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A Study on Clinical Profile of Metabolic Syndrome of Adults

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Abstract
INTRODUCTION*: Defining metabolic syndrome has always produced problems and controversies. Many organisations such as the WHO, IDF and the NCEP-ATPIII Has proposed different definitions, and many studies have been done comparing these definitions. And there is no agreement about which criteria for the diagnosis of metabolic syndrome are the best to use. Despite various definitions and criteria's the metabolic syndrome is an important predictor of future catastrophic events such as stroke and cardiovascular disease.*
AIMS AND OBJECTIVES*:*
1,To assess the in hospital prevalence of metabolic syndrome using the IDF criteria among adults who are admitted in GTVMCH.TIRUVANNAMALAI.
2,To assess the clinical profile of metabolic syndrome in patients admitted in medical wards.
MATERIALS AND METHODS *Cross sectional observational study*
Patients who are getting admitted on Sunday, Tuesday, Wednesday in medical wards.
INCLUSION CRITERIA:
Consenting patients.,Patients getting admitted from February 2018– January 2019.Patients who are between the age group of 30 – 65 yrs of age.
EXCLUSION CRITERIA:
Non consenting patients.Patients with hypothyroidism, Cushing's syndrome and congenital obesity syndromes,Critically ill patients,Patients with end organdamage.
DATA ANALYSIS:*Data collected from each individual was entered after coding of variables & appropriate analysis was done with help of EPI- INFO version 7. Qualitative data was analysed&depicted as percentages. Quantitative data was analysed and depicted as means and median. Odds ratio was calculated using chi-square test and p value was calculated*
SUMMARY*: In this study the prevalence of metabolic syndrome was 27 percent with the prevalence being more common in the female population which coincided with the earlier studies which were done in India. With the rise in metabolic syndrome proper education and life style modications along with its risk factors should be told to the patients.*
KEYWORDS*: Metabolic syndrome ,Syndrome X, insulin resistance syndrome.*

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I. Introduction

An increase in the Urbanisation and Westernisation has altered our food habits as well as our lifestyle .This has led to an increase in the non-communicable diseases like diabetes mellitus, hypertension, chronic lung diseases and coronary artery diseases. The magnitude of the problem is evident when a study shows that 64% of the total deaths in 23 low income countries are due to non-communicable diseases[1].

India has also fallen into this category, with an eccentric increase in urbanisation and westernisation, there has been an abrupt increase in NCDs (Non communicable diseases) like diabetes, and coronary artery diseases. Metabolic syndrome is a cluster of risk factors and diseases (which will be explained in the review of literature) which has predisposed the patients to increased risk of CVD and stroke. If identified early these patients with metabolic syndrome can avoid life threatening disease and circumstances. The importance of this syndrome is that all the components which are present are modifiable risk factors. So early identification of the patient and proper education and treatment is needed for these patients .

Vague in 1947 first observed an association between central adiposity and some metabolic abnormalities present in patients with diabetes mellitus and cardiovascular diseases[2]. Later Reaven outlined the clinical importance of this syndrome .He didn't consider central obesity as a risk factor for the development of metabolic syndrome, but he described the syndrome as a group of metabolic abnormalities in which the insulin resistance had a causative role and he called it as Syndrome X .

Metabolic syndrome has been called with different names such as "Syndrome X", the "Deadly quartet" and the "insulin resistance syndrome" over the past few decades. But

Defining this syndrome has always produced problems and controversies. Many organisations such as the WHO, IDF and the NCEP-ATPIII Has proposed different definitions, and many studies have been done comparing these definitions. And there is no agreement about which criteria for the diagnosis of metabolic syndrome are the best to use. Despite various definitions and criteria's the metabolic syndrome is an important predictor of future catastrophic events such as stroke and cardiovascular disease.

II. Aims And Objectives:

1) To assess the in hospital prevalence of metabolic syndrome using the IDF criteria among adults who are admitted in GTVMCH.TIRUVANNAMALAI.
2) To assess the clinical profile of metabolic syndrome in patients admitted in medical wards.

III. Materials And Methods

STUDY DESIGN:
Cross sectional observational study. STUDY SETTING:
Patients who are getting admitted on Sunday, Tuesday, Wednesday in medical wards.
INCLUSION CRITERIA:

1) Consenting patients.
2) Patients getting admitted from February 2018– January 2019.
3) Patients who are between the age group of 30 – 65 yrs of age.

EXCLUSION CRITERIA:

1) Non consenting patients.
2) Patients with hypothyroidism, Cushing's syndrome and congenital obesity syndromes.
3) Critically ill patients.
4) Patients with end organdamage.

SAMPLE SIZE AND METHODS:

With the prevalence of 25.8%, with confidence interval of 95%, absolute precision of 7% the sample size calculated was 165. First patient getting admitted on Sunday, Tuesday and Wednesday were selected for the study. The most common age group getting admitted in our hospital is between 30 – 65 yrs of age and hence this age group was selected for the study. For all the patients who were included in the study anthropometric measurements including waist circumference, height, bmi and weight were measured using standard techniques.

Waist circumference was measured using the non-stretchable inch tape at the smallest horizontal girth between the costal margins and the iliac crest during minimal respiration.

Height and weight were measured with the participant wearing light clothing and no shoes, and body mass index was calculated using the formula weight (kg)/height (m^2).

Blood pressure was measured using a standard sphygmomanometer in the right upper limb. Pulse rate was counted for one whole minute.

Relevant blood investigations like haemoglobin, total count, fasting blood glucose and fasting lipid profile was done using standard measurements.

Patients with coronary artery disease were identified with the history or previous treatment details or presence of pathological q waves in the ECG.

History for risk factors such as hypertension, diabetes, smoking and alcohol intake was asked using a structured questionnaire to obtain information.

Patients who had consumed > than 14 units/week of alcohol in woman and > than 21 units/week of alcohol in men (AASLD guidelines) were 1 unit is equal to 8 grams of alcohol, were considered to be taking alcohol in excess and was included in the history.

Patients who were not meeting the recommended levels of physical activity (WHO) of at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity were considered sedentary.

DATA ANALYSIS:

Data collected from each individual was entered after coding of variables & appropriate analysis was done with help of EPI- INFO version 7. Qualitative data was analyse &depicted as percentages. Quantitative data was analysed and depicted as means and median. Odds ratio was calculated using chi-square test and p value was calculated.

IV. Results And Analysis

PREVALENCE OF METABOLIC SYNDROME:

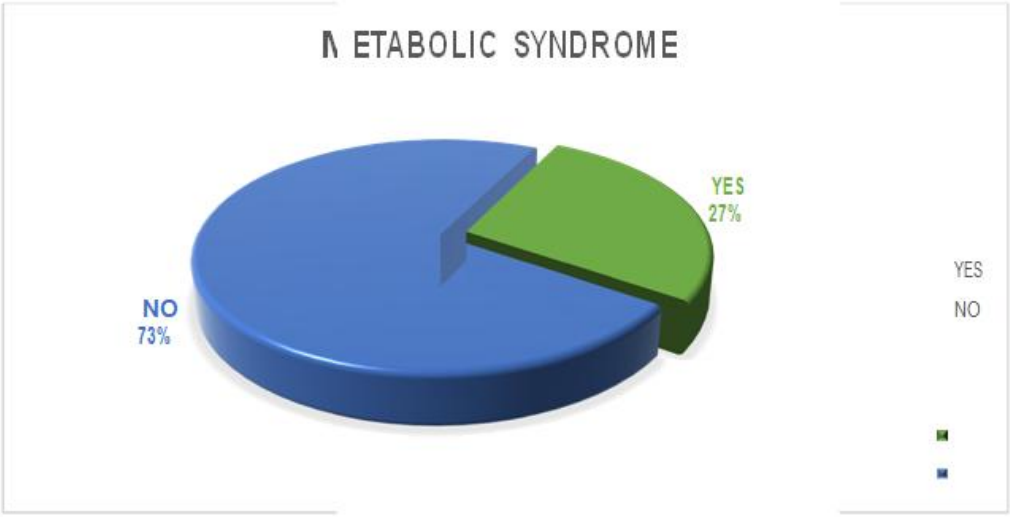

FIGURE NO: 1

TABLE NO: 2

METABOLIC SYNDROME	Frequency	Percent
NO	120	72.73 %
YES	45	27.27 %
TOTAL	**165**	**100.00 %**

