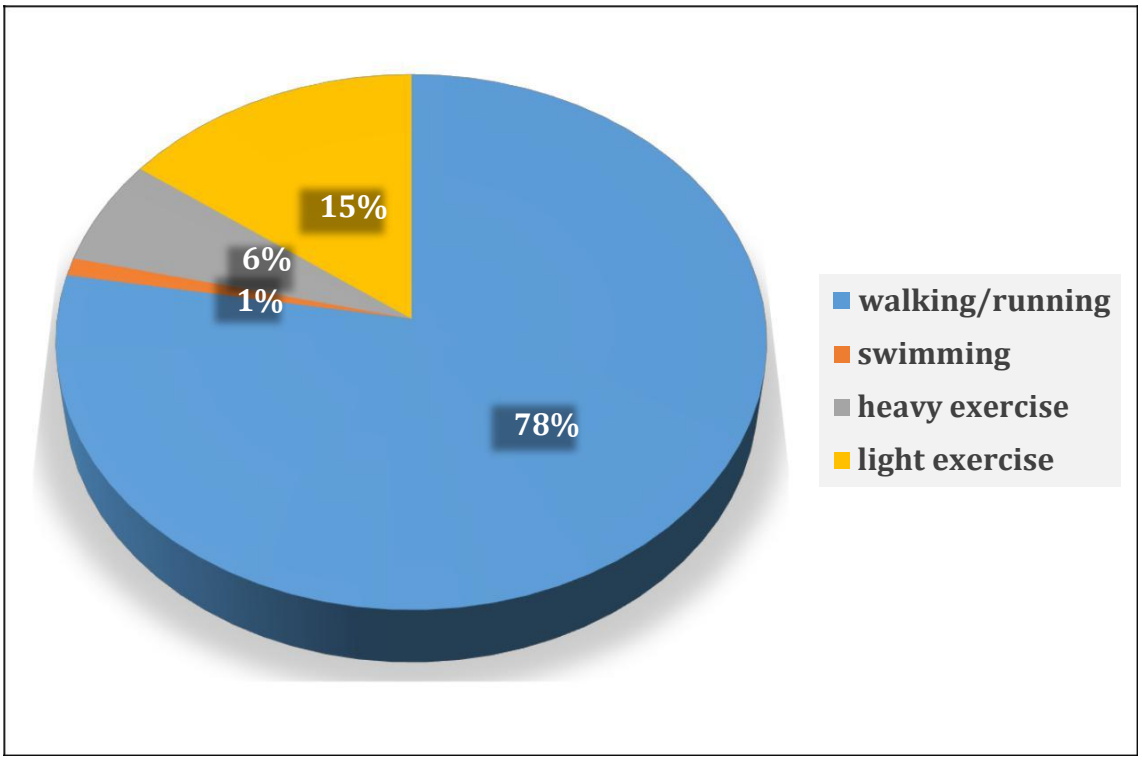

Figure 4.5: Percentage of Respondents Performing Different Types of Exercise

4.6 Respondents preferring to use Stairs/Elevators

Table 4.6 Percentage of Respondents Preferring to use Stairs/Elevators

Types of People	Total Number	Number		Percentage	
		Elevators	Stairs	Elevators	Stairs
General People	151	75	76	49.7%	50.3%
People with Diabetes	76	36	40	47.4%	52.6%
People Without Diabetes	75	39	36	52.0%	48.0%

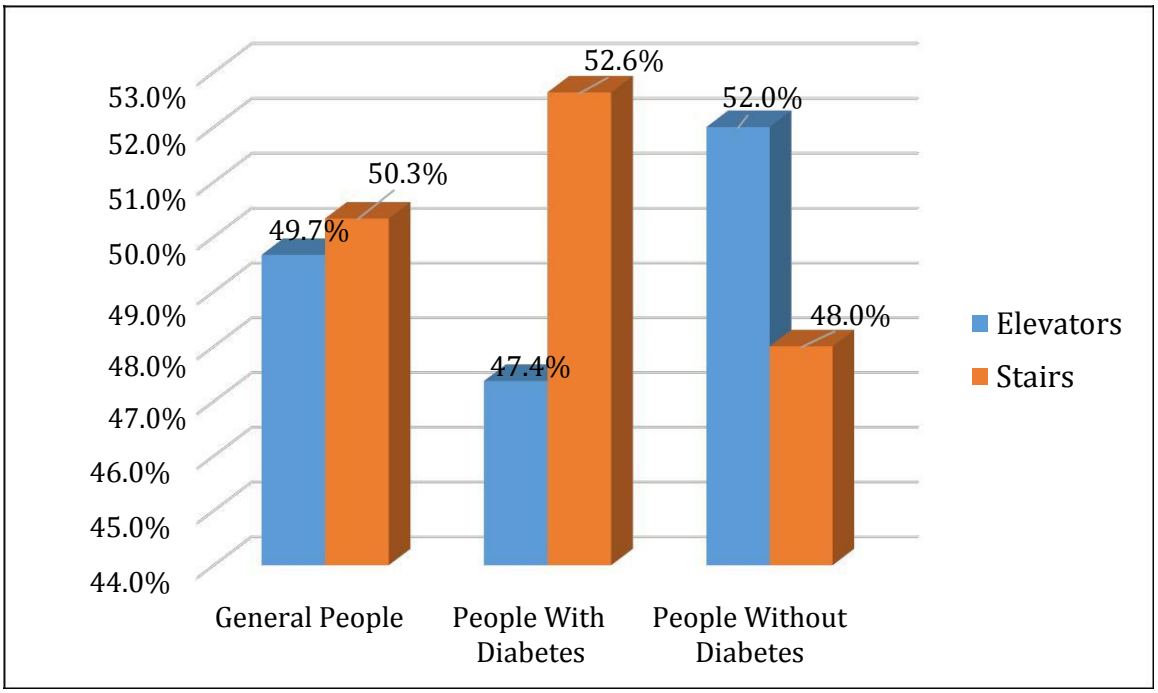

Figure 4.6: Percentage of Respondents Preferring to use Stairs/Elevators

4.7 Respondents Food Habit (Breakfast)

Table 4.7 Respondents Food Habit (Breakfast)

