

## Assessing the Prevalence of Obesity in the Community: A Survey Study

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### I. INTRODUCTION:

Obesity is a medical condition characterized by an excessive amount of body fat, to the extent that it may have an adverse effect on health. It is usually defined as a body mass index (BMI) of 30 or greater. BMI is a measure of body fat based on height and weight, and it is widely used to classify overweight and obesity in adults. Obesity is associated with various health problems such as cardiovascular disease, type 2 diabetes, sleep apnea, and certain types of cancer. It is considered a global public health concern, as it affects millions of people worldwide and has a significant impact on health outcomes and healthcare costs.

As commonness of diabetes, heart disease, high blood pressure, and malignancy rises, over weight is a global epidemic that threatens to overwhelm medical resources. Both the increment of bulk of adipose tissue and the rise in production of virulent substances from larger adipocytes are causes of these effects of over-weight. The split of the negative effects of over-weight into those caused by the amount of adipocyte and those caused by the metabolic actions of adipocytes made simple by this idea of the pathogenicity of obesity as a disease. The above category includes which is socially confined associated with overweight, sleep problems caused in part by increased parapharyngeal mass lesion deposits and degenerative joint disease caused by the wear and tear on joints. The metabolic factors linked to far-reaching impacts of substances released from larger fat cells are included in the second category. The increased release of adipocytes from fat cells, which deposited in the liver or muscle, is likely what causes the insulin-resistant condition that is so prevalent in overweight. Diabetes occurs when pancreas' secretory capacity is diminished by the fight against insulin resistance. This effect is especially concerning for health care expenses because to the substantial correlation between elevated fat, particularly visceral fat, and diabetes. The proinflammatory state that defines obesity may be stimulated by the production of cytokines from the fat cell, particularly IL-6. The increased risk of heart and blood disease and high blood pressure may be led along to changes in endothelial function and the increased production of serine protease inhibitor from fat cells, that might relate to the procoagulant condition of obesity. The increased stromal mass's ability to produce oestrogen correlates to the risk of breast cancer. Other forms of proliferative growth might be influenced by increased cytokine release. An increased risk of a reduced life expectancy results from these pathogenetic effects of increasing fat deposits taken collectively.

### EPIDIMEOLOGY

A serious, complicated disease, obesity. Since 1980, the commonness of over-weight has increased significantly all around the world, approximately tripled, to the level that a one fourth of the global population is assessed to be overweight. In anyway based on the area, ethnic background, trade or labour, the commonness of overweight has increased in individuals of all ages and genders, however it tends to be higher in older people and women. Despite significant differences in the absolute common rates of this pattern was constant across regions and nations. The prevalence rates of obesity appear to have held steady in a few wealthy nations over the past several years. In epidemiological research, overweight is commonly defined using the critical mass. Although age, sex, and ethnicity seem to be followed a sequence accountable for the high inter-individual variability in % body fat for any given BMI score, BMI has low sensitivity. Increased fat to lean mass ratios, visceral adipose tissue distribution of excess fat, and abnormal depots (such as muscle and liver) have all been linked to greater cardiometabolic risk (e.g., metabolically-obese normal-weight).

These finding suggest that, contrast to what major epidemiological studies have indicated, obesity may be much more prevalent and immediately requires intervention. Future obesity prevention and control measures may be handicapped if their prevalence is only determined by BMI. No evidence of the obesity epidemic is being countered. The environmental factors that are causing the population to gradually gain weight must be addressed immediately. Over the previous ten years, the commonness of over-weight has been increasing significantly and is currently at an all-time high.

### **SOCIAL FACTORS IN OBESITY:**

Studies have been conducted for the relationship between obesity and various social factors. Obesity and socioeconomic status were found to have an opposite relation, similar to that between obesity and parental socioeconomic status. Women with low status were six times more likely to be obese than those with peak status. Females who were upwardly mobile also had lower obesity rates (12%) than those who were downwardly mobile (22%). For both sexes, there may be correlation between ethnic and religious parameters and obesity. These findings imply that initiatives specifically designed for populations at high risk could provide chances for more efficient weight control approaches.

### **RISKS OF OBESITY:**

Additionally, obesity is closely linked to a higher risk of mortality, including cardiovascular disease and malignancy. Despite the serious consequences of overweight, losing pounds can significantly lower the risk for most of these co-morbid conditions. To promote awareness of potential negative effects, it is necessary to identify those comorbidities that are most directly related to obesity. This will make it possible for medical professionals to agree on and implement out the best measures to lower patient risk and death.

### **PATHOPHYSIOLOGY OF OBESITY:**

Obesity is a complex condition that results from the interaction of multiple factors, including:

#### Genetics vs environment:

Multiple studies have compared the roles of heredity and other environmental factors to the causes of obesity. It's also crucial to consider how environment and genetics interact. Some individuals of a community may have a genotype that makes them more likely to become obese, but this genotype may only come out under specific unfavourable environmental circumstances, such as high consumption of fatty foods and being motionless.

Genetics: Certain genetic factors can increase the risk of obesity, such as variations in genes that regulate metabolism and hunger.

Here are some examples of genetic factors that can increase the risk of obesity:

Variations in the leptin gene: Leptin is a hormone that regulates hunger and metabolism. Certain variations in the leptin gene can cause resistance to its effects, leading to increased appetite and weight gain.

Variations in the melanocortin 4 receptor gene (MC4R): The MC4R gene regulates hunger and metabolism. Certain variations in this gene can cause decreased sensitivity to melanocortin, leading to increased hunger and weight gain.

Variations in the pro-opiomelanocortin (POMC) gene: The POMC gene helps regulate appetite and metabolism. Certain variations in this gene can result in decreased production of POMC peptides, leading to increased hunger and weight gain.

Variations in the fat mass and obesity-associated gene (FTO): The FTO gene is associated with energy homeostasis and metabolism. Certain variations in this gene can increase the risk of obesity and type 2 diabetes.

It's important to note that genetics is only one of many factors that can contribute to the development of obesity, and not all individuals with obesity will have genetic causes. Other factors such as diet, physical activity, and environment also play a significant role. Additionally, the impact of genetic factors on obesity can be modified by lifestyle choices. A comprehensive evaluation by a healthcare professional can help determine the specific factors contributing to obesity in an individual.

Diet: An unhealthy diet that is high in calories, sugar, and saturated fat can contribute to weight gain and obesity. Here are some examples of dietary factors that can contribute to obesity:

High calorie intake: Consuming more calories than the body burns through physical activity and metabolism can lead to weight gain and obesity.

High sugar intake: Consuming large amounts of sugar, especially from sugary drinks, can contribute to weight gain and obesity.

High fat intake: Consuming high amounts of saturated and trans fats, which are typically found in processed and fast foods, can contribute to weight gain and obesity.

Lack of fibre: A diet low in fibre, especially soluble fibre, can contribute to weight gain and obesity.

Unbalanced meal patterns: Eating irregularly or skipping meals can disrupt the body's energy balance and contribute to weight gain.

Portion control: Consuming large portions of food can result in a higher calorie intake and contribute to weight gain.

