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RESEARCH ARTICLE

CHALLENGES, CHANCES & CHANGES WITH OBSTETRIC CO- MORBIDITIES IN PREGNANT WOMEN WITH COVID-19

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Abstract

Introduction: Covid 19 pandemic had a significant impact on people's lives all over the world, and pregnant women are one of the most vulnerable groups of population more so with obstetric comorbidities.

Aim: To study the association of obstetrical co-morbid conditions and the course of covid 19 infection in pregnant women.

Methods: It is a cross-sectional, quantitative observational study carried out at King George Hospital, Andhra Medical College, Visakhapatnam. Study participants were women diagnosed with covid 19 infection who were admitted at CSR block, King George Hospital during the period April 2021-October 2021. ICU admissions, maternal mortality in women with covid 19 infection, and their association with obstetrical co morbidities were studied.

Results: Among 392 hospitalized pregnant women with covid 19 diagnosis, 122 were asymptomatic at the time of admission. Majority of patients were in age group between 21-30yrs. 60 women had obstetric comorbidities like preeclampsia, obesity, and GDM. Preeclampsia accounted for 6.1% of the population in the study, GDM for 3.6%, and obesity for 5.6%. Of all individuals, 48 (12.2%) were admitted in Intensive Care Unit, 35 women required invasive mechanical ventilation and 24 deaths were reported which accounts to 6.1%. Obesity was found to have a significant association with covid 19 morbidity and mortality in this study, whereas no significant association was found with other obstetric comorbid conditions such as gestational diabetes and preeclampsia.

Conclusions: Though all three comorbid conditions contributed to morbidity such as ICU admissions and deaths, obesity alone showed a statistically significant association with maternal morbidity and mortality. Identification of risk factors during hospitalisation is therefore crucial for directing preventative measures and initiate appropriate treatment.

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Introduction:-

COVID 19 is caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). Pregnant women are one of the vulnerable group of population and are susceptible to community spread of covid19. Pregnancy is considered an independent risk factor for severe COVID-19¹. Initial studies suggested that pregnant women were not a higher risk of complications due to covid19 infection, recent studies indicated that pregnant and postpartum women were at increased risk of severe complications associated with covid19 and poor outcome. Common symptoms of covid 19 include myalgia, fever, cough, chestpain, breathlessness.

Mild disease was defined as nopneumonia and mild pneumonia; severe disease was defined as dyspnea, respiratory rate of ≥ 30 /minutes, SPO2 of $\leq 93\%$, lung infiltrates of $>50\%$ on chest X-ray; and critical disease was defined as respiratory failure, septic shock, and multiple organ failure².

Most Pregnant women with COVID-19 infection will be asymptomatic or have only mild symptoms; however, progression to severe acute respiratory syndrome and multiorgan failure may occur, with an increased risk among those with comorbidities such as diabetes and hypertension³.

In this study research, we aimed at evaluating the obstetrical comorbidities as risk factors for maternal mortality and morbidity in covid19 pregnant women.

Aim And Objectives:-

To evaluate whether obstetric comorbid conditions effect the outcome in COVID-19 pregnant women.

Material And Methods:-**Study design:**

Cross-sectional quantitative observational study.

Sample size:

392 individuals with covid-19 infection

Study period:

April 2021-october2021

Place of study:

Study was conducted at covid obstetric ward, CSR block, King George Hospital, Andhra Medical College, Visakhapatnam.

Methodology:-

Women included in this study group were diagnosed covid positive by either serological tests(RTPCR) or radiological(Chest X-ray/CT) parameters, who were enrolled immediately at any stage of pregnancy or delivery and were followed up until hospital discharge. Indices of maternal mortality and morbidity were studied

Inclusion Criteria

- Pregnant women with covid19 infection.
- Age 17-40 years.
- Term and preterm pregnant women.

Exclusion Criteria

- Pregnant women with out covid-19 infection.
- Age >40 years.

Statistical Methods:

The data obtained was tabulated and analysed statistically using social science system version SPSS.

Results And Observations:-**Table-A:-** Age Wise Distribution.

AGE	FREQUENCY	PERCENT
17-20	19	4.8
21-30	364	92.9
31-40	9	2.3
TOTAL	392	100

In this study population, majority of patients were in age group between 21-30yrs and constitute about 92.9%

Table-B:- Based On Gestational Score.

Gestational score	Frequency	Percent
Multigravida	223	56.9
Primigravida	169	43.1
Total	392	100

In this study population, 56.9% were multiparous and 43.1% were primigravida.