Having Breakfast	Total Number	Yes	No
Number	151	127	24
Percentage		84.1%	15.9%

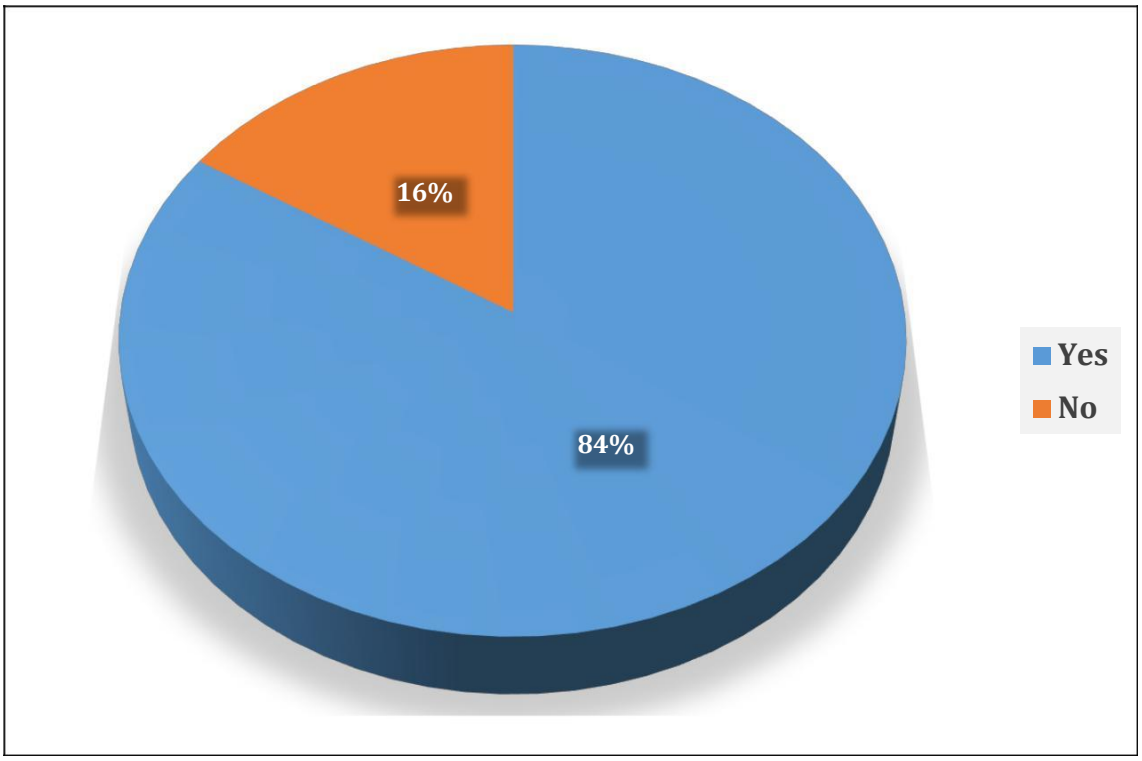

Figure 4.7: Percentage of Respondents Food Habit (Breakfast)

4.8 Respondents Food Habit (Dinner Time)

Table 4.8 Respondents Food Habit (Dinner Time)

Dinner Time	≤15 minutes	≤30 minutes	≥30 minutes
Respondent Number	91	56	4
Percentage	60.3%	37.1%	2.6%

