METABOLIC SYNDROME AMONG PSYCHIATRY PATIENTS: A CROSS SECTIONAL STUDY

By: Dr. Vathsala G K

Dissertation submitted to the

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In partial fulfillment of the requirements for the degree of

DOCTOR OF MEDICINE (M.D.)
IN
PSYCHIATRY

Under the guidance of

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METABOLIC SYNDROME IN PSYCHIATRY PATIENTS: A CROSS- SECTIONAL STUDY ABSTRACT Introduction: Mentally ill people have a higher risk of premature all-cause death. Physical comorbidities, especially cardiovascular disorders, account for 60% of mental illness-related death. Psychiatric populations with schizophrenia, bipolar disorder (BD), and major depressive disorder (MDD) had high rates of MetS, showing it is a common comorbidity. Thus, MetS and mental disorder comorbidity is likely caused by broad, nonspecific disease processes. Methods: Observational research undertaken with a samplee size off 100 to evaluate thee prevalencee off metabolic syndrome in patients diagnosed to have psychotic disorders in adult inpatients and outpatients at R L Jalappa Medical College and Research Center. We employ systematic randomized sampling for participants present during the trial. Metabolic syndrome is explained using a criteria National Cholesterol Education Program Adult Treatment Panel III Results: Average age of individuals is 50.61 years, SD off 8.85, reflecting moderate dispersion around the mean age among 100 individuals. There exists a correlation with psychiatric comorbidity and the occurrence of metabolic syndrome, implying a potential interrelation between these conditions. Conclusion The prevalence of metabolic syndrome was moderately elevated. Consequently, the therapy of individuals with severe mental illness in resource-constrained environments should encompass the evaluation of cardiovascular risk and the targeting of modifiable risk factors within this demographic. Patient age should be taken into account when justifying the restricted resources allocated for evaluating metabolic syndrome in participants with severe mental illness. INTRODUCTION Individuals with psychiatric disorders demonstrate an higher risk of early cause death compared to the general population. Epidemiological research indicate that participants with serious mental problems are prone for a decreased life expectancy of 7 to 24 years1. Psychiatric problems result in a burden comparable to an 8-year reduction in lifespan associated with excessive smoking.1 Approximately 60-% of the elevated death rates in - patients with mental illness can be attributed to physical comorbidities, mainly heart-related conditions. The probability of cardiovascular disease, along with associated comorbidities such as diabetes, stroke, and obesity, is markedly elevated in several mental diseases, such as anxiety disorders, bipolar disorder, schizophrenia, and depression. The notion of metabolic syndrome (MetS) was developed to aid physicians in recognising and managing persons at heightened risk of heart related diseases. MetS is defined by central obesity, hypertension, reduced high density lipo protein cholesterol (HDL-C), increased tri glycerides, and hyper glycaemia. MetS signifies a pre-clinical condition before the onset of cardiovascular disease and diabetes.2 Multiple descriptions for Met S are being suggested, intended to facilitate clinical application and establishing uniform diagnostic criteria. Abdominal obesity is a key criterion in the International Diabetes Federation's diagnosis of Metabolic Syndrome (MetS), while it's not a necessary characteristic in the National Cholesterol Education Program (NCEP) Adult Treatment Panel III's categorisation for MetS. It is essential to acknowledge that MetS is a diverse construct intended : hypertension, dyslipidaemia, and hyper glycemia are significantly co- morbid and interrelated; nevertheless, pathophysiological mechanisms do not uniformly align. Metabolic Syndrome (MetS), a common syndrome and an indicator of cardiovascular disease (CVD) among various ethnic, gender, and age demographics, offers a chance to recognize high-risk individuals & mitigate the advancement of primary causes of morbidity and death. 3 A recent meta-analysis found that people with mental health conditions have a 58% higher prevalence of Metabolic Syndrome (MetS) compared to the general population, which is linked to an increased risk of cardiovascular-related death. This elevated occurrence is observed consistently across all MetS components, regardless of the diagnostic criteria used, though hypertension appears to be affected to a lesser extent. The study also highlighted that MetS is equally prevalent among individuals with schizophrenia, bipolar disorder (BD), and major depressive disorder (MDD), suggesting that it is a common co-morbidity in various psychiatric populations. Thus, it's probable that predominantly overarching, nonspecific disease processes facilitate the comorbidity of Metabolic Syndrome and mental disorders.4 REVIEW OF LITERATURE Existence of several categories concerned to metabolic syndrome hampers the comparability of data from studies utilising various criteria. The National Cholesterol Education Programmee , Adults Treatments Panel III is extensively acknowledged.3 Central obesity is crucial The aetiology of metabolic syndrome does not necessitate identification; nonetheless, a diagnosis requires the completion of any three of the five specified criterion The metabolic syndrome's definitions Individuals exhibiting one or a few symptoms of metabolic syndrome are likely to possess other traits related with insulin resistance, as these traits frequently co-occur. The necessity and value of assessing insulin resistance in conjunction with other readily quantifiable aspects of the syndrome remain unclear. Furthermore, although glycated haemoglobin (A1C) is not explicitly incorporated in the official criteria for metabolic syndrome, an abnormal A1C level (5.7 to 6.4 %) is progressively recognised & utilised to diagnose impaired glycemia in individuals with metabolic syndrome.5 National Cholesterol Education Programme ATP III According to 2005 A T P III guidelines, metabolic syndrome is defined by occurrence off any three of the criteria. One key characteristic is abdominal obesity, mentioned by a waist circum ference of at least 1 0 2 cm (4 0 inches) in men and 8 8 cm (3 5 inches) in wo men. Serum tri glycerides at or above 1 5 0 mg/dL (1.7 mmol/L), or pharmacological intervention for hypertriglyceridemia Pharmacological treatment for changed HDL cholesterol, serum HDL cholesterol levels below 40 mg/dL (1"mmol/L) in men and below 50 mg/dL (1.3 mmol/L) in women A BP reading off at least 130 /85 mmHg r the initiation off pharmaceutical therapy for hypertension Fasting blood glucose (FPG) ≥100 mg/dL (5.6 mmol/L) or pharmacological intervention hyperglycaemia. Inter national Diabetes Federation In 2006, the Inter national Diabetes Federation revised its criteria for metabolic syndrome, identifying obesity as a critical component and establishing distinct waist circumference limits for several racial and ethnic groups. In order to standardize the criterion for identifying metabolic syndrome, the I D F eliminated higher waist circum ference as diagnostic criterion in 2009 in cooperation with a number of organizations, including the International Heart Federation, the NHLBI, the AHA, The International

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Last, but not the least, I would like to express my gratitude to the **Almighty** for all blessings.

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ABSTRACT

Introduction: Mentally ill people have a higher risk of premature all-cause death. Physical comorbidities, especially cardiovascular disorders, account for 60% of mental illness-related death. Psychiatric populations with schizophrenia, bipolar disorder (BD), and major depressive disorder (MDD) had high rates of MetS, showing it is a common comorbidity. Thus, MetS and mental disorder comorbidity is likely caused by broad, nonspecific disease processes.

Methods: A cross-sectional observational study was undertaken with a sample size of 100 to evaluate the prevalence of metabolic syndrome among patients diagnosed with psychiatric disorders in adult inpatients and outpatients at R L Jalappa Medical College and Research Center. We employ systematic randomized sampling for participants present during the trial. The metabolic syndrome was defined using the criteria established by the National Cholesterol Education Program Adult Treatment Panel-III (NCEP-ATP III).

Results: The average age of participants is 50.61 years, with a standard deviation of 8.85, reflecting a moderate dispersion around the mean age among 100 individuals. There exists a statistically significant correlation between psychiatric comorbidity and the occurrence of metabolic syndrome, implying a potential interrelation between these conditions.

Conclusion

The prevalence of metabolic syndrome was moderately elevated. Consequently, the therapy of individuals with severe mental illness in resource-constrained environments should encompass the evaluation of cardiovascular risk and the targeting of modifiable risk factors within this demographic. Patient age should be taken into account when justifying the restricted resources allocated for evaluating metabolic syndrome in individuals with severe mental illness.

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ABBREVIATIONS

- **MetS – Metabolic Syndrome**
- **CVD – Cardiovascular Disease**
- **HDL / HDL-C – High-Density Lipoprotein Cholesterol**
- **LDL / LDL-C – Low-Density Lipoprotein Cholesterol**
- **TG – Triglycerides**
- **BP – Blood Pressure**
- **SBP – Systolic Blood Pressure**
- **DBP – Diastolic Blood Pressure**
- **FPG – Fasting Plasma Glucose**
- **BMI – Body Mass Index**
- **NCEP-ATP III – National Cholesterol Education Program Adult Treatment Panel III**
- **IDF – International Diabetes Federation**
- **CRP – C-Reactive Protein**
- **IL-6 – Interleukin-6**

- **PAI-1 – Plasminogen Activator Inhibitor-1**
- **A1C / HbA1C – Glycated haemoglobin**
- **NHANES – National Health and Nutrition Examination Survey**
- **ECG – Electrocardiography**
- **HR – Hazard Ratio**
- **CHD – Coronary Heart Disease**
- **WHO – World Health Organization**
- **EGIR – European Group for the Study of Insulin Resistance**
- **CKD – Chronic Kidney Disease**
- **OR – Odds Ratio**
- **PD – Personality Disorder (also used for Parkinson's Disease depending on context)**
- **OCD – Obsessive-Compulsive Disorder**
- **ADHD – Attention-Deficit/Hyperactivity Disorder**
- **PTSD – Post-Traumatic Stress Disorder**
- **ASD – Autism Spectrum Disorder**
- **TSH – Thyroid-Stimulating Hormone**
- **TgAb – Thyroglobulin Antibody**

- **TPOAb – Thyroid Peroxidase Antibody**
- **HDRS – Hamilton Depression Rating Scale**
- **YMRS – Young Mania Rating Scale**
- **COBY – Course and Outcome of Bipolar Youth**
- **HAMA – Hamilton Anxiety Rating Scale**
- **HAMD – Hamilton Depression Rating Scale**
- **ICD-10 – International Classification of Diseases, 10th Revision**
- **BPAD – Bipolar Affective Disorder**
- **ATP III – Adult Treatment Panel III (repeated usage)**
- **VLDL – Very Low-Density Lipoprotein**

INTRODUCTION

Individuals with psychiatric disorders demonstrate an increased risk of early all-cause death compared to the general population. Epidemiological studies indicate that individuals with serious mental problems have a decreased life expectancy of 7 to 24 years[1]. Psychiatric problems result in a burden comparable to an 8-year reduction in lifespan associated with excessive smoking.[1] Approximately 60-% of the elevated death rates in - patients with mental illness can be attributed to physical comorbidities, mainly heart-related conditions. The probability of cardiovascular disease, along with associated comorbidities such as diabetes, stroke, and obesity, is markedly elevated in several mental diseases, such as anxiety disorders, bipolar disorder, schizophrenia, and depression.

The notion of metabolic syndrome (MetS) was developed to aid physicians in recognising and managing persons at heightened risk of heart related diseases. MetS is defined by abdominal obesity, hypertension, decreased high-density lipo protein cholesterol (HDL-C), increased tri glycerides, and hyper glycaemia. MetS signifies a pre-clinical condition before the onset of cardiovascular disease and diabetes.[2]

Various descriptions for MetS have been suggested, all intended to facilitate clinical application and establishing uniform diagnostic criteria. Abdominal obesity is a key criterion in the International Diabetes Federation's diagnosis of

Metabolic Syndrome (MetS), while it's not a necessary characteristic in the National Cholesterol Education Program (NCEP) Adult Treatment Panel III's categorisation for MetS. It is essential to acknowledge that MetS is a diverse construct intended : hypertension, dyslipidaemia, and hyper glycemia are significantly co- morbid and interrelated; nevertheless, pathophysiological mechanisms do not uniformly align. Metabolic Syndrome (MetS), a common syndrome and an indicator of cardiovascular disease (CVD) among various ethnic, gender, and age demographics, offers a chance to recognize high-risk individuals & mitigate the advancement of primary causes of morbidity and death. [3]

A recent meta-analysis found that people with mental health conditions have a 58% higher prevalence of Metabolic Syndrome (MetS) compared to the general population, which is linked to an increased risk of cardiovascular-related death. This elevated occurrence is observed consistently across all MetS components, regardless of the diagnostic criteria used, though hypertension appears to be affected to a lesser extent. The study also highlighted that MetS is equally prevalent among individuals with schizophrenia, bipolar disorder (BD), and major depressive disorder (MDD), suggesting that it is a common co-morbidity in various psychiatric populations. Thus, it's probable that predominantly overarching, nonspecific disease processes facilitate the comorbidity of Metabolic Syndrome and mental disorders.[4]

OBJECTIVE

To assess the prevalence of metabolic syndrome among patients diagnosed to have psychiatric illness.

REVIEW OF LITERATURE

The existence of several categories concerned to metabolic syndrome hampers the comparability of data from studies utilising various criteria. The National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) is the most widely acknowledged.[3] Abdominal obesity is crucial The aetiology of metabolic syndrome does not necessitate identification; nonetheless, a diagnosis requires the completion of any three of the five specified criteria.

The metabolic syndrome's definitions

Individuals exhibiting one or a few symptoms of metabolic syndrome are likely to possess other traits related with insulin resistance, as these traits frequently co-occur. The necessity and value of assessing insulin resistance in conjunction with other readily quantifiable aspects of the syndrome remain unclear. Furthermore, although glycated haemoglobin (A1C) is not explicitly incorporated in the official criteria for metabolic syndrome, an abnormal A1C level (5.7 to 6.4 %) is progressively recognised & utilised to diagnose impaired glycemia in individuals with metabolic syndrome.[5]

National Cholesterol Education Program ATP III

According to the 2005 ATP III guidelines, metabolic syndrome is defined by the presence of any three of the following criteria. One key characteristic is abdominal obesity, which is identified by a waist circumference of at least 102 cm (40 inches) in men and 88 cm (35 inches) in women. Serum tri glycerides at or above 150 mg/dL (1.7 mmol/L), or pharmacological intervention for hypertriglyceridemia

pharmacological treatment for changed HDL cholesterol, serum HDL cholesterol levels below 40 mg/dL (1 mmol/L) in men and below 50 mg/dL (1.3 mmol/L) in women

A BP reading of at least 130/85 mmHg or the initiation of pharmaceutical therapy for hypertension

Fasting blood glucose (FPG) ≥100 mg/dL (5.6 mmol/L) or pharmacological intervention for hyperglycaemia.

Inter national Diabetes Federation

In 2006, the International Diabetes Federation revised its criteria for metabolic syndrome, identifying central obesity as a critical component and establishing distinct waist circumference limits for several racial and ethnic groups. In order to standardize the criteria for diagnosing metabolic syndrome, the IDF eliminated increased waist circumference as a diagnostic criterion in 2009 in cooperation

with a number of organizations, including the International Heart Federation, the NHLBI, the AHA, The International Association for the *Study of Obesity and the International Atherosclerosis Society recommend using five specific* criteria to assess metabolic syndrome. A diagnosis can be made if an individual meets at least three of these criteria. Metabolic syndrome is assessed using specific criteria, including increased waist circumference based on ethnicity-specific standards. Other factors include triglyceride levels of at least 150 mg/dL (1.7 mmol/L) or treatment for hypertriglyceridemia. Additionally, HDL cholesterol levels below 40 mg/dL (1.03 mmol/L) in men and below 50 mg/dL (1.29 mmol/L) in women, or the need for intervention due to low HDL, are considered. Blood pressure is also a key factor, with a systolic reading of 130 mmHg or higher, a diastolic reading of 85 mmHg or above, or ongoing management for hypertension contributing to the diagnosis. FPG ≥100 mg/dL (5.6 mmol/L) or a prior diagnosis of type 2 diabetes; an oral glucose tolerance test is advised for individuals with elevated FPG, but it is not mandatory.

Other potential markers

Metabolic syndrome is defined as a proinflammatory, prothrombotic condition marked by increased concentrations of C-reactive protein (CRP), interleukin (IL)-6, and plasminogen activator inhibitor (PAI)-1. Adipokines and inflammatory markers only partially explained the association between metabolic syndrome and coronary heart disease mortality in one study, despite the fact that they are

associated with an increased risk of cardiovascular disease and type 2 diabetes. A study examining phenotypic characteristics related to metabolic syndrome and CRP levels could not establish a causal relationship between increased CRP and metabolic syndrome.[9]

The role of inflammatory and vascular function markers in diagnosing metabolic syndrome remains uncertain. These markers should be used solely for therapeutic purposes, specifically to assess and reduce the risk of cardiovascular disease. The AHA/CDC recommendations state that CRP testing is optional and should be based on clinical judgement rather than regularly recommended, given to uncertainty over its independent predictive value.[6]

RISK FACTORS

Weight is a risk determinant

Excess body weight plays a major role in the development of metabolic syndrome. Data from NHANES III revealed that metabolic syndrome affects 5% of adults with normal weight, 22% of those classified as overweight, and 60% of individuals with obesity.

In the Framingham Heart Study cohort, a weight gain of 2.25 kg or more over 16 years was associated with a 21% to 45% increase in the likelihood of developing metabolic syndrome. Additionally, having an increased waist circumference

alone suggests that up to 46% of individuals may be at risk of developing metabolic syndrome within five years.

The rising obesity rates among adults in the United States are expected to lead to an increase in metabolic syndrome cases, emphasizing the importance of obesity prevention and encouraging physical activity.

Even individuals with a normal weight may face a higher risk of hypertension, cardiovascular disease, and diabetes. However, the classification of these individuals as a distinct sub phenotype of metabolic syndrome—often referred to as "normal weight, metabolically obese"—remains uncertain.

A genome-wide association study examining 19 common genetic variants associated with insulin resistance, characterized by elevated fasting insulin levels, identified a metabolic profile suggestive of a genetically widespread, mild form of lipodystrophy within the general population. These genetic variations were found to be linked with increased metabolic risk factors, liver biomarkers, type 2 diabetes, and coronary artery disease. Additionally, they were associated with lower body mass index (BMI) and a higher visceral-to-subcutaneous adipose tissue ratio. [7]

Clinical Evaluation and Significance of Diagnosis

Healthcare providers should routinely assess individuals for metabolic risk during regular clinic visits. According to the Endocrine Society's clinical guidelines, those with at least one risk factor should undergo evaluation every three years. This assessment should include measurements of blood pressure, waist circumference, fasting lipid profile, and fasting glucose levels.

Impact of a Metabolic Syndrome Diagnosis

A diagnosis of metabolic syndrome signals a higher risk of developing cardiovascular disease and other obesity-related health issues. The key therapeutic goal of identifying metabolic syndrome is to pinpoint individuals who could benefit from proactive lifestyle changes. Emphasizing weight management and increased physical activity can significantly reduce the likelihood of future complications associated with the condition.

Risk of cardiovascular disease

Three meta-analyses, utilizing overlapping datasets, found that metabolic syndrome significantly increases the risk of developing cardiovascular disease (CVD), with relative risks ranging from 1.53 to 2.18, as well as all-cause mortality, with relative risks between 1.27 and 1.60.

The increased risk appears to stem from the accumulation of metabolic risk factors and insulin resistance associated with metabolic syndrome rather than

obesity alone. Not all individuals with obesity face the same likelihood of developing cardiovascular disease or diabetes; the risk varies depending on insulin sensitivity, with insulin-resistant individuals being the most vulnerable.[8]

This trend is supported by several studies:

- Research on the Framingham population indicated that obesity alone, without metabolic syndrome, does not significantly raise the risk of diabetes or cardiovascular disease. However, individuals with both obesity and metabolic syndrome were found to have a tenfold higher risk of developing diabetes and a twofold increased risk of cardiovascular disease compared to normal-weight individuals without metabolic syndrome.
- Those of normal weight who met the revised 2005 ATP III criteria for metabolic syndrome had a fourfold increased risk for diabetes and a threefold higher risk for cardiovascular disease.
- A study involving 211 individuals with moderate obesity (BMI 30 to 35) revealed significant differences in insulin sensitivity, with a sixfold variation observed. Participants with the highest level of insulin resistance also showed increased blood pressure, triglyceride levels, fasting and two-hour post-oral glucose blood sugar levels, and reduced HDL concentrations, despite having similar obesity levels.

These findings emphasize the critical role of insulin resistance in determining metabolic risk beyond obesity alone.

The risk of developing cardiovascular disease may be linked to underlying subclinical conditions, which can be assessed using electrocardiography (ECG), echocardiography, carotid ultrasonography, and ankle-brachial blood pressure tests in individuals with metabolic syndrome.[9]

Findings from the Framingham Offspring study revealed that 51% of 581 participants with metabolic syndrome showed signs of subclinical cardiovascular disease (CVD). Those with preclinical CVD had a significantly higher likelihood of progressing to overt CVD compared to individuals with metabolic syndrome but no underlying cardiovascular issues (hazard ratio [HR] 2.67 vs. 1.59). Additionally, subclinical CVD was found to be a predictor of overt CVD even in individuals without metabolic syndrome (HR 1.93, 95% CI 1.15-3.24).

