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Role of Edible Fats in the Development of Diabetes Mellitus Type 2 and Prevalence of Diabetes Mellitus Type 2 in Relation of Edible Fats in Rural Population of Bhopal (M. P.) India

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Abstract

The role of edible fats in the development of type 2 diabetes mellitus (NIDDM) in rural population Bhopal M.P. India, an observational study was conducted in the rural population specifically S.C. dominant population area of Bhopal. Edible fats play an important role in the development of type 2 diabetes mellitus. Edible fats show the various physiological changes in human body after their metabolism and produce the unhealthy metabolic product and by-products. That produced various pathologies in human body and causes the various disease i.e. diabetes mellitus type 2.

Edible fats divided into various types on the bases of their nature, origin and effect on health. **A- On the base of nature;**

1. Polyunsaturated fats (PUFA)
2. Monounsaturated fats (MUFA)
3. Transfats (TFA)

B- On the base of origin;

1. Animal fats
2. Vegetable fats

C- On the base of effect on the body;

1. Good fats
2. Bed fats

Edible oils play an important role in human body as carrier for essential fatty acids (EFA) and EFA are not synthesized in the body, but as name suggest its essential and comes through diet in human body and maintain the cell membrane integrity and synthesis of various prostaglandin [1]. Various eating habits of fats and various socio-economic condition and life style conditions play the important role in the development of type 2 diabetes mellitus.

Keywords; Diabetes mellitus type 2, Edible fats, Rural Population, Insulin resistance, Obesity.

Introduction

Diabetes mellitus is an important public health problemin present age. Diabetes mellitus divided into two types, type 1and type2. When Pancreas unable to produce the sufficient insulin (type 1) it known as IDDM and when body not response to insulin, or body developed the resistance its known as or (type 2) NIDDM. Diabetes mellitus type 2 usually occurs due to metabolic disturbances and closely related with eating habits and its produce the multiple disorders as primary and secondary complications, not only adults population affected by type 2 diabetes mellitus. Its also seen in younger population, about more than 1.4 billion in world (11.4% population of India was suffering from diabetes) more than 100 million people suffering from diabetes and about 95% of diabetes population is suffering from diabetes mellitus type 2 in India, About 136 million Indians are prediabetics [2] and about 40-50% people who is suffering from diabetes and they not aware their situation [3] India represent the largest population of diabetics in the world [2] India has an estimated 212 million people[3] with diabetes out of 828 million globally – mean 1 in 4 people (26%) in world diabetes in form India[4] The No of diabetics patient increase day by day in the world and under developed countries are main target of diabetes mellitus type 2, due to unhealthy life style and used low quality of edible fats.[2][6] the pancreas does not produce the enough insulin type 1 and when body cannot be effectively use the insulin it produce diabetes type 2. cardiovascular disorders & CVA due to reduce blood flow and nerve damage (complications), diabetic retinopathy is an important cause of blindness. Its also leading cause of chronic renal failure [5][6]

In other word we can say the diabetes is a disease of consequences nature i.e. presence of genetic factor (nature) and environmental cause or life style (nurture) [7] and divided into two type IDDM or type 1, NIDDM or type 2.

Following factors plays the important role in development of diabetes mellitus.

1. Faulty dietary intake
2. Poverty and malnutrition
3. Disturbed or improper hygiene
4. Sedentary life or physical inactivity
5. Method of cooking
6. Use of more edible fats and low quality saturated fats [7]

The prevalence of diabetes mellitus type 2 along with dyslipidaemia is increase of Day by Day in India and its alarming, life style and dietary habits are two main causes of increase the diabetes mellitus type 2. Consumption of edible fats is an important factor in the development of diabetes mellitus type 2, in this study we considered the following type of oils/ edible fats usually use in rural population of Bhopal & we studied the prevalence of diabetes mellitus type 2

