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Original Research Article

A study of the socio demographic and obstetric factors in pregnant women with COVID-19 infection at a tertiary care hospital, Kollam, Kerala, India

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ABSTRACT

Background: The first wave of the COVID-19 pandemic took the world to task. Pregnant women needed care without actually knowing if the treatment schedules outside of pregnancy could be extrapolated to the pregnant state. Obstetric protocols were adhered to as far as was feasible, yet world over there was an increase in cesarean section rates. The so-called alpha variant that we saw at the time appeared to infect pregnant women too with equal frequency but they fared well. The issues regarding infectivity and the use of personal protective equipment (PPE) assumed mammoth dimensions. The objectives of this paper were to explore the demographic data and the epidemiological risk factors and study the symptomatology, severity and course of COVID-19 in pregnancy.
Methods: This was an observational study conducted on all the COVID-19 positive pregnant women admitted to the department of obstetrics and gynecology at the designated COVID hospital for the district - Government Medical College Kollam - for a period of 6 months from October 2020 to March 2021. These women were studied with respect to their socio demographic details and their Obstetric risk factors and performance. Data was collected and analyzed using statistical package for the social sciences (SPSS) software.
Results: 377 antenatal COVID-19 positive women were admitted and analyzed during the study period. Nulliparous women (48.5%%) in the age group 20 to 30 years (74.28%) formed the major group. Third trimester and near date admissions were the majority (48.80%). Most women (79.31%) were asymptomatic. Most common symptoms were fever in 35% and flu like upper respiratory symptoms (20%). Breathlessness and lung involvement was seen in 2.91%. Contact tracing revealed a travel history or contact with infected persons at 15.64%. However, 84.8% had no contact history. All antenatal women were tested at admission and reverse transcriptase-polymerase chain reaction (RTPCR) was done in 73.21%. Rapid antigen and nucleic acid amplification test (NAAT) detected the rest. 46% had some co morbidity gestational diabetes mellitus (GDM), gestational hypertension, thyroid disease and anemia were the common co morbidities detected. The presence of GDM in 24.14% of the study population is noteworthy.
Conclusions: Pregnancy being an immune compromised state, unpredictable outcomes are possible with COVID-19 infection. Asymptomatic patients too can experience complications. Frequent hospital and lab visits could be a source of infection. The growing incidence of GDM in the midst of the COVID-19 pandemic is a point for concern.

Keywords: COVID 19 in pregnancy, Contact tracing, Gestational diabetes mellitus

INTRODUCTION

The novel coronavirus, severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), a new strain of the single stranded RNA coronavirus, causes COVID-19 infection. It attaches itself by way of its spike protein on to the angiotensin converting enzyme (ACE) 2 receptors which are present in the gut as well as the respiratory tree.[1] Manifestations include fever, rhinitis, sore throat, upper

respiratory symptoms, myalgia and diarrhoea. Severe or category C patients experience dyspnea, desaturation, tachycardia, chest pain, cyanosis and haemoptysis, progressing on to florid bronchopneumonia and viral myocarditis, with an increased propensity for pulmonary thromboembolism.[2] This virus appears to spread readily through droplet infection and also possibly through faeces and fomites.

It was first identified in Wuhan City, China and spread rapidly through the world. Pregnant women were affected as well and it became a herculean task to manage both mothers and babies. The outbreak was declared a public health emergency of international concern on 30 January 2020. Prevention and control of COVID-19 infection among pregnant women and the potential risk of vertical transmission became a major concern. The supposed immunocompromised state in pregnancy meant that these women required prioritized medical attention.

Government medical college, Kollam was the COVID designated hospital for the district and we took care of large numbers of pregnant women and children belonging to different categories. Matar et al in their systematic review have shown an increased risk of preterm births, fetal growth restriction (FGR), and intra uterine deaths in the cohort of women exposed to COVID-19 infection in pregnancy.[3] Pregnant women in the study were managed following standard Obstetric guidelines. Considering the paucity of data on the pregnant woman's response to COVID-19 infection and its sequelae we deemed it fit to proceed with this study.