While metabolic syndrome indicates a heightened risk for cardiovascular disease, its utility in offering therapeutically pertinent prognostic insights remains ambiguous. In a prospective trial of individuals with angiographically confirmed coronary artery disease, higher triglyceride levels and reduced HDL cholesterol levels were similarly predictive of vascular events as the diagnosis of metabolic syndrome, according to ATP III criteria.[10]

In a long-term study tracking 5,128 British men aged 40 to 59 over 20 years, the Framingham Risk Score was found to be a more accurate predictor of coronary heart disease (CHD) and stroke compared to metabolic syndrome, based on ATP III criteria that defined obesity using BMI rather than waist circumference.

Additionally, in a separate trial involving 2,737 men from the same cohort, decreased HDL cholesterol levels and elevated blood pressure proved to be more reliable indicators of coronary heart disease than metabolic syndrome.[11]

Risk of type 2 diabetes

Prospective observational studies have shown a strong link between metabolic syndrome and an increased likelihood of developing type 2 diabetes. A meta-analysis of 16 multiethnic cohort studies found that the relative risk (RR) of diabetes ranged from 3.53 to 5.17, depending on the criteria used for metabolic syndrome and the specific population examined.

One study involving 890 nondiabetic Pima Indians observed that 144 participants developed diabetes over a four-year follow-up period. Based on the Adult Treatment Panel III (ATP III) criteria, metabolic syndrome raised the relative risk of developing diabetes by 2.1 times, while the World Health Organization (WHO) guidelines indicated an even greater increase of 3.6 times. This highlights the crucial role of insulin resistance, which is a key component in the WHO definition, in the development of type 2 diabetes.

Across multiple cohorts, the likelihood of diabetes increased as more components of metabolic syndrome were present. However, while metabolic syndrome signals a higher risk of diabetes, it remains uncertain whether it offers any additional predictive value beyond existing diagnostic methods. A prospective cohort study of 5,842 Australian adults found that metabolic syndrome, as defined by WHO, ATP III, EGIR, or IDF criteria, was less effective in identifying individuals likely to develop diabetes compared to fasting plasma glucose levels or a comprehensive diabetes prediction model. The latter incorporates factors such as age, sex, ethnicity, fasting plasma glucose, systolic blood pressure, HDL cholesterol, BMI, and family history.[12]

Other associations

Metabolic syndrome is associated with several obesity-related health conditions, including fatty liver disease, which can progress through stages of steatosis, fibrosis, and cirrhosis. It is also linked to hepatocellular carcinoma and intrahepatic cholangiocarcinoma.

Additionally, chronic kidney disease (CKD) is a concern, characterized by a glomerular filtration rate below 60 mL/min per 1.73 m^2 and the presence of microalbuminuria. Findings from the National Health and Nutrition Examination Survey (NHANES III) suggest that metabolic syndrome significantly increases the risk of developing CKD and microalbuminuria, with adjusted odds ratios (OR) of 2.6 and 1.9, respectively.

The risk of complications rises with the number of metabolic syndrome components an individual has. In a prospective cohort study, 10% of individuals with metabolic syndrome at the beginning of the study eventually developed CKD, compared to 6% of those without metabolic syndrome. These findings underscore the importance of early detection and intervention to mitigate health risks associated with metabolic syndrome.

Metabolic syndrome is associated with various health conditions, including polycystic ovary syndrome, sleep-related breathing disorders such as obstructive sleep apnea, and gout accompanied by hyperuricemia.[24]

Several components of metabolic syndrome, including hyperlipidemia, hypertension, and diabetes, have been linked to an increased risk of cognitive decline and dementia. This connection appears to be particularly significant in older adults, especially when metabolic syndrome is accompanied by heightened inflammation.

Metabolic syndrome in psychiatric patients

People with psychiatric disorders face a higher risk of early mortality, primarily due to cardiovascular diseases (CVDs). Extensive research has shown that psychiatric conditions are closely linked to an increased likelihood of developing metabolic syndrome (MetS), a condition marked by several cardiovascular risk

factors such as dyslipidemia, abdominal obesity, hypertension, and hyperglycemia.

This heightened risk is observed across various mental health disorders, including major depressive disorder (MDD), bipolar disorder (BD), schizophrenia, anxiety disorders, attention-deficit/hyperactivity disorder (ADHD), and posttraumatic stress disorder (PTSD). Evidence suggests a dose-response relationship, where the severity and duration of symptoms directly influence the risk of MetS, creating a cyclical effect between psychiatric illnesses and metabolic syndrome.

The connection appears to be stronger with abdominal obesity and dyslipidemia than with hypertension. Key contributing factors include unhealthy lifestyle habits and poor adherence to treatment protocols, which are commonly seen in individuals with mental health disorders. Additionally, certain psychiatric medications have significantly worsened the metabolic imbalances associated with MetS, further complicating its management.

MetS and major depression

Pan et al. conducted a comprehensive review of 29 cross-sectional studies involving 155,333 participants, identifying a modest association between depression—defined by self-reported symptoms or a diagnosed mental condition—and metabolic syndrome (MetS), with an adjusted odds ratio (OR) of 1.34.

The Netherlands Study of Depression and Anxiety, which included approximately 3,000 psychiatric patients, confirmed a correlation between major depression and MetS, demonstrating a dose-response relationship between the two.

Limited prospective data suggests a bidirectional link, where depression can predict the onset of MetS, and MetS can similarly precede the development of depression over time. Research consistently associates depression with obesity-related factors such as abdominal obesity, low HDL cholesterol levels, and hypertriglyceridemia, while connections to hyperglycemia and hypertension are less frequently observed.

Three longitudinal studies on individuals with depression indicate that various metabolic dysregulations contribute to the persistent nature of the condition. Furthermore, complications arising from MetS may reinforce and prolong states of depression in affected individuals.[13,14]

MetS and bipolar disorder

Research indicates that individuals with bipolar disorder have a higher incidence of metabolic syndrome (MetS), similar to findings related to major depressive disorder (MDD). A study involving 972 younger patients experiencing a current depressive episode—whether bipolar or unipolar—found that both groups had a significantly higher prevalence of MetS compared to community controls.

These patients exhibited increased body mass index (BMI), elevated glucose levels, total cholesterol, and low-density lipoprotein cholesterol (LDL-C), along with lower high-density lipoprotein cholesterol (HDL-C). However, their hypertension levels did not differ significantly from those of healthy individuals.

Further studies suggest that this elevated risk of MetS is not confined to individuals actively experiencing a depressive episode; it is also prevalent among those with bipolar disorder in remission. In a meta-analysis conducted by Vancampfort et al., which examined 37 studies involving approximately 7,000 individuals with bipolar disorder, the overall prevalence of metabolic syndrome was found to be 37.3%. Additionally, individuals with bipolar disorder had a 1.98 times higher likelihood of developing MetS compared to the general population.

[15]

Vancampfort's meta-analysis explored the impact of clinical factors on metabolic syndrome (MetS) risk in individuals with bipolar disorder. Five studies specifically examined patients with bipolar 1 disorder (BD-1), while others focused on mixed or undefined diagnostic categories, allowing for comparisons in MetS risk. Findings indicated that BD-1 patients had a notably lower risk of developing MetS. However, since the mixed or ambiguous diagnosis groups tended to be older, this result may simply reflect age-related differences.

Additionally, six studies within the meta-analysis assessed the prevalence of MetS among individuals with bipolar disorder taking antipsychotic medication

compared to those not receiving such treatment. Results showed that patients undergoing antipsychotic therapy had a significantly increased risk—1.72 times higher—of developing metabolic syndrome.

Further research directly comparing bipolar disorder patients on medication with those receiving a placebo or no treatment reinforced the role of psychotropic drugs in metabolic disturbances. A meta-analysis revealed that individuals prescribed lithium experienced more weight gain compared to those given a placebo. Moreover, a pooled review of placebo-controlled studies on individuals with acute mania linked to BD-1 found that olanzapine, quetiapine, risperidone, and valproic acid were all associated with increased weight gain relative to placebo-treated participants.

Most studies have primarily focused on bipolar disorder patients undergoing psychotropic treatment, leading to limited evidence regarding MetS risk in individuals who have never received medication. However, emerging research suggests that the elevated risk of MetS is also relevant for drug-naive bipolar disorder patients.[16]

MetS and schizophrenia

Cardiovascular disease is the leading cause of death among individuals with schizophrenia. A meta-analysis by Vancampfort found that people with schizophrenia face a significantly higher risk of abdominal obesity (OR=4.43), hypertension (OR=1.36), low HDL cholesterol (OR=2.35), hypertriglyceridemia

(OR=2.73), and metabolic syndrome (MetS) (OR=2.35). These metabolic imbalances tend to worsen as the illness progresses and with increasing age. Additionally, schizoaffective disorder appears to have a slightly higher prevalence of MetS compared to schizophrenia.[16,17]

Extensive research has examined the impact of antipsychotic medications on metabolic dysfunction. Second-generation antipsychotics, in particular, are associated with weight gain, central obesity, disturbances in lipid and glucose metabolism, and insulin resistance, often leading to higher rates of prescription discontinuation. These medications, especially those linked to significant weight gain, are also responsible for most metabolic disruptions, with weight increase observed in up to 72% of patients undergoing antipsychotic treatment. [18]

Research indicates that metabolic changes can occur even without noticeable weight gain. Among antipsychotic medications, clozapine and olanzapine pose the highest risk for weight gain by disrupting adipose tissue balance.

All antipsychotics primarily act on the dopamine D2 receptor in the brain, which plays a role in regulating appetite and body weight, as well as in the body, where dopamine influences insulin-secreting β-cells in the pancreas. Several mechanisms contribute to the link between antipsychotic use and metabolic syndrome, including oxidative stress responses, altered ghrelin and leptin secretion, autonomic nervous system dysfunction, inflammation, and various signaling pathways. These pathways involve dopamine, histamine, serotonin,

muscarinic systems, cannabinoids, and adiponectin, all of which play a role in metabolic disturbances associated with antipsychotic treatment.[19,20]

MetS and other psychiatric disorders

Anxiety exists on a spectrum, ranging from mild, overlapping symptoms to a fully diagnosed condition. Both ends of this spectrum seem to influence the risk of developing metabolic syndrome (MetS), though the strength of these associations remains inconsistent. Studies examining the relationship between anxiety, depression, and MetS have found similar but slightly weaker correlations for anxiety.

A recent meta-analysis of 18 cross-sectional studies found a moderate yet statistically significant link between elevated anxiety and MetS, with an odds ratio (OR) of 1.07. However, the two longitudinal studies included in this analysis did not establish a predictive association.

Medical record analysis indicates that individuals with anxiety face increased cardiometabolic risks, including diabetes (OR=1.31), hypertension (OR=1.21), hyperlipidemia (OR=1.25), and obesity (OR=1.09). While these risks are notable, they tend to be lower compared to those associated with most other mental health disorders.[21]

Numerous studies have investigated the prevalence of metabolic syndrome (MetS) in individuals with post-traumatic stress disorder (PTSD). A meta-

analysis comparing 9,673 PTSD patients to 6,852 control participants found that 38.7% of those with PTSD had MetS. Additionally, individuals with PTSD had a 1.82-fold higher risk of developing MetS compared to matched controls from the general population. This increased risk was consistently observed across different geographic regions and populations, regardless of combat veteran status.[44]

Personality disorders (PD), particularly borderline PD, have been associated with various cardiovascular risk factors. However, the direct impact of PD on metabolic syndrome risk remains unexplored. Parkinson's disease (PD) patients, often treated with second-generation antipsychotics, face a higher likelihood of developing MetS due to the frequent occurrence of comorbid mental health conditions.

Limited data is also a concern for obsessive-compulsive disorder (OCD). A study conducted in Italy involving 104 patients found that 21.2% met the criteria for MetS, though the confidence range overlapped with estimates from the general population. These findings highlight the need for further research to better understand the relationship between metabolic syndrome and various psychiatric conditions. [22]

A recent meta-analysis found that 21.5% of individuals with alcohol-use disorders had metabolic syndrome (MetS), with the prevalence being notably higher among those with significant mental health comorbidities.

Chronic liver disease, a common consequence of alcohol-use disorders, plays a major role in disrupting lipid metabolism within the framework of MetS. Among individuals using heroin or methadone, the prevalence of MetS was reported at 29.5%, with the duration of methadone exposure being a key factor in predicting its development.

Additionally, substances such as methamphetamine can significantly impact glucose metabolism, exhibit immunosuppressive or proinflammatory effects, and contribute to cardiotoxic complications. To accurately determine how substance use disorders increase the overall risk of MetS compared to the general population, it is essential to incorporate a healthy reference group in related research.[22]

Childhood developmental disorders have been linked, to some extent, with metabolic syndrome dysregulations; however, comprehensive research covering all aspects of metabolic syndrome remains limited.

An analysis of medical records found that children with autism spectrum disorder (ASD) face a higher risk of obesity and related health conditions, with an odds ratio (OR) of 1.85. This study suggested that autistic individuals may be particularly vulnerable, partly due to long-term use of medications such as antipsychotics, antidepressants, and antiepileptics.

Research on metabolic syndrome in children with attention-deficit/hyperactivity disorder (ADHD) is scarce. However, studies in adults indicate a possible link

between ADHD and increased BMI, along with changes in lipid profiles. Despite these findings, the evidence remains inconsistent, and further comprehensive studies are needed to establish a clearer connection.

Mechanisms connecting MetS and psychiatric disorders

Several factors contribute to the increased risk of metabolic syndrome (MetS) in individuals with mental health disorders. The use of psychotropic medications plays a significant role in this heightened risk, as these drugs can influence metabolism and body composition.

MetS is observed across patient populations receiving various treatments as well as among those who are not undergoing therapy, suggesting that the elevated risk is inherently linked to the presence of mental disorders themselves. The widespread prevalence of MetS in mental health patients indicates the involvement of universal, nonspecific mechanisms.

This analysis explores multiple key factors that may explain the connection between mental disorders and metabolic syndrome.

Substandard lifestyle and healthcare

Several lifestyle factors contribute to the increased risk of metabolic syndrome (MetS) in individuals with psychiatric disorders. Common unhealthy behaviors such as smoking, excessive alcohol consumption, poor sleep hygiene, physical inactivity, and unhealthy eating habits are widely observed in these populations.

These behaviors are well-documented risk factors that negatively impact cardiovascular health and raise the likelihood of developing MetS.

Many studies examining MetS in individuals with mental health conditions have taken these lifestyle factors into account, particularly smoking habits and physical activity levels. However, the association between MetS and psychiatric disorders often remains strong even after adjusting for these variables.

Assessing the true impact of lifestyle choices in mental health patients is particularly challenging, as it largely relies on self-reported data, which may lead to residual confounding. The strong influence of unhealthy habits and the tendency for individuals with psychiatric disorders to engage in harmful behaviors across multiple areas suggest that lifestyle plays a key role in exacerbating the link between mental illness and MetS.

Moreover, the reduced likelihood of mental health patients receiving routine medical care further worsens their metabolic health, making early detection and intervention even more critical.[23]

Central and peripheral immune, metabolic, and endocrine dysregulations

Growing evidence suggests that individuals with psychiatric disorders often exhibit disruptions in homeostatic systems, such as the hypothalamic-pituitary-adrenal (HPA) axis and inflammatory pathways. These physiological imbalances are closely linked to the development of metabolic syndrome (MetS).

Altered glucocorticoid sensitivity and systemic cortisol effects are well-documented in those with stress-related conditions involving the HPA axis. Excessive activation of this axis contributes to visceral fat accumulation by enhancing lipid storage and adipogenesis. The influence of glucocorticoids is particularly strong in abdominal adipose tissue, which contains a high concentration of glucocorticoid receptors.

Additionally, hyper cortisolemia accelerates lipolysis, leading to an increased release of fatty acids and the production of very-low-density lipoprotein (VLDL), ultimately resulting in hypertriglyceridemia. These mechanisms highlight the complex interplay between psychiatric disorders and metabolic dysregulation.[24]

White adipose tissue, particularly in the abdominal region, acts as an endocrine organ, releasing inflammatory cytokines and hormones like leptin. These secretions play a significant role in triggering immune metabolic responses in the central nervous system and throughout the body.

Peripherally produced cytokines can enter the brain either by crossing the blood-brain barrier through active transport pathways or indirectly via microglial activation. This process can impair neurogenesis in brain regions responsible for emotional regulation. Additionally, cytokines contribute to the conversion of tryptophan into kynurenine, leading to lower serotonin levels and increased tryptophan catabolites, which disrupt neurotransmission and contribute to neuronal damage.

A proinflammatory response prompts the release of lipids into the bloodstream, reducing HDL cholesterol and phospholipids while simultaneously increasing triglyceride levels. Persistent activation of the HPA axis and ongoing inflammation can further affect insulin sensitivity and alter glucose metabolism by directly influencing pancreatic β-cells. These mechanisms underscore the complex relationship between inflammation, metabolic syndrome, and neurological health.[25]

Several interconnected pathophysiological mechanisms also play a crucial role in metabolic regulation. The leptin-melanocortin pathway is essential for maintaining lipid and glucose balance, acting as a key neuroendocrine regulator of energy homeostasis. This system also influences mood by promoting neurogenesis and neuroplasticity in the hippocampus and cortical regions, while simultaneously modulating HPA-axis activity and immune system function.

Additionally, heightened oxidative and nitrosative stress may serve as another important link, as these factors have been shown to contribute to both mental health disorders and metabolic imbalances.

Overall, various immune metabolic and endocrine homeostasis systems interact bidirectionally with both mental and physical health. Disruptions in these regulatory pathways may underlie the comorbidity between psychiatric conditions and metabolic syndrome.[26,27]

A study by Penninx and Lange (2018) highlighted the increased risk of early mortality among individuals with psychiatric disorders, primarily due to cardiovascular diseases (CVDs). Extensive research has established a strong association between psychiatric conditions and metabolic syndrome (MetS), characterized by key cardiovascular risk factors such as dyslipidemia, abdominal obesity, hypertension, and hyperglycemia.

This elevated risk is observed across various mental health disorders, including major depressive disorder (MDD), bipolar disorder (BD), schizophrenia, anxiety disorders, attention-deficit/hyperactivity disorder (ADHD), and post-traumatic stress disorder (PTSD). Evidence supports a dose-response relationship, where the severity and duration of psychiatric symptoms influence the likelihood of developing MetS, reinforcing a reciprocal connection between mental disorders and metabolic dysfunction.

Among individuals with mental health conditions, harmful lifestyle habits and poor adherence to treatment regimens are common contributors to metabolic disturbances. Additionally, certain psychiatric medications have been found to worsen metabolic dysregulations. Genetic predisposition and underlying pathophysiological mechanisms—including increased central and peripheral activation of immunometabolic and endocrine systems—play a crucial role in the co-occurrence of MetS and psychiatric illnesses.

Given the significant health consequences associated with MetS, there is a pressing need to prioritize further research, prevention strategies, rigorous monitoring, and tailored treatment approaches to mitigate MetS in vulnerable psychiatric patient populations. [28]

Kumar et al., 2017 A research was conducted. To assess the prevalence of metabolic syndrome (MetS) in patients with bipolar disorder (BD) and examine the clinical correlations of MetS. Sixty-seven patients diagnosed with bipolar illness were evaluated for the existence of metabolic syndrome. The consensus definition was utilised to define MetS. The clinical variables were recorded based on information provided by patients, their accompanying carers, and an analysis of treatment records. The severity of symptoms during the present depressive and manic episodes was assessed using the Hamilton Depression Rating Scale (HDRS) and the Young Mania Rating Scale (YMRS), respectively.

The prevalence of MetS was 53.7%. Patients with MetS were older than those with BD alone (P=0.001). The most abnormal parameter was increased waist circumference (74.6%), succeeded by low high-density lipoprotein (HDL) values (71.6%) and raised triglycerides (64.2%). Hypertension was reported in 35.8% of participants, whereas increased fasting blood glucose levels were recorded in 33.3%. MetS was associated with a greater number of lifetime episodes (p=0.010), prolonged illness duration (p=0.010), and an elevated incidence of lifetime depressive episodes (p<0.001). Substantial correlations exist between

drug use (alcohol and nicotine) and an increased incidence of hypertension in MetS patients ($p<0.001$), whereas abnormal triglyceride levels are associated with drug use ($p=0.010$). The patients' age, the frequency of lifetime depressive episodes, and the administration of Olanzapine were recognised as predictors of MetS development. Individuals with bipolar illness demonstrate a significant prevalence of metabolic syndrome, which correlates with certain clinical criteria.[29]

Li et al. (2019) conducted a study within the Course and Outcome of Bipolar Youth (COBY) research initiative to assess metabolic syndrome (MetS) in adolescents and young adults with bipolar disorder. The cross-sectional, retrospective study included 162 participants (mean age 20.8 ± 3.7 years; range 13.6–28.3) diagnosed with bipolar disorder (I, II, or unspecified) according to DSM-IV criteria, recruited between 2000 and 2006.

MetS was evaluated using International Diabetes Federation criteria, measuring blood pressure, glucose levels, HDL cholesterol, triglycerides, and waist circumference at a single time point. Additionally, the Longitudinal Interval Follow-Up examination assessed mood, comorbid conditions, and treatment history during the six months prior to the MetS evaluation.