1. Sun flower oil
2. Palm oil
3. Soyabeen oil
4. Sesame oil
5. Ground nut oil or peanut oil
6. Mustered oil

Why India changes into capital of diabetes-

India lives in villages and villagers usually use the milk and vegetables in diet (lacto vegetables) and they used low fats or use of low amount of edible oils, and villagers used fried food occasionally and usual foods are low caloric and low fats. And only healthy fats used, with active and laborious life. But in now days due to urbanisation and fast-food culture the life style of Indians altered and low caloric food changed into high caloric food, and fried items increase in daily life fresh fruits and vegetables reduced in food and life change into sedentary life [8]

Edible oils or fats directly affect the metabolic health following factor play important role in metabolic health and development of type 2 diabetes.

1. **Insulin resistance**- insulin regulate the sugar metabolism when fat accumulate near the cell and stop the insulin its regulatory function of insulin.
2. **Inflammation**- certain oils are produce the cellular inflammation and stress inside the cells and complete the regulation of blood glucose or glycose metabolism.
3. **Ectopic fats**- ectopic fats are, that fats which accumulate the around the viscera i.e. around the liver & pancreas which blocks normal insulin release.

Palm oil are very harmful and responsible to produce the type 2 diabetes mellitus.

And its main ingredient of palm oil butter and processed food and it products produce the harmful molecules that block in signals from cells / organ to pancreas.

Reused cooking oils- Recurrent heating the oils over heating of oils produce of toxic compound like transfat & increase the oxidative stress.

Excessive intake- excessive intake of any edible oils may result the transfat that increase oxidative stress and inflammation.

Role of edible oil in diabetes management- cooking oils are crucial sources of linolic acid an omega -6 fatty acids which play an important role in diabetes management but research suggested that excessive intake of linolic acid increase of development of diabetes [9]

Dr Devyani san kalpal mentioned in her health blog **cooking oil for deep frying-**

1. Pea nut oil or ground nut oils.
2. Sun flower oils

Cooking for shallow frying

1. Mustard oil.
2. Olive oil.
3. Rice brawn oil

Oil for salad dressing

1. Sesame oil.
2. Olive oil
3. Oils for deep frying – Desi ghee due to high smoke point.

In Indian culture milk animal fat (desi ghee) is used for long time it has a high smoke point which make it ideal for deep frying [10][12].

Some Study suggest that a positive association seen between edible fats and development and prevalence of diabetes [11][12] and some other evidence also suggest that the relation between intake of fatty acids and risk of type 2 diabetes mellitus is directly related to cooking oil quality, type and quantity of consumption [14][15]

Unani aspect of body fats, fat metabolism and related disorders- Ancient Unani scholar have the sufficient information about body fats and its metabolism and metabolic disorder, ancient Unani scholars

mentioned the body fats into two types (1) Sheham (liquid body fat) (2) Sameen(solid body fats). They also mention the various types body fats according their function and situations in the body like. Sheham e Sifaq (peritoneal fat), Sheham e Mufasil or synovial fluid [16,17,18]. They also mentioned the Aish wa Ishrat ki Zndaqi (sedentary life and good fatty diet) result into accumulation of fats around the organs i.e. liver, pancreas and result into the increase insulin resistant & reduce the insulin production and developed the Ziabetus Shakri (DM2) due to abnormal fat metabolism and Saman e Mufrat also. Unani scholars also describe the role of temperament in the development of disorder due to disturbance in fat metabolism. Modern Unani scholars describe the term Farte Tadassum Fil Dam or hyperlipidaemia in their text, Unani scholar also mentioned the Sue Mizaj in the development of diabetes mellitus type 2. [18][19]

Objective of the study- Present study was performed by clinical research unit Bhopal to evaluate the prevalence of diabetes mellitus type 2 in relation of various type of edible oils and development of diabetes mellitus in the rural area of Bhopal.