It's important to note that diet is only one of many factors that can contribute to the development of obesity, and not all individuals with obesity will have dietary causes. Other factors such as physical activity, environment, and genetics also play a significant role. A comprehensive evaluation by a healthcare professional can help determine the specific factors contributing to obesity in an individual

Physical inactivity: A sedentary lifestyle, with little to no physical activity, can lead to weight gain and obesity. Here are some examples of physical inactivity that can contribute to obesity:

Sedentary behaviour: Spending long periods of time sitting, such as at a desk or in front of a screen, can lead to a decrease in energy expenditure and an increase in calorie storage.

Lack of exercise: Not getting enough physical activity, such as through exercise or physical labour, can result in a lower energy expenditure and contribute to weight gain.

Automation of daily activities: The increasing automation of daily activities, such as through the use of machines for household tasks, can lead to a decrease in physical activity and contribute to weight gain.

Reduced physical activity in leisure time: Spending less time engaging in physical activities during leisure time, such as sports or outdoor recreation, can lead to a decrease in physical activity and contribute to weight gain.

It's important to note that physical inactivity is only one of many factors that can contribute to the development of obesity, and not all individuals with obesity will have physical inactivity as a cause. Other factors such as diet, environment, and genetics also play a significant role. A comprehensive evaluation by a healthcare professional can help determine the specific factors contributing to obesity in an individual

Environment: Factors such as urbanization, availability of unhealthy foods, and lack of opportunities for physical activity can contribute to the development of obesity.

Here are some examples of environmental factors that can contribute to obesity:

Access to unhealthy foods: Living in environments with high availability and accessibility of unhealthy foods, such as fast-food restaurants and convenience stores, can increase the likelihood of consuming high calorie and low nutrient foods.

Lack of safe and accessible places to be physically active: Living in environments without safe and accessible places to be physically active, such as parks or sidewalks, can reduce opportunities for physical activity and contribute to weight gain.

Built environment: Living in environments with a built environment that does not encourage physical activity, such as neighbourhoods without sidewalks or parks, can contribute to reduced physical activity and weight gain.

Socioeconomic status: Living in lower income communities can be associated with a higher risk of obesity, as these communities may have limited access to healthy food options and safe places to be physically active.

Stressful work or home environment: Living in stressful work or home environments can contribute to weight gain by altering hormone levels, increasing stress-related eating, and reducing opportunities for physical activity.

It's important to note that environment is only one of many factors that can contribute to the development of obesity, and not all individuals with obesity will have environmental causes. Other factors such as diet, physical activity, and genetics also play a significant role. A comprehensive evaluation by a healthcare professional can help determine the specific factors contributing to obesity in an individual.

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Socioeconomic status: Lower income and education levels have been associated with higher rates of obesity. Here are some examples of how socioeconomic status can contribute to obesity:

Limited access to healthy food options: Low-income communities may have limited access to healthy food options, such as supermarkets with fresh produce, and higher availability of fast-food restaurants and convenience stores selling unhealthy foods.

Low food literacy: People with lower levels of education and income may have limited food literacy and limited knowledge of healthy eating habits.

Stressful work or home environment: People with lower levels of income and education may experience higher levels of stress and economic insecurity, which can contribute to weight gain by altering hormone levels and increasing stress-related eating.

Lack of safe and accessible places to be physically active: Low-income communities may have limited access to safe and accessible places to be physically active, such as parks or sidewalks, which can reduce opportunities for physical activity and contribute to weight gain.

Time constraints: People with low income or working multiple jobs may have limited time and resources to prioritize healthy habits, such as meal preparation and physical activity.

It's important to note that socioeconomic status is only one of many factors that can contribute to the development of obesity, and not all individuals with obesity will have socioeconomic causes. Other factors such as diet, physical activity, and environment also play a significant role. A comprehensive evaluation by a healthcare professional can help determine the specific factors contributing to obesity in an individual.

Medical conditions: Certain medical conditions, such as hypothyroidism, Cushing's syndrome, and polycystic ovary syndrome, can cause weight gain and obesity.

Here are some examples of medical conditions that can contribute to obesity:

Hypothyroidism: A condition where the thyroid gland is not producing enough hormones, which can lead to weight gain.

Polycystic ovary syndrome (PCOS): A hormonal disorder in women that can lead to weight gain and difficulty losing weight.

Cushing's syndrome: A condition caused by an overproduction of cortisol, a hormone produced by the adrenal glands, which can lead to weight gain.

Prader-Willi syndrome: A genetic disorder that causes constant hunger and leads to weight gain.

Sleep apnoea: A sleep disorder that causes disrupted breathing during sleep, which can lead to weight gain and difficulty losing weight.

Depression: Depression and other mental health conditions can lead to changes in eating habits and physical activity levels, which can contribute to weight gain.

Certain medications: Some medications, such as steroids, antipsychotics, and antidepressants, can cause weight gain as a side effect.

It's important to note that medical conditions are only one of many factors that can contribute to the development of obesity, and not all individuals with obesity will have medical causes. Other factors such as diet, physical activity, and environment also play a significant role. A comprehensive evaluation by a healthcare professional can help determine the specific factors contributing to obesity in an individual.

Medications: Certain medications, such as steroids and some antidepressants, can cause weight gain and contribute to the development of obesity.

Some medications that can cause weight gain and lead to obesity include:

Antidepressants (e.g. tricyclics, MAO inhibitors, SSRIs)

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Antihistamines (e.g. diphenhydramine)  
Antipsychotics (e.g. clozapine, olanzapine)  
Insulin and other diabetes medications  
Steroids (e.g. prednisone)  
Mood stabilizers (e.g. valproate)  
Hormonal contraceptives

It's important to note that not everyone taking these medications will experience weight gain and that other factors such as diet and physical activity can also play a role

It's important to note that obesity is a complex condition with many contributing factors, and not all individuals with obesity will have the same causes. A comprehensive evaluation by a healthcare professional can help determine the specific factors contributing to obesity in an individual.

Metabolic Predictors of Weight Gain: -

When caloric intake is excessive when compared with energy expenditure, obesity develops.

- ❖ Being immobile
- ❖ High carbohydrate fat ratio
- ❖ Lack of physical activity

These are three parameters that have been shown to forecast about weight gain.

Sedentary lifestyle is thought to contribute to weight gain as well, but this has yet to be demonstrated in a well-designed prospective study of past data. Physical activity involvement declines with age, according to the Report on Physical activity and the health. More females than males do not engage in the exercise in each age group. For instance, by the age of 45, only about 18% of men and 30% of women are routinely exercising. The second possible metabolic indicator of weight increase is RQ. A low RQ of 0.7 indicates that more fats than the sugars are being oxidised, whereas the ratio of 1.0 indicates that more sugars are being oxidised than the fats.

Other factors are also linked to being obese, but it is unclear why they affect and how they affect the condition. Gender, age, ethnicity, and economic situation all affect weight gain, with women, elderly people, people of other races, and those with lower socioeconomic class being more likely to be overweight or obese.

Patterns of Fat Distribution in the body and Risk for Certain Diseases:

Sugar, high blood pressure, ischemic heart disease (IHD), hyperlipidaemias, gallstones and various types of cancers are few of the conditions that obesity makes more likely to develop. In addition to raising the risk of various conditions, being overweight also affects how fat is distributed in many of these conditions. While females are more likely to have a lower body pattern of fat distribution, males are more likely to have abdominal or upper-body obesity. However, women are more prone to develop belly and upper-body fat when they put on weight.