SEX DISTRIBUTION OF THE STUDY POPULATION:

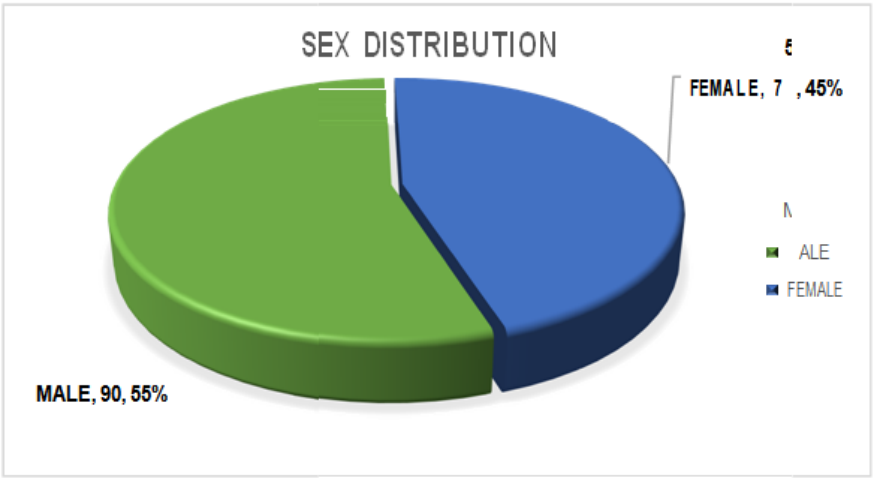

FIGURE NO: 2

TABLE NO: 3

sex	Frequency	Percent
female	75	45.45 %
male	90	54.55 %
TOTAL	**165**	**100.00 %**

AGE DISTRIBUTION OF THE STUDY POPULATION:

TABLE NO: 4

	OBSERVATIONS	MEAN	SD	MEDIAN 25 – 75 IQR
AGE	165	49.87	9.38	50(45 – 58)

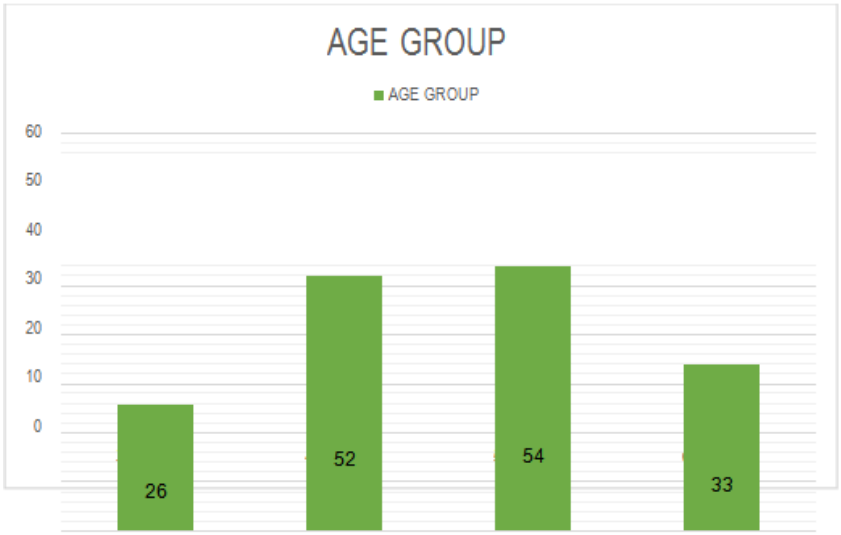

FIGURE NO: 3

TABLE NO: 5

age group	Frequency	PERCENT
30 – 39 yrs	26	15.76 %
40 – 49 yrs	52	31.52%
50 – 59 yrs	54	32.73%
60 – 65 yrs	33	20.00%
TOTAL	**165**	**100%**

METABOLIC SYNDROME DISTRIBUTION ACCORDING TO SEX:

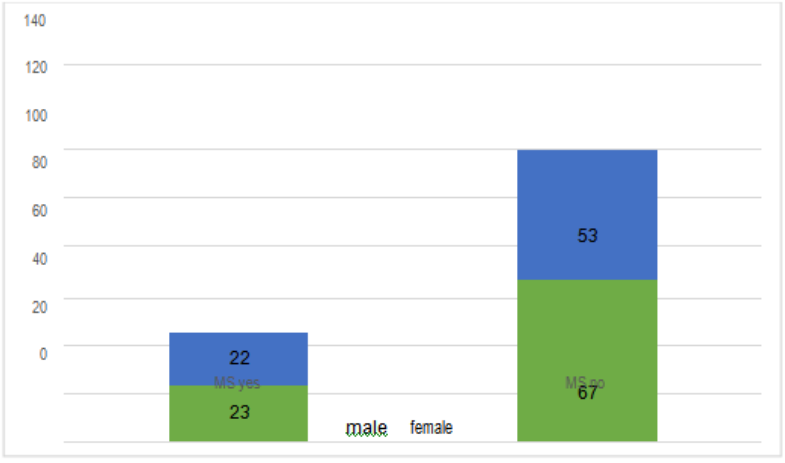

FIGURE NO: 4

TABLE NO: 6

		MALE	FEMALE
METABOLIC SYN	YES	23	22
METABOLIC SYN	NO	67	53

PREVALENCE OF METABOLIC SYNDROME ACCORDING TO SEX:

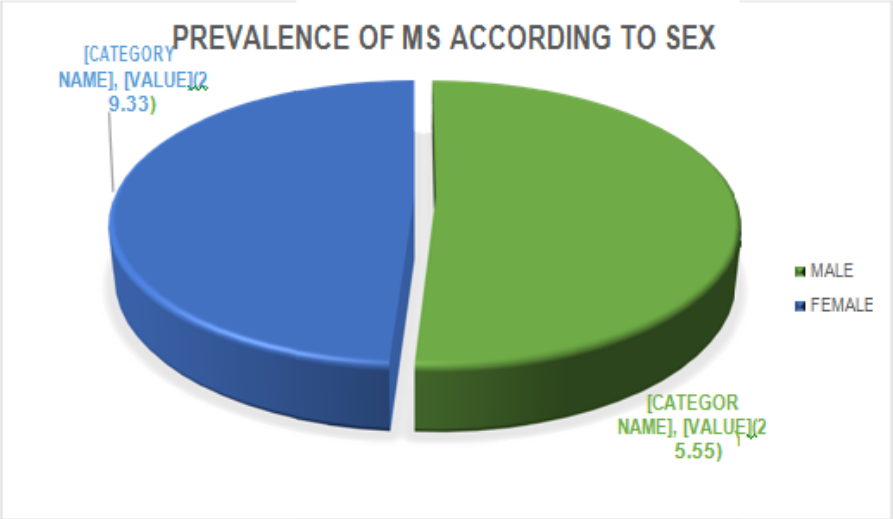

FIGURE NO: 5

TABLE NO: 7

METABOLIC	SYNDROME
MALE	23 (25.55%)
FEMALE	22 (29.33%)
TOTAL	**45 (27.27%)**

AGE GROUP FREQUENCY OF METABOLIC SYNDROME:

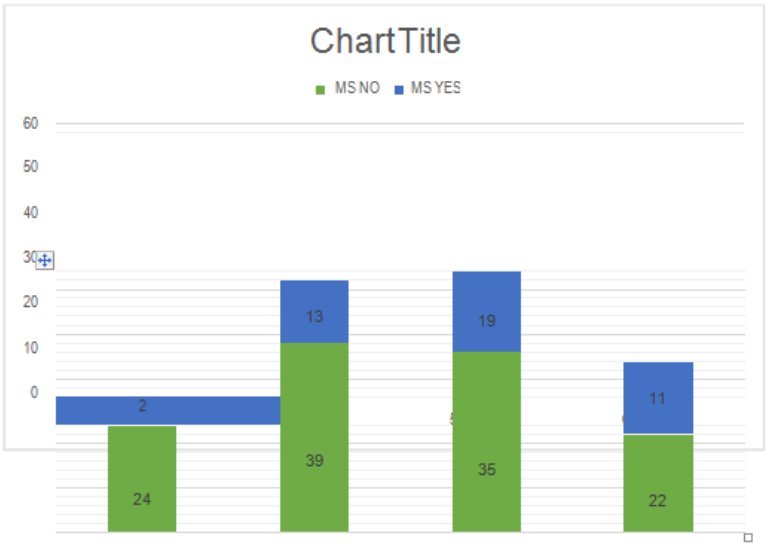

FIGURE NO: 6

TABLE NO: 8

METABOLIC SYNDROME

Age	NO	YES	TOTAL
30–39YRS	24	2(7.69%)	**26(15.76%)**
40–49YRS	39	13(25.00%)	**52(31.52%)**
50–59YRS	35	19(35.19%)	**54(32.73%)**
60–65YRS	22	11(33.33%)	**33(20.00%)**
TOTAL	**120**	**45**	**165**

RELATIONSHIP OF TRIGLYCERIDES TO METABOLIC SYNDROME:

TABLE NO: 9

PARAMETER	MEAN	SD	MEDIAN 25 – 75 IQR
TRIGLYCERIDE	142.30	25.27	141(129 – 156)

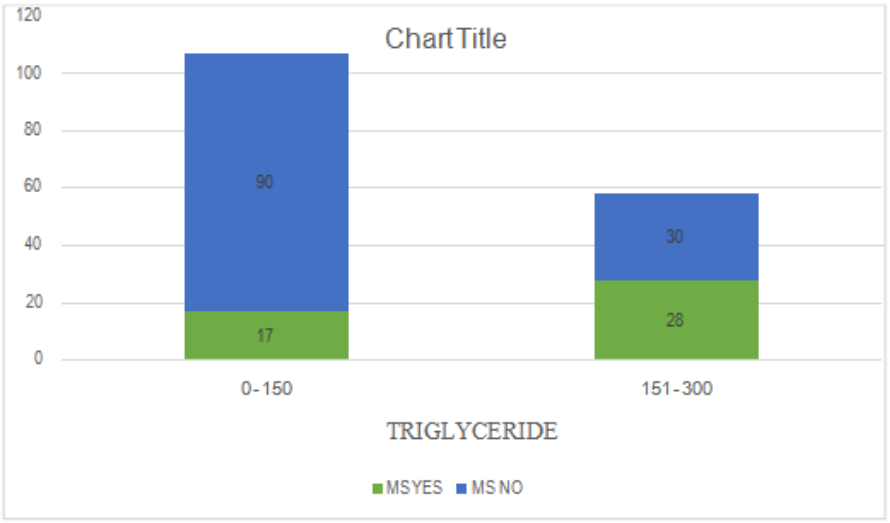

FIGURE NO: 7

TABLE NO: 10

	METABOLIC SYNDROME		
TRIGLYCERIDE	**YES**	**NO**	**Total**
151-300	28	30	58
Row %	48.28 %	51.72 %	100.00 %
Col %	62.22 %	25.00 %	35.15 %
0 - 150	17	90	107
Row %	15.89 %	84.11 %	100.00 %
Col %	37.78 %	75.00 %	64.85 %
Total	45	120	165
Row %	27.27 %	72.73 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds ratio was 4.94

TRIGLYCERIDE AGE WISE DISTRIBUTION:

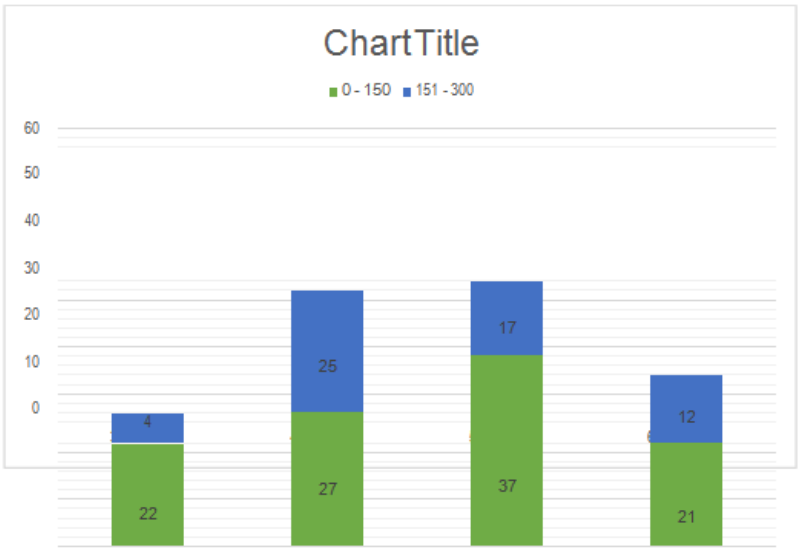

FIGURE NO: 8

TABLE NO: 11

	0 – 150	151 – 300	Total
30 – 39 yrs	22	4	26
40 – 49 yrs	27	25	52
50 – 59 yrs	37	17	54
60 – 65 yrs	21	12	33
	107	**58**	**165**

FASTING BLOOD SUGAR TO METABOLIC SYNDROME:

TABLE NO: 12

PARAMETER	MEAN	SD	MEDIAN 25-75 IQR
FBS	105.62	23.38	97 (94 – 105)

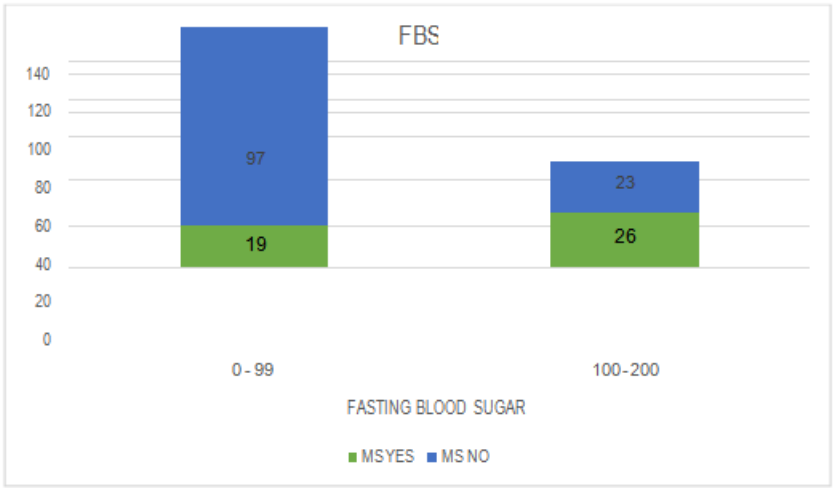

FIGURE NO: 9

TABLE NO: 13

	METABOLIC SYNDROME		
FBS	**YES**	**NO**	**Total**
100-200	26	23	49
Row %	53.06 %	46.94 %	100.00 %
Col %	57.78 %	19.17 %	29.70 %
0 - 99	19	97	116
Row %	16.38 %	83.62 %	100.00 %
Col %	42.22 %	80.83 %	70.30 %
Total	45	120	165
Row %	27.27 %	72.73 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds ratio was 5.77

AGE GROUP FREQUENCY OF HIGH FASTING BLOOD SUGAR:

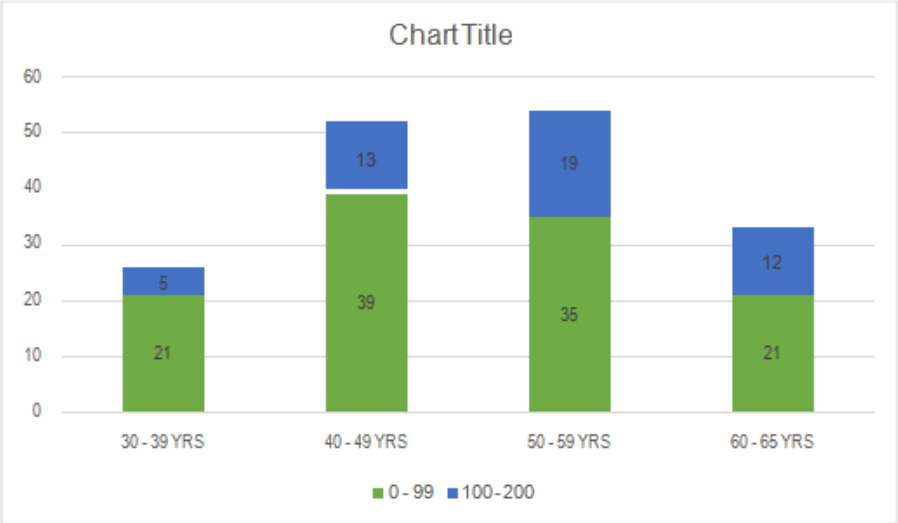

FIGURE NO: 10

TABLE NO: 14

FASTING BLOOD GLUCOSE

Age	0 - 99	100 - 200	TOTAL
30 – 39 yrs	21	5	**26**
40 – 49 yrs	39	13	**52**
50 – 59 yrs	35	19	**54**
60 – 65 yrs	21	12	**33**
TOTAL	**116**	**49**	**165**

BMI AND METABOLIC SYNDROME

TABLE NO: 15

PARAMETER	MEAN	SD	MEDIAN 25 – 75 IQR
BMI	24.32	2.58	24.06 (22.66 – 25.76)

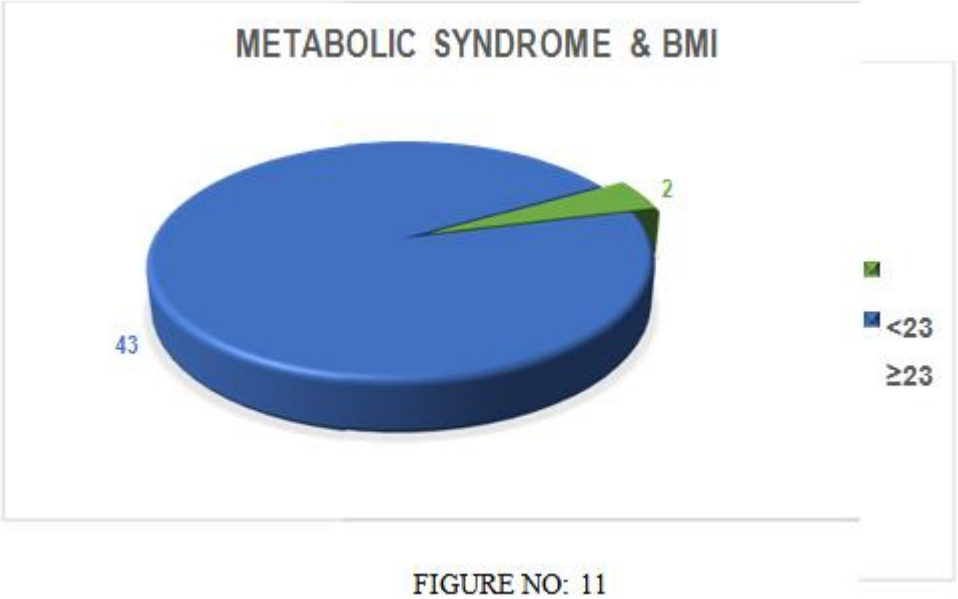

FIGURE NO: 11

TABLE NO: 16

BMI	METABOLIC SYNDROME
< **23**	2
≥ **23**	43

Odds ratio was 12.9

RELATION OF HDL FOR MEN TO METABOLIC SYNDROME:

TABLE NO: 17

PARAMETER	MEAN	SD	MEDIAN 25 – 75 IQR
HDL	39.78	3.80	40 (38 – 42)

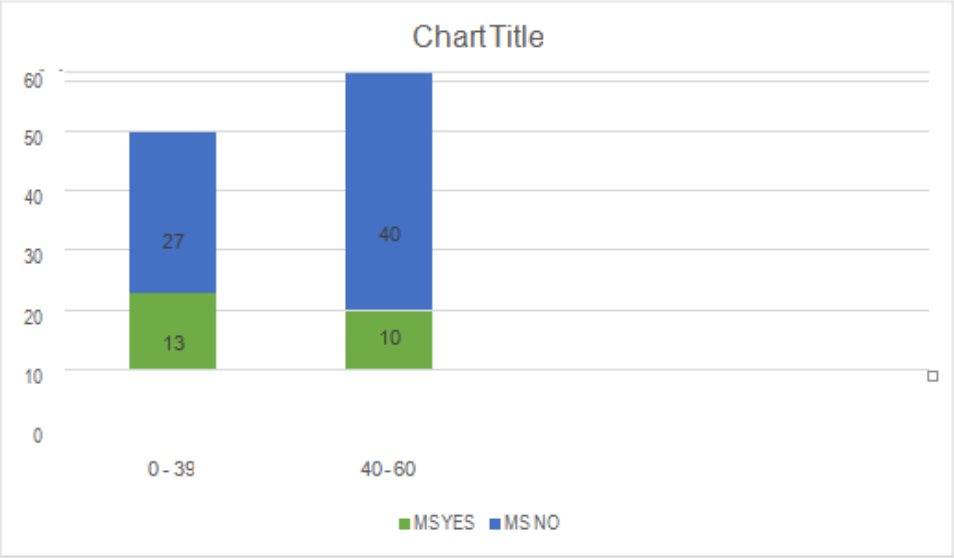

FIGURE NO: 12

TABLE NO: 18

METABOLIC SYNDROME

HDL	YES	NO	Total
0 - 39	13	27	40
Row %	32.50 %	67.50 %	100.00 %
Col %	56.52 %	40.30 %	44.44 %
40 - 60	10	40	50
Row %	20.00 %	80.00 %	100.00 %
Col %	43.48 %	59.70 %	55.56 %
Total	23	67	90
Row %	25.56 %	74.44 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds Ratio	**1.9259**

AGE GROUP FREQUENCY OF HDL IN MEN:

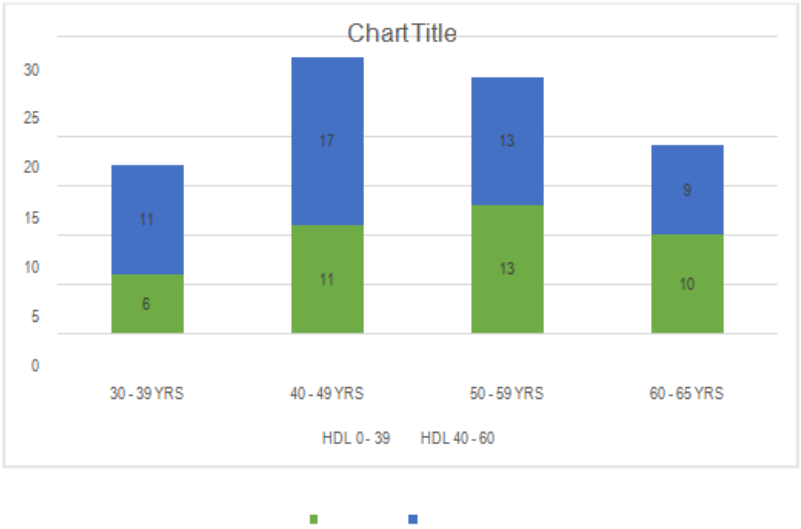

FIGURE NO: 13

TABLE NO: 19

AGE	HDL 0 – 39	HDL 40 – 60	Total
30 – 39 yrs	6	11	17
40 – 49 yrs	11	17	28
50 – 59 yrs	13	13	26
60 – 65 yrs	10	9	19
Total	40	50	90

RELATIONSHIP OF HDL FOR WOMAN TO METABOLIC SYNDROME:

TABLE NO: 20

PARAMETER	MEAN	SD	MEDIAN 25 – 75 IQR
HDL	43.64	5.81	43 (41 – 48)

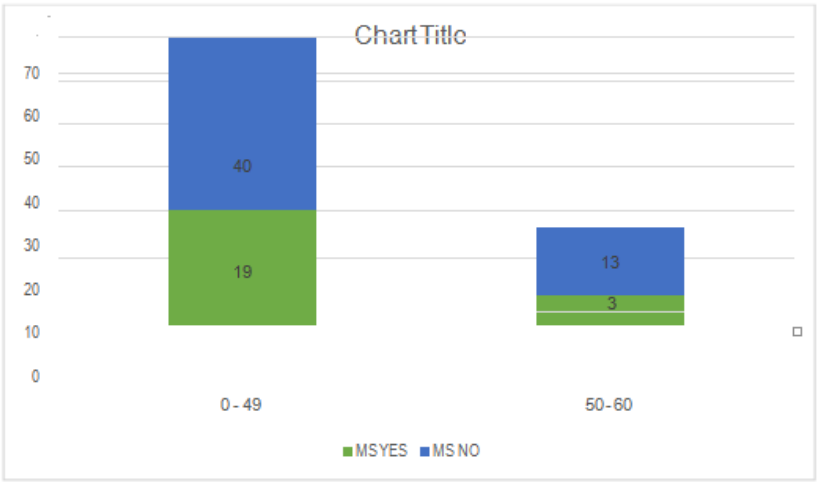

FIGURE NO: 14

TABLE NO: 21

Metabolic Syndrome

HDL	YES	NO	Total
0 - 49	19	40	59
Row %	32.20 %	67.80 %	100.00 %
Col %	86.36 %	75.47 %	78.67 %
50 - 60	3	13	16
Row %	18.75 %	81.25 %	100.00 %
Col %	13.64 %	24.53 %	21.33 %
Total	22	53	75
Row %	29.33 %	70.67 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds ratio was 2.05

AGE GROUP FREQUENCY OF HDL IN WOMEN:

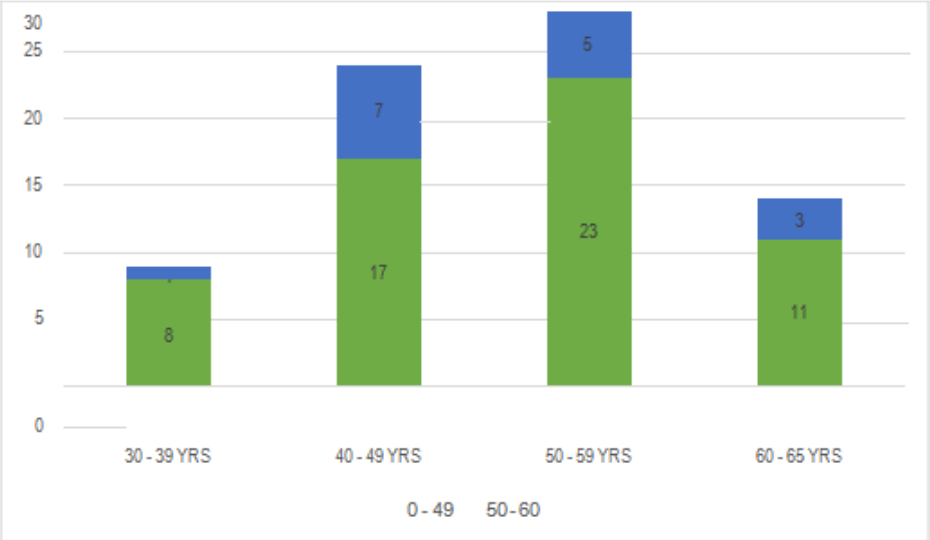

FIGURE NO: 15

TABLE NO: 22

AGE	HDL 0 - 49	HDL 50 - 60	TOTAL
30 – 39 yrs	8	1	**9**
40 – 49 yrs	17	7	**24**
50 – 59 yrs	23	5	**28**
60 – 65 yrs	11	3	**14**
TOTAL	**59**	**16**	**75**

RELATIONSHIP OF SYSTOLIC BLOOD PRESSURE TO METABOLIC SYNDROME:

TABLE NO: 23

PARAMETER	MEAN	SD	MEDIAN 25 – 75 IQR
SBP	123.43	15.72	120 (110 – 132)

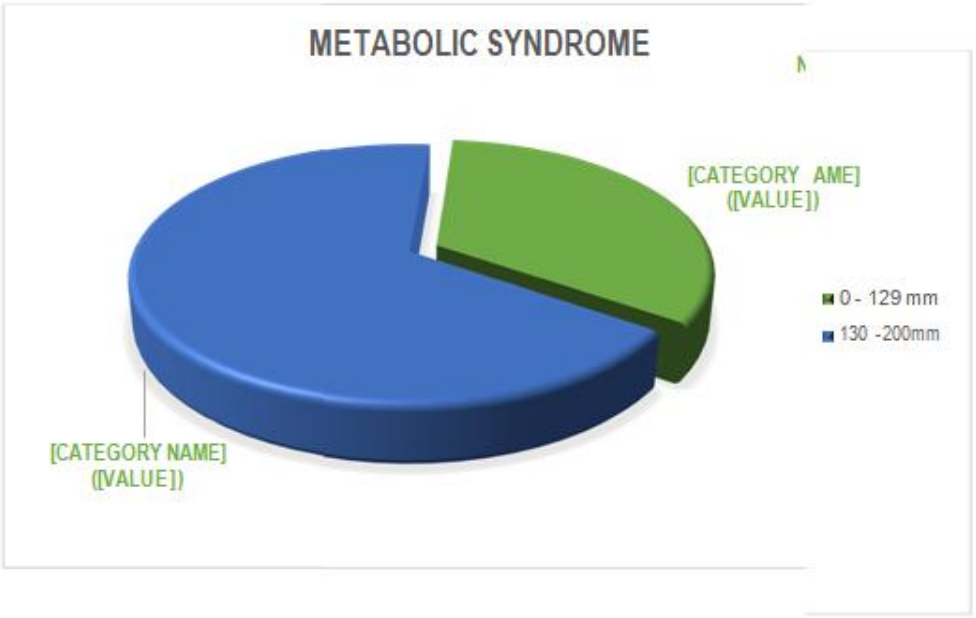

FIGURE NO: 16

TABLE NO: 24

	METABOLIC SYNDROME
BLOOD PRESSURE	YES
130 - 200	30
0 - 129	15
Total	**45**

AGE GROUP FREQUENCY OF SYSTOLIC BLOOD PRESSURE:

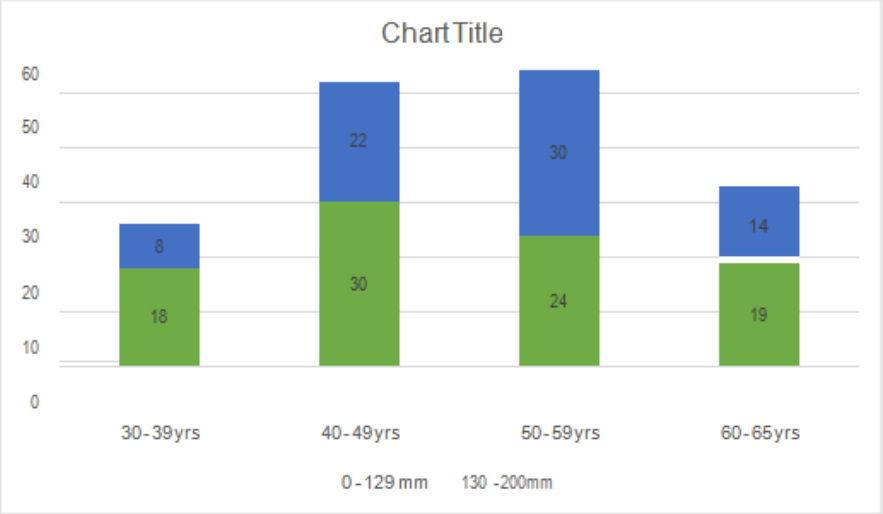

FIGURE NO: 17

TABLE NO: 24

Age	SBP 0 – 129 mm hg	SBP 130 – 200 mm hg	TOTAL
30 – 39 yrs	18	8	**26**
40 – 49 yrs	30	22	**52**
50 – 59 yrs	24	30	**54**
60 – 65 yrs	19	14	**33**
TOTAL	**91**	**74**	**165**