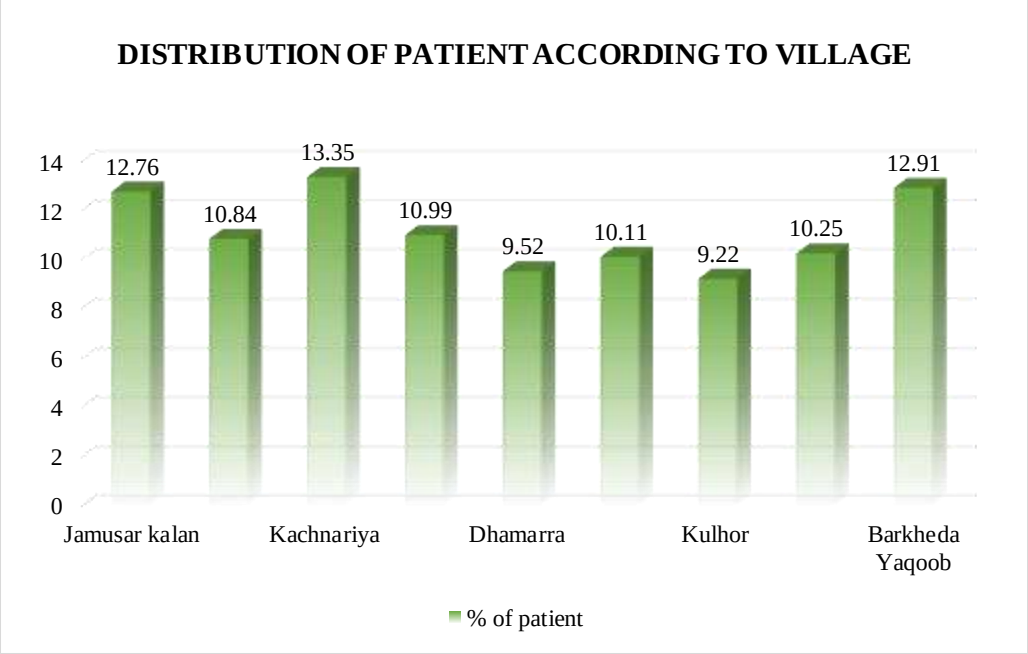
Methodology- present study an observational study and carried out by clinical research unit Bhopal, which is situated in the heart of India Bhopal M.P. state India. Clinical research unit Bhopal working under the central council for research in Unani medicine. Which is an apex & autonomous body of ministry of Ayush Government of India for research and development in Unani medical field. In the study conducted since 1 April 2024 to 31 March 2026.

Total 1355 patient enrolled in this study in which the 1050 patient were observed from mobile OPD (from rural area population SCSP sub plans)

Observation and results-

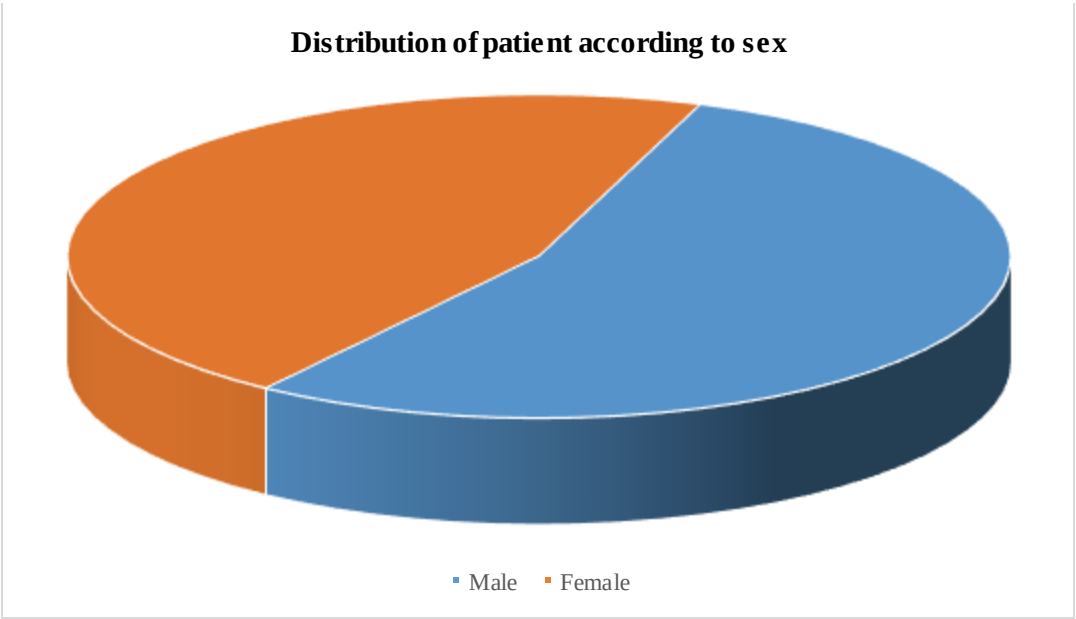
1- Distribution of patient according to village