Currently, upper-body fat distribution is independently linked to a higher risk of developing kidney and cardiovascular disease, according to multiple prospective longitudinal studies. Additionally, cross-sectional study shows that, their link with a high quintet index (BMI) or the total fat, the distribution of the abdominal fat is related to a variety of the metabolic abnormalities and illnesses. Endothelial dysfunction, high clotting factors, high blood pressure, insulin sensitivity, high amount of insulin in the blood, higher blood glucose levels, joint inflammation, irregular menstruation, and gallstone disease are only a few of these metabolic disorders.

Disorders associated with obesity:

- INSULIN SENSITIVITY/ HIGH AMOUNT OF INSULIN IN THE BLOOD
- OSTEOARTHRITIS
- HEART ATTACK
- SUGAR
- BREATHING ILLNESS
- HIGH BLOOD PRESSURE
- APNOEA
- HYPERLIPIDEMIA
- ISCHEMIC HEART DISEASE
- COMPLICATIONS DURING THE PREGNANCY
- GALL STONES
- DIFFERENT TYPES OF MALIGNANCIES
- MENSTRUAL PROBLEMS
- EXCESSIVE HAIR GROWTH
- EARLY DEATH
- MENTAL STRAIN AND STRESS.

**VARIOUS CONDITIONS THAT ARE ASSOCIATED WITH OBESITY:**

Insulin sensitivity : A decrease in insulin sensitivity may be acquired as a result of fat or it may result from a hereditary issue. Particularly seen among the members with a high distribution of abdominal fat, these changes were evident. Once high insulin levels in the blood and insulin sensitivity are prominent, series of metabolic alterations that eventually result in cardiovascular disease, diabetes, dyslipidaemia, hypertension, and hypercoagulability begins.

The Bergman minimum model technique is used to demonstrate the connection between insulin sensitivity and BMI. Insulin sensitivity is inversely linked with BMI in a group of non-diabetic individuals whose BMI varied substantially. Obese persons require the insulin levels that are several times higher than those of the non-obese subjects to maintain normal glucose tolerance in both the fasting and postprandial states.

Tyrosine autophosphorylation and subsequent intracellular signalling are caused by insulin's binding to the surface receptors of the target cells. These processes result in cellular reactions, such as the movement of the transporters of glucose of the cell surface to enable glucose absorption for the purpose of the glycogen synthesis. However signalling pathway of insulin is damaged in obesity. Obese subjects have reduced insulin-stimulated protein kinase activity than the non-obese subjects, and obese type 2 diabetes patients have even lower kinase activity of the insulin stimulated protein by the insulin receptors which triggers the autophosphorylation of the tyrosine.

Additionally, obesity is linked to various post-receptor binding problems in insulin action, including anomalies in some of the crucial pathways associated with the enzyme involved in glucose utilisation, reduced glucose transport, and impaired second messenger production.

Hypertension:

Along with an increase in BMI comes an increase in hypertension risk. A rise in vascular volume is a hallmark of the obesity-related hypertension, but peripheral resistance is often marginally raised.

Sympathetic nervous system activation, increased water absorption, increased levels of the renal salts, alterations in the Na<sup>+</sup>/H<sup>+</sup> ATP activity ,growth mediated factors which are being associated with the structural changes to the arterial wall are some of the variables that are being contributing to the development of hypertension in the obese individuals .Hyperinsulinemia may play a role in any instance

Dyslipidaemia:

The elevated FFA levels in obesity have a number of negative effects in addition to improper glucose utilisation and as well as the increased hepatic glucose production. Increased FFA levels also have an impact on lipid metabolism by boosting the liver's production of different types of lipoproteins.

The smaller LDL particles are more dangerous than larger, because they can more easily puncture the arterial wall, undergo oxidation followed by glycation. The presence of the smaller LDL particles, increases the atherogenic risk even when the LDL cholesterol level does not change much. Together, these changes to the lipoprotein profile are linked to a higher risk of CHD.

SIGNS AND SYMPTOMS OF OBESITY :

- ✓ High amount of body fat,
- ✓ Difficulty in breathing
- ✓ Snoring
- ✓ Difficulty in sleeping
- ✓ Skin problems
- ✓ Unable to do the work as before
- ✓ Fatigue
- ✓ Tiredness
- ✓ Pain usually in the joints.
- ✓ Profuse sweating
- ✓ Swelling in the lower body parts
- ✓ Constipation
- ✓ Lethargy
- ✓ Increased hunger
- ✓ Excess fat deposition in abdomen and waist
- ✓ Double chin
- ✓ Low confidence and self esteem
- ✓ Big belly



- ✓ Lower back pain
- ✓ Weight gain
- ✓ Varicose veins
- ✓ Decreased performance
- ✓ Decreased libido
- ✓ Difficulty in doing the daily activities
- ✓ Larger body frame
- ✓ Stretch marks
- ✓ Flat feet
- ✓ Early puberty and irregular menstrual cycle in girls
- ✓ Delayed puberty in boys
- ✓ Dark velvet around the neck
- ✓ Dislocated hip

#### **COMPLICATIONS ASSOCIATED WITH OBESITY:**

Obesity can contribute to many serious health complications. Serious health complications that are more likely to be associated with the obesity includes the following:

- ❖ Stroke
- ❖ Depression
- ❖ Intracranial hypertension
- ❖ Obstructive sleep apnoea
- ❖ Cataracts
- ❖ Asthma
- ❖ Hyperlipidaemia
- ❖ High blood pressure
- ❖ Ischemic heart disease
- ❖ Endothelial dysfunction
- ❖ Non-alcoholic fatty liver disease
- ❖ Steatohepatitis
- ❖ Liver cirrhosis
- ❖ Liver fibrosis
- ❖ Gall stones
- ❖ Risk for colon cancer
- ❖ Pancreatitis
- ❖ Proteinuria
- ❖ Glomerulosclerosis
- ❖ Diabetes
- ❖ Irregular menses
- ❖ Polycystic ovarian syndrome
- ❖ Infertility
- ❖ Early puberty
- ❖ Hypogonadism in males
- ❖ Hernia
- ❖ Forearm fracture
- ❖ Flat feet
- ❖ Joint disease
- ❖ Deep vein thrombosis or pulmonary embolism
- ❖ Venous stasis

#### **DIAGNOSIS OF OBESITY**

These exams and tests generally include:

1. Medical history:

- ✓ Weight history
- ✓ Weight loss methods
- ✓ Physical activity and exercise
- ✓ Eating patterns
- ✓ Medications

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- ✓ Stress levels
- ✓ Family history
- ✓ Other predisposed conditions

### 2. Physical examination:

- ✓ Height
- ✓ Heart rate
- ✓ Blood pressure
- ✓ Temperature

### 3. BMI calculation :

Body Mass Index (BMI) is a simple and widely used method for estimating body fat based on a person's weight and height. It is calculated by dividing a person's weight in kilograms by their height in meters squared ( $\text{kg}/\text{m}^2$ ). The resulting value is used to classify a person's weight status as underweight, normal weight, overweight, or obese. The following are the commonly used BMI categories:

Underweight: BMI less than 18.5

Normal weight: BMI between 18.5 and 24.9

Overweight: BMI between 25 and 29.9

Obese: BMI of 30 or greater

BMI is a useful tool for population-level assessments of overweight and obesity, but it has limitations for individual assessments. For example, it does not take into account differences in muscle mass, bone density, and distribution of fat. It is also not a diagnostic tool, as other factors such as genetics, diet, physical activity, and overall health must also be considered. In general, it should be used as part of a comprehensive evaluation of a person's health status, rather than as the sole determinant.

