How to Cite:
Raghvendrasinghmeena, R., Vishalgourh, V., Mamtameena, M., & Apoorvakatare, A. (2022). Overview of metabolic syndrome in COVID-19 patients: A retrospective mono centric study in Central India. *International Journal of Health Sciences*, *6*(S1), 12240–12245.
https://doi.org/10.53730/ijhs.v6nS1.8062

Overview of metabolic syndrome in COVID-19 patients: A retrospective mono centric study in Central India

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***Abstract*---**Metabolic syndrome (MetS) is highly prevalent in Indian Subcontinent, andits components like high BMI, diabetes mellitus, and hypertension have been identified as risk factors to develop severe SARS-CoV2 (COVID-19); however, data on MetS and clinical outcomes in COVID-19 are limited. Thisstudy aims to determine association between MetS and disease out-comes, that is, morbidity and mortality among patients with COVID-19. This retrospective mono centric cohort study was performed from. 1st may to 15th may 2021, on 100 patient admitted in a tertiary care hospital. Hospital stay and mortality rates are compared between the Mets and non Mets group. The mean age of participant was 44.5±9 year there is preponderance of male gender was present, among 100 patients 28 were having MetS and 72 were non MetS, Among 28 MetS 5 were remain asymptomatic, 13 were symptomatic with hospital stay less than 14 days and 7 were symptomatic with hospital stay more than 14 days and 3 were died. The findings our study suggest a relationship between patient having MetS are at increased risk of severe complications and mortality among COVID-19 patients.

***Keywords*---**SARS CoV2, COVID-19, Mets, Non Mets.

Introduction

The pandemic of SARS CoV-2 (COVID-19) has raised a health concern globally [1] and also the velocity of its spread and transmission together with its variable mortality among different countries has remained as a puzzle [2]. In fact we are still searching, what exactly put someone at high risk of severe diseases and worst outcomes i.e. death because of COVID-19. But what we do to know is that cases at risk for a detrimental prognosis of SARS-CoV-2) were described to have pre- existing conditions like carcinoma, chronic respiratory illness , diabetes, cardiovascular disease , hypertension, as well as the advancement of age [3-7]. Metabolic syndrome (MetS) as a common metabolic disorder in common people [8] is defined by World Health Organization (WHO) as a pathologic state determined by abdominal obesity, insulin resistance, hyperlipidaemia, and hypertension(8). Though it may not be a disease, but it is a term that shows traits that may have put people on the risk of comorbidities [9]. Accordingly, as reported by the Centers for Disease Control and Prevention (CDC), it is estimated that individuals with MetS following diabetes mellitus type 2 might have up to ten fold high risk of death due to COVID-19 [10]. High blood glucose level as one of the defining factors of MetS, was obtained as a self-reliant predictive factor of mortality and morbidity in cases with COVID-19, and its control of the same was observed as key in COVID-19 patients [11]. Moreover, patients with higher Body Mass Index (BMI), which is also an indicator of MetS, may be more susceptible to develop a severe course of COVID-19; to the extent that, for 4103 COVID-19 patients in New York City, the United States, BMI>40 kg/ m2 was revealed to be the second independent predictor of hospitalization after old age [12]. Obesity in itself is likely to be an eminent risk factor of increased mortality and morbidity among COVID-19 cases [13]. Given the widely recognized fact that the comorbidities may worsen the seriousness of clinical course and complications of COVID-19 , exploring the connection between MetS and the severity of COVID-19 has been of major clinical significance and well-conducted studies to elucidate these associations are urgently needed. So, this study is aimed at providing an overview of MetS and its impact on clinical course, complications, prognosis, and mortalities in patients presenting with COVID-19.

Materials and Methods

This retrospective mono centric cohort study was performed from. 1stJune to 31stDecember2020 on 100 patient admitted in a tertiary care hospital.
All patient who were covid positive and ready to give consent were included our study , The patients were categorized in MetS and Non-MetS group, and compared according to Hospital stay and mortality rates are compared between the MetS and non-MetS group. Statistical analysis was done by using excel and online available statcalc.

Result

Present study was conducted in the Covid ward of tertiary care hospital of central India, where patient with covid positive were purposively selected, total 100 patient were participant of study gender distribution was 66% were male and 34% were female, most of the participant were belong to age of 46-50 years followed

by, 41-45 years, the mean age of the participant were 43.39 ±2.714years among male 42.61 ±3.147 and among female 44.9118 ±5.1 . Out 100 patient 22 were MetS, preponderance of male gender present in the both group is present.