The study found that 19.8% of participants (32 of 162) met the criteria for MetS, with low HDL cholesterol (56.5%) and abdominal obesity (46.9%) being the most prominent factors. There was a slight association between MetS and poorer

lifetime global functioning at COBY intake (odds ratio [OR] = 0.97, P = .06). However, a strong correlation emerged between MetS and the duration of weeks spent in full-threshold pure depression (OR = 1.07, P = .02) as well as the proportion of weeks receiving antidepressant therapy (OR = 1.06, P = .001) within the preceding six months.

MetS showed no association with manic symptoms or treatment modalities, except for antidepressant therapy. The prevalence of MetS in this group was at least twice that of the general population. Additionally, individuals with MetS exhibited a higher frequency of depressive symptoms. These findings highlight the importance of integrating metabolic syndrome risk factor management into treatment strategies for early-onset bipolar disorder.[30]

Tang et al. (2023) explored the relationship between major depressive disorder (MDD) and metabolic syndrome (MetS), recognizing both as interconnected conditions with significant health and economic impacts. The study aimed to assess the prevalence of MetS and identify associated risk factors among patients hospitalized for MDD.

A total of 981 individuals diagnosed with MDD participated in the study, during which sociodemographic and clinical data were collected, metabolism-related indicators were measured, and psychological symptoms were evaluated. The findings revealed a 9.68% prevalence of MetS within this population. Patients

with both MDD and MetS exhibited heightened metabolic disturbances alongside more severe psychological symptoms.[31]

Several key risk factors were identified in relation to MetS onset and severity. Early onset of MDD, more intense depressive symptoms, and elevated thyroid-stimulating hormone (TSH) levels were associated with a greater likelihood of developing MetS. Additionally, increased TSH levels correlated with the severity of MetS.[32]

While the study suggests that MetS is relatively uncommon among MDD patients, certain factors may contribute to its presence and progression. These insights emphasize the importance of incorporating metabolic risk assessment into the management of MDD to guide treatment strategies and improve patient outcomes.[8]

Gao et al. (2024) explored gender differences in comorbid conditions among individuals with major depressive disorder (MDD) and metabolic syndrome (MetS), an area that has received limited research attention. The study aimed to investigate potential gender disparities in the prevalence and clinical associations of anxiety within this population.[33]

A total of 794 drug-naïve individuals experiencing their first episode of MDD with coexisting MetS were enrolled. Researchers collected sociodemographic data, thyroid function metrics, and metabolic indicators from participants. Each individual also completed the 14-item Hamilton Anxiety Rating Scale (HAMA)

and the 17-item Hamilton Depression Rating Scale (HAMD) to assess psychological symptoms.[3]

Findings indicated no significant gender differences in anxiety prevalence among individuals with both MDD and MetS. However, female patients with MDD exhibited a shorter duration of illness. Correlation analysis revealed that HAMD scores, thyroid-stimulating hormone (TSH), thyroglobulin antibody (TgAb), and thyroid peroxidase antibody (TPOAb) were linked to anxiety prevalence in female patients. In contrast, anxiety onset in male patients was associated only with TSH, TgAb, and TPOAb levels.

Further analysis using multivariate logistic regression identified TSH and TgAb as significant predictors of anxiety in males, whereas HAMD scores and age of onset were key predictors in females. Overall, while the study found no gender-based differences in anxiety prevalence among individuals with MDD and MetS, distinct biological and psychological correlations emerged between male and female participants. These findings underscore the need for gender-specific considerations in understanding and managing psychiatric and metabolic conditions.[33]

Mohammed and Naeem (2022) conducted a retrospective observational study analyzing medical records of adult psychiatric patients at Shaikh Khalifa Medical City who were prescribed oral second-generation atypical antipsychotics between January 2016 and December 2017. Pediatric patients were excluded, along with

individuals using additional medications known to contribute to metabolic syndrome, such as first-generation antipsychotics, mood stabilizers, anxiolytics, and antidepressants. Additionally, patients with pre-existing metabolic syndrome prior to initiating atypical antipsychotics were excluded from the study.[34]

Statistical analysis was performed using IBM SPSS version 25 and Jamovi version 1.0.4.0, with data sourced from Jamovi. The Shapiro-Wilk test assessed data normality, while one-way repeated measures ANOVA examined significant changes in BMI across three time periods. Kendall's tau was used to analyze correlations between categorical variables, and the paired t-test measured differences in BMI from baseline to one year later, with a p-value greater than 0.05 considered non-significant.[35]

Out of 4,123 individuals, 123 participants were included in the study. Among the atypical antipsychotics prescribed, olanzapine disintegrating tablets were the most commonly used, followed by risperidone and quetiapine. BMI showed a statistically significant increase from baseline to six months ($M = 2.37$ kg/m², $p = .002$) and from baseline to 12 months ($M = 3.26$ kg/m², $p < .001$), though no significant change was observed between six and 12 months ($M = 1.41$ kg/m², $p = .346$).

However, inadequate documentation and monitoring prevented an assessment of changes in total cholesterol, HDL, glucose, and HbA1C levels.[36]

Within the study sample, nine individuals (7.32%) initiated treatment for metabolic syndrome. Given the heightened mortality risk associated with metabolic syndrome, regular monitoring and targeted interventions for patients receiving second-generation antipsychotics are essential. Improving the documentation of patient concerns, treatments, and progress is crucial to optimizing clinical outcomes.[37]

METHODOLOGY

Study Design**:** Cross Sectional Observation study.

Sample size: 100

Presently 30 patients have been appraised.

SELECTION CRITERIA

Inclusion criteria:

- All individuals diagnosed with psychological disorders, aged 18 to 70 years.
- All mental disorders (Bipolar Affective Disorder, Depression, Mania, Schizophrenia, Unspecified Psychosis)

Exclusion criteria

- All expectant ladies.
- Individuals exhibiting mild mental problems such as anxiety spectrum diseases, Obsessive-Compulsive Disorder, Panic Disorder, Substance Use problems, and Personality diseases.
- Individuals already diagnosed with Type 2 Diabetes Mellitus and Hypertension will be excluded.

TOOLS:

- Measurement of Blood pressure, abdominal circumference and body mass index of patients.
- Blood sample for lipid profile, Fasting blood sugars
- NECP ATP 3 Guidelines
- ASIA PACIFIC Classification, BMI Grading
- ICD 10

RESULTS

Table 1: Distribution of age group

Age Group	Frequency	Percent
31 - 40	18	18.00
41 - 50	32	32.00
51 - 60	31	31.00
61 - 65	19	19.00
Total	100	100.00
Mean ± SD = 50.61 ± 8.85		

Table 1 presents the distribution of participants across different age groups, with a total of 100 individuals. The largest group is aged 41 to 50 years, comprising 32% of the sample, followed closely by the 51 to 60 age group at 31%. The 31 to 40 and 61 to 65 age groups account for 18% and 19%, respectively. The mean age of participants is 50.61 years, with a standard deviation of 8.85, indicating a moderate spread around the average age.

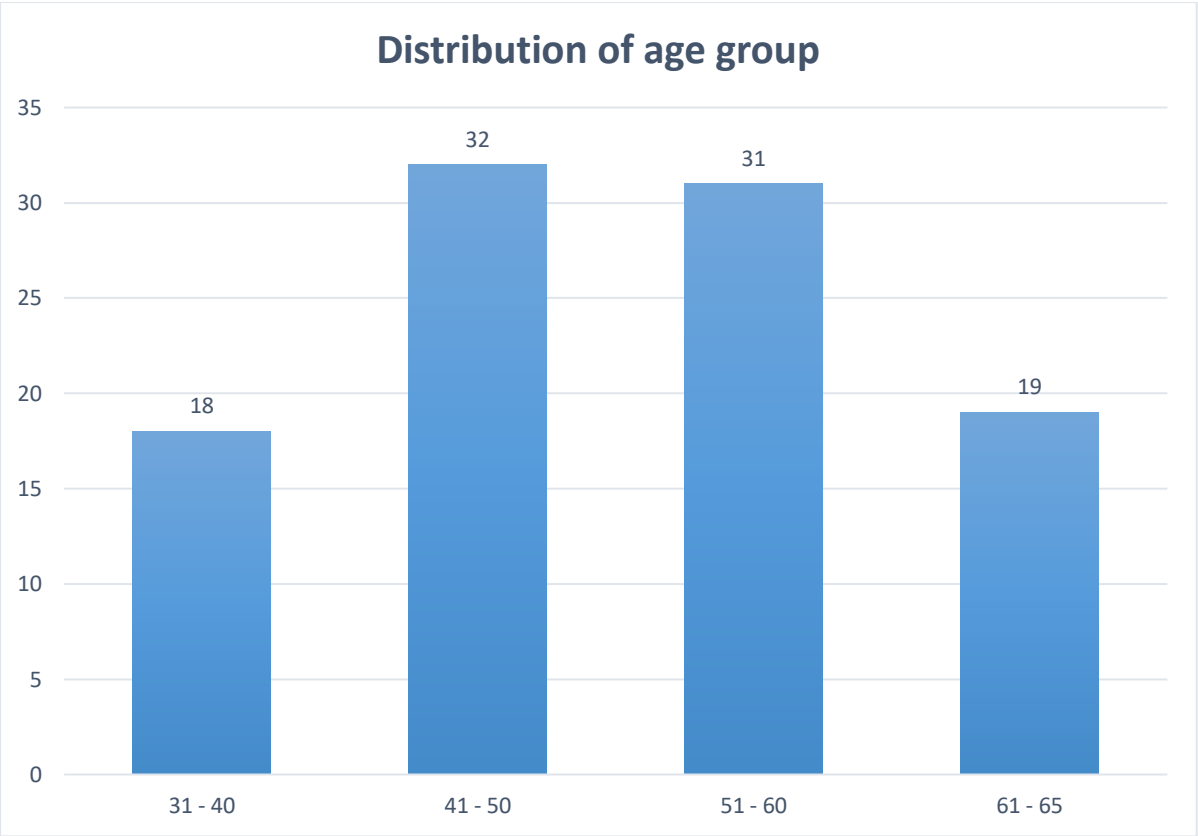


Table 2: Distribution of Sex

Sex	Frequency	Percent
Female	42	42.00
Male	58	58.00
Total	100	100.00

Table 2 displays the distribution of sex among participants, with a total of 100 individuals. Males represent 58% of the sample, while females account for 42%.

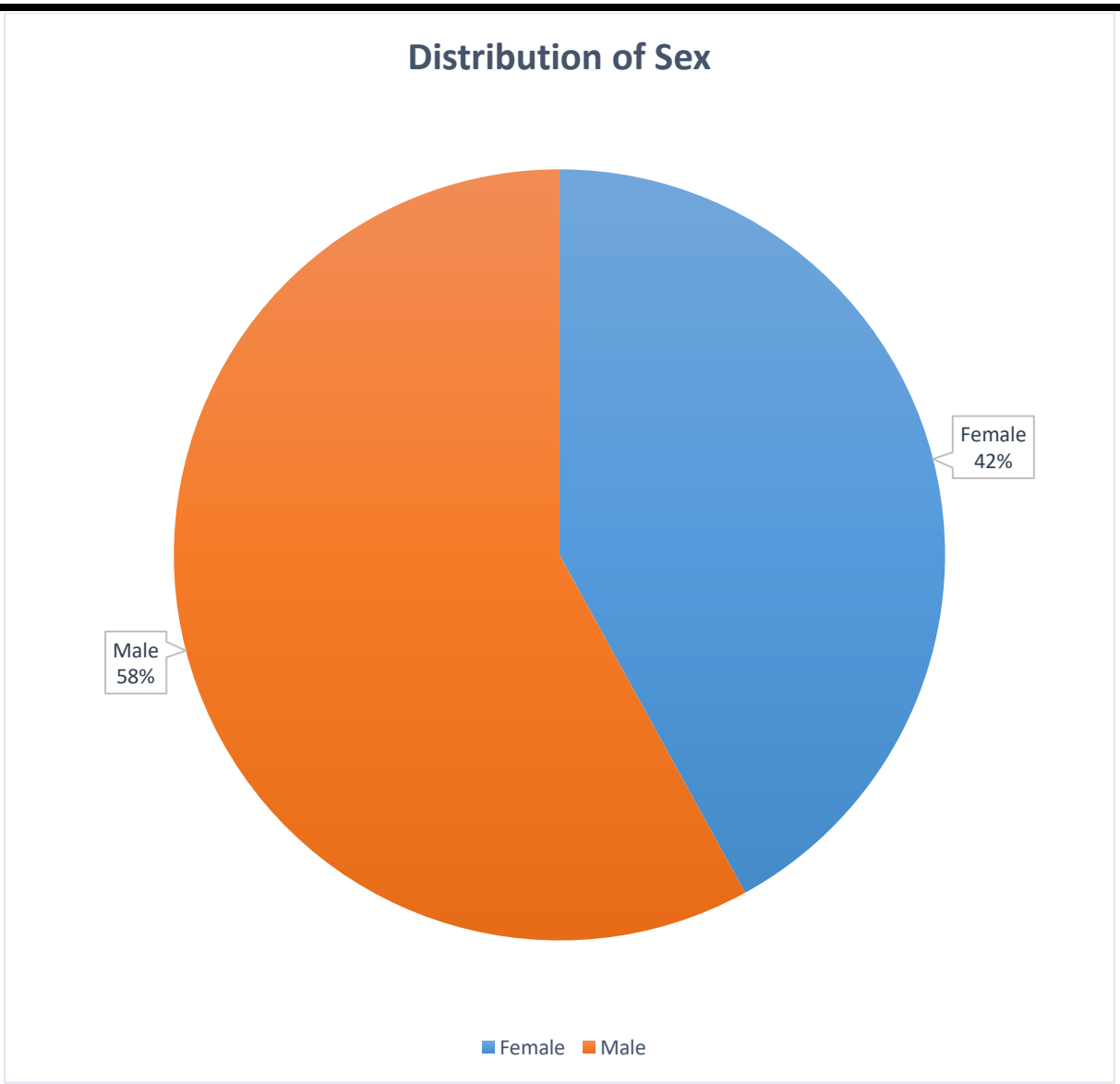


Table 3: Distribution of SES Classification

SES Classification	Frequency	Percent
Lower	18	18.00
Lower middle	24	24.00
Upper lower	22	22.00
Upper middle	21	21.00
Upper	15	15.00
Total	100	100.00

Table 3 details the distribution of participants by socio-economic status (SES) classification, with a total of 100 individuals. The largest group is categorized as lower middle class at 24%, followed by upper lower class at 22% and upper middle class at 21%. Lower class accounts for 18%, while the upper class represents 15%.

Table 4: Distribution of BMI Classification

BMI Classification	Frequency	Mean	Std. Deviation
Normal Weight	13	22.04	1.05
Overweight	14	23.99	0.54
Obesity Class I	56	27.88	1.36
Obesity Class II	17	31.72	1.07

Table 5 summarizes the distribution of participants based on Body Mass Index (BMI) classification, with a total of 100 individuals. The majority fall into Obesity Class I, comprising 56 participants with a mean BMI of 27.88 and a standard deviation of 1.36. Overweight individuals make up 14% with a mean BMI of 23.99, while Obesity Class II includes 17 participants with a mean of 31.72. Only 13 participants are classified as normal weight, with a mean BMI of 22.04.

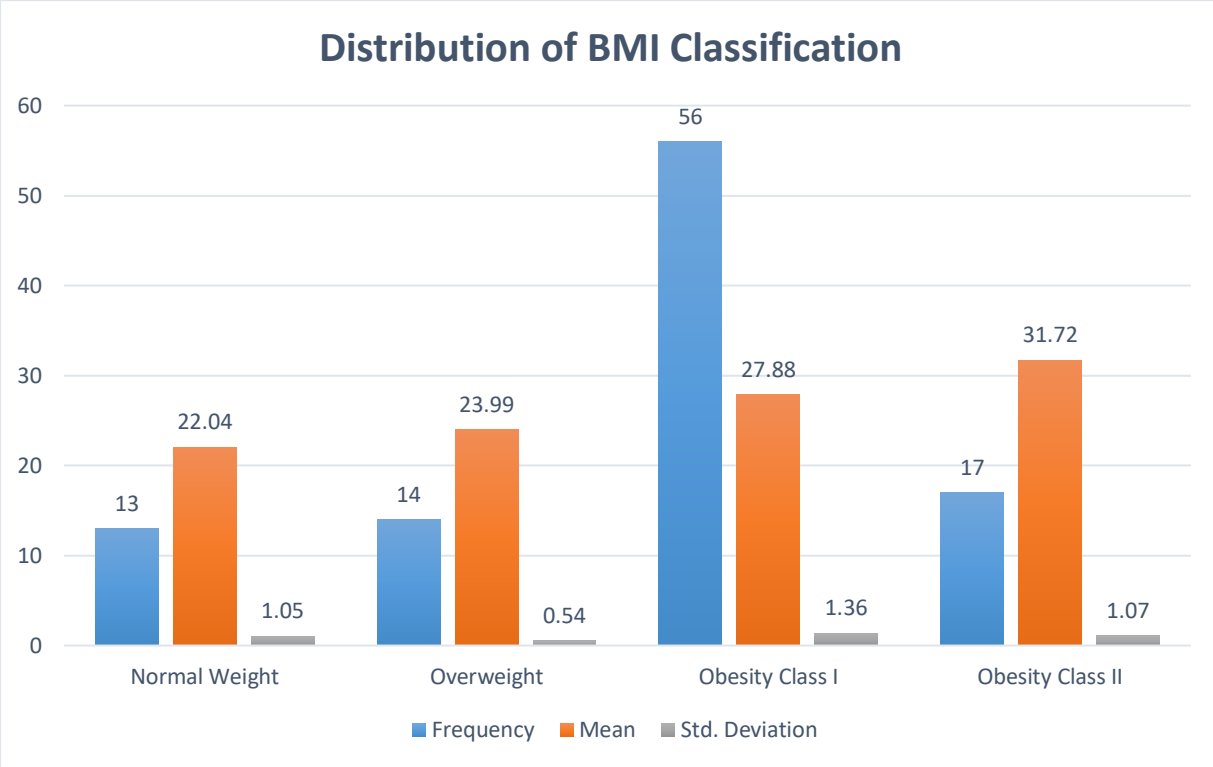


Table 5: Distribution of waist circumference

Waist Circumference	Frequency	Mean	Std. Deviation
Increased Waist Circumference	83	94.83	8.47
Normal Waist Circumference	17	79.94	4.34

Table 5 presents the distribution of participants based on waist circumference, encompassing a total of 100 individuals. A significant majority, 83 participants, are classified with increased waist circumference, yielding a mean measurement of 94.83 cm and a standard deviation of 8.47. In contrast, only 17 participants have a normal waist circumference, with a mean of 79.94 cm and a standard deviation of 4.34.

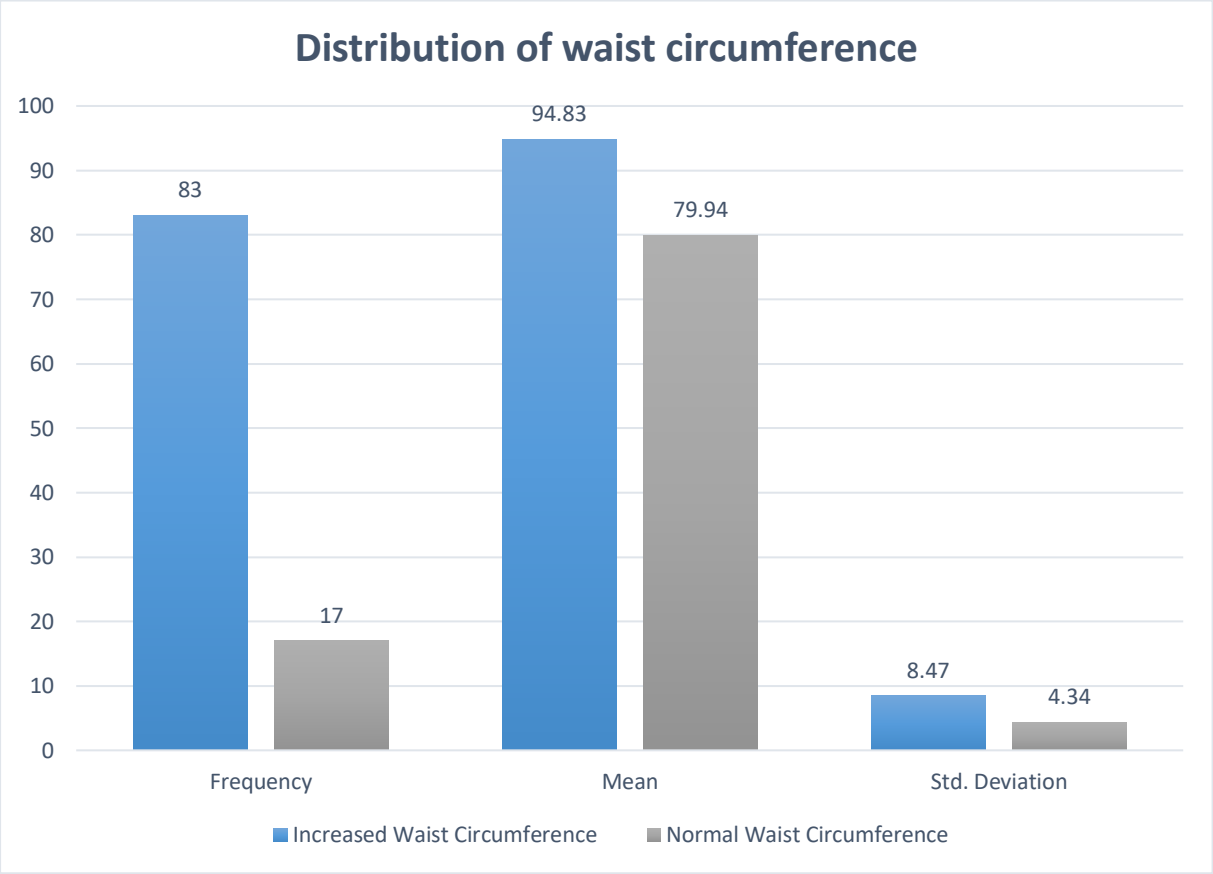


Table 6: Distribution of Fasting Plasma Glucose

Fasting Plasma Glucose	Frequency	Mean	Std. Deviation
High Fasting Plasma Glucose	56	121.55	12.49
Normal	44	93.16	5.52

Table 6 outlines the distribution of participants based on fasting plasma glucose levels, with a total of 100 individuals. The majority, 56 participants, are classified as having high fasting plasma glucose, with a mean level of 121.55 mg/dL and a standard deviation of 12.49. In contrast, 44 participants fall within the normal range, showing a mean level of 93.16 mg/dL and a standard deviation of 5.52.