It's important to note that the BMI categories are general guidelines, and other factors such as age, sex, and muscle mass should also be considered in determining a person's overall health status. A healthcare professional can provide personalized guidance and recommendations based on a comprehensive evaluation.

Category as per BMI	BMI RANGE - $\text{Kg}/\text{m}^2$
Severe thinness	<16
Moderate thinness	16-17
Mild thinness	17-18.5
Normal	18.5-25
Over weight	25-30
Obese class 1	30-35
Obese class 2	35-40
Obese class 3	>40

### 4. waist circumference measurement:

Age	Average waist size(cm)	Average waist size(inches)
20-29	94.2	37.1
30-39	102.6	40.4
40-49	104.1	41.0
50-59	105.1	41.4
60-69	107.3	42.2
70-79	107.4	42.3
>80	104.3	41.1

### 5. Checking for other health problems:

- ✓ High blood pressure
- ✓ Cholesterol
- ✓ Thyroid problems
- ✓ Liver problems
- ✓ Diabetes



Preventive measures to overcome obesity:

The preventive measures to overcome obesity include:

Eating a healthy diet: Focus on eating whole, unprocessed foods and reducing your intake of added sugars and saturated fats.

Engaging in regular physical activity: Aim for at least 30 minutes of moderate-intensity activity most days of the week.

Maintaining a healthy weight: Monitor your weight and make changes to your diet and activity level as needed to keep it in a healthy range.

Limiting sedentary behaviour: Reduce the amount of time you spend sitting, watching TV, or using electronic devices.

Getting enough sleep: Aim for 7-9 hours of sleep each night.

Managing stress: Find healthy ways to manage stress, such as exercise, meditation, or therapy.

Avoiding fad diets and rapid weight loss programs: These approaches are not sustainable and can lead to yo-yo dieting and weight gain over time.

It's important to work with your healthcare provider to determine the best approach for you and to monitor your progress over time.

Treatment for obesity:

The treatment for obesity typically involves a combination of lifestyle changes, medical intervention, and, in some cases, bariatric surgery.

Lifestyle changes: This includes following a healthy diet, increasing physical activity, and reducing sedentary behaviour.

Medical intervention: This may include prescription medications, such as weight loss drugs, as well as behavioural therapy and support groups.

The safe and effective medicines for the treatment of obesity are orlistat and liraglutide.

#### 1. ORLISTAT:

- It is an anti-obesity drug used to treat obesity and help in weight loss
- It decreases the absorption of the fat from the food that is being consumed through the diet.
- Thus, fat passes through the gut and excreted through the faeces, making the body unable to use fat as a source of energy or by converting it into a fat tissue.
- Thereby it helps in the weight loss as well as reducing the risk of complicated health disorders.

Side effects:

- Nausea
- vomiting
- headache
- Stomach pain
- Loss of appetite
- Diarrhoea
- Dark urine
- Flatulence(gas)

Contraindications:

- Cholestasis
- Anorexia
- Thyroid
- Diabetes
- Liver problems
- Kidney problems

Drug interactions:

Drug - drug interactions	Drug - food interactions	Drug - disease interactions
Warfarin (blood thinner)	Butter	Cholestasis
Levothyroxine ( anti thyroid)	Meat	Chronic malabsorption
Amiodarone (antiarrhythmic)	Dark chocolates	Anorexia
Lamotrigine (anticonvulsant)	Olive oil	Thyroid disorders
Atazanavir(HIV drug)	Nuts	Liver problems
Ciclosporin (suppressant)	Seeds	Kidney problems

Diet and life style advise:

- Eat fruits, vegetables and grains.
- Do not skip meals
- Do regular exercise.
- Limit intake of sugar
- Avoid alcohol consumption
- Avoid fried foods.

Special advise:

- Blood test is to recommended while taking orlistat to monitor kidney and liver functioning
- Regular monitoring of blood sugar is recommended as it may affect the blood sugar levels

LIRAGLUTIDE :

- It is an anti-diabetic drug.
- It is mainly used to treat type 2 diabetes mellitus.
- it is a recombinant deoxy ribonucleic acid (rDNA).
- It works by increasing insulin release from the pancreas and decreases the blood sugar levels .
- It also shows the stomach emptying time, thereby further leads to decrease the appetite and promotes the weight loss.

Side effects:

- Nausea
- Vomiting
- Decrease in the appetite
- Diarrhoea
- Stomach upset
- Headache
- Constipation
- Dizziness
- Discomfort
- Feeling tired

Contraindications:

- Heart diseases
- Kidney disorders
- Liver disorders

- Stomach disorders
- Tumours

Drug interactions :

- Insulin glargine (anti-diabetic)
- Prednisone (corticosteroids)
- Olanzapine (psychiatric medicine)
- Ciprofloxacin (antibiotics)
- Propranolol (antihypertensive)

Diet and lifestyle advise:

- Eat at the regular intervals
- Eat fruits, vegetables.
- Avoid sugars and fatty food
- Avoid carbonated drinks and foods

### Treating obesity in children

Various strategies are used for the treatment of obesity in children

- Reducing the energy intake
- Increase in the physical activity
- Reduction in sedentary life style

Drug therapy in children must not be used as the isolated treatment but as the complementary to it the traditional treatments such as the dietary changes ,life style modifications, physical activity and control of their emotions.

Bariatric surgery: This is a more drastic option for those who are severely obese and have not been able to achieve significant weight loss through other means. Bariatric procedures work by reducing the size of the stomach or altering the digestive process.

It's important to work with a healthcare provider to determine the best approach for you and to monitor your progress over time. The goal of treatment is to achieve and maintain a healthy weight for the long-term, rather than just a quick fix.

## **II. Methods:**

Design of the Survey Study: A survey study to assess the prevalence of obesity and the effectiveness of preventive measures and treatment options can be designed as follows:

Participants: The study should include a representative sample of the population, such as individuals of different ages, genders, ethnicities, and socio-economic backgrounds.

Data collection: A combination of self-reported questionnaires and clinical measurements (e.g. Body Mass Index, waist circumference) can be used to collect data on participants' weight, diet, physical activity, and other relevant factors.

Questionnaire: The questionnaire should include questions on demographic information, current weight and height, dietary habits, physical activity levels, medication use, and treatment history (if applicable).

Data analysis: Descriptive statistics can be used to summarize the prevalence of obesity and associated risk factors in the sample population. Inferential statistics can be used to examine the relationship between these factors and the effectiveness of preventive measures and treatment options.

Ethical considerations: Participants should be informed of the purpose of the study and their rights, and they should provide written informed consent. Confidentiality of participants' personal information should be maintained.

It is important to note that this is a basic design and that the specifics of the study, including sample size, questionnaire content, and data analysis methods, may need to be adapted based on the research question and available resources

Sampling:

he sampling for the survey study on obesity can be done using one of the following methods:

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**Simple Random Sampling:** In this method, participants are selected randomly from a larger population. This ensures that each participant has an equal chance of being selected and that the sample is representative of the population.