Table-C:- Based On Gestational Age.

Gestational age	Frequency	Percent
Pre-term(<37wks)	95	24.2
Term (>=37WKS)	297	75.8
Total	392	100

Out of 392 individuals, 297 individuals were term gestation and 95 individuals were below 37weeks.

Table-D:- Based On Riskfactors(GDM).

GDM	Frequency	Percent
Yes	14	3.6
No	378	96.4

Out of 392 individuals, 14 individuals had gestational diabetes and 378 individuals were with out GDM.

Table-E:- Based On Obesity.

Obesity	frequency	Percent
Yes	22	5.6
No	370	94.4

Out of 392 individuals, 22 individuals had obesity and 370 individuals were with out obesity.

Table-F:- Based On Pre-Eclampsia.

Pre-eclampsia	Frequency	Percent
Yes	24	6.1
No	368	93.9

Out of 392 individuals, 24 individuals had preeclampsia and 368 individuals were with out preeclampsia.

Table G:- Mode of Delivery.

Mode	frequency	Percent
LSCS	223	56.8
NVD	142	36

56.8% individuals were delivered by lower segment cesarean section and 36% by normal vaginal delivery.

Table H:- ICU Admissions.

ICU	Frequency	Percent
Yes	48	12.2

No	344	87.8
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12.2% individuals needed intensive care while rest of 87.8% individuals did not need it.

Table I:- Deaths in covid-19.

Death	Frequency	percent
Yes	24	6.1
No	368	93.9

24 individuals were died due to severe covid infection which constitute about 6% mortality rate.

Table J:-Correlation of GDM & ICU Admissions.

GDM	ICU ADMISSIONS		Total
	YES	NO	
Yes	2(14.3%)	12(85.7%)	14
No	46(12.2%)	332(7.8%)	378
Total	48(12.2%)	344(87.8%)	392

χ^2 -0.56,P VALUE-0.812

Out of 48 individuals with ICU admissions only 14.3% individuals had gestational diabetes as riskfactor and rest of 85.7% were with out any risk factors.So, this shows no statistical significant association of GDM and ICU admissions.

Table K:- Correlation of Obesity & ICU Admissions.

Obesity	ICU Admissions		TOTAL
	YES	NO	
Yes	9(40.9%)	13(59.1%)	22
No	39(10.5%)	331(89.5%)	370
Total	48(12.2%)	334(87.8%)	392

χ^2 -17.822,P VALUE-0.001

Out of 48 individuals with ICU admissions 40.9% individuals had obesity as riskfactor and rest of 59.1% were with out any risk factors.So, this shows statistical significant association of obesity and ICU admissions.

Table-L:-Correlation of pre-eclampsia and ICU admissions.

Pre-eclampsia	ICU admissions		Total
	Yes	No	
Yes	4(16.7%)	20(83.3%)	24
No	44(12%)	324(88%)	368
Total	48(12.2%)	344(87.8%)	392

χ^2 - 465,P VALUE-0.495

Out of 48 individuals with ICU admissions only 16.7% individuals had PRE ECLAMPSIA as riskfactor and rest of 83.3% were with out THIS risk factors.So, this shows no statistical significant association of PE and ICU admissions.

Table M:- Correlation Of GDM And Mortality in Covid19.

GDM	DEATH		Total
	Yes	No	
Yes	1(7.1%)	13(92.9%)	14
No	23(6.1%)	355(93.9%)	378
Total	24(6.1%)	368(93.9%)	392

χ^2 -0.026,P VALUE-0.871

Out of 24 deaths due to covid-19 only one individual has GDM as riskfactor which was not statistically significant.

TableN:- Correlation Of Preeclampsia And Death.

PRE-ECLAMPSIA	DEATH		Total
	Yes	No	
Yes	2(8.3%)	22(6%)	24
No	22(91.7%)	346(22%)	368
Total	24(6.1%)	368(93.9%)	392

χ^2 -0.217,P VALUE;0.641

Out of 24 deaths due to covid-19 only two individual has pre eclampsia as riskfactor which was not statistically significant.