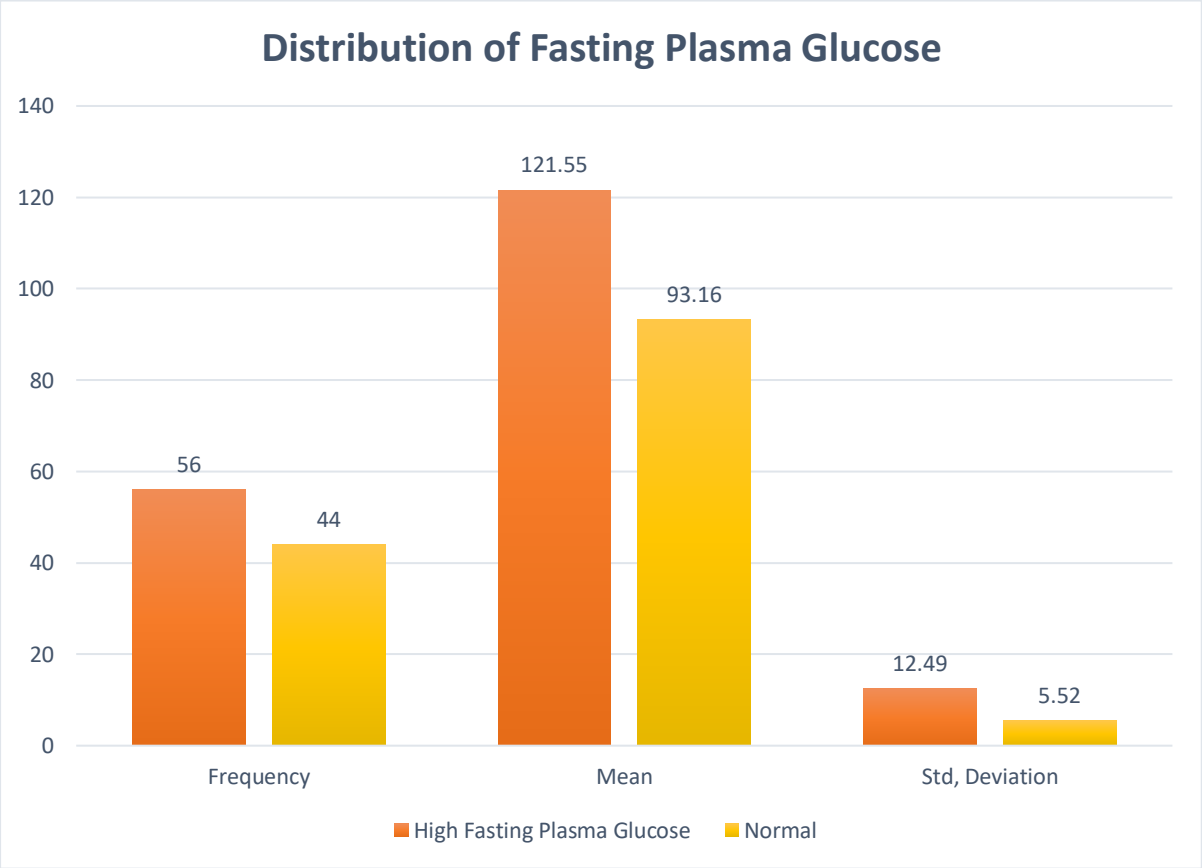


Table 7: Distribution of SBP

SBP	Frequency	Mean	Std. Deviation
High Systolic Blood Pressure	35	141.20	4.48
Normal	65	122.09	7.15

Table 7 presents the distribution of participants based on systolic blood pressure (SBP), consisting of a total of 100 individuals. Out of these, 35 participants are classified with high systolic blood pressure, exhibiting a mean measurement of 141.20 mmHg and a standard deviation of 4.48. In comparison, 65 participants fall within the normal range, showing a mean SBP of 122.09 mmHg with a standard deviation of 7.15.

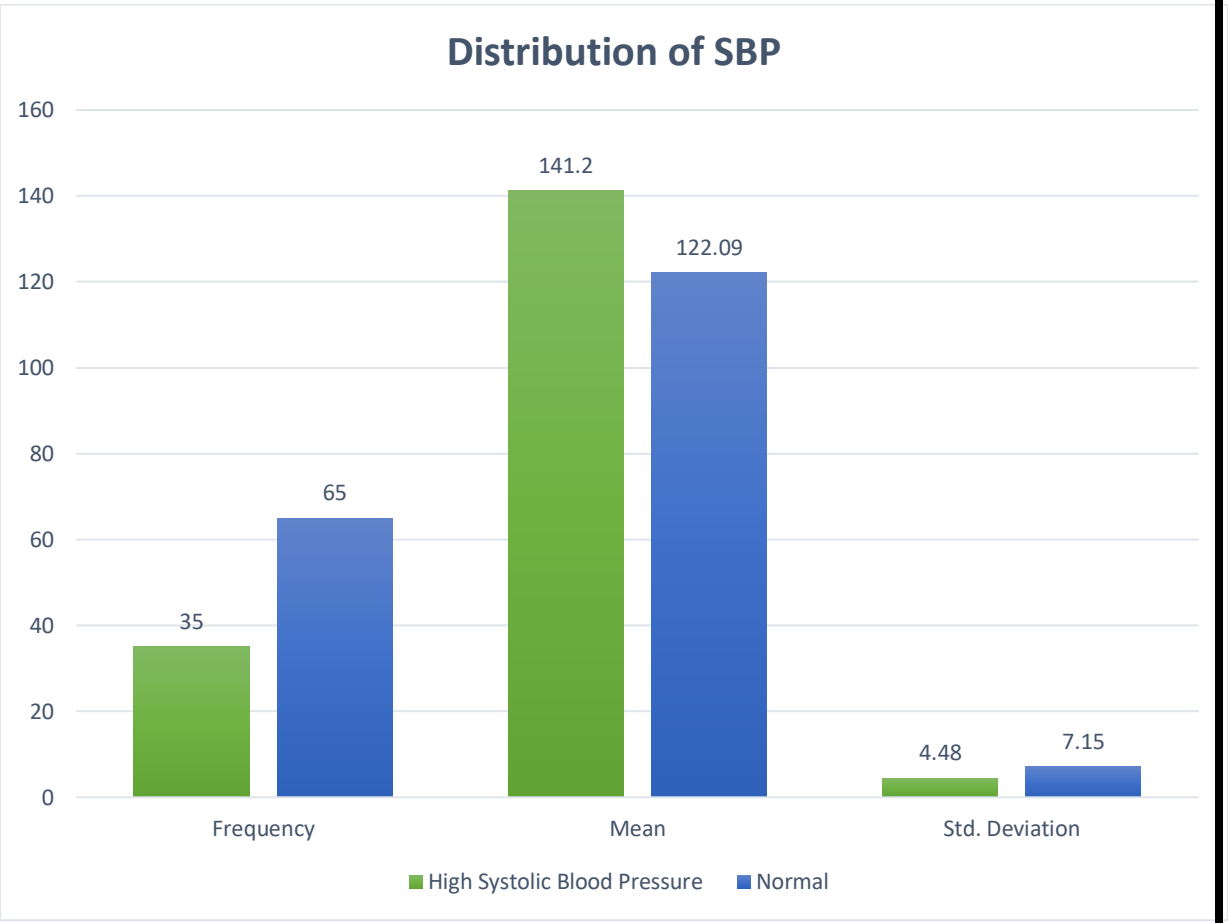


Table 8: Distribution of Diastolic Blood Pressure

DBP	Frequency	Mean	Std. Deviation
High Diastolic Blood Pressure	23	91.30	2.60
Normal	77	71.16	6.90

Table 8: Distribution of Diastolic Blood Pressure

DBP	Frequency	Mean	Std. Deviation

Table 8 details the distribution of participants based on diastolic blood pressure (DBP), with a total of 100 individuals. Among them, 23 participants are classified with high diastolic blood pressure, having a mean measurement of 91.30 mmHg and a standard deviation of 2.60. In contrast, 77 participants are categorized as having normal diastolic blood pressure, with a mean of 71.16 mmHg and a standard deviation of 6.90.

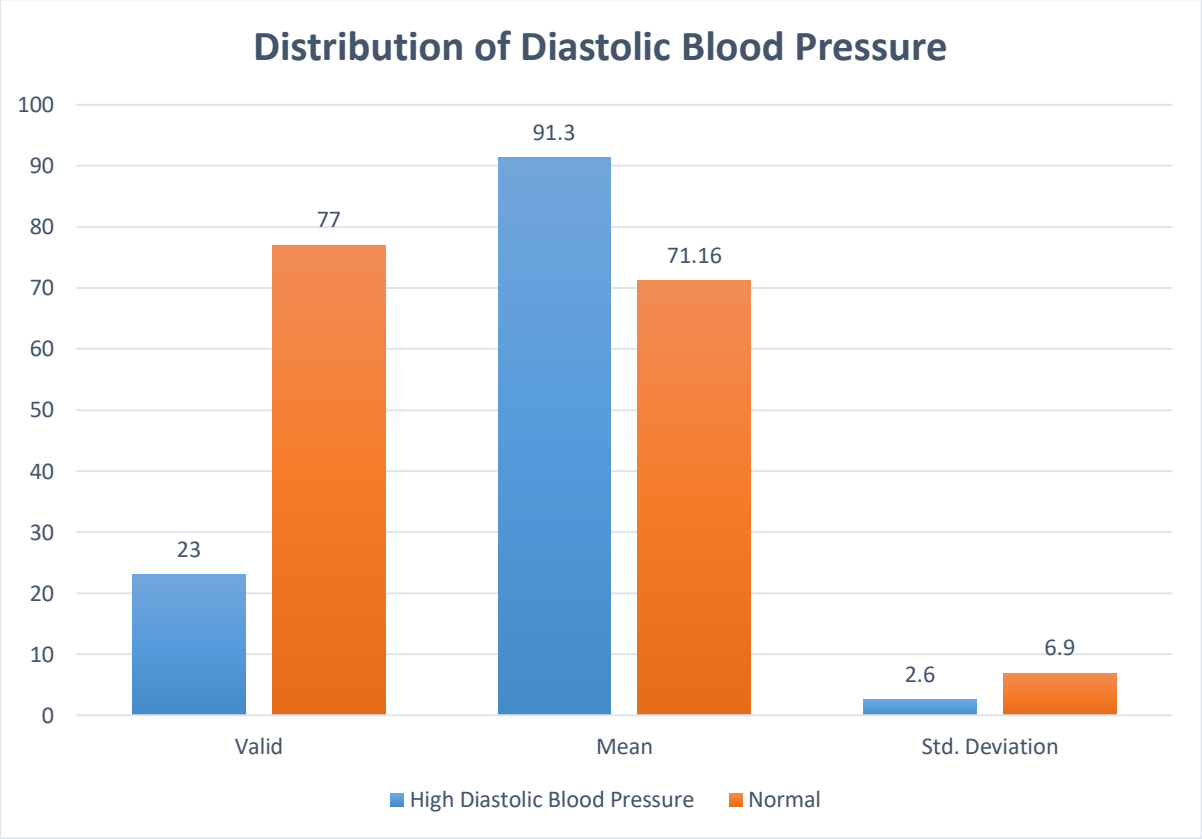


Table 9: Distribution of Triglycerides

Triglycerides	Frequency	Mean	Std. Deviation
High Triglycerides	73	188.53	36.56
Normal	27	136.67	8.91

Table 9 presents the distribution of participants based on triglyceride levels, consisting of a total of 100 individuals. A significant majority, 73 participants, are classified with high triglycerides, exhibiting a mean level of 188.53 mg/dL and a standard deviation of 36.56. In comparison, 27 participants fall within the normal range, with a mean triglyceride level of 136.67 mg/dL and a standard deviation of 8.91.

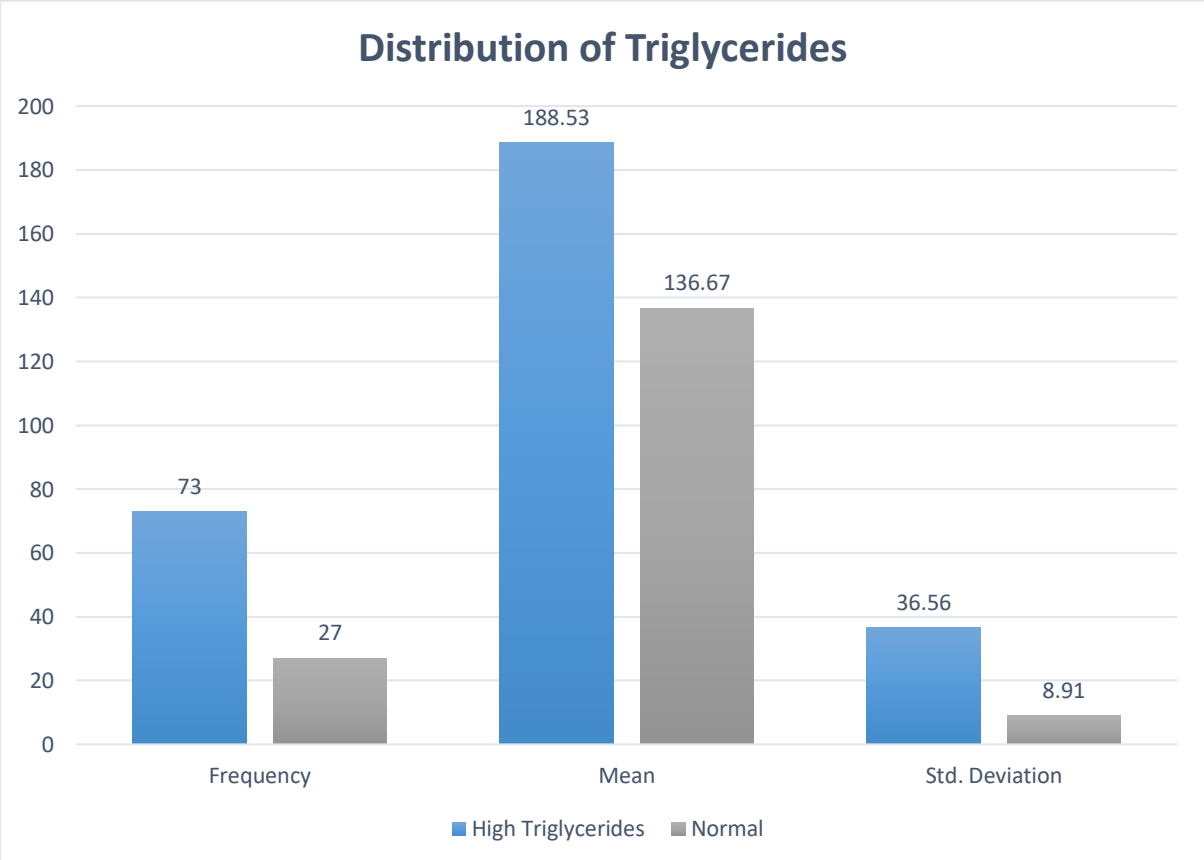


Table 10: Distribution of Total Cholesterol

Total Cholesterol	Frequency	Mean	Std. Deviation
Abnormal	67	242.69	62.26
Normal	33	182.91	11.70

Table 10 outlines the distribution of participants based on total cholesterol levels, with a total of 100 individuals. Among these, 67 participants are classified as having abnormal total cholesterol, with a mean level of 242.69 mg/dL and a standard deviation of 62.26. In contrast, 33 participants fall within the normal range, exhibiting a mean total cholesterol level of 182.91 mg/dL and a standard deviation of 11.70.

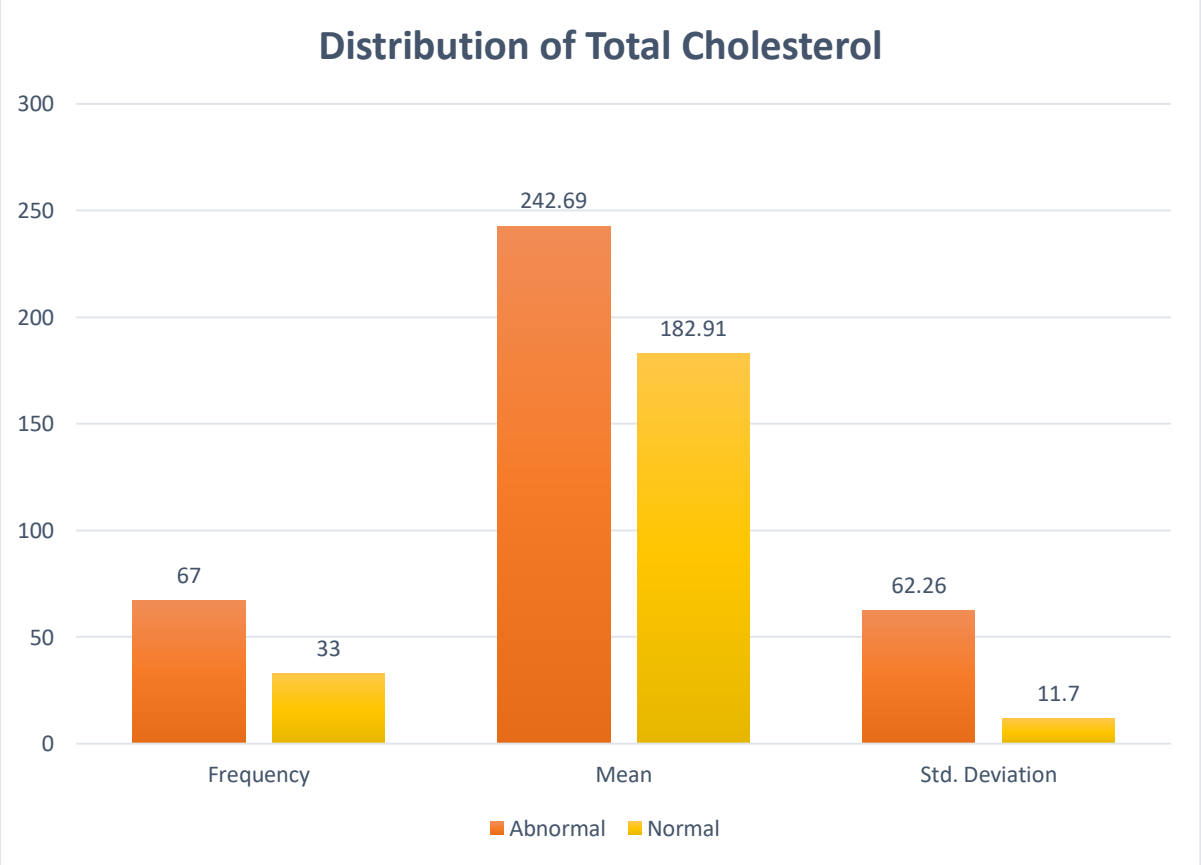


Table 11: Distribution of HDL

HDL	Frequency	Mean	Std. Deviation
Abnormal	61	32.74	6.47
Normal	39	45.36	3.45

Table 11 presents the distribution of participants based on high-density lipoprotein (HDL) levels, comprising a total of 100 individuals. Of these, 61 participants are classified as having abnormal HDL levels, with a mean of 32.74 mg/dL and a standard deviation of 6.47. Conversely, 39 participants fall within the normal range, exhibiting a mean HDL level of 45.36 mg/dL and a standard deviation of 3.45.