**Stratified Sampling:** In this method, the population is divided into strata or subgroups based on characteristics such as age, gender, or socio-economic status. Participants are then randomly selected from each stratum to ensure that the sample is representative of the entire population.

**Cluster Sampling:** In this method, the population is divided into smaller clusters or groups, and then a sample of these clusters is selected. Participants are then selected randomly within each selected cluster. This method is useful when it is difficult or impractical to obtain a list of all individuals in the population.

**Convenience Sampling:** In this method, participants are selected based on their accessibility or willingness to participate in the study. This method is not representative of the population and can lead to selection bias, but it is often used in early stages of research when resources are limited.

It is important to consider the size of the sample when selecting a sampling method. A larger sample size increases the accuracy and generalizability of the results, but it also increases the time and resources required to conduct the study. The specific sampling method used and the sample size should be chosen based on the research question, resources available, and ethical considerations.

**Data Collection, and Analysis:**

Data collection and analysis for the survey study on obesity can be done as follows:

**Data Collection:** Participants can complete a self-administered questionnaire and undergo clinical measurements, such as body mass index (BMI) and waist circumference. The questionnaire should include questions on demographic information, current weight and height, dietary habits, physical activity levels, medication use, and treatment history (if applicable). The data collected should be entered into a secure database for analysis.

**Data Cleaning:** Before analysis, the collected data should be reviewed and any missing, inconsistent, or inaccurate data should be corrected or removed.

**Descriptive Statistics:** Descriptive statistics can be used to summarize the prevalence of obesity and associated risk factors in the sample population. This may include calculating the mean, median, and standard deviation of weight and height, as well as the frequency of specific dietary and physical activity habits.

**Inferential Statistics:** Inferential statistics can be used to examine the relationship between various factors (e.g. diet, physical activity, medication use) and the effectiveness of preventive measures and treatment options. This may include regression analysis, chi-square tests, and t-tests.

**Data Visualization:** Data visualization tools, such as graphs and charts, can be used to present the results in a clear and understandable manner.

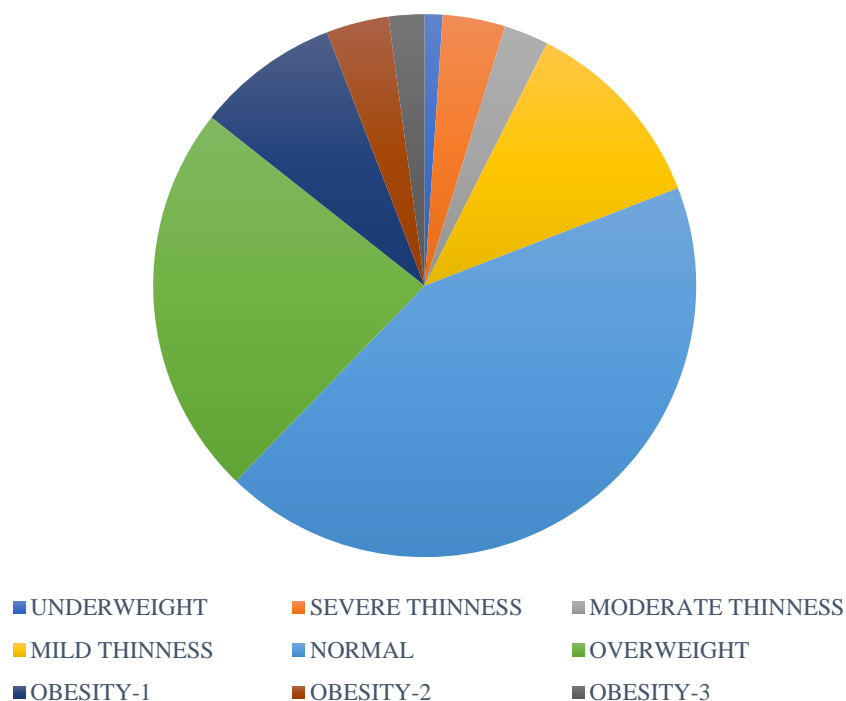
**Interpretation of Results:** The results of the study should be interpreted in light of the research question and any limitations of the study design and data collection. The findings should be reported in a clear and concise manner, and any implications for future research or practice should be discussed.

It is important to ensure the quality and validity of the data collected and the accuracy of the analysis. The specific analysis methods used should be chosen based on the research question and the type of data collected. It is also important to consider any ethical considerations, such as ensuring the confidentiality of participant information and obtaining informed consent.

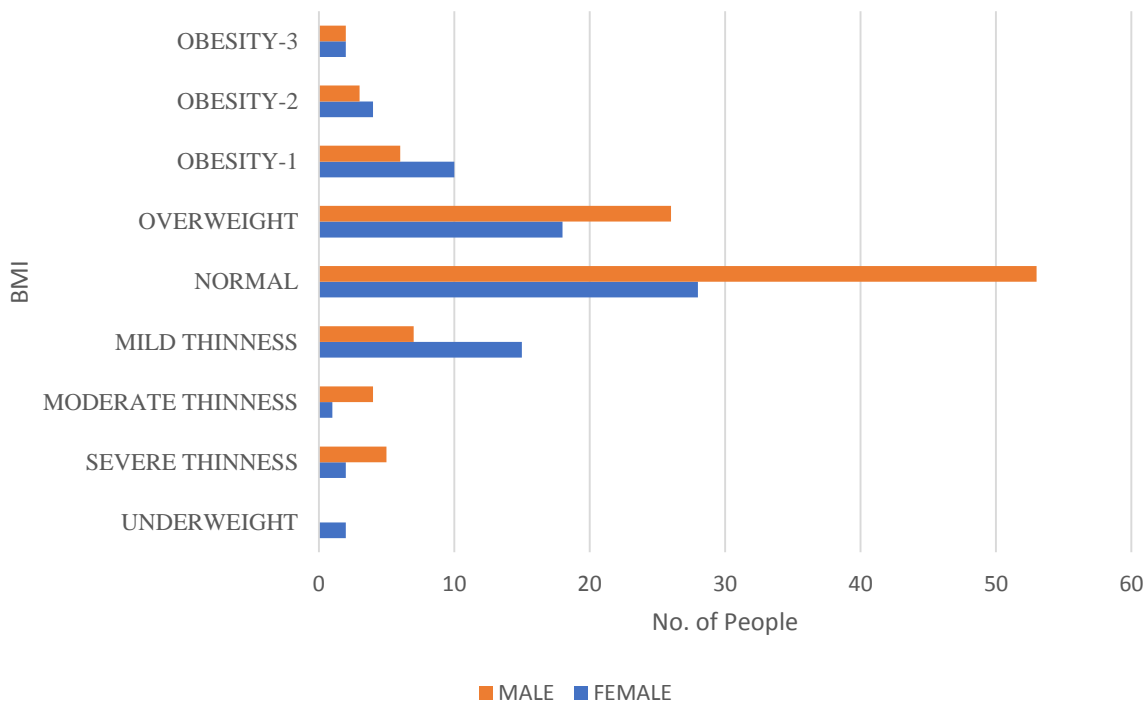
### **III. Results:**

The prevalence of obesity among the global population is currently so high that it is starting to displace malnutrition and infectious diseases as the main cause of poor health. Obesity is specifically linked to diabetes mellitus, coronary heart disease, certain cancers, and sleep-breathing disturbances. In order to be categorized as obese, a person must have a quetelet index of at least 30 kg/m<sup>2</sup>, which excludes the morbidity and mortality imposed by even mild degrees of overweight as well as the negative effects of intra-abdominal fat. A combination of genetic predisposition, increased accessibility to high-energy meals, and modern society's decreased need for physical activity has led to an epidemic of obesity all around world. Obesity should no longer be considered only a cosmetic issue affecting some people, but rather an epidemic that directly threatens the wellbeing of the entire world.