S N	Name of village	No of patient	% of patient
1	Jamusar kalan	173	12.76
2	Dillod	147	10.84
3	Kachnariya	181	13.35
4	Shahpur	149	10.99
5	Dhamarra	127	9.52
6	Gada khurd	137	10.11
7	Kulhor	125	9.22
8	Birha shyamkhedi	139	10.25
9	Barkheda Yaqoob	175	12.91



2- Distribution of patient according to sex.

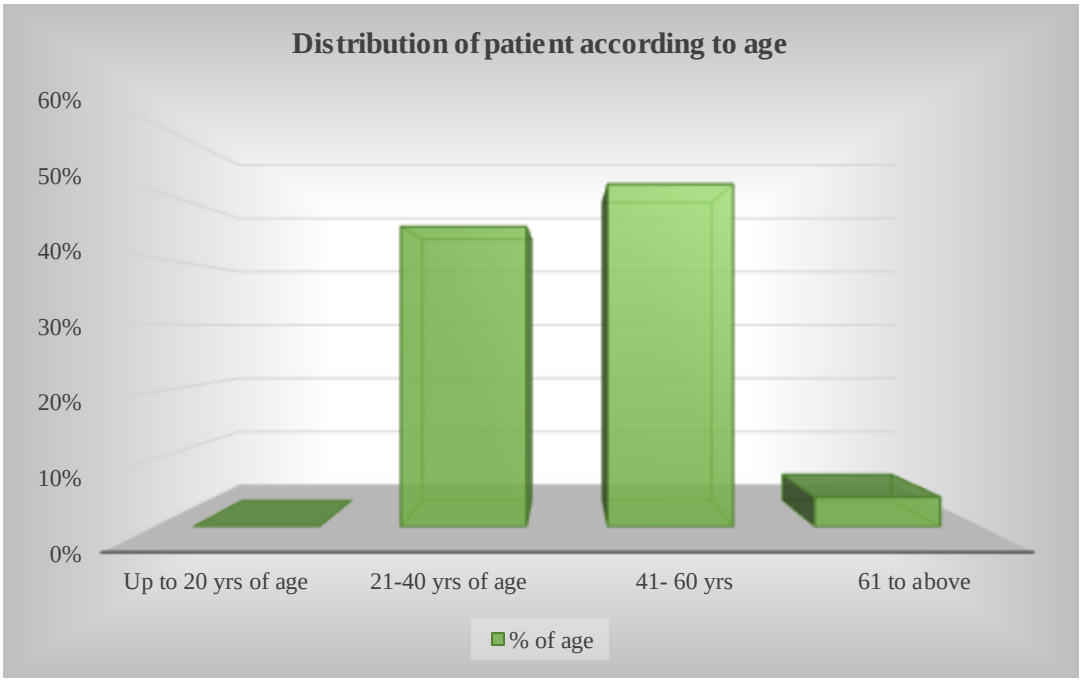
S N	Name of sex	No of patient	% of patient
1	Male	735	54.24
2	Female	620	45.75