RELATIONSHIP OF DIASTOLIC BLOOD PRESSURE TO METABOLIC SYNDROME:

TABLE NO: 26

PARAMETER	MEAN	SD	MEDIAN 25 – 75 IQR
DBP	77.64	9.70	80 (70 – 80)

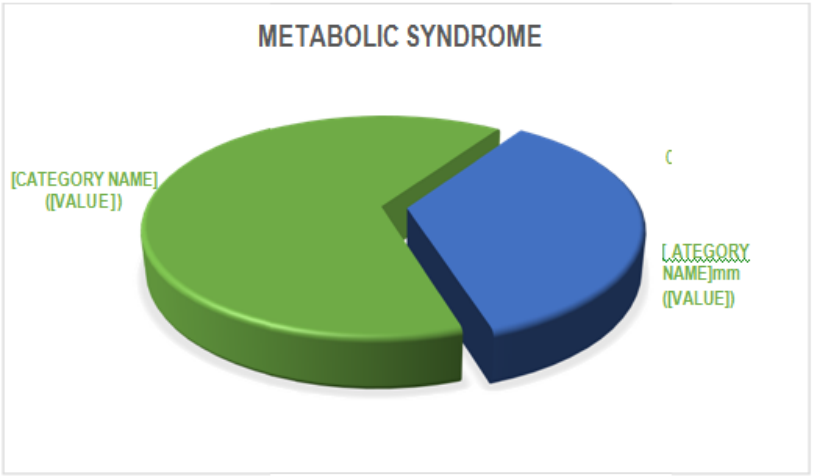

FIGURE NO: 18

TABLE NO: 27

	METABOLIC SYNDROME
BLOOD PRESSURE	YES
0 – 84	29
85 – 120	16
Total	45

AGE GROUP FREQUENCY OF DIASTOLIC BLOOD PRESSURE:

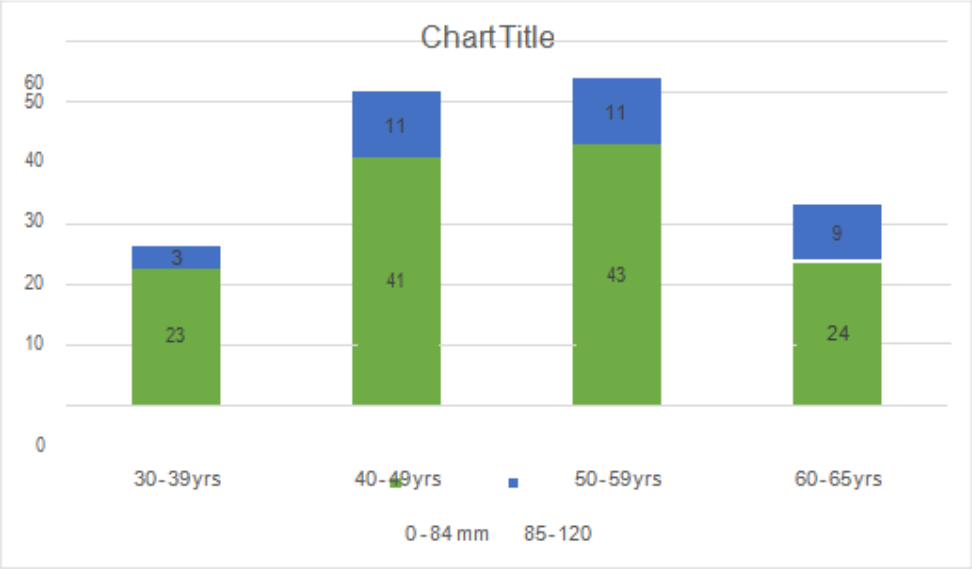

FIGURE NO: 19

TABLE NO: 28

Age	DBP 0 – 84 mm hg	DBP 85 – 120 mm hg	TOTAL
30 – 39 yrs	23	3	**26**
40 – 49 yrs	41	11	**52**
50 – 59 yrs	43	11	**54**
60 – 65 yrs	24	9	**33**
TOTAL	**131**	**34**	**165**

RELATION BETWEEN CAD AND METABOLIC SYNDROME:

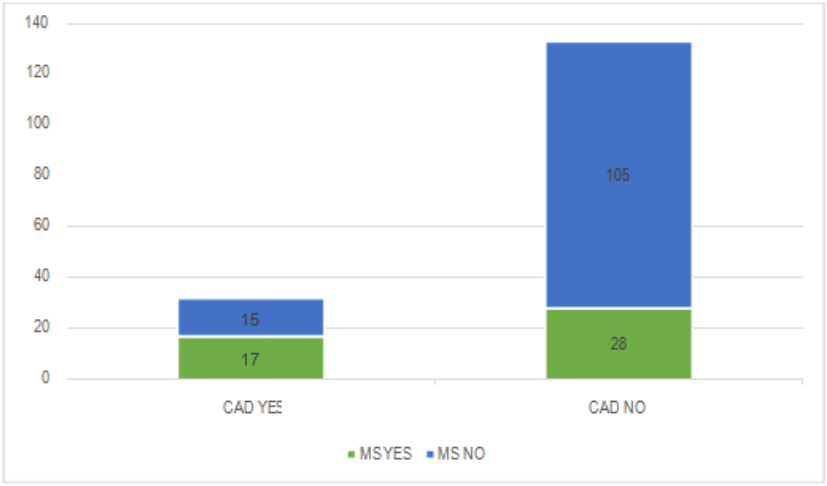

FIGURE NO: 20

TABLE NO: 29

METABOLIC SYNDROME			
cad	**YES**	**NO**	**Total**
YES	17	15	32
Row %	53.13 %	46.88 %	100.00 %
Col %	37.78 %	12.50 %	19.39 %
NO	28	105	133
Row %	21.05 %	78.95 %	100.00 %
Col %	62.22 %	87.50 %	80.61 %
Total	45	120	165
Row %	27.27 %	72.73 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds ratio was 4.25

RELATIONSHIP OF SEDENTARY LIFE STYLE AND METABOLIC SYNDROME:

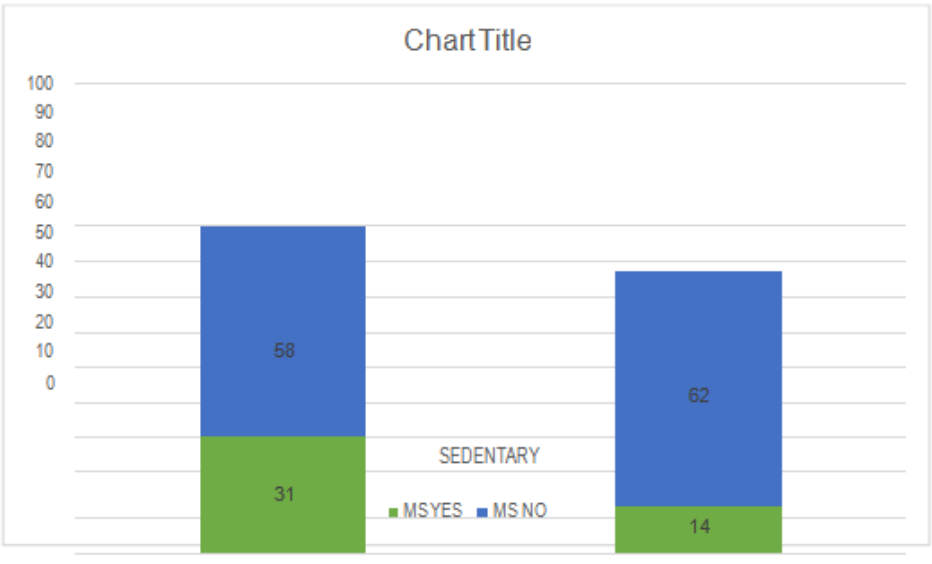

FIGURE NO: 21

TABLE NO: 30

	METABOLIC SYNDROME		
Sedentary	**YES**	**NO**	**Total**
YES	31	58	89
Row %	34.83 %	65.17 %	100.00 %
Col %	68.89 %	48.33 %	53.94 %
NO	14	62	76
Row %	18.42 %	81.58 %	100.00 %
Col %	31.11 %	51.67 %	46.06 %
Total	45	120	165
Row %	27.27 %	72.73 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds ratio was 2.36