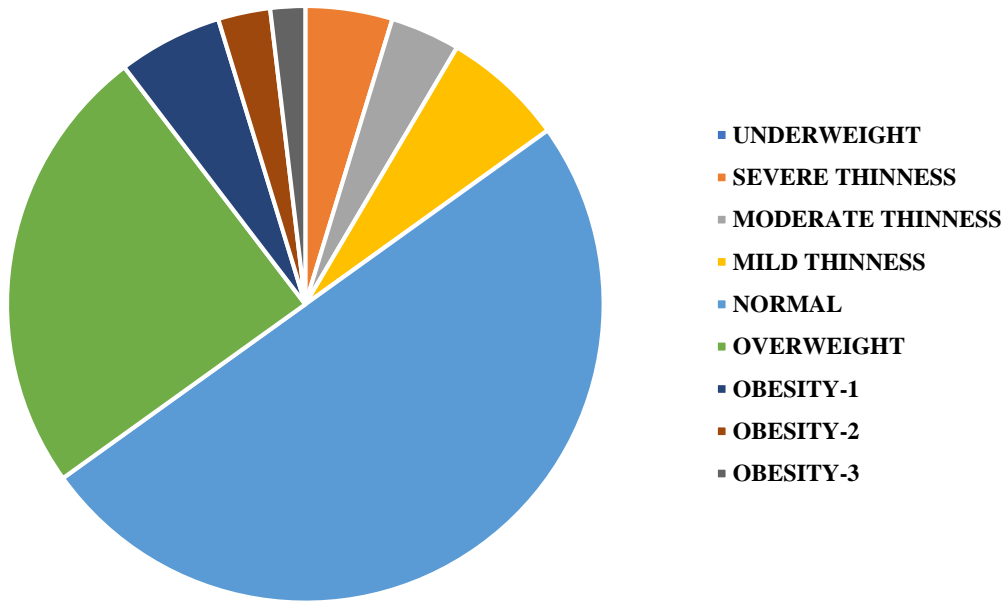
**Fig.1 - BMI DISTRIBUTION IN TOTAL SURVEYED POPULATION**



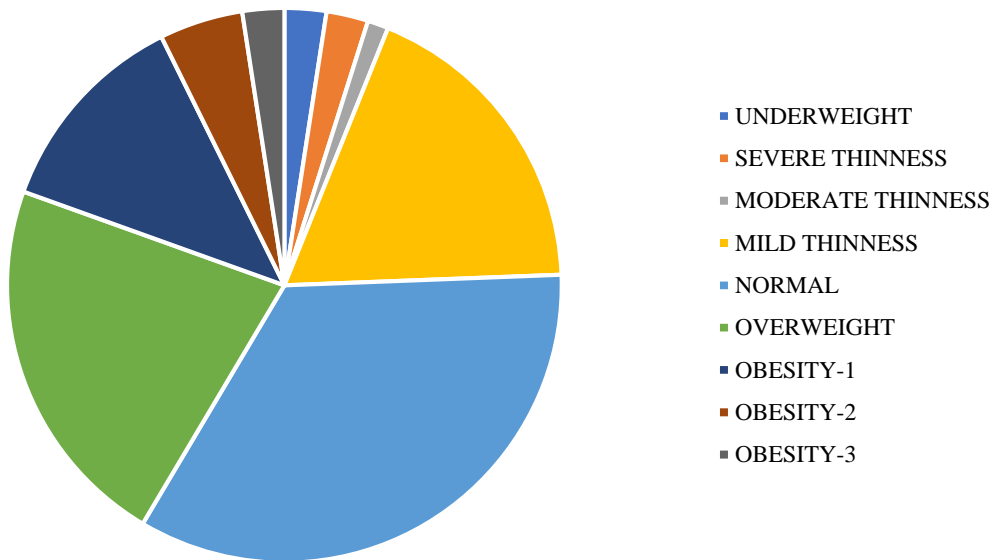
**Fig.2 - VARIATION OF BMI{as per gender}**

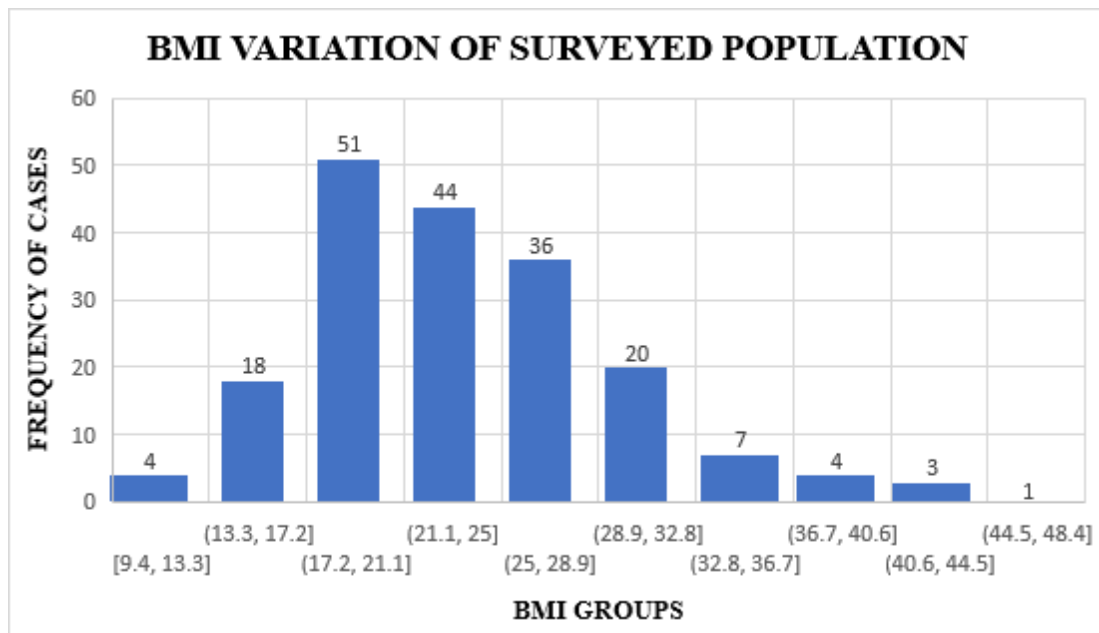
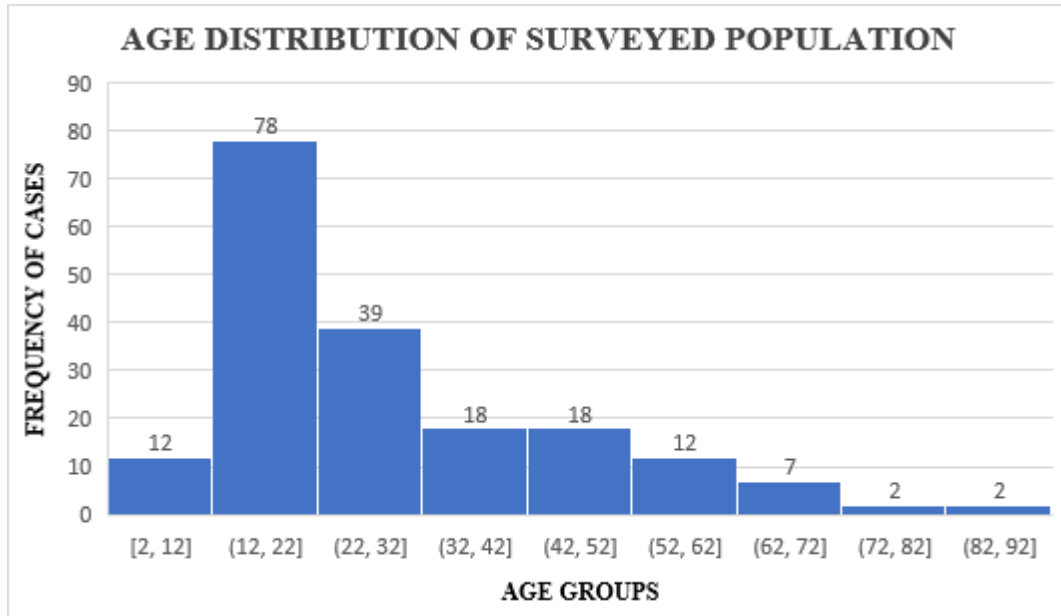