3- Distribution of patient according to age-

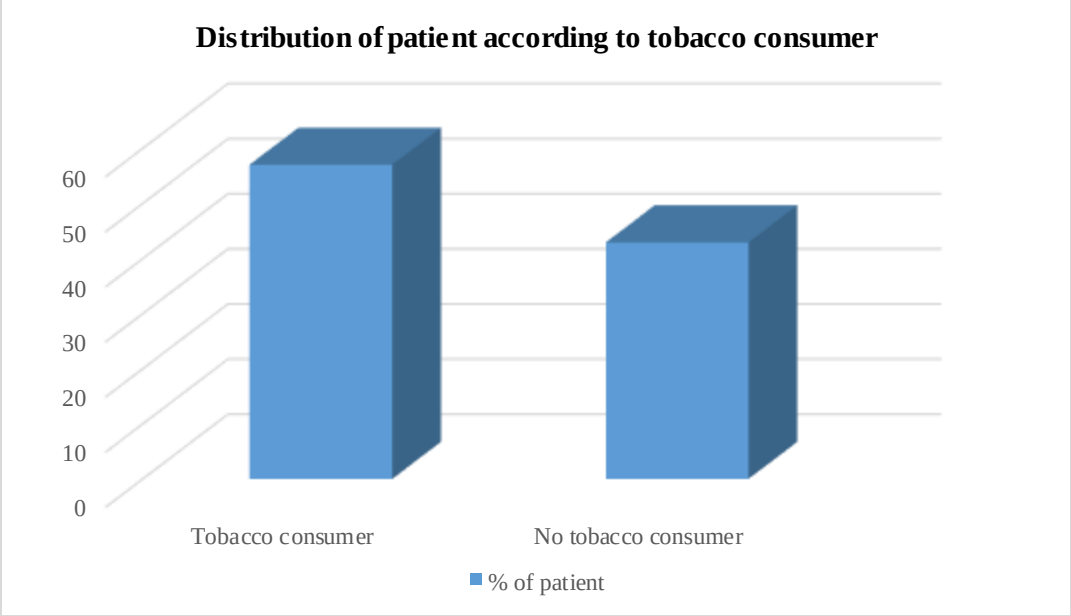
S N	Age group	No of patient	% of age
1	Up to 20 yrs of age	0	0%
2	21-40 yrs of age	605	44.64
3	41- 60 yrs	690	50.92

4	61 to above	60	4.42



4- Distribution of patient according to tobacco consumer.

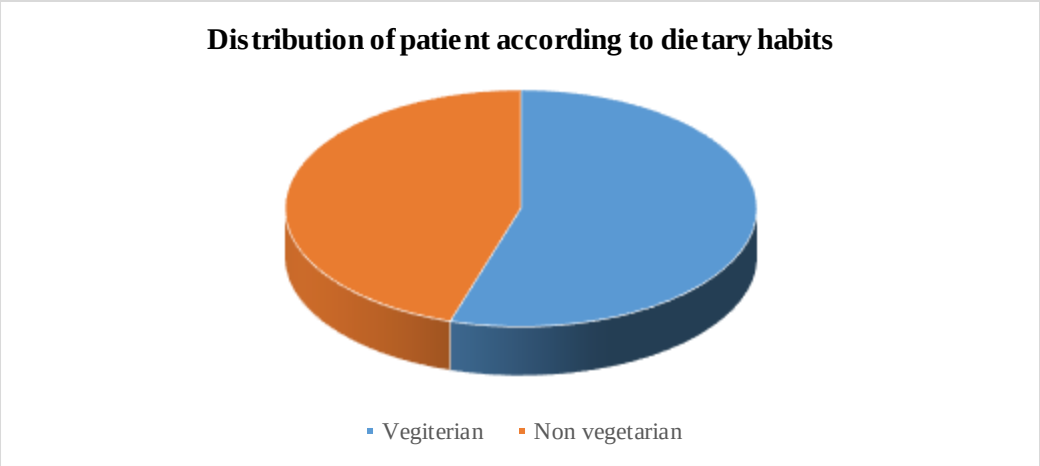
S N	According to category	No of patient	% of patient
1	Tobacco consumer	773	57.04
2	No tobacco consumer	582	42.95



5- Distribution of patient according to dietary habits.