Table 1
Age wise distribution of Participant

Age Group	age in years	Total	Male	Female
	20-30	15	2	0
	31-40	89	38	15
	41-50	24	15	10
	>50	20	11	9
	Mean	43.39 ±2.714	42.61 ±3.147	44.9118 ±5.1

Mean Blood sugar among all the participant 92.29 ±4.9, 14 participant 10 male and 4 female were having Fasting Blood sugar above 100mg/ dL. Waist Circumference normal waist Circumference male<102 cm(40 inch) among female <88cm(<35 inches) 23 participant have raised waist circumference 13 male and 10 female participants. Blood Pressure SBP <130mmHgand DBP<85mmHg were considered normal. 13 participant were having raised SBP 9 were male and 4 were female, 12 participant were having raised DBP 9 were male 3 were female. HDL among male normal value is <40mg/dL for female <50mg/ dL. 29 participant were having raised HDL 14 were male 15 were female. Among the MetS 3 people were died while among Non – MetS 1 was died OR 8.52 and RR 7.71 which is interpreted as people with MetS 7.71 times more prone to die than Non-MetS patients. And for morbidity comparison also OR calculated between MetS and Non-MetS OR observed is OR=9.2, 95% CI -3.1112 to 27.2045 and P=0.0001. among the MetS patient only 5 remain asymptomatic, 23 patients were symptomatic and among them 20 were discharged and 3 were died, 13 patient remain in hospital for less than 14 days and 7 patient were remain in hospital for more than 14 days. among the Non-MetS patient only 48 remain asymptomatic, 24 patients were symptomatic and among them 23 were discharged and 1 was died, 18 patient remain in hospital for less than 14 days and 5 patient were remain in hospital for more than 14 days.

Table 2
Gender wise distribution according to components of metabolic syndrome

Components of metabolic syndrome (MetS)		Total	Male	Female
FBS (mg/dl)	<100mg/dl	86	56	30
	>100mg/dl	14	10	4
	Mean	92.29 ±4.9	91.83±6.13	93.1765 ±8.4
Waist Circumference (cm)	Normal	77	53	24
	Raised	23	13	10
	Mean	91.51 ±2.49	94.66±2.89	85.38±3.306
SBP (Systolic	Normal	87	57	30

blood pressure -in mmhg)	Raised	13	9	4
	Mean	122.56 ±4.1	123.1±5.44	121.53±5.99
DBP(diastolic blood pressure -in mmhg)	Normal	88	57	31
	Raised	12	9	3
	Mean	78.28 ±2.73	78.82±3.73	77.23±3.41
HDL(mg/dl)	Normal	71	52	19
	Raised	29	14	15
	Mean	47.1 ±2.22	47.11±2.7	47.0882 ±3.9

Table 3
Mortality and Morbidity Outcome among MetS and Non MetS

			No.of participants(n=100)
MetS (n=28)	Asymptomatic		5
	Symptomatic	Hospital stay<14 day	13
		Hospital stay>14 day	7
	Death		3
Non-MetS (n=72)	Asymptomatic		48
	Symptomatic	Hospital stay<14 day	18
		Hospital stay>14 day	5
	Death		1

Table 4
Odds ratio among MetS and NonMetS for morbidity

	MetS	Non-MetS
Symptomatic	23	24
Asymptomatic	5	48

Odds Ratio (OR) for the above table OR=9.2, 95% CI -3.1112 to 27.2045 and P=0.0001
Relative Risk (RR)- 5.19

Table 5
Odds ratio among MetS and NonMetS for mortality

	MetS	Non-MetS
Died	3	1
Discharged from hospital/ remain asymptomatic	25	71

Odds Ratio (OR) for the above table OR=8.52, 95% CI - 0.8468 to 85.7190and P=0.068
Relative Risk (RR)- 7.71

Discussion

This is mono centric study conducted on 100 patients with confirmed diagnosis of SARS CoV-2, suggested that mortality among the MetS patient is 10.71% while among NonMetS 1.38% (Odds Ratio(OR) for the above table OR=8.52, 95% CI -0.8468 to 85.7190and P=0.068)which is comparable with the Our study results suggest patient with MetS was independently associated with COVID-19 deterioration. In two different studies, it was associated with mortality, invasive mechanical ventilation, and ICU transfer for COVID-19 [13,14]. In another study from Iran were includes only patientsadmitted in ICU, the patients with MetS as compared to those without had a 3.3-fold increased risk of death [15].

The increasing prevalence of metabolic syndrome is concerning for worsening morbidity and mortality due to COVID-19 infection. In 2016, over 1.9 billion world's adult population were over than the normal weight, which constitute around 39% of the world population.[16] Moreover, countries with higher rates of obesity among there population also tend to have patients with more severe COVID-19 infection.[17]

Conclusion

Each comorbidity contributes in its way to increase the risk or aggravate the Covid-19 disease, although they often appear combined, such as in the MetS in which the risk becomes much more significant,. Assuming that MetS is increasing worldwide, the need to study the relationship becomes more important when we face two pandemics of COVID-19 and MetS.

Funding: None
Conflict of interest: None declared
Ethical approval: taken frominstitutional ethicscommittee of gandhi medical college bhopal

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