RELATIONSHIP OF SMOKING TO METABOLIC SYNDROME:

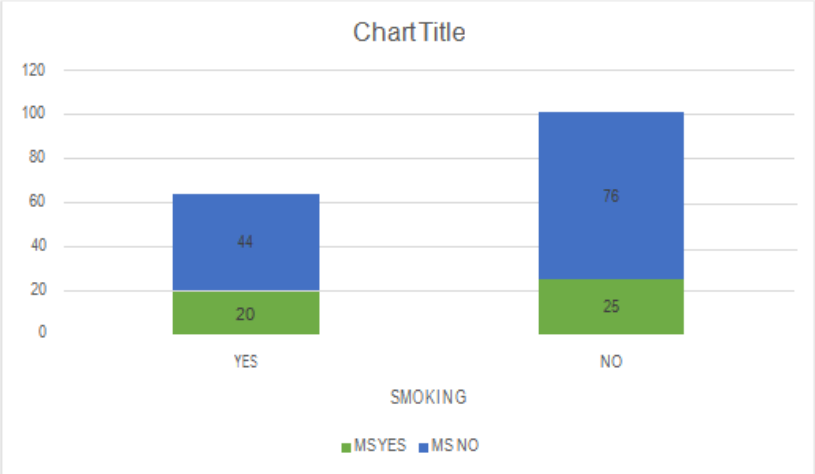

FIGURE NO: 22

TABLE NO: 31

	METABOLIC SYNDROME		
smoking	**YES**	**NO**	**Total**
YES	20	44	64
Row %	31.25 %	68.75 %	100.00 %
Col %	44.44 %	36.67 %	38.79 %
NO	25	76	101
Row %	24.75 %	75.25 %	100.00 %
Col %	55.56 %	63.33 %	61.21 %
Total	45	120	165
Row %	27.27 %	72.73 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds ratio was 1.38

RELATIONSHIP BETWEEN ALCOHOL CONSUMPTION AND METABOLIC SYNDROME:

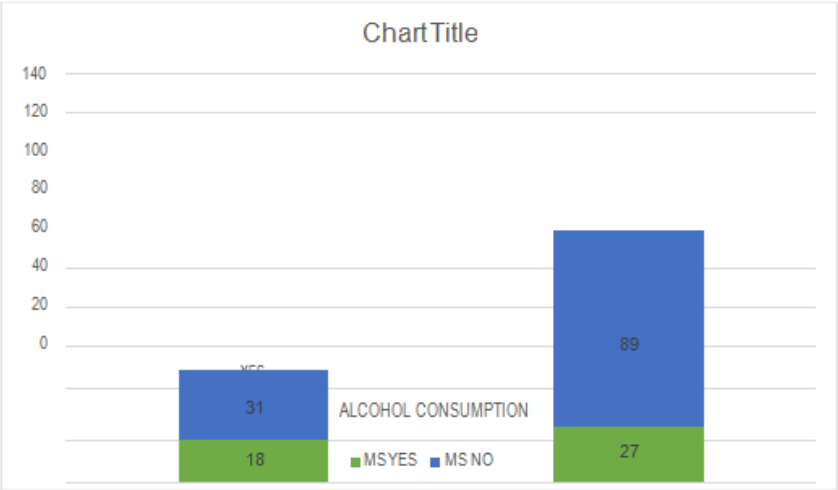

FIGURE NO: 23

TABLE NO: 32

	METABOLIC SYNDROME		
alcohol consumption	**YES**	**NO**	**Total**
YES	18	31	49
Row %	36.73 %	63.27 %	100.00 %
Col %	40.00 %	25.83 %	29.70 %
NO	27	89	116
Row %	23.28 %	76.72 %	100.00 %
Col %	60.00 %	74.17 %	70.30 %
Total	45	120	165
Row %	27.27 %	72.73 %	100.00 %
Col %	100.00 %	100.00 %	100.00 %

Odds ratio was 1.91

PREVALENCE OF OBESITY (WAIST CIRCUFERENCE) IN MALES:

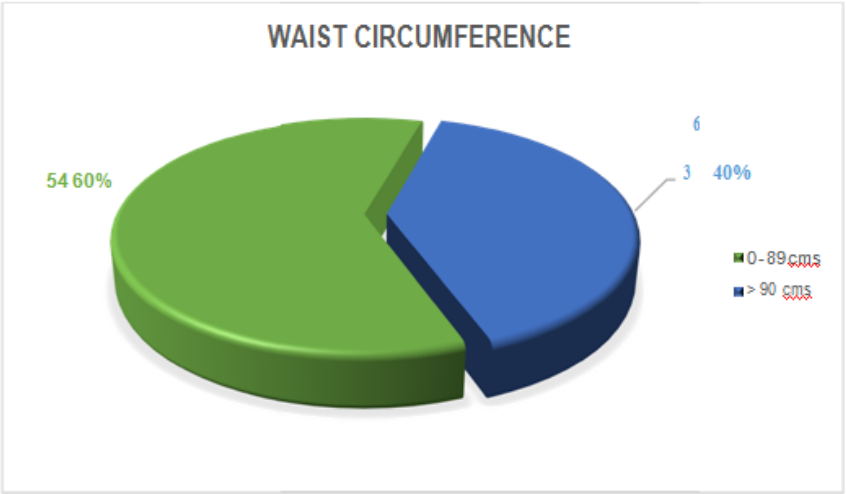

FIGURE NO: 24

TABLE NO: 33

MEASUREMENT	WAIST CIRCUMFERENCE
0 – 89 cms	54 (60%)
≥ 90 cms	36 (40%)

PREVALENCE OF OBESITY (WAIST CIRCUMFERENCE) IN FEMALES:

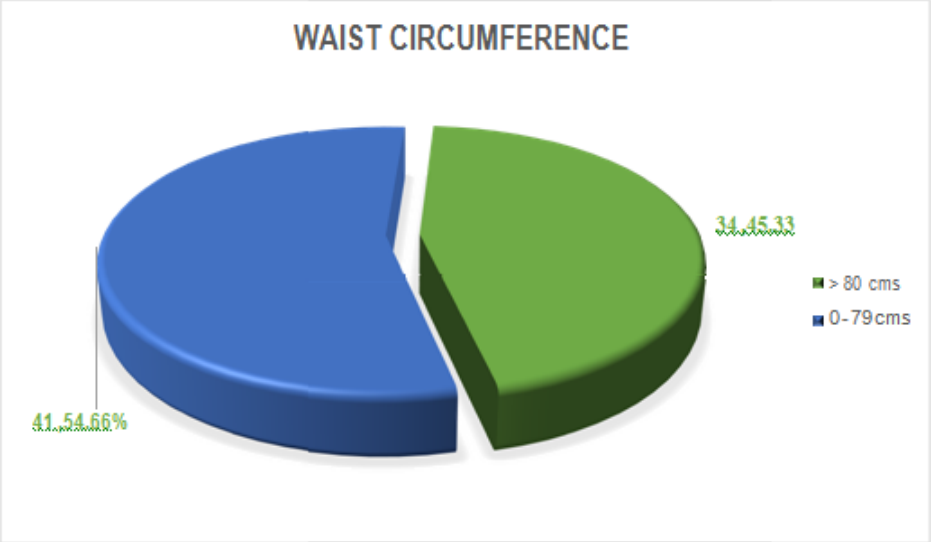

FIGURE NO: 25

TABLE NO: 34

MEASUREMENT	WAIST CIRCUMFERENCE
0 – 79 cms	41 (54.66%)
≥ 80 cms	34 (45.33%)