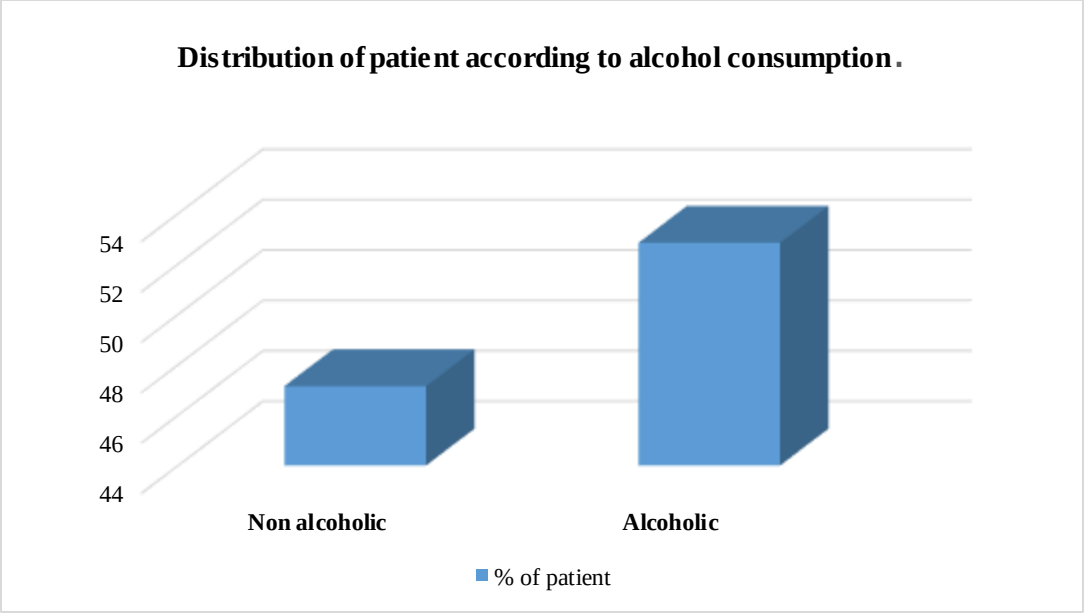
S N	According to dietary habits	No of patient	% of patient
1	Vegiterian	743	54.83

2	Non vegetarian	612	45.16



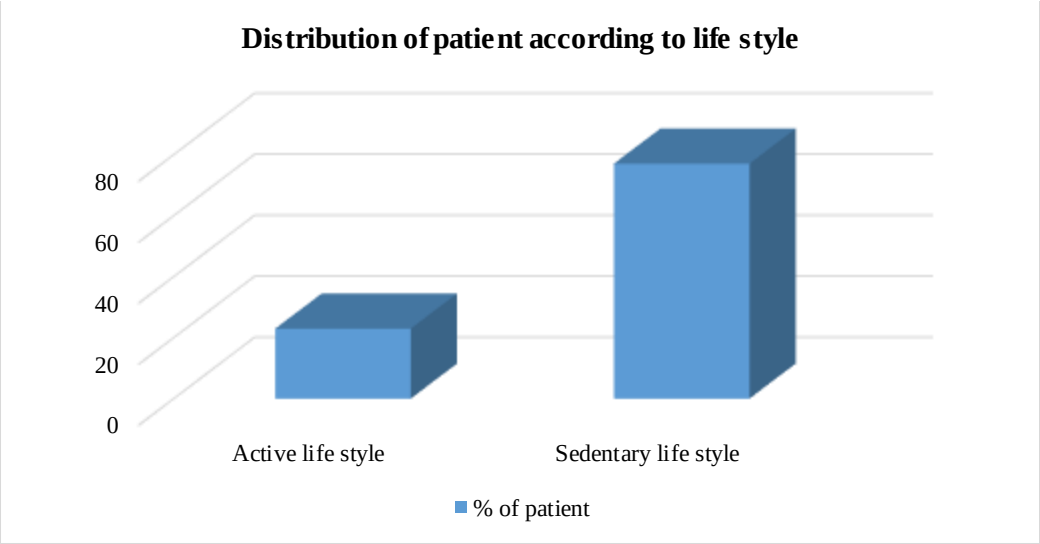
6- Distribution of patient according to alcohol consumption.