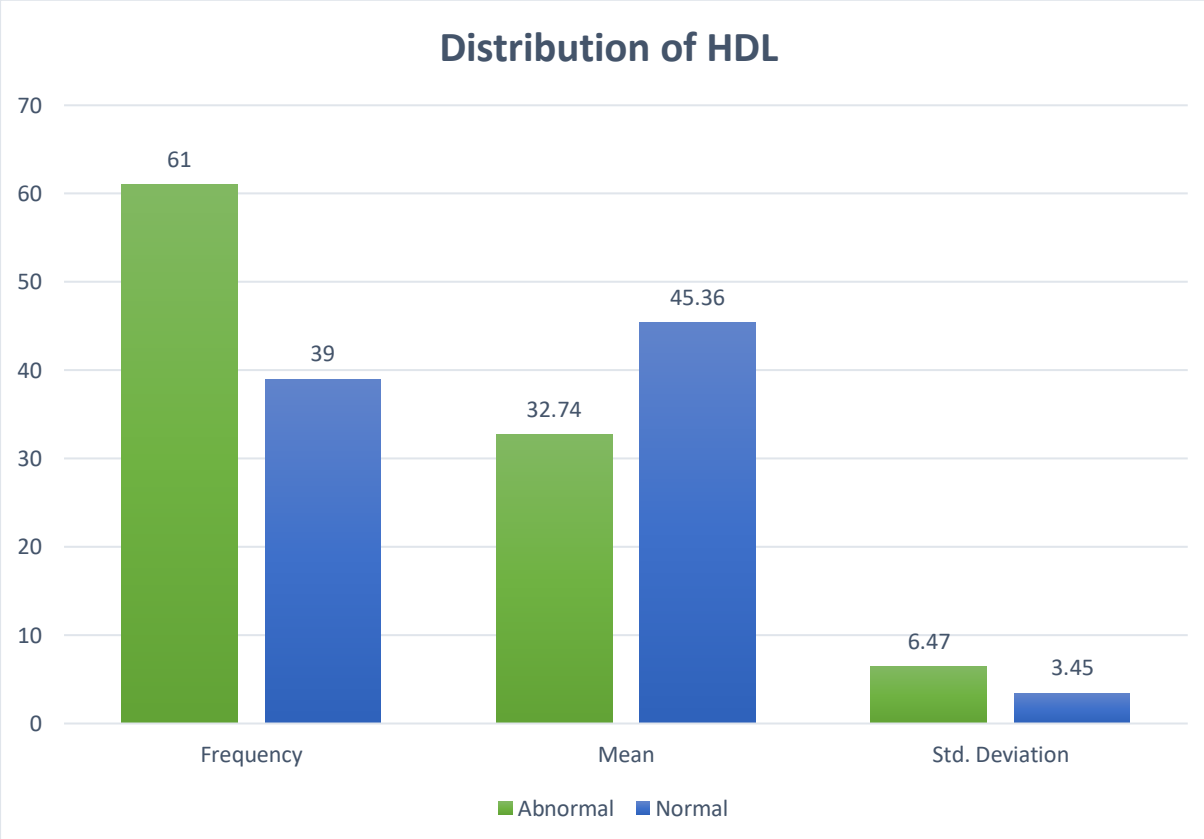


Table 12: Distribution of LDL status

LDL	Frequency	Mean	Std. Deviation
Abnormal	75	125.41	21.56
Normal	25	89.84	5.47

Table 12 outlines the distribution of participants based on low-density lipoprotein (LDL) levels, comprising a total of 100 individuals. A significant majority, 75 participants, are classified as having abnormal LDL levels, with a mean of 125.41 mg/dL and a standard deviation of 21.56. In contrast, 25 participants fall within the normal range, showing a mean LDL level of 89.84 mg/dL and a standard deviation of 5.47.

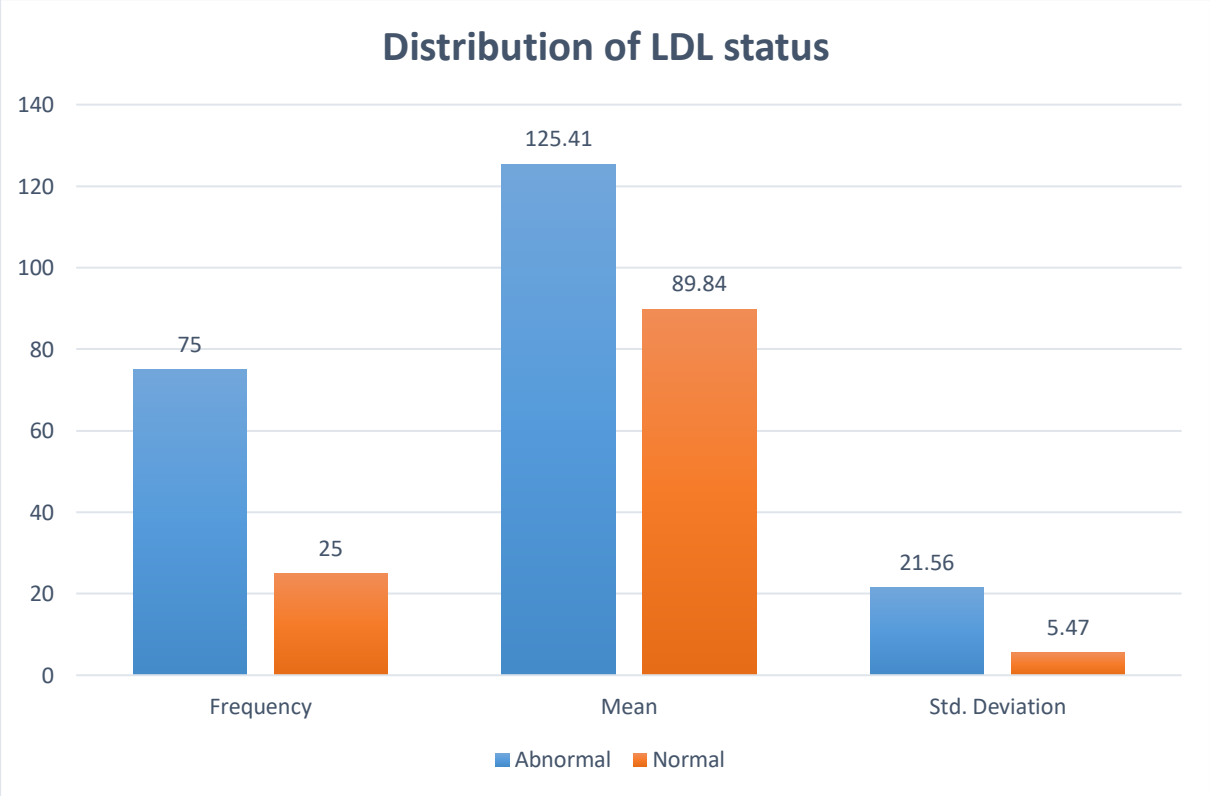


Table 13: Distribution of Metabolic Syndrome

Metabolic Syndrome	Frequency	Percent
Absent	62	62.00
Present	38	38.00
Total	100	100.00

Table 13 displays the distribution of participants with respect to metabolic syndrome, consisting of a total of 100 individuals. Among them, 62 participants are classified as absent of metabolic syndrome, accounting for 62% of the sample, while 38 participants are classified as present, representing 38%.

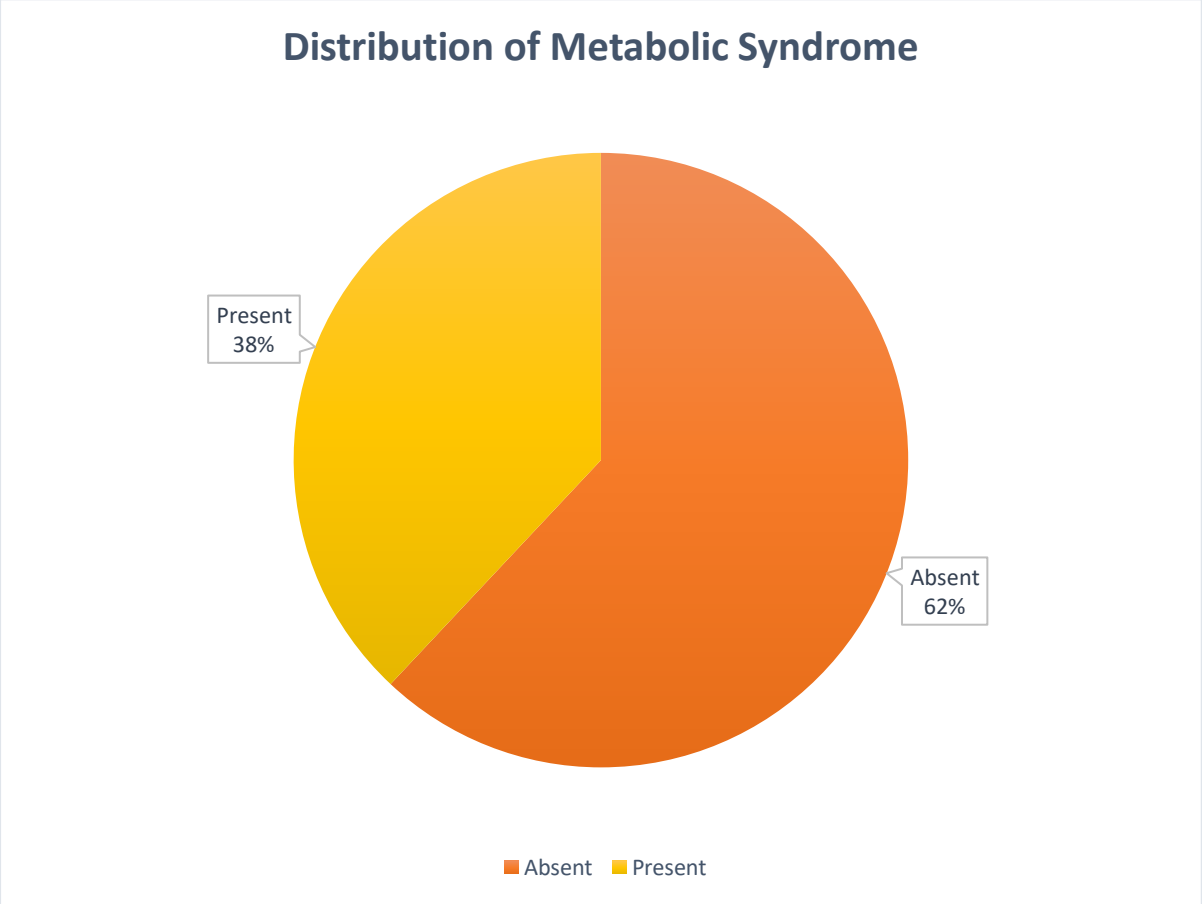


Table 14: Distribution of Psychiatric Comorbidity

Psychiatric Comorbidity	Frequency	Percent
BPAD	20	20.00
Psychosis	26	26.00
Schizophrenia	36	36.00
Others	18	18.00
Total	100	100.00

Table 14 presents the distribution of psychiatric comorbidity among participants, with a total of 100 individuals. Schizophrenia is the most prevalent condition, affecting 36% of the sample, followed by psychosis at 26%. Bipolar affective disorder (BPAD) accounts for 20%, while other psychiatric conditions comprise 18%.

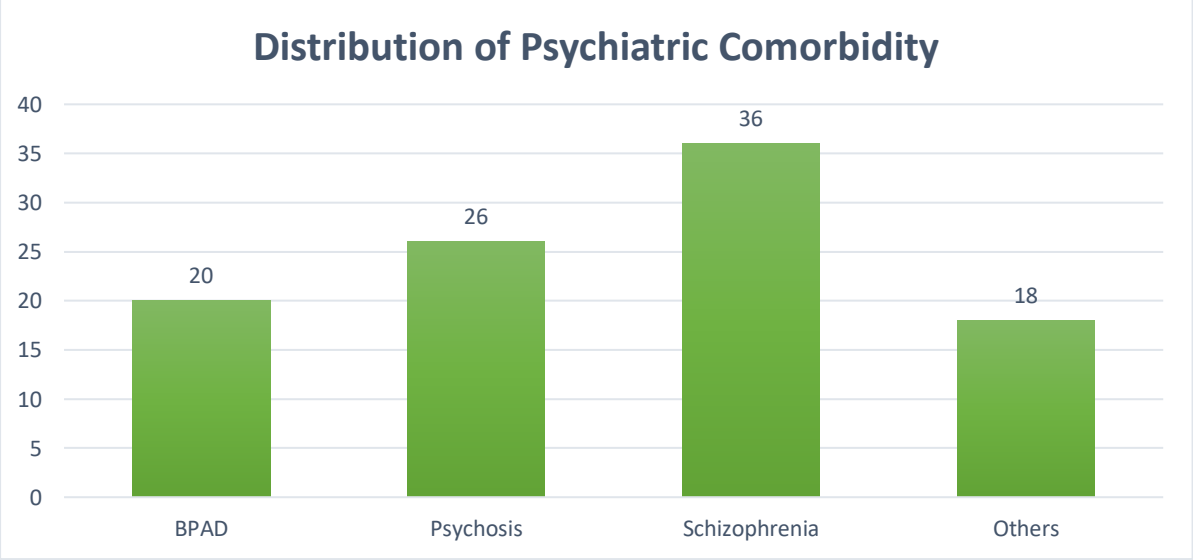


Table 15: Association between Psychiatric comorbidity and metabolic syndrome

Metabolic Syndrome	Psychiatric Comorbidity			Total
	BPAD	Psychosis	Schizophrenia	
Absent	18	19	25	62
Present	8	13	17	38
Total	26	32	42	100

p-value = 0.02 (Statistically Significant)

Table 15 illustrates the association between psychiatric comorbidity and metabolic syndrome among participants, totaling 100 individuals. Among those without metabolic syndrome, 18 have bipolar affective disorder (BPAD), 19 have psychosis, and 25 have schizophrenia, totaling 62. In contrast, among participants with metabolic syndrome, 8 have BPAD, 13 have psychosis, and 17 have schizophrenia, totaling 38. A p-value of 0.02 signifies a meaningful statistical connection between psychiatric comorbidities and metabolic syndrome, indicating a potential interrelationship between these conditions.

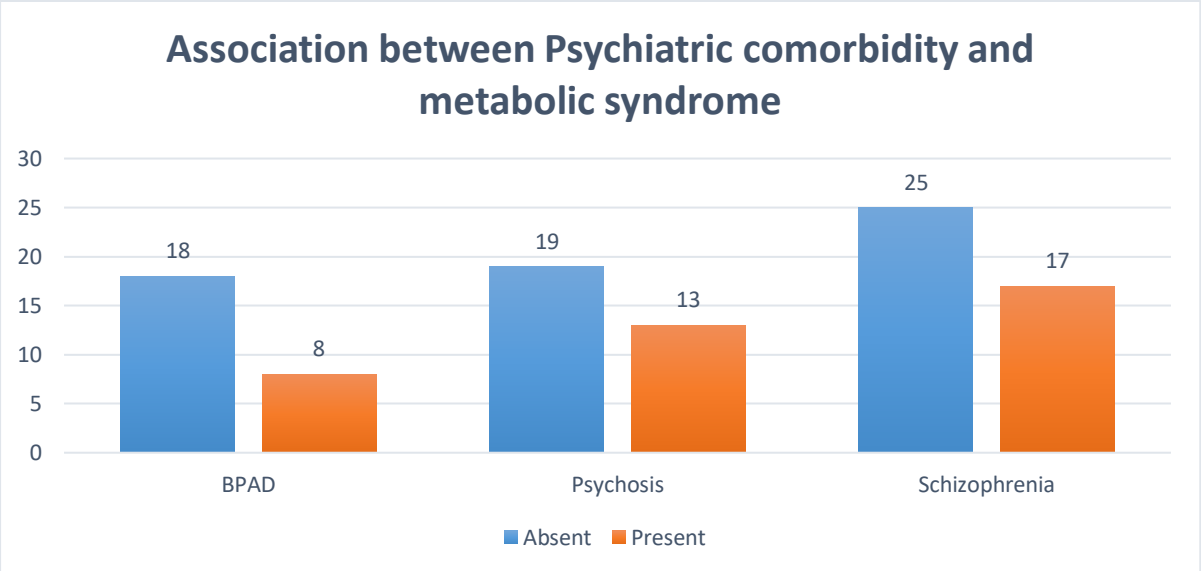


Table 16: Association between Metabolic syndrome and waist circumference

Metabolic Syndrome	Interpretation of waist circumference		Total
	Increased Waist Circumference	Normal Waist Circumference	
Absent	45	17	62
Present	38	0	38
Total	83	17	100
p-value < 0.001 (Statistically Significant)			

Table 16 demonstrates the association between metabolic syndrome and waist circumference among participants, totaling 100 individuals. Among those without metabolic syndrome, 45 have increased waist circumference, while 17 have normal waist circumference, totaling 62. In contrast, all 38 participants with metabolic syndrome exhibit increased waist circumference, with none having normal waist measurements. A p-value below 0.001 signifies a statistically significant relationship, highlighting a strong association between metabolic syndrome and increased waist circumference within this population.

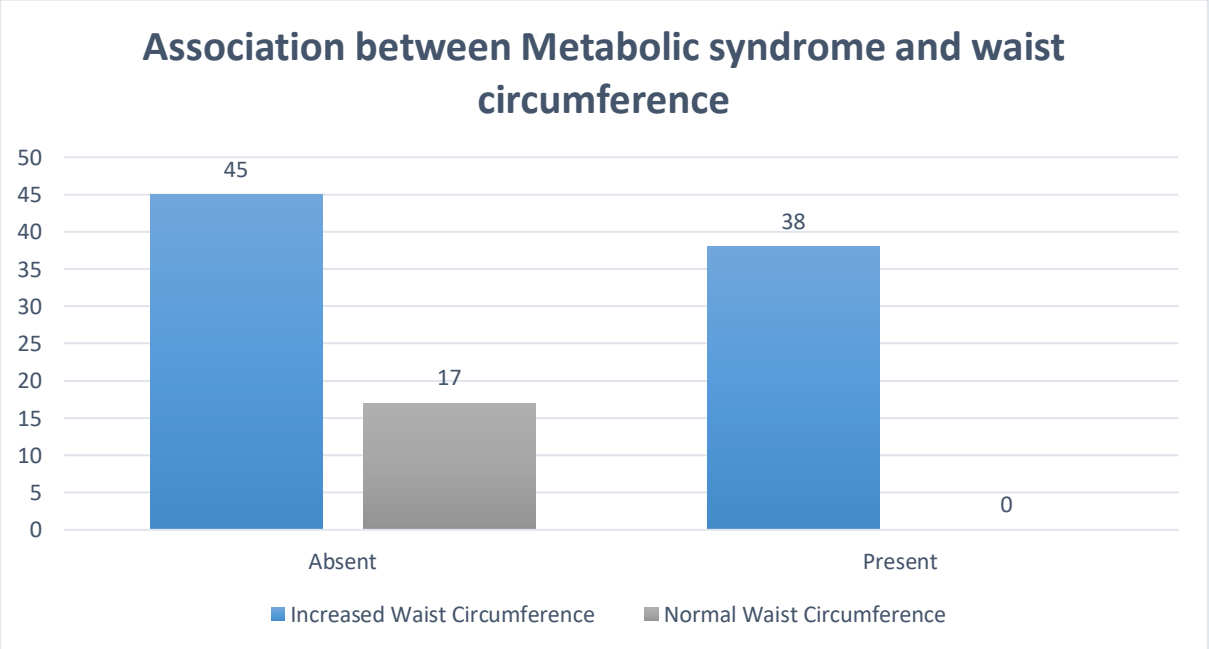


Table 17: Association between Metabolic syndrome and BMI classification

Metabolic Syndrome	BMI Classification				
	Normal Weight	Obesity Class I	Obesity Class II	Overweight	Total
Absent	12	27	10	13	62
Present	1	29	7	1	38
Total	13	56	17	14	100
p-value < 0.001 (Statistically Significant)					

Table 17 illustrates the association between metabolic syndrome and BMI classification among participants, with a total of 100 individuals. Among those without metabolic syndrome, 12 are classified as normal weight, 27 as Obesity Class I, 10 as Obesity Class II, and 13 as overweight, totaling 62. Conversely, among participants with metabolic syndrome, only 1 is normal weight, while 29 are classified as Obesity Class I, 7 as Obesity Class II, and 1 as overweight, totaling 38. A p-value below 0.001 signifies a statistically significant relationship, indicating a strong correlation between higher BMI classifications and the prevalence of metabolic syndrome within this population.