The objectives of this study were to find out the sociodemographic, epidemiological and obstetric risk factors of pregnant women with COVID-19 infection and to study the symptomatology, severity and management of pregnant women with COVID-19 infection.

METHODS

This observational study was conducted at the obstetrics and gynaecology department of Government Medical College Kollam over a period of 6 months from October 2020 to March 2021. A total of 377 COVID-19 positive pregnant women admitted to this hospital were studied. Data was collected regarding demographics, exposure history, symptoms and signs exhibited, maternal and foetal complications and severity of disease.

Inclusion criteria

All pregnant women who were admitted to this hospital with a positive COVID test were included.

Exclusion criteria

All those who tested negative for COVID-19 and who did not consent to the study were excluded.

RESULTS

A total of 377 COVID positive pregnant women were admitted in this hospital during the study period and were all included in the study as they gave consent.

Socio demographic profile

Majority 74.8% belonged to the 20-to-30-year group. This reflects the age at pregnancy of the majority of our general population (Table 1).

Table 1: Mean levels of plasma glucose and chromium of control and different gestational periods compared.

Age group (years)	Number of COVID positives	%
Less than 20	27	7.16
20-30	282	74.8
30-40	68	18.04
More than 40	0	0

Of the total COVID positive pregnant women, 2.12% belonged to the health care worker category. Majority were unemployed (Table 2).

Table 2: Occupational status.

Occupation	No. of COVID positive	%
Health care worker	8	2.12
Others	2	0.53
Nil	367	97.35

Contact tracing revealed history of contact with case or suspect in 59 patients (15.64%). Those with no contact history were diagnosed by presence of symptoms or through routine screening for antenatal women which was done across the district especially prior to admission in the third trimester (Table 3).

Table 3: Epidemiological risk factors.

Contact history	No. of COVID patients	%
Contact with an infected person	35	9.28
History of travel	15	3.97
Health-care worker	8	2.12
Social gathering	1	0.26
No contact history	318	84.35
Total	377	

Most common symptoms were upper respiratory infection and fever. Myalgia and dyspnoea were other common symptoms. 7 of the 11 patients with dyspnea required oxygen and of these 1 needed an ICU admission. The remains 3 had a normal SpO_2 and fared well. Majority was asymptomatic. Asymptomatic antenatals without contact

history were detected by screening of all patients attending emergency care and on routine admission (Table 4).

Table 4: Symptom status.

Main symptoms	Number of COVID positive	%
Asymptomatic	299	79.31
Flu like symptoms	20	5.3
Fever	35	9.28
Myalgia	10	2.65
Dyspnoea	11	2.91
Others	1	0.26

Obstetric profile

Nulliparous women formed 48.5% of study population. Of the women with 1 child, 22.5% had a previous normal delivery, 21% had previous caesarean section (Table 5).

Table 5: Parity status.

Parity	No. of COVID positives	%
Nullipara	183	48.5
Para 1	164	43.5
Para 2	26	6.9
Para 3 and more	4	1.06

Majority belonged to the >37 weeks category (49%) and were detected at routine screening at admission for confinement. Much of the early pregnancies were under home quarantine (Table 6).

Table 6: Gestational age.

Gestational age (weeks)	Number of COVID positive	%
<30	86	22.81
30-36	106	28.12
>37	185	49.07

46.4% had some co morbidity. GDM was seen in 24.14% of the study population. Gestational hypertension, thyroid disorders and anaemia were the common associations noted (Table 7).

Table 7: High risk pregnancy and co morbidities.

Comorbidity	Number	%
Gestational hypertension	34	9.01
GDM	91	24.14
Thyroid disease	26	6.89
Anaemia	17	4.51
Overt DM	1	0.26
Psoriasis	1	0.26
Seizure disorder	2	0.52
Bronchial asthma	3	0.79

DISCUSSION

The paper presents 377 women affected with COVID-19 in 2020. 75% of the women were young (20-30 years) and a large majority were nulliparas detected in the third trimester. Metkari et al from Maharashtra India, and Hui et al from Wuhan, showed similar profiles.[4,5] The latter had a median age group of 30 years among affected pregnant women with 52% in the nulliparous group. High incidence in third trimester was found in both studies and were also similar to ours probably the result of routine testing practices.