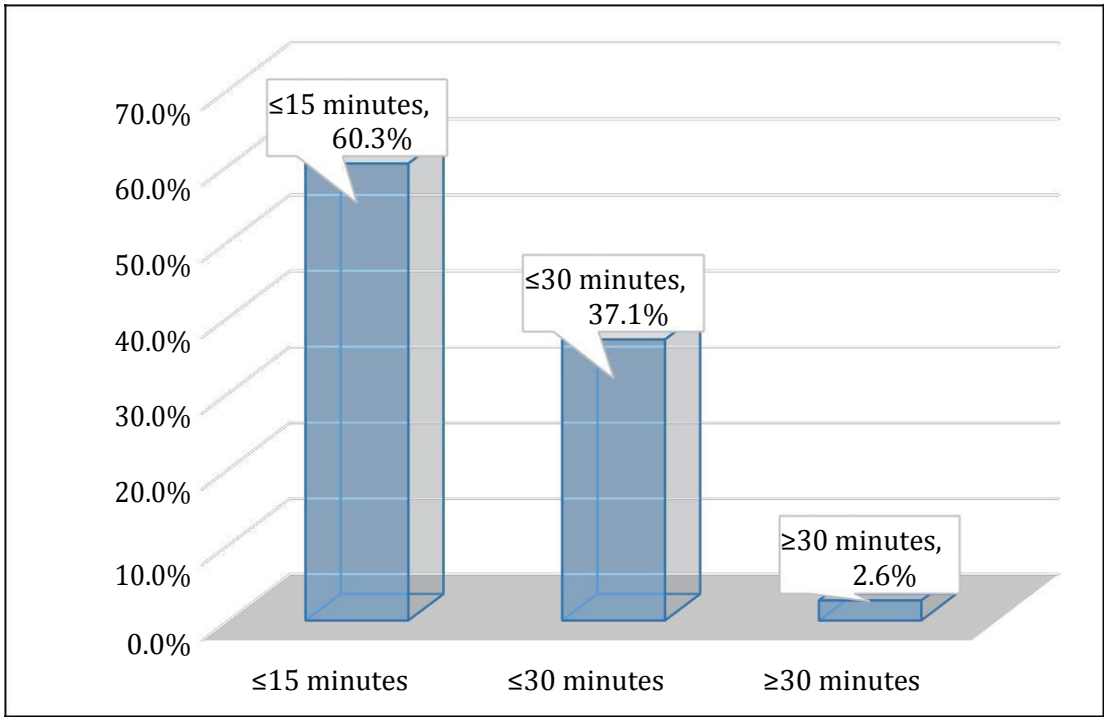

Figure 4.8: Percentage of Respondents Food Habit (Dinner Time)

4.9 Respondents Food Habit

Table 4.9 Respondents Food Habit

Food Habit	Number of Respondents Food Habit			Percentage of Respondents Food Habit		
	Never	Several Times	Occasionally	Never	Several Times	Occasionally
Eating Out	28	69	54	18.5%	45.7%	35.8%
Meat Dishes	1	113	37	0.7%	74.8%	24.5%
Fast Food	59	43	49	39.1%	28.5%	32.5%
Fried Items	28	58	65	18.5%	38.4%	43.0%
Sweets	13	48	90	8.6%	31.8%	59.6%

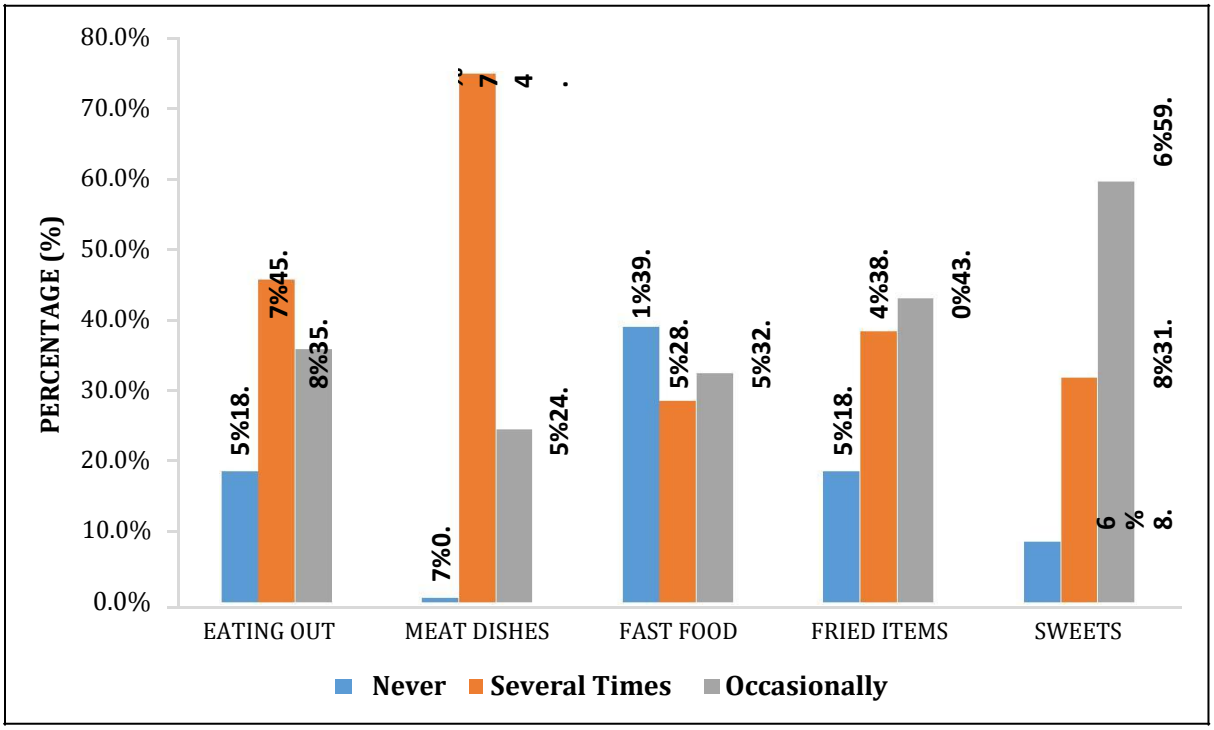

Figure 4.9: percentage of Respondents Food Habit

4.10 Percentage of Smoking by Respondents

Table 4.10Percentage of Smoking by Respondents

Smoking	Yes	No	No Response
Respondent Number	24	67	60
Percentage	15.9%	44.4%	39.7%