S N	According to alcohol consumption habit	No of patient	% of patient
1	Non alcoholic	639	47.15
2	Alcoholic	716	52.84



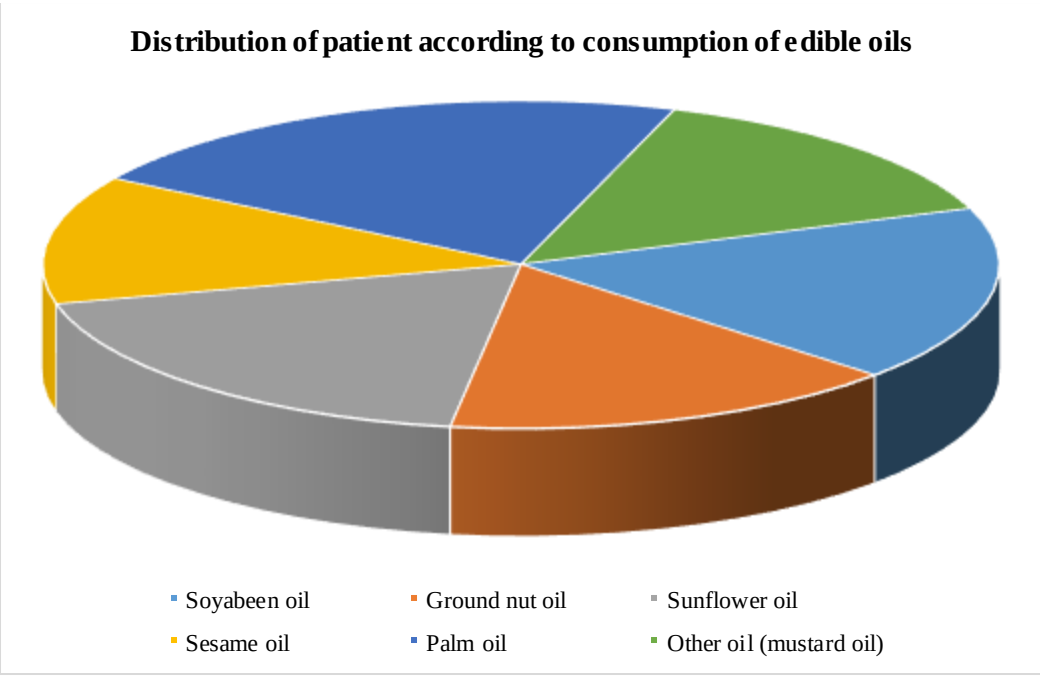
1- Distribution of patient according to life style.