**Fig.3 - DISTRIBUTION OF BMI IN MALE POPULATION**

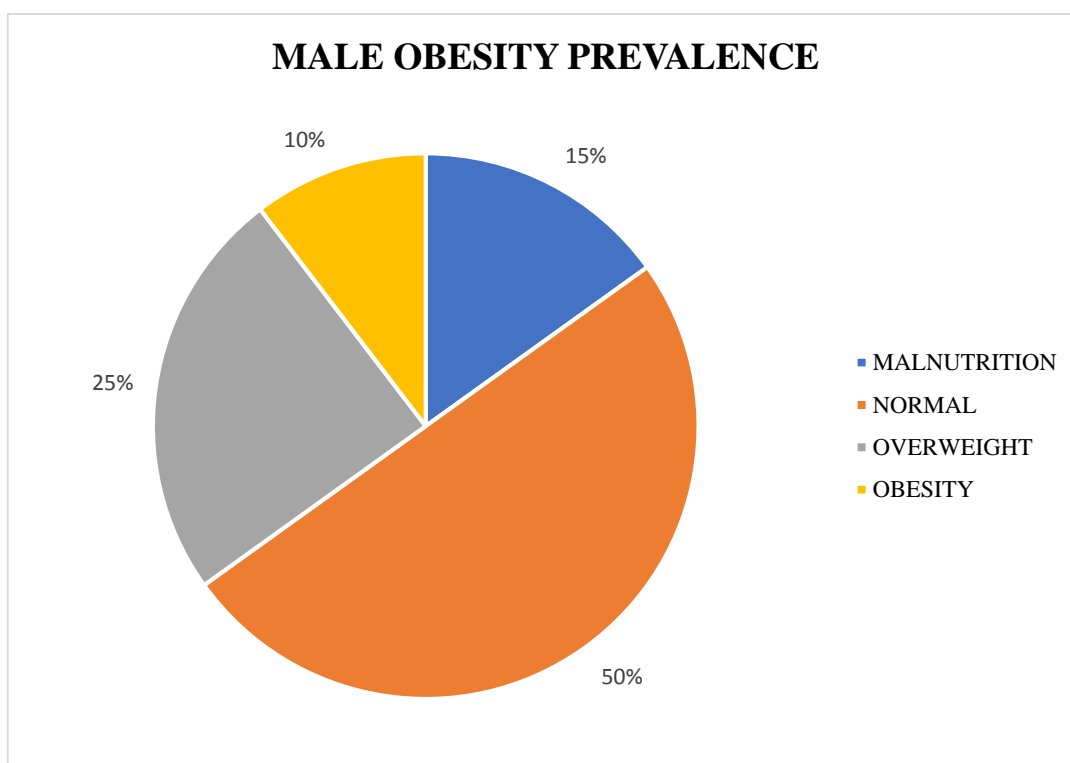
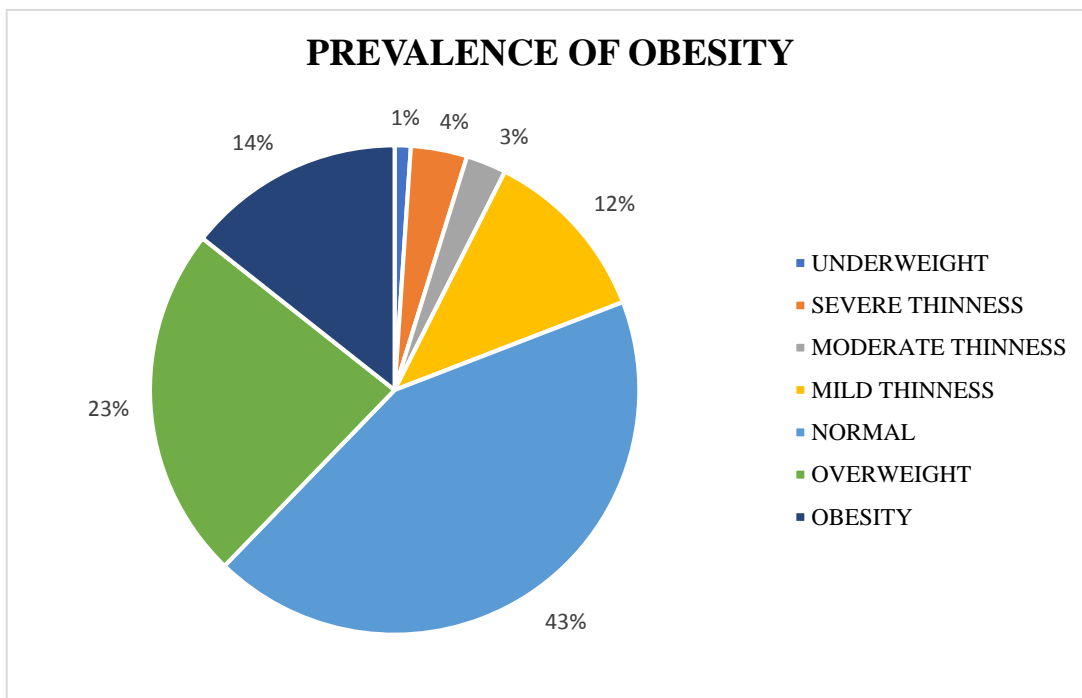