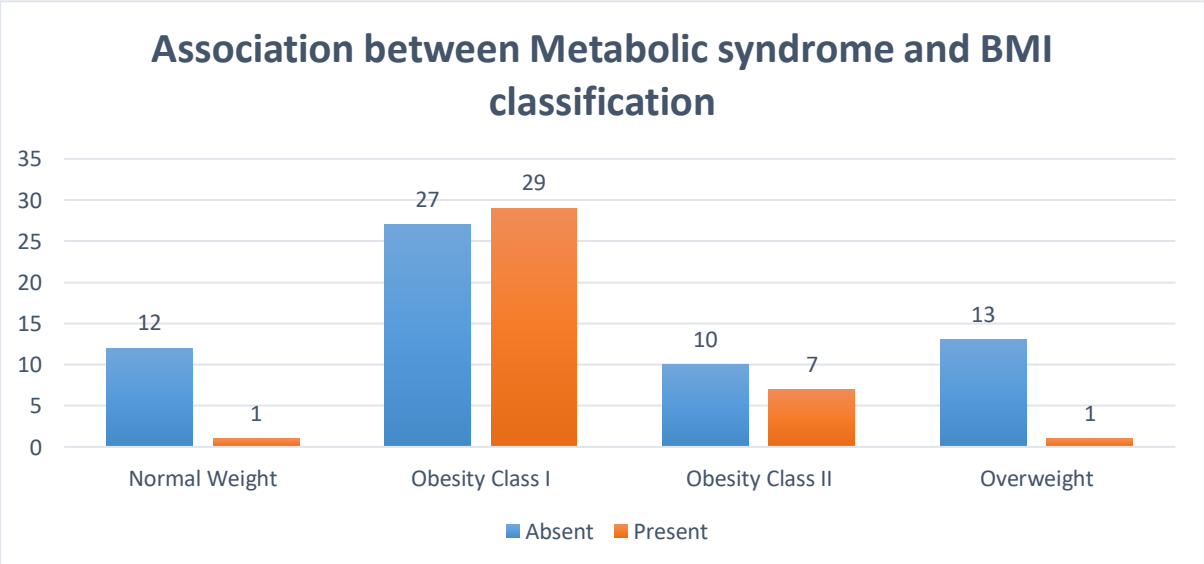


Table 18: Association between Metabolic syndrome and high fasting plasma glucose

Metabolic Syndrome	Interpretation of FBS		
	High Fasting Plasma Glucose	Normal	Total
Absent	35	27	62
Present	21	17	38
Total	56	44	100

p-value < 0.001 (Statistically Significant)

Table 18 examines the association between metabolic syndrome and fasting plasma glucose (FBS) levels among participants, totaling 100 individuals. Among those without metabolic syndrome, 35 have high fasting plasma glucose, while 27 have normal levels, totaling 62. In contrast, among participants with metabolic syndrome, 21 exhibit high fasting plasma glucose, and 17 have normal levels, totaling 38. A p-value below 0.001 signifies a statistically significant relationship, indicating a strong association between elevated fasting plasma glucose levels and the presence of metabolic syndrome within this population.

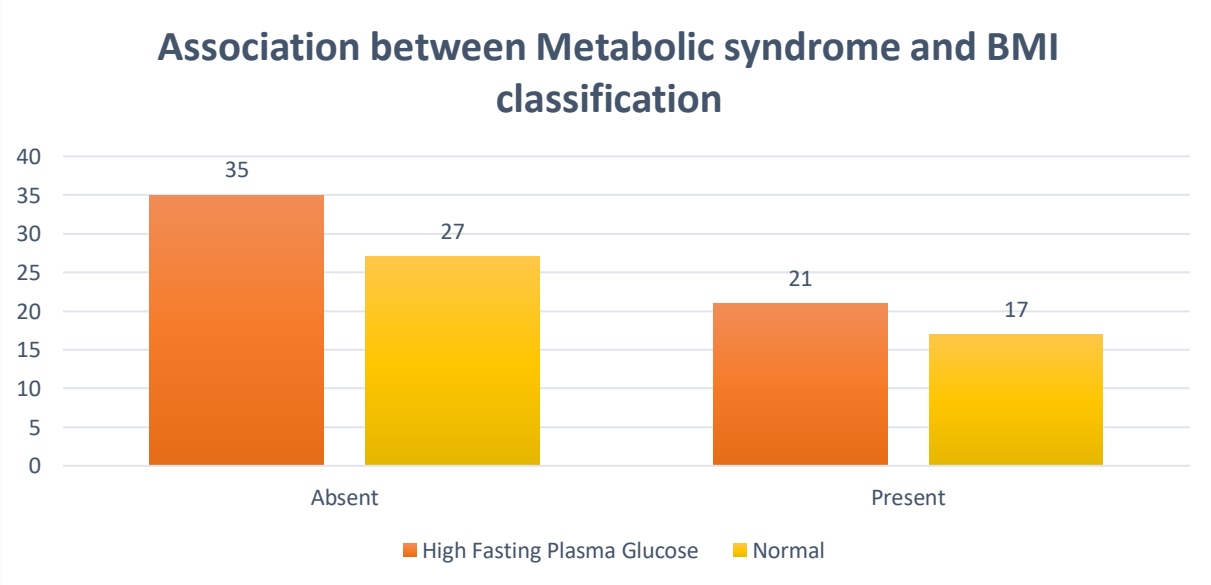


Table 19: Association between Metabolic syndrome and SBP

	SBP Interpretation		
Metabolic Syndrome	**High Systolic Blood Pressure**	**Normal**	**Total**
Absent	17	45	62
Present	18	20	38
Total	35	65	100
p-value = 0.04 (Statistically Significant)			

Table 19 explores the association between metabolic syndrome and systolic blood pressure (SBP) among participants, with a total of 100 individuals. Among those without metabolic syndrome, 17 have high systolic blood pressure, while 45 have normal levels, totaling 62. In contrast, among participants with metabolic syndrome, 18 exhibit high systolic blood pressure, and 20 have normal readings, totaling 38. A p-value of 0.04 signifies a statistically significant association, pointing to a meaningful relationship between elevated systolic blood pressure and the prevalence of metabolic syndrome in this population.

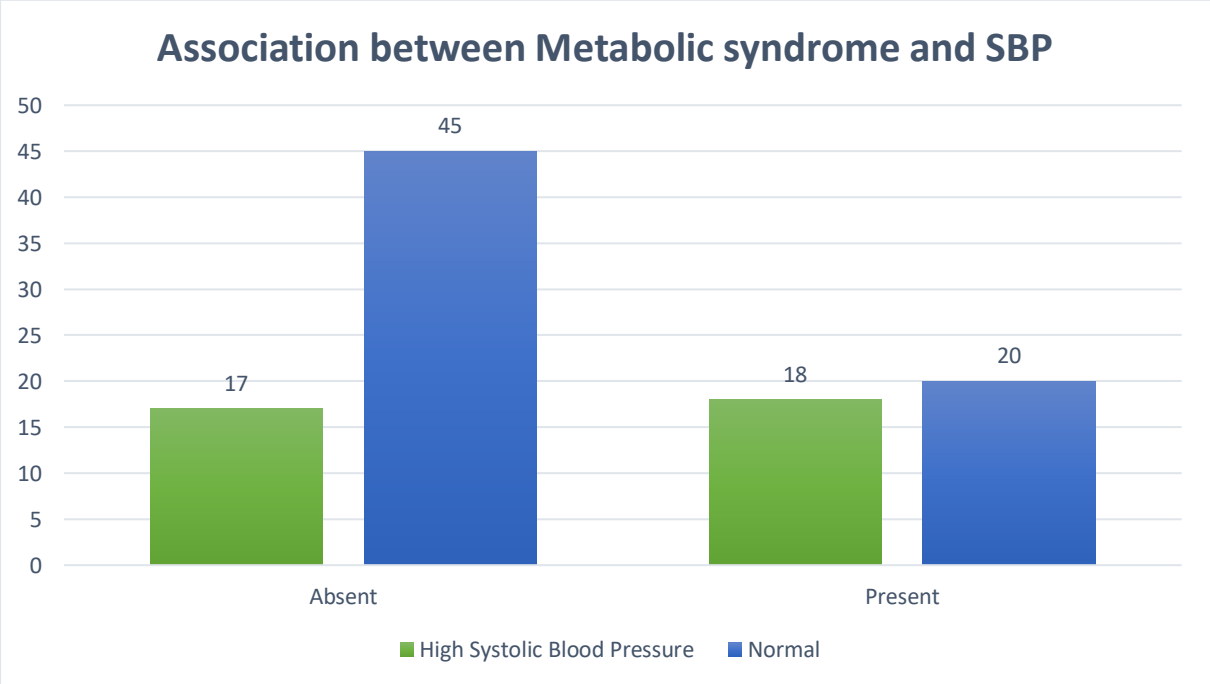


Table 20: Association between Metabolic syndrome and DBP

	DBP Interpretation		
Metabolic Syndrome	**High Diastolic Blood Pressure**	**Normal**	**Total**
Absent	4	58	62
Present	19	19	38
Total	23	77	100

p-value < 0.001 (Statistically Significant)

Table 20 This study analyzes the relationship between metabolic syndrome (MetS) and diastolic blood pressure (DBP) among 100 participants. Among individuals without MetS, 4 had high DBP while 58 maintained normal levels, totaling 62. In contrast, within the MetS group, 19 participants exhibited high DBP, while 19 had normal readings, amounting to 38.

A p-value of less than 0.001 suggests a statistically significant association, underscoring a strong correlation between elevated diastolic blood pressure and the presence of metabolic syndrome in this population.

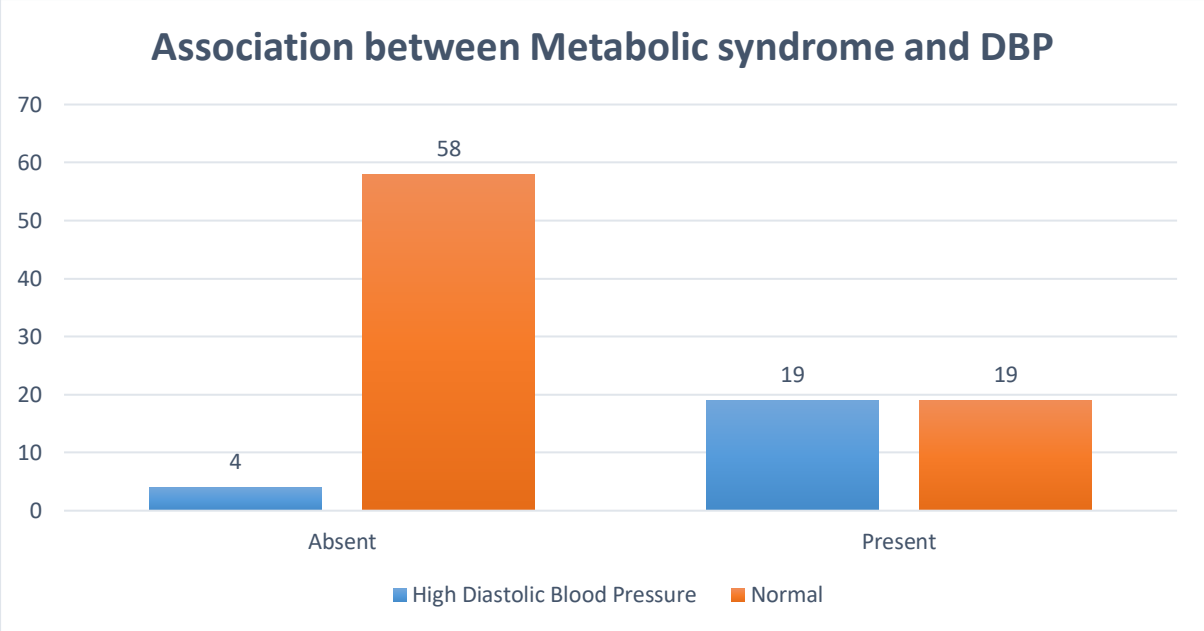


Table 21: Association of Metabolic syndrome and Triglycerides

	Interpretation of Triglycerides		
Metabolic Syndrome	**High Triglycerides**	**Normal**	**Total**
Absent	36	26	62
Present	37	1	38
Total	73	27	100

p- value < 0.001 (Statistically Significant)

Table 21 presents the association between metabolic syndrome and triglyceride levels among participants, comprising a total of 100 individuals. Among those without metabolic syndrome, 36 have high triglycerides, while 26 have normal levels, totaling 62. In contrast, among participants with metabolic syndrome, 37 exhibit high triglycerides, and only 1 has normal levels, totaling 38. The p-value of less than 0.001 indicates a statistically significant association, underscoring a strong link between high triglyceride levels and the presence of metabolic syndrome in this population.

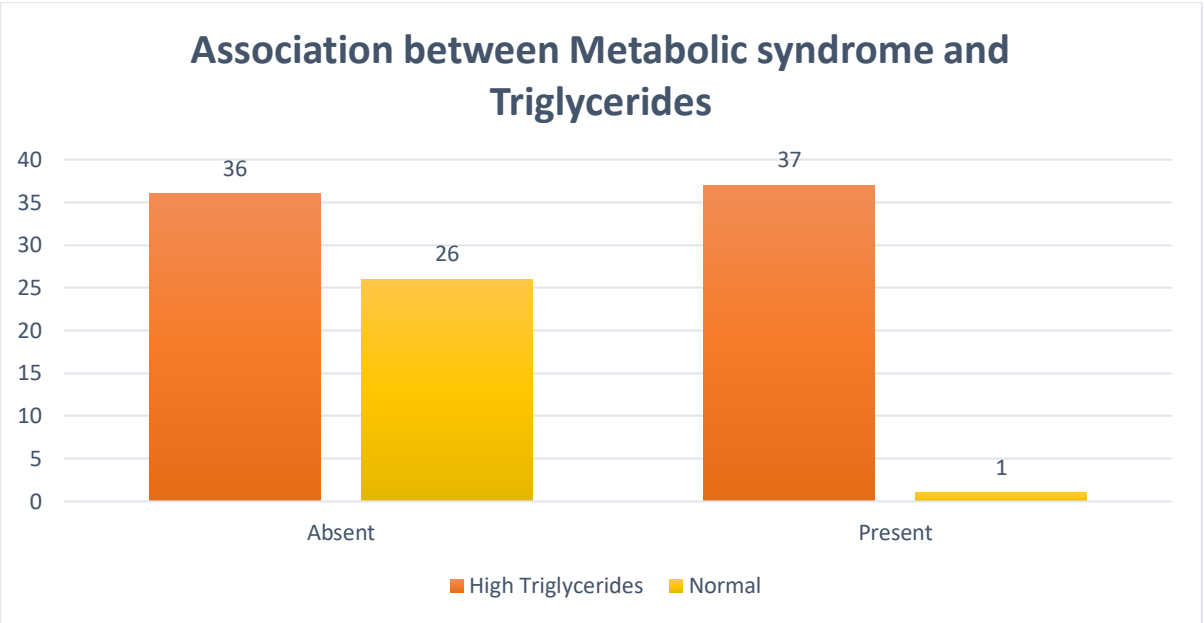


Table 22: Association between Metabolic syndrome and Total Cholesterol

	Interpretation of Total Cholesterol		
Metabolic Syndrome	**Abnormal**	**Normal**	**Total**
Absent	31	31	62
Present	36	2	38
Total	67	33	100

p-value < 0.001 (Statistically Significant)

Table 22 This study analyzes the relationship between metabolic syndrome (MetS) and diastolic blood pressure (DBP) among 100 participants. Among individuals without MetS, 4 had high DBP while 58 maintained normal levels, totaling 62. In contrast, within the MetS group, 19 participants exhibited high DBP, while 19 had normal readings, amounting to 38.

A p-value of less than 0.001 suggests a statistically significant association, underscoring a strong correlation between elevated diastolic blood pressure and the presence of metabolic syndrome in this population.

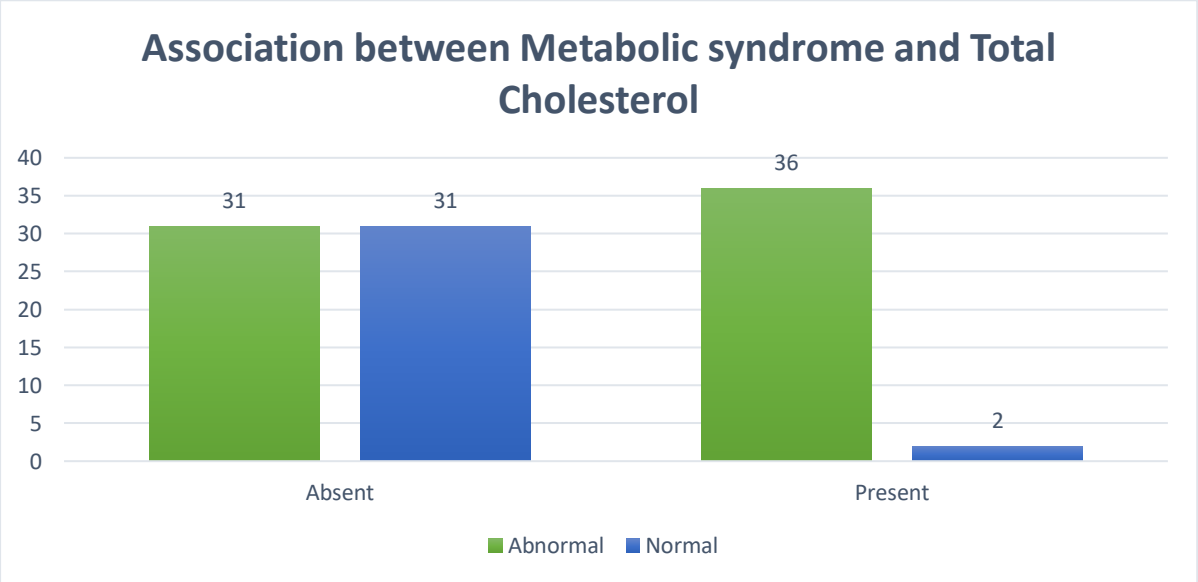


Table 23: Association between Metabolic syndrome and HDL

	HDL Interpretation		
Metabolic Syndrome	**Abnormal**	**Normal**	**Total**
Absent	40	22	62
Present	21	17	38
Total	61	39	100

p-value = 0.36 (Not Significant)

Table 23 analyzes the association between metabolic syndrome and high-density lipoprotein (HDL) levels among participants, totaling 100 individuals. Among those without metabolic syndrome, 40 have abnormal HDL levels, while 22 have normal levels, totaling 62. In contrast, among participants with metabolic syndrome, 21 exhibit abnormal HDL, and 17 have normal levels, totaling 38. A p-value of 0.36 suggests that the association is not statistically significant, indicating no strong correlation between HDL levels and the presence of metabolic syndrome.

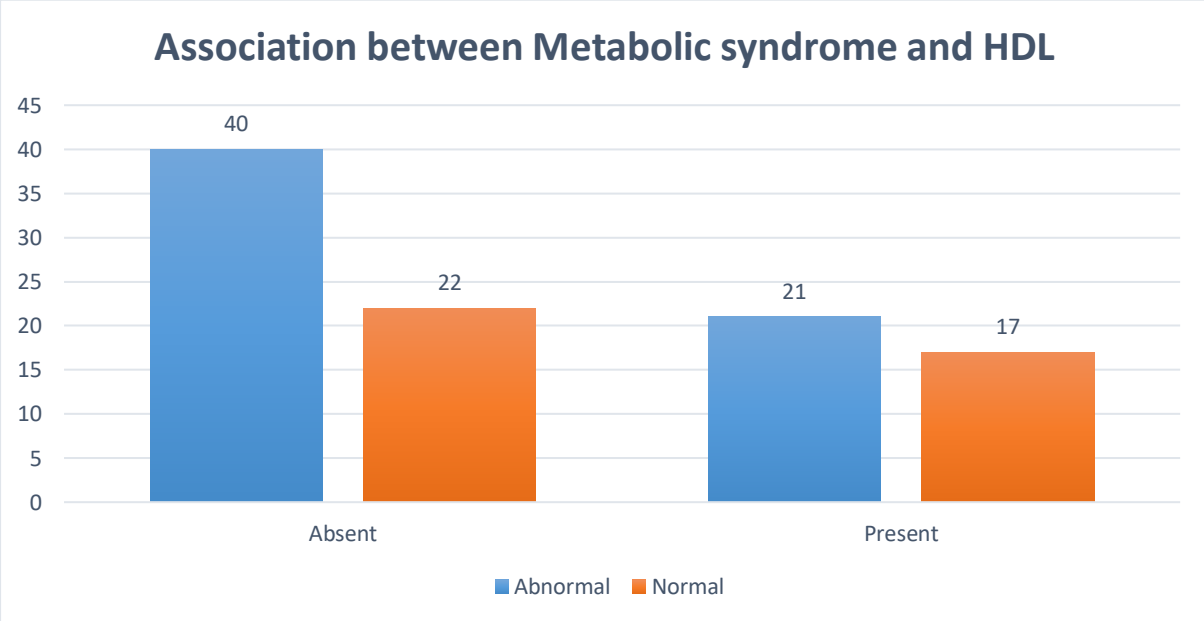
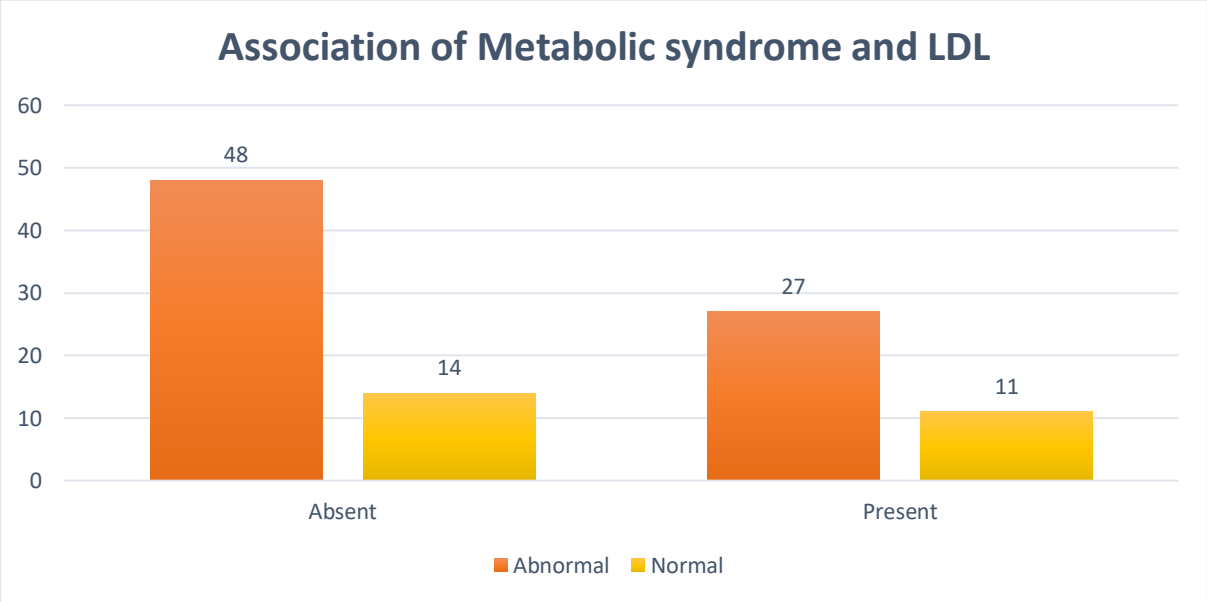


Table 24: Association between Metabolic syndrome and LDL

	LDL Interpretation		
Metabolic Syndrome	**Abnormal**	**Normal**	**Total**
Absent	48	14	62
Present	27	11	38
Total	75	25	100

p-value = 0.48 (Not Significant)

Table 24 examines the association between metabolic syndrome and low-density lipoprotein (LDL) levels among participants, with a total of 100 individuals. Among those without metabolic syndrome, 48 have abnormal LDL levels, while 14 have normal levels, totaling 62. In contrast, among participants with metabolic syndrome, 27 exhibit abnormal LDL, and 11 have normal levels, totaling 38. A p-value of 0.48 suggests that the association is not statistically significant, indicating no strong correlation between LDL levels and the presence of metabolic syndrome in this population.