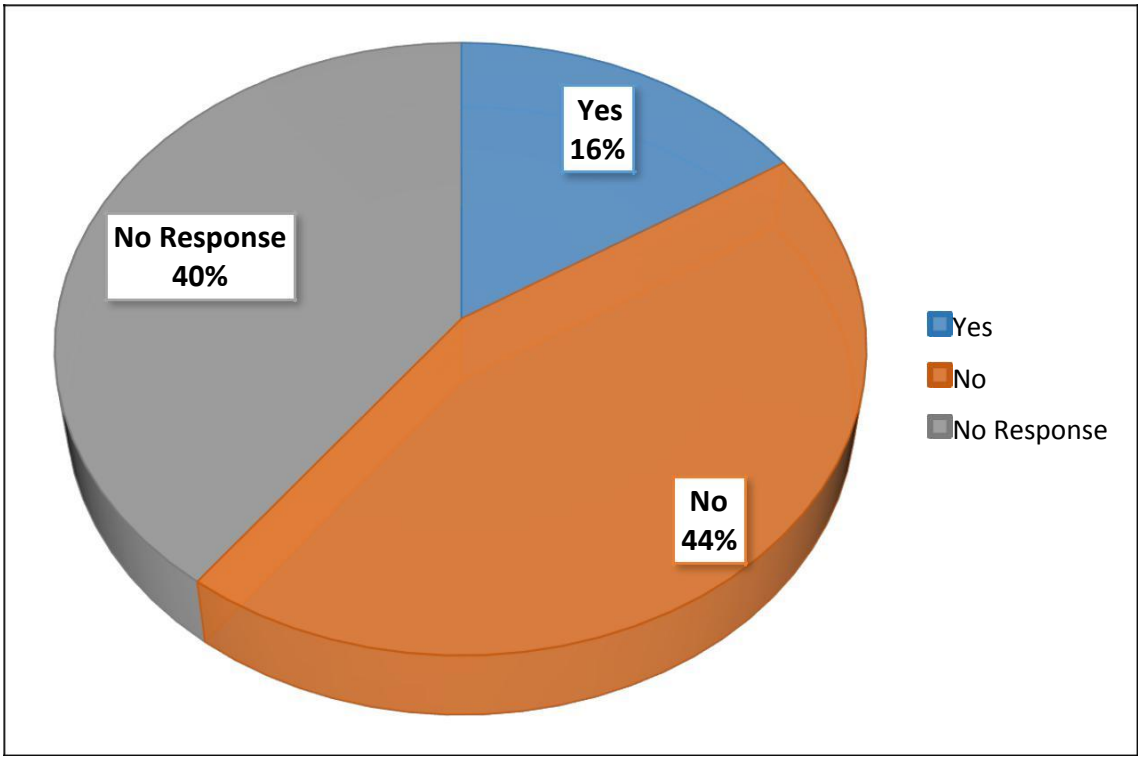

Figure 4.10: Percentage of Smoking by Respondents

4.11 BMI (Body Mass Index)

Table 4.11 BMI of the Participants

BMI	Total Number	Percentage
Underweight	2	1.3 %
Normal	23	15.2 %
Overweight	41	27.2 %
Pre-obese	59	39.1 %
Obese	26	17.2 %
Total	**151**	**100%**

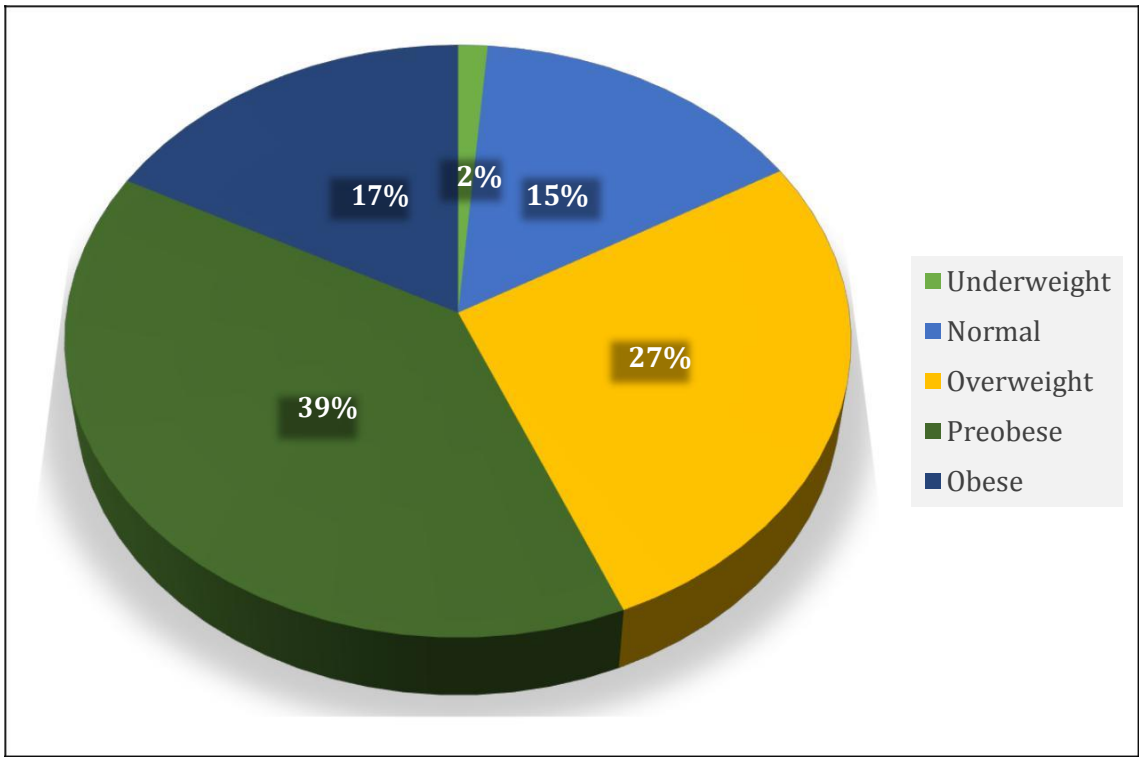

Figure 4.11: percentage of BMI

4.12 NAFLD Patient

Table 4.12 NAFLD Patient

Disease	Number among the total population	Percentage
Have NAFLD	6	3.97%
Have both Diabetes and NAFLD	6	3.97%
Heard about NAFLD but don't have it	23	15.23%
Haven't Heard about NAFLD but Have it	1	0.66%