S N	Types of life style	No of patient	% of patient
1	Active life style	311	22.95
2	Sedentary life style	1044	77.04



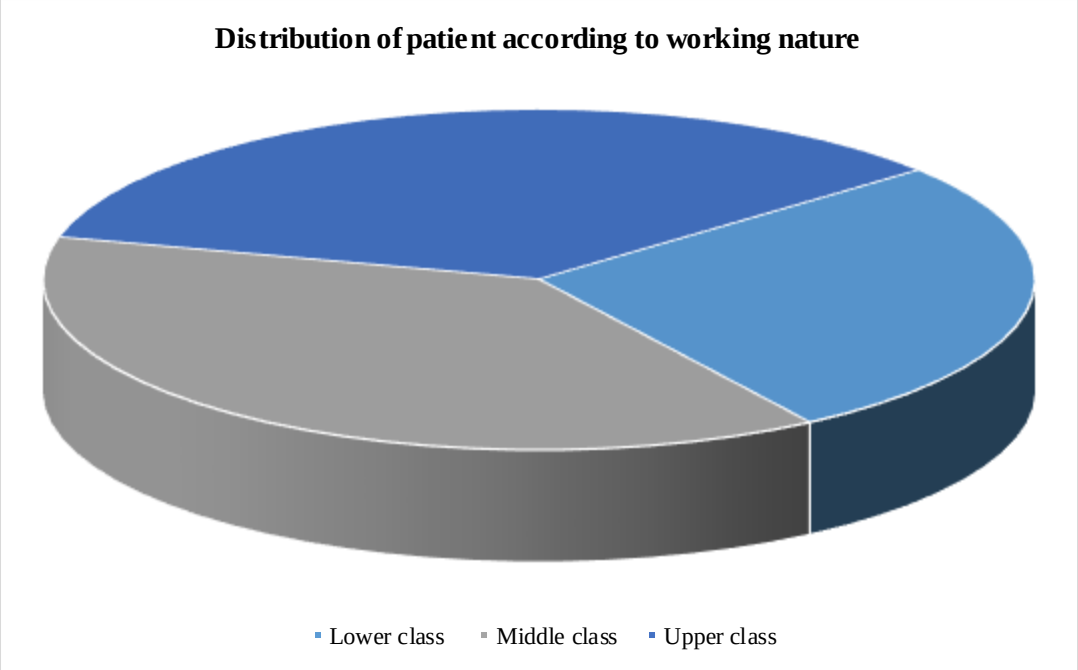
2- Distribution of patient according to consumption of edible oils.

S N	According to consumption of edible oils	No of patient	% of patient
1	Soyabeen oil	235	17.34
2	Ground nut oil	211	15.57
3	Sunflower oil	254	18.74
4	Sesame oil	172	12.69
5	Palm oil	290	21.40
6	Other oil (mustard oil)	193	14.24



3- Distribution of patient according to working nature.

S N	Name of working class nature	No of patient	% of patient
1	Lower class	365	26.93
2	Middle class	517	38.15
3	Upper class	473	34.90



Discussion & conclusion-

The present study was suggest that the role of edible fats in the development & prevalence of diabetes mellitus type 2 (NIDDM) in the rural area of Bhopal M.P. India as follows.

Sex – Male are more prone than female for development & prevalence (NIDDM) in rural area of Bhopal.

Age – Age of 41 yrs to 60 yrs. More prone (50.92%) but youngsters 21 to 40 yrs of age group is also having the 2nd largest population that prevalence the disease.

Tobacco consumption – Study suggest tobacco consumers are more prone to development of type 2 diabetes mellitus (57.04%).

Alcohol consumption- Alcohol consumption person are more prone in the development of type 2 diabetes mellitus (52.84%).

Dietary habits – Study suggest that vegetarian are more prone in comparison of Non vegetarian (54.83) due its deep fried food consumption.

Life style – Sedentary life style is more prone in the prevalence (77.04%) due to low consumption of calories.

Types of edible oils – Study suggest that used palm oil is more prone to develop the diabetes mellitus type 2 (21.40%) and sesame oil is less prone (good for health, 12.69%).

Working nature – Study suggest that middle class population is more prone with (38.15%), upper class is second position in this merit (38.15%) due to fitness freak nature, and use of good fats and nuts which help to maintain the health status.

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