MAJOR HEAMATOLOGICAL PARAMETERS:

TABLE NO: 35

PARAMETERS	MEAN	SD	MEDIAN 25 – 75 IQR
HAEMOGLOBIN	12.06	1.68	12 (11 – 13.1)
TOTAL COUNT	8312.72	2217.97	7900 (6700 – 9700)

ANTHROPOMETRIC PARAMETERS:

TABLE NO: 36

PARAMETERS	MEAN	SD	MEDIAN 25 – 75 IQR
WAIST CIRCUMFERENCE	85.13	7.26	85 (79 – 90)
WC (MALE)	87.63	6.77	88 (84 – 93)
WC (FEMALE)	82.13	6.71	79 (78 – 86)
HEIGHT	161.03	9.63	159 (154 – 169)

OTHER LIPID PARAMETERS:

TABLE NO: 37

PARAMETER	MEAN	SD	MEDIAN 25 – 75 IQR
LDL	135.47	30.32	130 (118 – 146)

V. Discussion:

Among the 165 sample size study population 54.55% were males and 45.45% were females and the median age group was 50 with an interquartile range of 45 and 58. Among the age distribution 31.52% was present in the 40 to 49 age group and 32.73 % was present in the 50 to 59 age group. The prevalence of metabolic syndrome in this study was 27.27 %,and among the females the prevalence of metabolic syndrome was 29.33 % (22) and among the male population the prevalence of metabolic syndrome was 25.55% (23). According to a study done in south India by Deepa et al the prevalence of metabolic syndrome was 25.8% using the IDF criteria and the prevalence among the males and the females were 23.1% and 28.2%[18].According to a study done in India the prevalence of metabolic syndrome was 33.3 in males and 40.4 in females[55]. Anationwide population based survey in Taiwan observed 20.4% of men and 15.3 % of women with metabolic syndrome[56].So as told earlier different studies show different prevalence rate according to the ethnicity age andpopulation.

Among the age group distribution maximum prevalence of MS was present in the 50 to 59 (35.19 %) age group and the 60 to 65(33.33%) age group, according to Ervin et al, males and females aged 40 to 59 yrs were three times more likely to develop metabolic syndrome than the 20 to 39 yrs age group[57], and according to a study done by Yousefzadeh et al and Sheikhvatan et al the prevalence of metabolic syndrome peaked in the age range of 51 to 60 years among both males and females[58]which was coinciding with our study.

Among the components of metabolic syndrome the median waist circumference is 85 with an interquartile range of 79 and 90. Whereas in the male population the median waist circumference is 88 with an interquartile range of 84 to 93, and in the females the median waist circumference is 79 with an interquartile range of 78 and 86.Overall prevalence of obesity in males was 40% and the prevalence of obesity in females was 45% and in the study done by Deepa et al the prevalence of obesity in males and females was 38.5% and 58.3%[18]and in a study done in India high waist circumference was present in 35.7% of males and 57.5% of females[59] . Body mass index more than 23 was present in 71 percent of the study population, and 36% of the population was associated with metabolic syndrome (ICMR guidelines normal for Indian population 18.5 – 22.9), and according to a study done by Sawant et al the prevalence of high body mass index was 79.01%($>23kg/m^2$)[60]. The overall prevalence of hyper triglyceridemia in the study population was 35.15% and was high in the 40 to 49 age group (48.08%) and the 60 to 65 age group (36.36%). ODD's ratio was 4.94.The median value was 141 with an interquartile range of 129 and 156.

According to deepa et al the prevalence of hypertriglyceridemia in the study population was 25.2%, according to deedwania et al the prevalence of hypertriglyceridemia was 41.2% in males and 31.5% in females

[57] .Impaired fasting glucose was prevalent in 29.7% of the study population and the odd's ratio was 5.77, with the prevalence of impaired fasting blood glucose level increasing in the 50 to 59 age group (35%) and in the 60 to 65 age group (36%). Median value of IFG was 97 with an interquartile range of 94 and 105, and an Indian study showed a prevalence 20.9% [18] and according to Thakur et al the prevalence of fasting blood glucose was 32.6%[61].HDL levels (in men) less than < 40 was present in 44.44% of the study (male)population, the median value of HDL was 40 with an inter quartile range of 38 and 42 and odds ratio was 1.9 for those patients who had HDL < 40 for developing metabolic syndrome. Here HDL less than 40 was present in high percentage in the 50 to 59 age group (50%) and in the 60 to 65 age group (52%).

For women those who were having HDL levels less than 50, the median value was 43 with an interquartile range of 41 and 48 , 78% of the study (female) population had HDL values less than 50 with an odds ratio of 2.05. HDL levels less than 50 were present in high percentage in the 40 to 49 age group (70.83%), 50 to 59 age group (82.14%) and 60 to 65 age group (78.57%) and there is an Indian study which shows a prevalence of 70.4% of decreased HDL[59].Systolic blood pressure ≥ 130 elevated in 44.85% of the study population with an odds ratio of 3.45, the median value of SBP was 120 with an interquartile range of 110 and 132, high prevalence of systolic blood pressure ≥ 130 was found in the 50 to 59 age group (55.56%) and the 60 to 65 age group (42.42%) .

Diastolic blood pressure ≥85 was present in 20 % of the study population with an odd's ratio of 3.12 and high prevalence of diastolic blood pressure ≥ 85 was found in the 50 – 59 age group (20.37%) and the 60 to 65 age group (27.27%). Median value for DBP was 80 with an interquartile range 70 and 80. And according to an Indian study the prevalence of metabolic syndrome in hypertensive patients was 63.6% (according to the IDF criteria).

Around 19.39% of the study population had coronary artery disease and 53% of patients with CAD were associated with metabolic syndrome, with an odds ratio of 4.25, according to an Indian study 61.06% of CAD patients were associated with metabolic syndrome[62].

In the study population 53.94% of patient's lead sedentary life style and among them 34.83 were associated with metabolic syndrome with an odds ratio of 2.36.

Among smokers (predominantly men) 31.25% of them were associated with metabolic syndrome and odds ratio was 1.38.Among people who were consuming excess amount of alcohol 36.73% were having metabolic syndrome with an odds ratio of 1.9.According to a study done in Puerto Rico, 42.7% of smokers and 48.4% of ex-smokers were associated with metabolic syndrome[63]and a study done in India shows a prevalence of 24.6% of metabolic syndrome among those who consume alcohol in excess[64].

Median value of haemoglobin was 12 with an interquartile range of 11 and 13.1, and the median value of total count was 7900 with an interquartile range of 6700 and 9700.
The median value of LDL was 130 with an interquartile range of 118 and 146.

VI. Conclusion

1) Here in this study the prevalence of metabolic syndrome was present in about 27% of the study population, with the prevalence of metabolic syndrome more in the female population.
2) In the age group distribution of metabolic syndrome the highest percentage was present in the sixth decade of life.
3) Among the individual components of metabolic syndrome decreased HDL was the commonest followed by high blood pressure, elevated triglycerides and IFG, and increased waist circumference was of course a definitive criteria for the diagnosis of metabolic syndrome according to the IDF criteria.
4) People with metabolic syndrome were four times more prone to develop coronary artery disease.
5) People who are smoking and consuming excess amount of alcohol are more prone to develop metabolic syndrome.
6) People who are leading a sedentary life without physical activity are two times more prone to develop metabolic syndrome.

   So in this study the prevalence of metabolic syndrome was 27 percent with the prevalence being more common in the female population which coincided with the earlier studies which were done in India. With the rise in metabolic syndrome proper education and life style modications along with its risk factors should be told to the patients.

LIMITATIONS OF THE STUDY:

Limitations of the study are the small sample size which may not represent the general population. Systematic random sampling may cause the sampling error in this study. A larger sample may be needed to represent the general population. All the risk factors could not be studied properly. The other limitation is that this is a hospital study where many confounding factors are present which may alter the study.

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