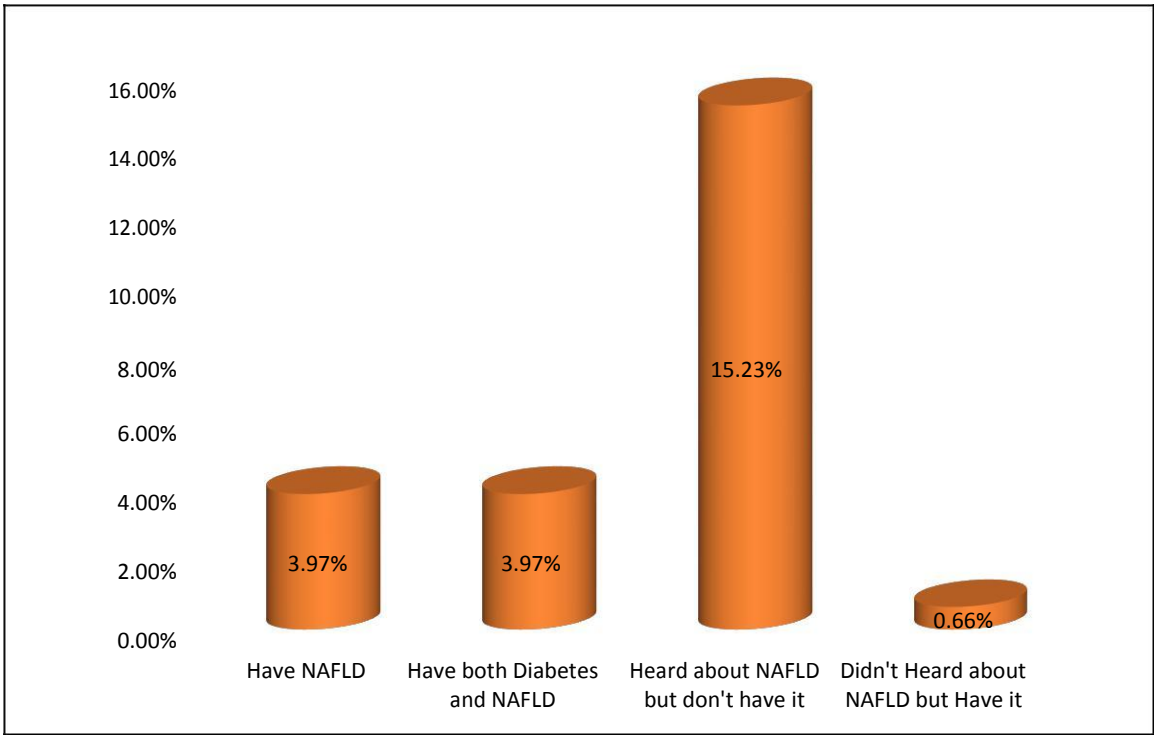

Figure 4.12: percentage of patients having NAFLD

4.13 Diabetic Patients

Table 4.13 Diabetic Patients

Total Number of Respondent	Number of Diabetic Patient	Number of Non-Diabetic Patient	Percentage of Diabetic Patient	Percentage of Non-Diabetic Patient
151	76	75	50.33%	49.67%