DISCUSSION

1. Prevalence of Metabolic Syndrome

- **Present study**: Metabolic Syndrome (MetS) was observed in 38% of mental patients.
- **Comparison**:
    - A comprehensive evaluation indicated a combined prevalence of 41.3% among people with schizophrenia, with variances across different nations.
    - A research conducted in India revealed a 59% incidence of bipolar illness among individuals.[38]
    - A separate research indicated a frequency of 34.74% among psychiatric inpatients.[39]

The prevalence in the current research corresponds with global data, demonstrating a substantial burden of MetS among mental patients.[30]

2. Demographic Distribution

- **Age**:
    - **Present**: Mean age was 50.61 years.
    - **Comparison**: A research conducted by Colijn et al. in 2017 indicated a mean age of 51.9 years for mental patients.
- **Sex**:
    - **Present study**: 58% male, 42% female.
    - **Comparison**: A research indicated a higher frequency of Metabolic Syndrome in females (43.3%) than in males (28.5%).[39]

Discussion: The age distribution aligns with findings from previous research. Nevertheless, the variation in sex distribution indicates the necessity for gender-specific treatments.[40]

3. Body Mass Index (BMI) and Waist Circumference

- **Present study**:
    - Obesity Class I: 56%
    - Increased waist circumference: 83%
- **Comparison**:

- Among individuals with schizophrenia, increased waist circumference was the most frequently observed abnormality, affecting 64.8% of cases. This highlights a significant metabolic concern within this population.[29]

Discussion: Elevated rates of obesity and central obesity are common among mental patients, requiring focused lifestyle therapy.[41]

4. Fasting Plasma Glucose (FPG)

- **Present study**: 56% had high FPG.
- **Comparison**:
  - Elevated fasting plasma glucose levels were noted in 47.8% of mental patients in a research conducted in Saudi Arabia.[15]

Discussion: Increased FPG levels are prevalent, underscoring the necessity of routine glucose monitoring in psychiatric cohorts.[42]

5. Blood Pressure

- **Present study**:
    - High systolic BP: 35%
    - High diastolic BP: 23%
- **Comparison**:
    - Hypertension was identified in 42.5% of mental patients in Saudi Arabia.[15]

Hypertension is common in mental patients, requiring regular blood pressure evaluations.[43]

6. Lipid Profile

- **Present Study**:
    - High triglycerides: 73%
    - Abnormal HDL: 61%
    - Abnormal LDL: 75%
- **Comparison**:
    - Elevated triglycerides and reduced HDL levels were prevalent among psychiatric patients.[15]

Dyslipidaemia is a considerable issue in mental patients, necessitating consistent lipid monitoring and care.[42]

7. Psychiatric Comorbidities

- **Present Study**:
    - Schizophrenia: 36%
    - Psychosis: 26%
    - BPAD: 20%
- **Comparison**:
    - Among individuals diagnosed with schizophrenia, the prevalence of metabolic syndrome (MetS) was found to be 41.3%, highlighting a significant metabolic risk in this population.[44]
    - Among individuals diagnosed with bipolar affective disorder (BPAD), the prevalence of metabolic syndrome (MetS) was found to be 59%, indicating a substantial metabolic risk within this population.[45]

Various mental diseases have differing incidence rates of MetS, highlighting the necessity for disorder-specific screening techniques.

8. Associations Between MetS and Clinical Parameters

- **Present Study**:
    - Notable correlations exist between MetS and elevated waist circumference, BMI, FPG, BP, triglycerides, and total cholesterol.[46]
- **Comparison**:
    - Comparable relationships were identified in further investigations, highlighting the multifaceted characteristics of MetS in mental patients[47].

The interaction of several metabolic markers and mental disorders highlights the intricacy of managing MetS in these individuals.

This study corresponds with international research, emphasising the significant incidence of MetS among mental patients and its correlation with many clinical characteristics. Consistent screening and comprehensive treatment strategies are crucial to tackle this escalating issue.

The study included a sample of 100 people, consisting of 58% males and 42% females. The age distribution had a very homogeneous pattern, with the largest group, accounting for 32%, being within the 41–50 years age range. This was closely followed by another notable section, comprising 31%, which fell within the 51–60 years bracket. The computed The participants had a mean age of 50.61 years, with a standard deviation of 8.85. This signifies a moderate degree of variety in the age distribution of the sample population. The participants exhibited a diverse range of socioeconomic statuses, with the predominant group identified as lower middle class, accounting for 24% of the total. Individuals categorised as upper lower class comprised 22%, and those in the upper middle class accounted for 21%.

A considerable portion of individuals, 56%, fell into Obesity Class I, with an average Body Mass Index (BMI) of 27.88. In contrast, only 13% were classified as having a normal weight, with a mean BMI of 22.04, highlighting notable disparities in weight distribution within the studied population. The findings regarding waist circumference indicated that a substantial majority of the participants, namely 83%, exhibited increased waist circumference, with an average measurement of 94.83 cm. Conversely, just 17% of the patients had normal waist dimensions, averaging 79.94 cm. A significant proportion of participants, specifically 56%, exhibited elevated fasting plasma glucose levels, averaging 121.55 mg/dL. In contrast, 44% maintained levels within the normal

range, with a mean fasting plasma glucose concentration of 93.16 mg/dL. These findings highlight a notable discrepancy in glucose regulation among the studied population.[48]

The inquiry further assessed blood pressure levels and cholesterol profiles. Regarding blood pressure readings, 35% of individuals had high systolic blood pressure, with a mean value of 141.20 mmHg. In contrast, the remaining 65% of individuals exhibited a mean systolic blood pressure of 122.09 mmHg, categorising them within the normal range. A comparative study revealed that 23% of the participants displayed increased diastolic blood pressure, with a mean of 91.30 mmHg, whilst 77% of the population maintained normal readings, averaging 71.16 mmHg. The lipid profile assessment revealed that 73% of participants had elevated triglyceride levels, with an average measurement of 188.53 mg/dL. In contrast, the remaining 27% maintained normal triglyceride levels, averaging 136.67 mg/dL. [49]This distribution underscores a notable prevalence of lipid imbalances within the study population. The study indicated that a substantial percentage of individuals displayed abnormal total cholesterol levels, with 67% of the cohort showing a mean value of 242.69 mg/dL. Additionally, HDL cholesterol levels were abnormal in 61% of individuals, with a mean of 32.74 mg/dL, whereas 39% exhibited normal levels, with a mean of 45.36 mg/dL. Additionally, a substantial percentage, precisely 75%, had elevated levels of LDL cholesterol, with an average concentration of 125.41 mg/dL.

Conversely, just 25% of the participants had normal LDL levels, defined by a mean value of 89.84 mg/dL.

Metabolic syndrome was diagnosed in 38% of the research subjects. The findings indicate a strong correlation between metabolic syndrome and several key physiological markers, including increased waist circumference, elevated body mass index (BMI), higher fasting plasma glucose levels, and elevated systolic and diastolic blood pressures. These associations highlight the complex interplay between metabolic and cardiovascular health, underscoring the importance of early detection and intervention. Furthermore, there were substantial increases in triglyceride levels and abnormal total cholesterol levels, all associated with statistically significant p-values (all $p < 0.05$ or below). Nonetheless, no significant connections were seen between metabolic syndrome and the levels of HDL or LDL.[50] Additionally, mental comorbidities were noted, with schizophrenia identified as the predominant disorder, impacting 36% of the investigated group. Subsequently, psychosis was observed in 26% of the individuals, while bipolar affective disorder (BPAD) was diagnosed in 20%. A significant association was seen between mental comorbidities and the occurrence of metabolic syndrome, with p-value 0.02.

The study's findings reveal that a considerable proportion of individuals had metabolic abnormalities, including obesity, irregular waist circumference, and dysglycemia, which were significantly correlated with metabolic syndrome. The

strong association between mental illnesses and metabolic syndrome suggests that both problems may coexist and perhaps exacerbate the metabolic risk profile in this population.[51]

Comparing with existing literature

The findings of the present study indicate a 38% incidence of metabolic syndrome among individuals receiving mental health care. This result corresponds with contemporary research that emphasises the increased metabolic hazards associated with this particular group. A observational study in Saudi Arabia revealed a prevalence rate of 41.2% among a sample of 992 mental health patients, underscoring the widespread nature of this significant health issue worldwide. citation transformation inquiry.[52]

Our study identified strong associations between metabolic syndrome and several key physiological markers, including increased waist circumference, higher body mass index (BMI) classifications, elevated fasting plasma glucose levels, and hypertension. These findings underscore the critical link between metabolic syndrome and broader health risks, highlighting the importance of early intervention and targeted management strategies. The results of this investigation align with the study performed in Saudi Arabia, which revealed a significant prevalence of elevated fasting blood sugar levels (47.8%), increased waist circumference (42.2%), and elevated blood pressure (42.5%) as essential components of metabolic syndrome within the psychiatric patient demographic.[53]

The relationship between mental disorders and metabolic syndrome is intricate and involves several factors. Our study revealed a strong association between mental comorbidities, such as schizophrenia and psychosis, and the prevalence of metabolic syndrome. However, research conducted in Saudi Arabia did not find an independent correlation between specific mental disorders and metabolic syndrome, even after accounting for various demographic and clinical factors. These findings highlight the complexity of interactions between psychiatric conditions and metabolic health, emphasizing the need for further investigation. Both findings recognise the significant impact of mental medications on metabolic disorders. The research conducted in Saudi Arabia revealed that the administration of mirtazapine and venlafaxine was independently linked to the onset of metabolic syndrome, highlighting the imperative for vigilant oversight of medication regimens.[54]

Recent research suggests that dietary modifications may play a crucial role in the management of both metabolic and mental health disorders. The ketogenic diet, originally developed for epilepsy management, has increasingly gained attention for its potential benefits in mental health conditions like bipolar disorder. A case highlighted by the *New York Post* reported a remarkable recovery in a patient with treatment-resistant bipolar disorder who experienced complete symptom remission after adhering to a ketogenic diet under strict medical supervision. This case adds to growing research suggesting that metabolic interventions may

influence psychiatric conditions, particularly through mechanisms such as neuroinflammation regulation and neurotransmitter modulation.[55] However, while promising, further studies are needed to validate its efficacy and establish safe, standardized guidelines for clinical application. Recent research has extensively investigated the prevalence of metabolic syndrome in individuals with severe mental illness, comparing these rates to those observed in the general population. Findings indicate that the age-adjusted prevalence of metabolic syndrome among adults in the United States is approximately 24%, highlighting a significant metabolic burden within this demographic. These studies underscore the importance of targeted screening and intervention strategies to mitigate associated health risks in vulnerable populations. [56]

The results of the present study underscores significant prevalence of metabolic syndrome in individuals with mental comorbidities. This conclusion corresponds with previous recent studies that have investigated the complex relationship between metabolic and mental disorders. Our research indicated that metabolic syndrome was observed in 38% of the participants.[57] This illness had a significant association with indicators of central obesity, specifically characterised by an increase in waist circumference and elevated body mass index (BMI) categories. The results of this study align with previous research, notably the analysis of De Hert et al. (2009), which documented a heightened prevalence of metabolic syndrome in individuals diagnosed with schizophrenia and other

severe mental health disorders. This phenomenon appears to be primarily influenced by central obesity and related metabolic disorders.[58]

Furthermore, our research uncovered significant connections between metabolic syndrome and several metabolic markers, including elevated fasting plasma glucose, increased systolic and diastolic blood pressure, heightened triglyceride levels, and abnormal total cholesterol levels. The relationships identified in this study corroborate findings in previous literature, indicating a link between metabolic syndrome and diseases such as dysglycemia and hypertension in psychiatric patients.[59] Research by Vancampfort and colleagues (2013, 2015) has demonstrated that persons diagnosed with bipolar illness and schizophrenia frequently have insulin resistance and dyslipidaemia. These diseases significantly elevate the risk of cardiovascular disease. The findings of the present study indicate that no substantial connections are present between HDL and LDL levels and metabolic syndrome. This discovery corresponds with research indicating that, while these lipid parameters are relevant, the overall metabolic risk load in psychiatric patients may be more profoundly affected by factors such as central obesity and hypertriglyceridemia.[60]

The results of our study demonstrate a statistically significant association between psychiatric comorbidity and metabolic syndrome ($p = 0.02$), so confirming the bidirectional interaction between mental and metabolic health. Studies demonstrate that mental problems, such as schizophrenia and psychosis,

are more prevalent among patients diagnosed with metabolic syndrome. Supplementary cross-sectional research corroborate this finding, indicating that individuals with mental disorders had an increased susceptibility to developing metabolic syndrome. This heightened risk can be attributed to several factors, including lifestyle choices, the adverse effects of psychotropic medications, and intrinsic pathophysiological alterations linked to mental health conditions.[61]

This study's findings significantly contribute to the expanding knowledge that underscores the critical necessity for early identification and suitable treatment of metabolic syndrome in individuals with mental health conditions. The notable correlations shown between metabolic syndrome and several anthropometric and metabolic markers underscore the necessity for comprehensive treatment approaches that simultaneously tackle mental health concerns and metabolic risk factors.[62] Future research should prioritise longitudinal methodologies to elucidate causal relationships and explore intervention strategies that may enhance mental health outcomes while mitigating metabolic hazards. This dual method aims significantly increases the overall life qualities of affected individuals.[63]

In conclusion, our research contributes to the growing body of information that underscores the substantial prevalence of metabolic syndrome among the mental illness population. The substantial correlations with several metabolic markers

highlight the critical necessity for comprehensive treatment approaches that encompass both mental and physical health aspects. Future research should focus on longitudinal studies to improve understanding of causation and to evaluate intervention options, such as dietary changes, intended to increase outcomes for this vulnerable group.[64]

SUMMARY

This study evaluated 100 individuals to determine the occurrence of metabolic syndrome and it's associations over demographic, anthropometric, metabolic parameters, and mental comorbidities. The sample consists of 58% males and 42% females, with a mean age of 50.61 ± 8.85 years. The socioeconomic status varied, with most persons classified as lower middle, upper lower, and upper middle class. Anthropometric data revealed that the majority of participants were overweight or obese, with 56% classified as Obesity Class I and 17% as Obesity Class II. Furthermore, a substantial proportion (83%) had an increased waist circumference. Metabolic assessments revealed that more than fifty percent of the subjects had elevated fasting plasma glucose, heightened triglycerides, abnormal total cholesterol levels, and irregular blood pressure readings. Metabolic syndrome was observed in 38% of the study population, significantly correlating with increased waist circumference, elevated BMI classifications, heightened fasting plasma glucose, and altered blood pressure, as well as increased triglycerides and abnormal total cholesterol levels. Significantly, HDL and LDL values had no substantial correlation with metabolic syndrome.

Moreover, the prevalence of mental comorbidities was significant, with schizophrenia being the most prevalent, succeeded by psychosis and bipolar affective disorder.

A statistically significant link exists between psychiatric comorbidity and metabolic syndrome, suggesting an interrelated risk between mental health disorders and metabolic irregularities.

LIMITATIONS

Despite the useful discoveries, this inquiry has numerous limitations that must be acknowledged. The cross-sectional technique restricts the capacity to ascertain causal linkages between metabolic syndrome and its related components, as the data merely offer a temporal snapshot. Secondly, the sample size was rather small and derived from a single area, thereby limiting the generalisability of the findings to broader groups. Furthermore, substantial confounding variables, including as diet, exercise, and medication intake, were inadequately regulated, potentially influencing the observed correlations. Reliance on individual observations for metabolic indicators may insufficiently represent the inherent temporal variability of these biological markers.

CONCLUSION

The study reveals a significant incidence of metabolic syndrome in individuals, especially in those with mental comorbidities. The notable correlations seen between metabolic syndrome and variables such as increased waist circumference, higher BMI, heightened fasting plasma glucose, and abnormal blood pressure and lipid profiles underscore the complex nature of metabolic risk in this population. These findings underscore the imperative of implementing comprehensive screening and integrated management strategies that address both metabolic and psychological health. Future research employing longitudinal designs, larger and more diverse cohorts, and rigorous control of confounding variables is crucial to elucidate these relationships and to develop targeted interventions to mitigate the adverse health effects associated with metabolic syndrome in psychiatric patients.

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ANNEXURE

NAME:

AGE:

SEX:

ADDRESS:

DIAGNOSIS OF PSYCHIATRIC ILLNESS ACCORDING TO ICD 10 :

ANALYSIS OF LABORATORY VALUES

PARAMETERS	**PATIENTS VALUES**	**NORMAL VALUES**
1)FASTING BLOOD SUAGR		90-110 mg/dl
2)TRIGLYCERIDES		>200 mg/dl
3)HIGH DENSITY LIPOPROTEIN		<100 mg/dl
4)BLOOD PRESSURE		<130/90 mmhg
5)ABDOMINAL CIRCUMFERENCE		M:<102cms,F:88cms
6)BODY MASS INDEX		<24.9 kg/m^2

AFTER ANLYZING THE LABORATORY VALUES, I WOULD CONSIDER THIS PATIENT TO BE DIAGNOSED OR NOT TO DIAGNOSED AS METABOLIC SYNDROME.

PATEINT HAS BEEN EXPLAINED ABOUT THE RISK FACTORS AND THE NEED TO BE PRECAUTIOUS ABOUT IT.THE NEED FOR REGULAR EXERCISE, DIETARY CHANGES, LIFESTYLE CHANGES AND TO MAINTAIN BODY MASS INDEX BELOW 24.9.

PATIENT INFORMATION SHEET

STUDY TITLE: METABOLIC SYNDROME AMONG PSYCHIATRIC PATIENTS : A CROSS SECTIONAL STUDY

STUDY SITE: R.L. JALAPPA HOSPITAL AND RESEARCH CENTRE, TAMAKA, KOLAR

Metabolic syndrome are a cluster of conditions that increase the risk of CVD, stroke and diabetes. Metabolic syndrome includes high blood pressure, high sugars, excess body fat around waist and abnormal cholesterol values (low HDL). Metabolic syndrome has increased risk and prevalence for cardiovascular diseases and diabetes among patients who are diagnosed to have psychiatric illness. Studies have found that patients diagnosed to have psychiatric illness are prone to or are at a risk of having co morbidities like Cardio vascular disease.

Type 2 Diabetes mellitus and hypertension. We intend to analyze the co morbidities among the psychiatric patients and treat accordingly. In this way we will be able to provide good care for the patients and reduce the risks of Cardiovascular disease, Type 2 diabetes mellitus and Hypertension.

By giving consent for this study, we will evaluate you thoroughly for the presence of any comorbidities . This enables us to understand the Metabolic syndrome among patients with psychiatric illness more effectively and provide better patient care. In this way, you will be benefited and the same principles can be applied to the community at large.

By participating in this study, do know that you can be truthful that no personal information of yours will be misused. All the information gathered from you will be kept strictly confidential in the safe lockers of the department of psychiatry. You can choose not to participate in the study if you do not want to answer the questions. Your refusal to participate or withdrawal from the study will not affect any medical or health benefits to which you are otherwise entitled to. You can ask any question regarding the study. If you agree to participate in this study we will collect information (as per proforma) from you.