TableO:- Correlation Of Obesity And Death:

OBESITY	DEATH		TOTAL
	YES	NO	
Yes	5(22.7%)	17(77.3%)	22
No	19(5.1%)	351(94.9%)	370
Total	24(6.1%)	368(93.9%)	392

χ^2 - 11.181,P VALUE-0.001

Out of 24 deaths, 5 individuals had obesity as riskfactor and it shows statistical significant association with p value of 0.001

Discussion:-

Among 392 hospitalized pregnant women with covid19 diagnosis,122 were asymptomatic at the time of admission.3 (0.7%), 37 (9.4%), and 352 (89.7%) of the 392 women with a diagnosis of covid19 were hospitalised during the first, second, and third trimesters, respectively. Out of all hospitalised cases, 60 women had obstetric comorbidities like preeclampsia, obesity, and GDM, while the rest 332 women did not. Preeclampsia accounted for 6.1% of the population in the study, GDM for 3.6%, and obesity for 5.6%.

365 women with covid19 diagnosis resulted in livebirths. 223 women underwent Caesarean section , 142 women delivered vaginally and pregnancy loss occurred in 2.2%(9 women). Among them 75.8%were term and 24.2% were preterm births.

Data from the Centers for Disease Control and Prevention (CDC) and other studies have shown increased risks of mechanical ventilation, ICU admission, and death from COVID-19 in pregnancy.In our study,out of 270 symptomatic pregnant women,48 (12.2%)were admitted in Intensive Care Unit,35 women required invasive mechanical ventilation and 24 deaths were reported which accounts to 6.1%.21 out of 48 patients who got admitted in ICU developed ARDS with metabolic acidosis and hypoxia <60 mmHg.No asymptomatic women were admitted to an ICU, required ventilation or died.

In women with ICU admissions, majority of them belongs to 21-30years age group(12.4%),10.5% were below 20 years and 11%were more than 30years of age. 35.8% women were <37weeks and 4.7% were >37 weeks.

Among 48 ICU cases only 2 (4.3%)people had gestational diabetes.In a study conducted by zornado et.al found that GDM prevalence in 2020 was substantially greater than in 2019 during the COVID-19 pandemic⁴.

The binding of SARS-CoV-2 to the angiotensin-converting enzyme 2 (ACE2) receptor allows it to enter the body⁵. In diabetes, an increase in ACE2 receptor expression caused by hyperinsulinemia may facilitate virus entry, which is further enhanced by the surface glycoprotein dipeptidyl peptidase-4⁶. Diabetes may be associated with complement deficiencies, immunodeficiency, and increased inflammatory activity. In nonpregnant COVID-19 patients, inhospital hyperglycemia and inflammation are both associated with a severe course⁷. Furthermore, SARS-CoV-2 has been shown to damage pancreatic beta cells, leading to an increase in the incidence of newly diagnosed diabetes^{8,9}.

Although GDM is a milder form of hyperglycemia, pregnant women with COVID-19 and GDM are 3.3 times more likely to be admitted to an intensive care unit (ICU) than women without DM;However, a study by Allotey J et al

found that severe disease and invasive ventilation in women with GDM were not increased¹⁰. Similar to that, only two patients in this study who had GDM as a risk factor needed intensive care and invasive ventilation.

Out of 48 patients admitted to the ICU, four women had pre-eclampsia as a risk factor and constitute about 16.7%. Papageorgiou AT et al in their analysis concluded that the infected nulliparous women in particular still had a significant risk ratio for preeclampsia.

Women with preeclampsia should be considered a particularly vulnerable group with regard to the risks posed by COVID-19.¹¹

Overweight, pre-pregnancy obesity and obese pregnant women are at increased risk for both morbidity and mortality from SARS¹². Moreover, the highest mortality risk for these pregnant women was correlated to acute cardiopulmonary conditions presenting in the second and third trimesters¹³.

In this study, obesity was noted as an obstetrical comorbidity in 9 (40.9%) of the ICU patients, indicating a significant association with disease severity. In cases where COVID 19 has resulted in death, comorbid diseases including preeclampsia account for 6.1%, GDM for 7.1%, and obesity for 22.7%.

Obesity alone has a significant association with COVID-19 morbidity and mortality in this study.

Conclusions:-

Obstetric comorbid conditions had a proven risk with severe COVID morbidity and mortality in previous studies. In our study, obesity has a significant association with morbidity and mortality in pregnant women. Still GDM, Preeclampsia and obesity are considered as risk factors for COVID morbidity and mortality.

Pregnant women and health care providers should be aware of potential risks for severe COVID-19, including adverse pregnancy outcomes. Identifying risk factors associated with COVID-19 during hospitalization is important to guide preventive measures and appropriate timely treatment to improve maternal and fetal outcome. Although causality cannot be determined from these associations, these results may be in line with recent recommendations in favor of vaccination for pregnant women.

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