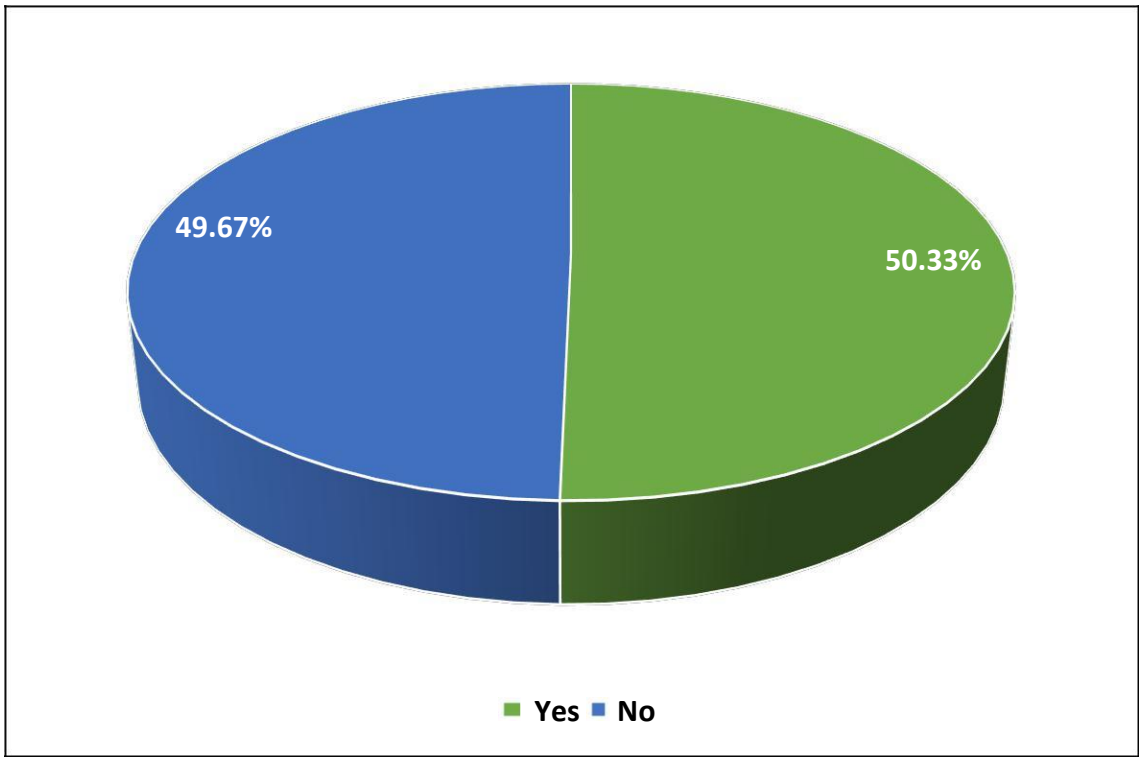

Figure 4.13: Percentage of diabetic patients

4.14 Inherited Diabetes

Table 4.14 Inherited Diabetes

	Number	Percentage
From Family	49	64.47%
Not from Family	27	35.53%

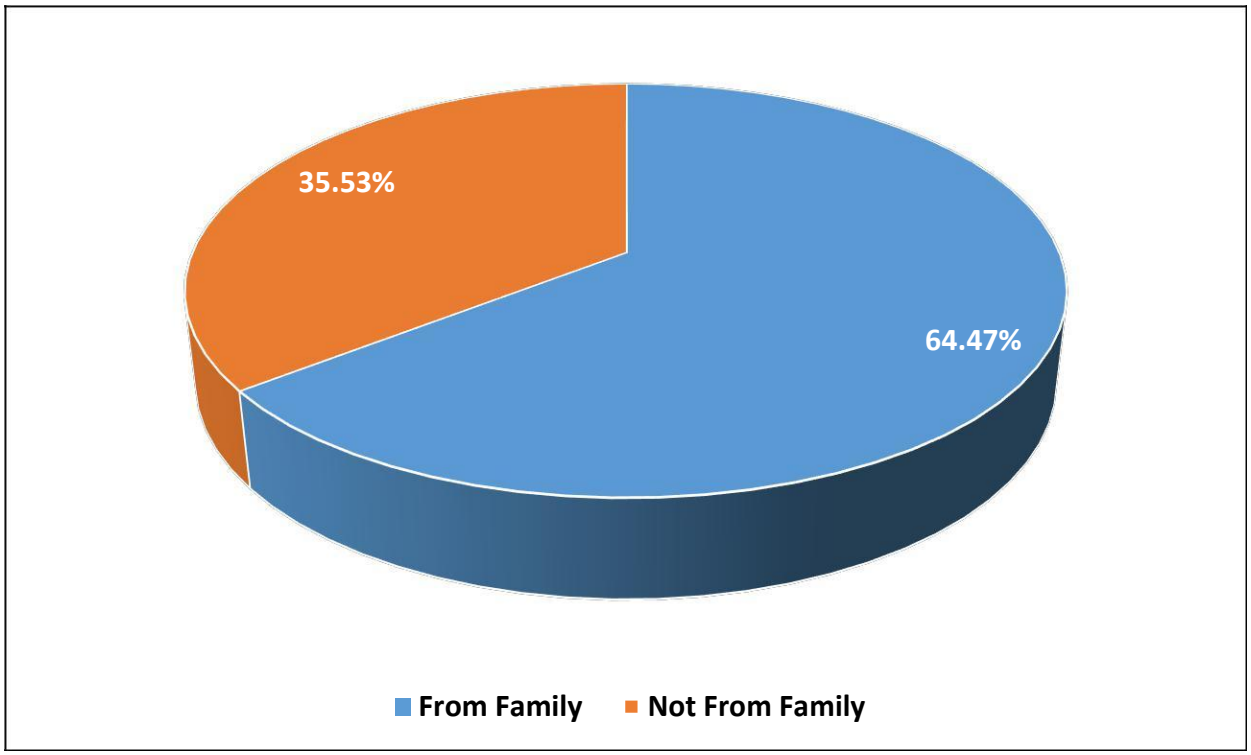

Figure 4.14: Percentage of Participant's having inherited diabetes

4.15 Diabetic Medication

Table 4.15 diabetic medication

Medication	Number	Percentage
Taken Insulin	36	47.37%
Oral Hypoglycemic agents	47	61.84%
Both Insulin and Oral Hypoglycemic agents	14	18.42%