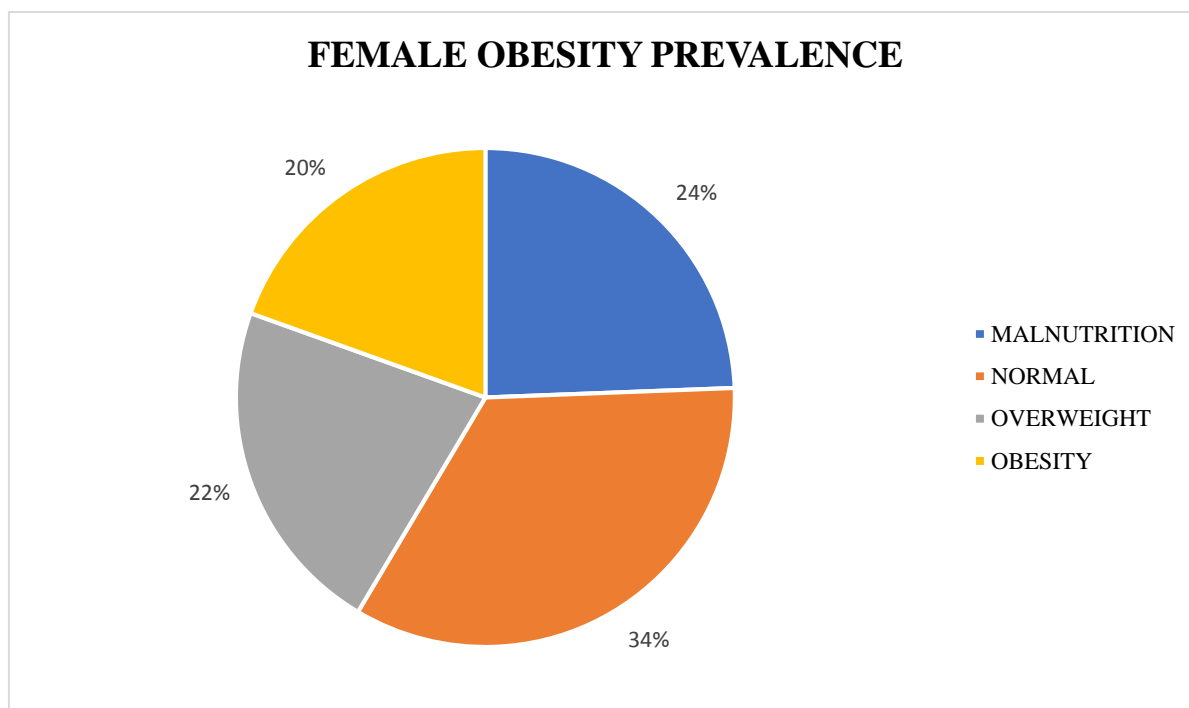
**Fig. 4- DISTRIBUTION OF BMI IN FEMALE POPULATION**











#### **IV. Discussion:**

Interpretation of the results:

Based upon the data and the studies conducted, the result obtained can be summarized by the following points:-

- There is a significantly higher incidence and higher rates and prevalence of cases of obesity in females in the selected sample population under study as compared to male gender category.
- Out of all the groups, there is higher incidence of overweight conditions in men rather than the women.
- The frequency of the cases more occurred in the age group of mostly adults, this is due to the continuous stress, dietary changes, lack of physical activity, more adhere to the junk or canned food products etc.

#### **V. Conclusion:**

Both total fat and individual fatty acids have to be considered when reaching conclusions about dietary fat and obesity. However, further research needs to be done to examine the most effective strategies of intervention, prevention, and treatment of obesity.

A) Sedentary lifestyle and easy accessibility to highly palatable nutrient-dense foods create an environment that promotes overweight and obesity. Preventing obesity in a child's earliest years (and even before birth, by healthy habits during pregnancy) confers a lifetime of health benefits. Obesity and its associated health risks have risen dramatically in the past few decades.

B) Chronic social stress, often arising from poor interpersonal relationships, job or unemployment stress, poor self-esteem, and low socioeconomic status has been associated with obesity and its associated illnesses. Obese and post-obese subjects do not appear to adapt to dietary fat, and therefore fat storage is increased. The optimal diet for prevention of weight gain, obesity, metabolic syndrome, and type 2 diabetes is fat-reduced, fibre-rich and high in low-energy density carbohydrates (fruit, vegetables, and whole grain products).

#### **Implications for practice and future research:**

The data and the methods being used for conducting this study may provide an outline and a base for future research and studies which might be conducted on the topic of malnutrition and also as an outline for the selection of population or sample groups for other research or studies which might be chosen on the basis of the individual characteristics such as the nutrition. Previously conducted studies on malnutrition and factors affecting, its causes and its relation and effect on other diseased conditions act as a base for conducting this study as it helps to take into account the various factors that might influence the end result of this study.

Based upon the study conducted, the results obtained provides a clear perspective on the prevalence of malnutrition in respect to specific demographic locations along with correlation of enlisted variables such as age, gender, diseased or comorbid conditions.

A clarified perspective on these variables serves as an important tool that can be used as a baseline for the detailed and extensive future prospects and study projects that can be conducted on various facets of the problem of malnutrition such as a detailed theory on the correlation between nutritional status and socio-economic factors, biological, genetical, environmental factors or demographic factors and variables such as genotype variables, phenotype variables, population characteristics, nutritional sources, quality of life etc., all such factors can be studies, investigated and an inference can be drawn on the basis of the results obtained on the prevalence of malnutrition by the current study.

### **Limitations and the strengths:**

Limitations and strengths of the study

The results obtained based on the study conducted give us a perspective on the following facets of the study:-

Strengths of the study:- the study conducted list out the following strengths

- It provides a detailed explanation of the prevalence of the obesity over a selected sample population which has the combination of the individuals of all ages, gender and with certain diseased conditions.
- It provides a result on the correlation on the various factors affecting and causes and gives an outline between the exposure and outcome relations between certain factors.
- It provides an idea about the incidence of obesity out of the total sample population within different ages, different genders and also along with different diseases which may affect and may cause obesity.
- It also provides an understanding how the prevalence of obesity can be affected by factors such as dietary habits, diseased conditions, access to health services, socio-economic status etc.
- This type of distribution studies leads to the ease of understanding the data and also helps in obtaining an inference based on the observations made.
- This method of study allows or enables to study the variations in small sample groups and also allows to draw various inferences which enables us to make assumptions on the distribution of the various factors and the way these factors influence the occurrence and incidence of the obesity and thus draw a conclusion on the prevalence of malnutrition cases as per the variables and the corresponding age groups such as different age groups, different gender groups, groups of people with different diseased conditions which may affect or cause obesity conditions.

Limitations of the study:- the study has the following limitations to its extent of its usefulness

- The study does not elaborate on the data of the distribution of age, gender and other factors which is included in the population.
- It does not provide an accurate description or an outline about how the various factors are affecting the incidence and prevalence of the obesity in that specific committee
- The study of a selected sample population is not accurate representation of the universal population which might be suffering from obesity as it provides a vague idea about the percentage of obesity cases that are occurring due to the theoretical assumption of homogenous distribution of the population groups.
- The causes of obesity differ from every demographic location to another as the environmental conditions heavily the influence the genetics of the local population, the genotype and phenotype variations, the nutrient sources, the socio-economic status, health care facilities, etc.
- The selection of the population theoretically should be a homogenous mixture of individuals who share the common characteristics as a group which are to be studied but in practical applications it is mostly seen that the sample population is not a homogenous mixture but rather a mixture of individuals who share the listed characteristics in different extents and different proportions.
- The above-mentioned limitations lead to the rise of many potential biases which influence the result of the study as it is not taking into count the errors of the selection of a non-ideal or a group with variations or deviations from the ideal assumption, thus leading to obtaining an error or faulty results.

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