The fear of getting the infection weighed heavily on patients and health care workers alike. Most pregnant health care workers went on leave and only 2.12% of our subjects were health care workers.

The large majority had no contact history and the source could not be traced. Only in 15.64% could the source be identified. Being Kerala with a large population in the Gulf, travel history was a major epidemiological factor before community spread actually started.

Short incubation period, recall bias, inability to identify unknown contacts and role of digital contact tracing was brought out in the study by Connell and Derek in the UK.[6] In women in whom contact tracing could not be identified, a large majority attributed their infection to hospital visits, labs and scan centres.

In a meta-analysis by Matar and Alrahmani incorporating 24 studies and 136 patients, as well as the Wuhan study, the most common symptoms reported were cough and fever.[3,5] In the study by Metkari in Maharashtra 85.35% were asymptomatic.[4]

In our study only 20.69 % were symptomatic,35% had fever and 20% had flu like symptomatology. Similarly, Allotey in The British medical journal and Chen et al support the presence of a majority of pregnant women being asymptomatic.[7,8]

This variability in symptomatology can be explained by the varied testing protocols followed in different regions. At the same time, it may be inferred that pregnant women show the same kind of symptoms as their non pregnant counterparts.

A systematic review of pregnant women with COVID 19 conducted by Mirbeyk et al in 2021 found that majority of the patients belonged to the third trimester.[9] This paper too reports similar numbers, 48.80% at more than 37 weeks gestation. Most mothers showed mild to moderate symptoms of COVID and fever. More frequent visits to hospital and labs and routine screening prior to admission could have increased the COVID incidence among the near-term pregnant population.

Only 12.4% belonged to other trimesters. In the less than

30 weeks category, there were 7 miscarriages and 1 second trimester abortion. One case of ectopic gestation underwent emergency laparotomy and salpingectomy. There were 3 cases of twin gestation (0.7%). None of these appear to be higher than that in the general population.

Studies from China have shown equal susceptibility to the virus in both males and females but mortality was more in males. Any hormonal interplay in the course of disease needs further research. Analysis by Gao in the BMC Infectious Diseases showed symptoms in pregnant women (51.31%) were lower than in general population (91.67%).[10] Pre-existing or pregnancy associated co morbidities could make the pregnant woman more susceptible to corona virus infection and is a cause for concern. 46% of our subjects had some co morbidity or the other. Gestational diabetes topped the list at 24.14% and gestational hypertension and thyroid disorders followed. National and international scientific committees call diabetes a metabolic pandemic. Eberele et al indicated diabetes was the commonest comorbidity.[11] Another study by Kurian et al showed incidence of diabetes was twice as high in severe COVID cases.[12] GDM adding on to the already immune compromised state in pregnancy, making mothers prone to infection could be a factor. Also, the fear of going for ante natal care to a hospital facility was definitely a contributor to the increase in numbers of uncontrolled GDM we actually saw. However, 24.14% of these COVID-19 infected women actually had GDM which is more than the 18-20% overall incidence of GDM in Kerala outside COVID.

How gestational diabetes alters immune system and alters the course of this viral disease needs further research.

This study has incorporated large numbers making derivations robust. However, changing protocols from the district administration in the 6 months would have contributed to smaller numbers in severe COVID cases which were referred directly to medical college in Thiruvananthapuram.

CONCLUSION

The COVID-19 pandemic has cost the lives of many young mothers worldwide. Asymptomatic cases and absence of contact history in majority seems to justify the screening of all pregnancies especially close to term. High incidence of co morbidities especially GDM is a cause for concern and these women need to be monitored more carefully. How pregnancy alters the course of disease needs further research.

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