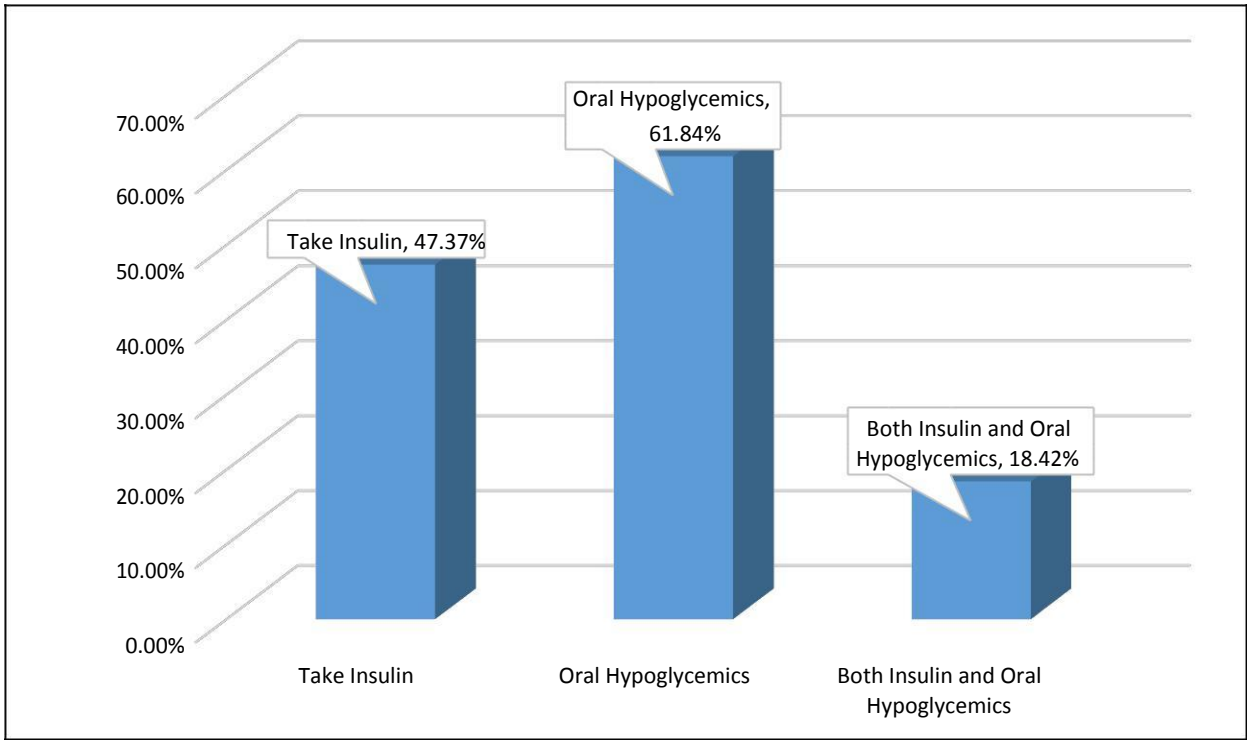

Figure 4.15: Percentage of Diabetic medication

4.16 Cholesterol and Blood pressure level

Table 4.16 Population Having Cholesterol and Blood Pressure

	Total Population	Number	Percentage in total People	Total Diabetic Patient	Number	Percentage in Diabetic People
High Cholesterol	151	29	19.2%	76	23	30.3%
High Blood Pressure		45	29.8%		36	47.4%

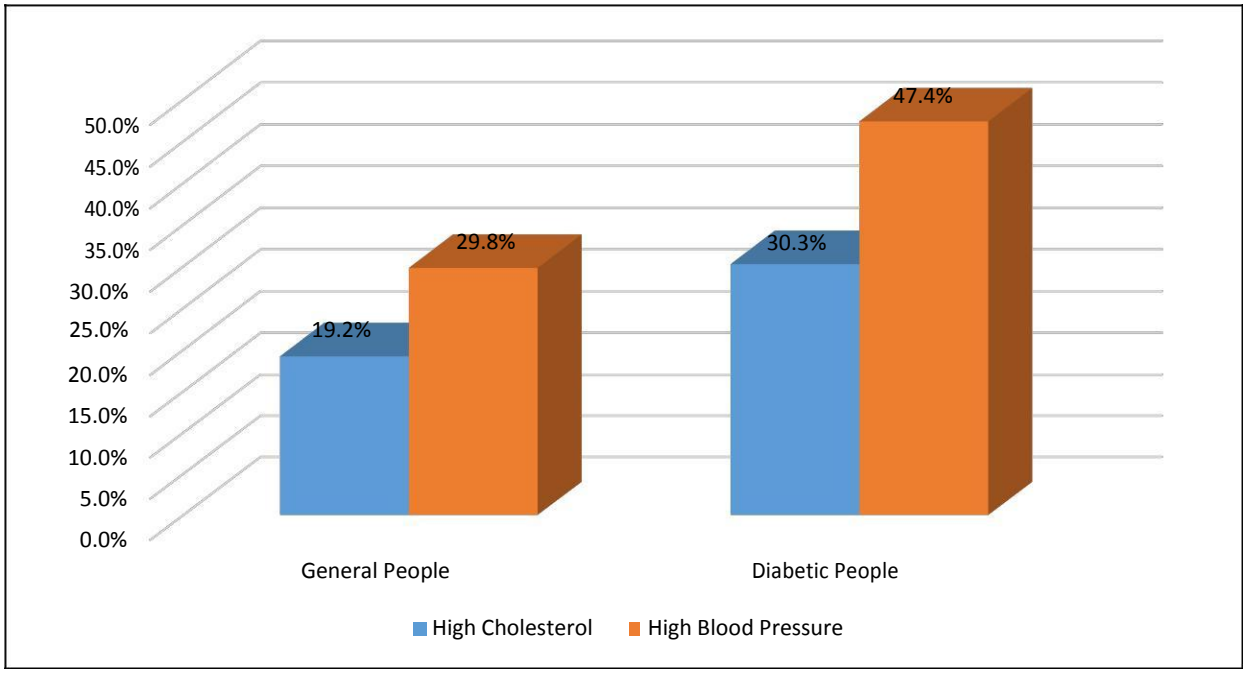

Figure 4.16: Percentage of High cholesterol and High blood pressure

CHAPTER-5
DISCUSSION

5. Discussion

NAFLD is an emerging health problem in the worldwide. The main challenge in the management of NAFLD is little awareness or giving low priority to life style related health problems. Several studies reported that type 2 diabetes and obesity act as major risk factors for non-viral NAFLD (Taddeo, Egedy, and Frappier 2008) which may be directly linked with life style. Healthy diet and regular physical activity may play a key role for the prevention and treatment of NAFLD (Taddeo, Egedy, and Frappier 2008)