Laboratory charges will be funded by the investigator.

You can ask the investigator if the information is being unclear or if you need more information regarding this study. On knowing this information, please read the informed consent and proceed to participate in the study.

Left Thumb Impression/Signature of the Patient

Left Thumb Impression/Signature of the Witness

signature of the investigator

For any further clarification you can contact the study investigator:

Dr. VATHSALA G K

Mobile no: 9108276624

E-mail id: vathsala.gkh@gmail.com

ರೋಗಿಯ ಮಾಹಿತಿ ಹಾಳೆ

ಅಧ್ಯಯನದ ಶೀರ್ಷಿಕೆ: ಮಾನಸಿಕ ರೋಗಿಗಳಲ್ಲಿ ಮೆಟಾಬಾಲಿಕ್ ಸಿಂಡ್ರೋಮ್: ಅಡ್ಡ ವಿಭಾಗದ ಅಧ್ಯಯನ

ಅಧ್ಯಯನ ತಾಣ: ಆರ್.ಎಲ್.ಜಾಲಪ್ಪ ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ, ತಮಕ, ಕೋಲಾರ

ಮೆಟಾಬಾಲಿಕ್ ಸಿಂಡ್ರೋಮ್ ಎನ್ನುವುದು CVD, ಸ್ಟ್ರೋಕ್ ಮತ್ತು ಮಧುಮೇಹದ ಅಪಾಯವನ್ನು ಹೆಚ್ಚಿಸುವ ಪರಿಸ್ಥಿತಿಗಳ ಸಮೂಹವಾಗಿದೆ. ಮೆಟಾಬಾಲಿಕ್ ಸಿಂಡ್ರೋಮ್ ಅಧಿಕ ರಕ್ತದೊತ್ತಡ, ಅಧಿಕ ಸಕ್ಕರೆಗಳು, ಸೊಂಟದ ಸುತ್ತಲಿನ ಹೆಚ್ಚುವರಿ ದೇಹದ ಕೊಬ್ಬು ಮತ್ತು ಅಸಹಜ ಕೊಲೆಸ್ಟ್ರಾಲ್ ಮೌಲ್ಯಗಳನ್ನು (ಕಡಿಮೆ HDL) ಒಳಗೊಂಡಿರುತ್ತದೆ. ಮೆಟಾಬಾಲಿಕ್ ಸಿಂಡ್ರೋಮ್ ಹೃದಯರಕ್ತನಾಳದ ಕಾಯಿಲೆಗಳು ಮತ್ತು ಮಧುಮೇಹದ ಅಪಾಯವನ್ನು ಹೆಚ್ಚಿಸಿದೆ ಮತ್ತು ಮನೋವೈದ್ಯಕೀಯ ಕಾಯಿಲೆಯನ್ನು ಹೊಂದಿರುವ ರೋಗಿಗಳಲ್ಲಿ ಮಧುಮೇಹವನ್ನು ಹೊಂದಿದೆ.

ಮನೋವೈದ್ಯಕೀಯ ಕಾಯಿಲೆಗೆ ಒಳಗಾಗುವ ರೋಗಿಗಳು ಹೃದಯರಕ್ತನಾಳದ ಕಾಯಿಲೆಯಂತಹ ಸಹ ರೋಗಗಳಿಗೆ ಒಳಗಾಗುತ್ತಾರೆ ಅಥವಾ ಅಪಾಯವನ್ನು ಹೊಂದಿರುತ್ತಾರೆ ಎಂದು ಅಧ್ಯಯನಗಳು ಕಂಡುಕೊಂಡಿವೆ. ಟೈಪ್ 2 ಡಯಾಬಿಟಿಸ್ ಮೆಲ್ಲಿಟಸ್ ಮತ್ತು ಅಧಿಕ ರಕ್ತದೊತ್ತಡ. ಮನೋವೈದ್ಯಕೀಯ ರೋಗಿಗಳಲ್ಲಿನ ಸಹ ಕಾಯಿಲೆಗಳನ್ನು ವಿಶ್ಲೇಷಿಸಲು ಮತ್ತು ಅದಕ್ಕೆ ಅನುಗುಣವಾಗಿ ಚಿಕಿತ್ಸೆ ನೀಡಲು ನಾವು ಉದ್ದೇಶಿಸಿದ್ದೇವೆ. ಈ ರೀತಿಯಾಗಿ ನಾವು ರೋಗಿಗಳಿಗೆ ಉತ್ತಮ ಆರೈಕೆಯನ್ನು ಒದಗಿಸಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ ಮತ್ತು ಹೃದಯರಕ್ತನಾಳದ ಕಾಯಿಲೆ, ಟೈಪ್ 2 ಡಯಾಬಿಟಿಸ್ ಮೆಲ್ಲಿಟಸ್ ಮತ್ತು ಅಧಿಕ ರಕ್ತದೊತ್ತಡದ ಅಪಾಯಗಳನ್ನು ಕಡಿಮೆ ಮಾಡಬಹುದು.

ಈ ಅಧ್ಯಯನಕ್ಕೆ ಸಮ್ಮತಿಯನ್ನು ನೀಡುವ ಮೂಲಕ, ಯಾವುದೇ ಕೊಮೊರ್ಬಿಡಿಟಿಗಳ ಉಪಸ್ಥಿತಿಗಾಗಿ ನಾವು ನಿಮ್ಮನ್ನು ಸಂಪೂರ್ಣವಾಗಿ ಮೌಲ್ಯಮಾಪನ ಮಾಡುತ್ತೇವೆ. ಇದು ಮಾನಸಿಕ ಅಸ್ವಸ್ಥತೆಯ ರೋಗಿಗಳಲ್ಲಿ ಮೆಟಬಾಲಿಕ್ ಸಿಂಡ್ರೋಮ್ ಅನ್ನು ಹೆಚ್ಚು ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳಲು ಮತ್ತು ಉತ್ತಮ ರೋಗಿಗಳ ಆರೈಕೆಯನ್ನು ಒದಗಿಸಲು ನಮಗೆ ಅನುವು ಮಾಡಿಕೊಡುತ್ತದೆ. ಈ ರೀತಿಯಾಗಿ, ನೀವು ಪ್ರಯೋಜನ ಪಡೆಯುತ್ತೀರಿ ಮತ್ತು ಅದೇ ತತ್ವಗಳನ್ನು ಸಮುದಾಯಕ್ಕೆ ವ್ಯಾಪಕವಾಗಿ ಅನ್ವಯಿಸಬಹುದು. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವ ಮೂಲಕ, ನಿಮ್ಮ ಯಾವುದೇ ವೈಯಕ್ತಿಕ ಮಾಹಿತಿಯನ್ನು ದುರುಪಯೋಗಪಡಿಸಿಕೊಳ್ಳುವುದಿಲ್ಲ

ಎಂದು ನೀವು ಸತ್ಯವಂತರಾಗಿರುತ್ತೀರಿ ಎಂದು ತಿಳಿಯಿರಿ. ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಿದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಮನೋವೈದ್ಯಶಾಸ್ತ್ರ ವಿಭಾಗದ ಸುರಕ್ಷಿತ ಲಾಕರ್‌ಗಳಲ್ಲಿ ಕಟ್ಟುನಿಟ್ಟಾಗಿ ಗೌಪ್ಯವಾಗಿಡಲಾಗುತ್ತದೆ. ನೀವು ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಲು ಬಯಸದಿದ್ದರೆ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸದಿರಲು ನೀವು ಆಯ್ಕೆ ಮಾಡಬಹುದು. ಅಧ್ಯಯನದಿಂದ ಭಾಗವಹಿಸಲು ಅಥವಾ ಹಿಂತೆಗೆದುಕೊಳ್ಳಲು ನಿಮ್ಮ ನಿರಾಕರಣೆಯು ನೀವು ಅರ್ಹರಾಗಿರುವ ಯಾವುದೇ ವೈದ್ಯಕೀಯ ಅಥವಾ ಆರೋಗ್ಯ ಪ್ರಯೋಜನಗಳ ಮೇಲೆ ಪರಿಣಾಮ ಬೀರುವುದಿಲ್ಲ. ಅಧ್ಯಯನಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ನೀವು ಯಾವುದೇ ಪ್ರಶ್ನೆಯನ್ನು ಕೇಳಬಹುದು. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ನೀವು ಒಪ್ಪಿದರೆ ನಾವು ಮಾಹಿತಿಯನ್ನು ಸಂಗ್ರಹಿಸುತ್ತೇವೆ (ಪ್ರೊಫಾರ್ಮಾ ಪ್ರಕಾರ) ಮಾಹಿತಿಯು ಅಸ್ಪಷ್ಟವಾಗಿದ್ದರೆ ಅಥವಾ ಈ ಅಧ್ಯಯನದ ಕುರಿತು ನಿಮಗೆ ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಬೇಕಾದಲ್ಲಿ ನೀವು ತನಿಖಾಧಿಕಾರಿಯನ್ನು ಕೇಳಬಹುದು. ಈ ಮಾಹಿತಿಯನ್ನು ತಿಳಿದ ಮೇಲೆ, ದಯವಿಟ್ಟು ತಿಳುವಳಿಕೆಯುಳ್ಳ ಒಪ್ಪಿಗೆಯನ್ನು ಓದಿ ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಮುಂದುವರಿಯಿರಿ.

ಎಡ ಹೆಬ್ಬೆರಳಿನ ಅನಿಸಿಕೆ/ರೋಗಿಯ ಸಹಿ ಎಡ ಹೆಬ್ಬೆರಳಿನ ಅನಿಸಿಕೆ/ಸಾಕ್ಷಿಯ ಸಹಿ

ತನಿಖಾಧಿಕಾರಿಯ ಸಹಿ

ಯಾವುದೇ ಹೆಚ್ಚಿನ ಸ್ಪಷ್ಟೀಕರಣಕ್ಕಾಗಿ ನೀವು ಅಧ್ಯಯನ ತನಿಖಾಧಿಕಾರಿಯನ್ನು ಸಂಪರ್ಕಿಸಬಹುದು:

ಡಾ. ವತ್ಸಲಾ ಜಿ ಕೆ

ಮೊಬೈಲ್ ಸಂಖ್ಯೆ: 9108276624

ಇ-ಮೇಲ್ ಐಡಿ: vathsala.gkh@gmail.com

INFORMED CONSENT FORM

STUDY TITLE: METABOLIC SYNDROME AMONG PSYCHIATRIC PATIENTS: A CROSS SECTIONAL STUDY

Consent form for Literate:

I have read the above information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily for me/my son/brother/husband to participate as a participant in this study.

Name of Participant_____

Date_____

Signature of the participant_____

Consent form for illiterate:

I have been chosen as a witness for _____ by him/her and I have no connection to the research team. I have witnessed the accurate reading of the consent form to the participant, and the individual was given the sufficient opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness_____ Thumb print of the participant

Signature of witness _____

Relationship of witness to participant_____

Date _____

PLACE OF STUDY: R. L. JALAPPA HOSPITAL AND RESEARCH INSTITUTE,

TAMAKA, KOLAR.

PRINCIPAL INVESTIGATOR: DR. VATHSALA G K

ಮಾಹಿತಿ ನೀಡಿದ ಒಪ್ಪಿಗೆ ನಮೂನೆ

ಅಧ್ಯಯನದ ಶೀರ್ಷಿಕೆ: ಮನೋವೈದ್ಯಕೀಯ ರೋಗಿಗಳಲ್ಲಿ ಮೆಟಾಬಾಲಿಕ್ ಸಿಂಡ್ರೋಮ್: ಒಂದು ಅಡ್ಡ ವಿಭಾಗದ ಅಧ್ಯಯನ

ಸಾಕ್ಷರರಿಗೆ ಸಮ್ಮತಿ ನಮೂನೆ:

ನಾನು ಮೇಲಿನ ಮಾಹಿತಿಯನ್ನು ಓದಿದ್ದೇನೆ ಅಥವಾ ಅದನ್ನು ನನಗೆ ಓದಿದ್ದೇನೆ. ಅದರ ಬಗ್ಗೆ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲು ನನಗೆ ಅವಕಾಶವಿದೆ ಮತ್ತು ನಾನು ಕೇಳಿದ ಯಾವುದೇ ಪ್ರಶ್ನೆಗಳಿಗೆ ನನ್ನ ತೃಪ್ತಿಗೆ ಉತ್ತರಿಸಲಾಗಿದೆ. ನಾನು/ನನ್ನ ಮಗ/ಸಹೋದರ/ಪತಿ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಸಮ್ಮತಿಸುತ್ತೇನೆ.

ಭಾಗವಹಿಸುವವರ ಹೆಸರು_____

ದಿನಾಂಕ_____

ಭಾಗವಹಿಸುವವರ ಸಹಿ_____

ಅನಕ್ಷರಸ್ಥರಿಗೆ ಒಪ್ಪಿಗೆ ನಮೂನೆ:

ನನ್ನನ್ನು ಅವನು/ಅವರಿಂದ _____ ಗೆ ಸಾಕ್ಷಿಯಾಗಿ ಆಯ್ಕೆ ಮಾಡಲಾಗಿದೆ ಮತ್ತು ಸಂಶೋಧನಾ ತಂಡದೊಂದಿಗೆ ನನಗೆ ಯಾವುದೇ ಸಂಬಂಧವಿಲ್ಲ. ಭಾಗವಹಿಸುವವರಿಗೆ ಒಪ್ಪಿಗೆಯ ನಮೂನೆಯನ್ನು ನಿಖರವಾಗಿ ಓದುವುದನ್ನು ನಾನು ನೋಡಿದ್ದೇನೆ ಮತ್ತು ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲು ವ್ಯಕ್ತಿಗೆ ಸಾಕಷ್ಟು ಅವಕಾಶವನ್ನು ನೀಡಲಾಗಿದೆ. ವ್ಯಕ್ತಿಯು ಮುಕ್ತವಾಗಿ ಒಪ್ಪಿಗೆ ನೀಡಿದ್ದಾರೆ ಎಂದು ನಾನು ದೃಢೀಕರಿಸುತ್ತೇನೆ.

ಸಾಕ್ಷಿಯ ಹೆಸರು_____ ಭಾಗವಹಿಸುವವರ ಹೆಬ್ಬೆರಳು ಮುದ್ರೆ

ಸಾಕ್ಷಿಯ ಸಹಿ _____

ಭಾಗವಹಿಸುವವರಿಗೆ ಸಾಕ್ಷಿಯ ಸಂಬಂಧ_____

ದಿನಾಂಕ _____

ಒಪ್ಪಿಗೆಯನ್ನು ತೆಗೆದುಕೊಳ್ಳುವ ಸಂಶೋಧಕ/ವ್ಯಕ್ತಿಯ ಹೇಳಿಕೆ:

ನಾನು ರೋಗಿಯ ಮತ್ತು ಸಂಭಾವ್ಯ ಭಾಗವಹಿಸುವವರ ವಿಶ್ವಾಸಾರ್ಹ ಸಂಬಂಧಿಗೆ ಮಾಹಿತಿ ಹಾಳೆಯನ್ನು ನಿಖರವಾಗಿ ಓದಿದ್ದೇನೆ ಮತ್ತು ನನ್ನ ಸಾಮರ್ಥ್ಯದ ಅತ್ಯುತ್ತಮವಾಗಿ ಈ ಕೆಳಗಿನವುಗಳನ್ನು ಮಾಡಲಾಗುತ್ತದೆ ಎಂದು ವ್ಯಕ್ತಿಯು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದಾನೆ ಎಂದು ಖಚಿತಪಡಿಸಿಕೊಂಡಿದ್ದೇನೆ: ವಿಷಯವನ್ನು ಕೇಳಲು ಅವಕಾಶವನ್ನು ನೀಡಲಾಗಿದೆ ಎಂದು ನಾನು ಖಚಿತಪಡಿಸುತ್ತೇನೆ ಅಧ್ಯಯನದ ಕುರಿತಾದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಕೇಳಲಾದ ಎಲ್ಲಾ ಪ್ರಶ್ನೆಗಳಿಗೆ ಸರಿಯಾಗಿ ಮತ್ತು ನನ್ನ ಸಾಮರ್ಥ್ಯಕ್ಕೆ ತಕ್ಕಂತೆ ಉತ್ತರಿಸಲಾಗಿದೆ. ಸಮ್ಮತಿಯನ್ನು ನೀಡುವಂತೆ ವ್ಯಕ್ತಿಯನ್ನು ಬಲವಂತಪಡಿಸಲಾಗಿಲ್ಲ ಮತ್ತು ಒಪ್ಪಿಗೆಯನ್ನು ಮುಕ್ತವಾಗಿ ಮತ್ತು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ನೀಡಲಾಗಿದೆ ಎಂದು ನಾನು ದೃಢೀಕರಿಸುತ್ತೇನೆ.

ಒಪ್ಪಿಗೆಯನ್ನು ತೆಗೆದುಕೊಳ್ಳುವ ಸಂಶೋಧಕರ/ವ್ಯಕ್ತಿಯ ಹೆಸರು_____

ಸಂಶೋಧಕರ/ಸಮ್ಮತಿಯನ್ನು ತೆಗೆದುಕೊಳ್ಳುವ ವ್ಯಕ್ತಿಯ ಸಹಿ_____

ದಿನಾಂಕ _____

Statement by the researcher/person taking consent:

I have accurately read out the information sheet to the patient and reliable relative of the potential participant, and to the best of my ability made sure that the person understands that the following will be done: I confirm that the subject was given an opportunity to ask questions about the study, and all the questions asked have been answered correctly and to the best of my ability. I confirm that the individual has not been forced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher/person taking the consent_____

Signature of Researcher /person taking the consent_____

Date _____

PLACE OF STUDY: R. L. JALAPPA HOSPITAL AND RESEARCH INSTITUTE, TAMAKA, KOLAR.

PRINCIPAL INVESTIGATOR : Dr. VATHSALA G K

ಒಪ್ಪಿಗೆಯನ್ನು ತೆಗೆದುಕೊಳ್ಳುವ ಸಂಶೋಧಕ/ವ್ಯಕ್ತಿಯ ಹೇಳಿಕೆ:

ನಾನು ರೋಗಿಯ ಮತ್ತು ಸಂಭಾವ್ಯ ಭಾಗವಹಿಸುವವರ ವಿಶ್ವಾಸಾರ್ಹ ಸಂಬಂಧಿಗೆ ಮಾಹಿತಿ ಹಾಳೆಯನ್ನು ನಿಖರವಾಗಿ ಓದಿದ್ದೇನೆ ಮತ್ತು ನನ್ನ ಸಾಮರ್ಥ್ಯದ ಅತ್ಯುತ್ತಮವಾಗಿ ಈ ಕೆಳಗಿನವುಗಳನ್ನು ಮಾಡಲಾಗುತ್ತದೆ ಎಂದು ವ್ಯಕ್ತಿಯು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದಾನೆ ಎಂದು ಖಚಿತಪಡಿಸಿಕೊಂಡಿದ್ದೇನೆ: ವಿಷಯವನ್ನು ಕೇಳಲು ಅವಕಾಶವನ್ನು ನೀಡಲಾಗಿದೆ ಎಂದು ನಾನು ಖಚಿತಪಡಿಸುತ್ತೇನೆ ಅಧ್ಯಯನದ ಕುರಿತಾದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಕೇಳಲಾದ ಎಲ್ಲಾ ಪ್ರಶ್ನೆಗಳಿಗೆ ಸರಿಯಾಗಿ ಮತ್ತು ನನ್ನ ಸಾಮರ್ಥ್ಯಕ್ಕೆ ತಕ್ಕಂತೆ ಉತ್ತರಿಸಲಾಗಿದೆ. ಸಮ್ಮತಿಯನ್ನು ನೀಡುವಂತೆ ವ್ಯಕ್ತಿಯನ್ನು ಬಲವಂತಪಡಿಸಲಾಗಿಲ್ಲ ಮತ್ತು ಒಪ್ಪಿಗೆಯನ್ನು ಮುಕ್ತವಾಗಿ ಮತ್ತು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ನೀಡಲಾಗಿದೆ ಎಂದು ನಾನು ದೃಢೀಕರಿಸುತ್ತೇನೆ.

ಒಪ್ಪಿಗೆಯನ್ನು ತೆಗೆದುಕೊಳ್ಳುವ ಸಂಶೋಧಕರ/ವ್ಯಕ್ತಿಯ ಹೆಸರು_____

ಸಂಶೋಧಕರ/ಸಮ್ಮತಿಯನ್ನು ತೆಗೆದುಕೊಳ್ಳುವ ವ್ಯಕ್ತಿಯ ಸಹಿ_____

ದಿನಾಂಕ _____

ಅಧ್ಯಯನದ ಸ್ಥಳ: ಆರ್.ಎಲ್.ಜಾಲಪ್ಪ ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಸಂಸ್ಥೆ, ತಮಕ, ಕೋಲಾರ.

ಪ್ರಧಾನ ತನಿಖಾಧಿಕಾರಿ : ಡಾ. ವತ್ಸಲಾ ಜಿ ಕೆ