Then I planned to study the present scenario of Bangladesh regarding to NAFLD and its progressive stage like knowledge and awareness by communicating with general people as well as diabetic patients. For this purpose I conducted with 151 people where 44.4% were male and 55.6% were female among them (%) were general people and (%) were suffered from diabetic. Patients and general people were selected randomly in this survey whatever their sex, age, level of education, marital status, profession, and income, mode of diagnosis and so many other things. Among of those population the percentage of age ranges were 13.9%, 17.9%, 9.9%, 27.8%, 6.6% for (16-25), (26-35), (36-45) (56-65) and ($56\text{-}65^{+}$) years aged population respectively. Another survey was conducted by Said et. al, they investigated the knowledge, attitudes, and behaviors relating to NAFLD and its main risk factors in urban Cameroonians in 2013. and to explore and descriptive study he conducted an interview across the four sites showing 10% of this surveys population had no formal education, 30% had completed primary education, 40% secondary education, and 20% had undertaken postsecondary studies (Said et al. 2013).

In my survey I observed that the basis of level of education among most of the populations were 17.9% under S.S.C, 8.6% S.S.C, 20.5% H.S.C and graduate (53.0%). Mainly by adapting a healthy life style, by taking good food, doing exercise regularly, and living in healthy environment people can lead a healthy life, without these parameters it is tough to manage life. In my survey among 151 people I found only 64.2% population prefer to do exercise and remaining 35.8% are not aware about this. Moreover 78% people prefer walking, only 1% people prefer swimming, 6% people prefer heavy exercise and 15% people prefer light exercise among the people who do the exercise. In a survey work Yasutake et al. found that the nutritional problem is associated in patients with NAFLD, include excess intake of energy, carbohydrates, and lipids, and shortages of polyunsaturated fatty acids, vitamins, and minerals. In his report he claimed that one of the

important factor to control NAFLD is having a balanced food habit or proper diet (Yasutake et al. 2014).

As food habit plays an important role in maintaining healthy life so in my survey more concentration was given on this matter but I found that majority of the people was following a poor diet pattern and few people skip their breakfast about 84% people have their breakfast . It was also noticed that about 45.7% people prefer to eat out several times, and 35.8% occasionally. Among the studied population vast of them eat fast food (28.5%) several times and 32.5% occasionally in a week; where percentage of people prefer to eat fried items about 38.4% several time and occasionally 43.0%. This is mainly happening in our country for westernization, people of our country blindly follow them and forget about our own life style and our food culture. A survey was performed on NAFLD where pang et al enlightened that increasing obesity is associated with the likelihood of having significant liver disease, while around 30% people were overweight and there is an independent relationship between of obesity and NAFLD. Pang et al also claimed in his study that high BMI levels are independently associated with NAFLD indicating that patients with central obesity had a higher risk of NAFLD than individuals with general obesity (Pang 2015 & Marchesini et al. 1999).

In my survey, after calculating the BMI I found that among 151 participant, only 15% were in normal range, 27% overweight, 39% pre-obese, and obese people were about 17%. Here, I noticed that most the people are in pre-obese condition, which may be due to selection of their unhealthy life style. I also found that 16% people associated with smoking and 44% were not responded. Among the total participant 30.2% people have high cholesterol and 47.4% people have high blood pressure.

A survey was conducted in Hong Kong among 508 people which showed that as high as 83% of responds had never come across the term ‘NAFLD’ and about 42% expressed no idea about NAFLD and its prevalence in the general population. .About 47% people knew nothing about the clinical presentation of NAFLD. Though obesity .hyperglycemia and diabetes mellitus were correctly pointed out by 82%, 79% and 57% of responds respectively a risk of NAFLD and 81% people claimed that their knowledge of NAFLD was inadequate according to this survey which was held in Hong Kong (Adams, Angulo, and Lindor 2005).

With resemblance of this data, I found that only 3.97% have NAFLD and among them o.66 person have not heard about NAFLD at all and remaining 15.23% people hardly heard about NAFLD. In my survey I found that 47.7% people take insulin and 61.84% people take oral hypoglycemic agents to have control over diabetes where The outcome of our survey represents that majority of people have no idea about NAFLD, they are not aware about their lifestyle, food habit, medications and so on. As a result, they are developing severe health related disease which will give rise to NAFLD.

The main limitation of our survey was the population number, which was very poor and lack of some clinical data like serum parameter which help to confirm their health condition.

CHAPTER- 6
CONCLUSION

6. Conclusion

Despite recent data showing current knowledge on distinct features of NAFLD in this population is insufficient. People have no knowledge on this matter. Most of the people are not aware of NAFLD as a result this disease is turning into a fatal disease. The knowledge and attitude of the general population toward NAFLD is very low. Majority of the participants had little awareness of NAFLD regardless of their age, gender, or educational status. Awareness of NAFLD must be promoted for prevention, early detection, and treatment. Thorough counseling by primary care physicians can be of paramount importance in preventive strategy for NAFLD. Educational tools including mass media should be utilized to increase awareness of NAFLD. Strategies to improve awareness of NAFLD and avoid risk factors among people should be a priority for individual person, medical professionals and parents alike.

CHAPTER-7
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