Systematic Review

Covid-19 among 185 pregnant women across four countries: A systematic review

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ABSTRACT

Background & Objective: The aim of this systematic review was to report pregnancy and its outcomes of women who were affected by COVID-19 as pregnancy is known to be adversely affected by most of the viral outbreaks of recent times and it is too early to rule out COVID-19 from the list.

Data Sources: Electronic search was made across popular databases such as PubMed and Google Scholar with emphasize on keywords and their combinations keeping “COVID-19 and pregnancy” as a central theme.

Study Eligibility Criteria: The major inclusion criteria for articles was that they must have data on pregnant women who were tested positive for COVID-19 and they should have reasonable information on the outcomes of the current pregnancy.

Study Appraisal and Synthesis Methods: Median age of the women, gestational age at delivery, Co-morbidities, events during current pregnancy, maternal and fetal complications, mode of delivery, birth weight, APGAR scores of the neonate, neonatal outcome and COVID-19 test result of the neonate were the information which were tried to compare from the selected articles.

Results: Eight articles were screened and finalized for the systematic review which belonged to China, USA, UK and Singapore which in total had data for 185 pregnant women who were tested positive for COVID-19 and had undergone delivery. Similarly, the median age of the pregnant women was 30 years (29-33) and the median gestational of the women at the time of delivery was 36.75 (34-38) weeks. The caesarean rates was typically higher across the articles, with mean of 77.45%. Fever, cough and shortness of breath were the commonest presentations. The maternal and fetal complications were not significant. The most of the results of neonatal testing for COVID-19 turned out to be negative. The rate of premature births were highly variable.

Conclusion: The data thus far showed that the course of a COVID-19 pregnancy is much similar to a non-infected one. However, the rates of premature births were found higher at several occasions and need to be explored further. The possibilities of vertical transmission were almost nil. The outcomes of the pregnancies were also comparable to uninfected ones.

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1. Introduction

The current pandemic of COVID-19 has affected most of the parts of the world counting for more than 28 lac confirmed cases and more than 1.93 lac deaths globally.¹ The vulnerable groups include persons with extreme ages and comorbid conditions like Coronary Heart Disease, Hypertension or Diabetes.² The current knowledge suggest that pregnancy is not a risk group as far as COVID-19 is concerned. But it should be remembered the lower immune status during pregnancy as well as the fact that Corona virus families have proven to be responsible for severe illnesses among pregnant women across the globe.³ Physiological adjustments of pregnancy are likely to pose significant maternal and foetal morbidity and mortality.⁴

Although the data till date suggest that there is no increased risk to the pregnant women as compared to the non-pregnant women;⁵⁻⁷ the rapidly spreading disease

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could have different implications in different settings as
the time passes. Nevertheless, every emerging infection
tended to affect pregnancy and foetal outcomes throughout
the globe, most recent examples being H1N1 Swine flu
and Zika virus. Moreover, there is a need to consider
pregnant women and their care separately in the health
action plans against COVID-19 as there are reports of
denials of care of pregnancy either in treatment or in
vaccination, due to concerns of foetal safety in previous
outbreaks of some of the recent emerging infections.
Even with the recent research and data on Corona virus
and pregnancy, experts opine that there is need of large
samples with epidemiological correlations to draw valid
conclusions across the globe. The objective of this
systematic review was to report pregnancy and its outcomes
of women who were affected by COVID-19 across the
countries. Further, it might help the stakeholders to identify
potential areas of research for COVID-19 with pregnancy,
till the pandemic continuous in general public.

2. Methodology

2.1. Identification of studies

A computerized literature search using the Pubmed and
Google Scholar database was conducted. The key words
used were as following: “Corona virus and/or pregnancy”,
“Covid-19 and/or pregnancy”, “Corona virus pregnancy
outcomes”, “2019-nCoV and/or pregnancy”, “Corona virus
and maternal infection” and “Corona virus and neonatal
outcomes”. Snowballing technique was used to search
further articles. Only studies that showed outcomes of
COVID-19 pregnancies were explored further. The types
of study looked for were cross-sectional studies, case
reports, case series, randomised trials, clinical trials as
well as systematic reviews and meta-analysis. The consort
guidelines were to be followed if randomised trials were
to be included in the analysis. The keywords were also
adjusted to find out articles belonging to different countries
as far as possible. In case of several consecutive reports of
the same study, the latest one was used. Two investigators
independently conducted the primary literature research
using the key terms of searching. Then the data were
independently reviewed and the studies not conforming to
the eligibility and inclusion criteria were excluded. The
remaining articles were further analysed for variations
of time and place. In case of any conflicts between
the investigators after independent search, consensus was
reached by discussion and then the articles were finalised
accordingly.

2.2. Data extraction

The following information was extracted from each study:
Study design, authors, date of publication and study
area. The date of publication/acceptance was given more
emphasiseas most of the literature would fall in 2020.
For actual analysis, the information sought for were
median age of the women, gestational age at delivery,
Co-morbidities, events during current pregnancy, maternal
and foetal complications, mode of delivery, birth weight,
APGAR score, neonatal outcome and COVID-19 test result
of the neonate. The variation, in the form of study area was
given due emphasise, even if some of the information was
lacking in some articles.

The articles suited most for the purpose were given prior-
ties. Articles were further screened for relevance, complete
information, the number of patients and heterogeneity of
authors/study area. A comparison was made through a table
regarding all the desired information. The median (with
range) was preferred over the mean for numerical data, as it
was a skewed distribution. Only symptoms of fever, cough
and shortness of breath were considered for the analysis
to simplify comparison and to avoid multiple symptoms.
The corresponding authors were not contacted due to time
constrain in ongoing pandemic. The quality of articles were
assessed subjectively. Ethical approval was not required for
this systematic review.

3. Results and Discussion

Considering the symptoms of the Covid-19 infection among
the pregnant women, fever, cough and shortness of breath
were the most common symptoms without any bias for
countries. Especially, in Singapore article, the proportions
of females with fever (84%) were significantly high
(Table 1). On the other hands, the proportions of cough
was more than two third in article by Breslin N et al. for
USA. The mode of delivery was also ascertained from
the articles. It was also observed that proportions premature
births were significantly higher (78.18%) for the article by
Dashraath P et al. at Singapore. The proportion was also
significant for the article by E. Mullins et al., which came
out to be 46.87% among the 32 deliveries. The incidences
of maternal and foetal complications were also tried to
found out. It can be seen that there were very few occasions
of maternal complications from all these observations. The
still birth rates were not significant and they were equally
observed among China, Singapore and UK. However, in
Singapore data the rates of IUGR (16.36%) were found to
be significant.

The rates of Caesarean section was also found out from
all the articles. The mean caesarean rate was found to
be about 77.45% from the available data (Table 1). It is
to be noted that in articles from Khan et al. and Liu et
al., both from China, the caesarean rates were 100% and
90.9% respectively. These higher rates have implications
of utmost care during the intervention. The standard
aseptic precautions in such pandemic are much warranted.
The APGAR score at 1 min was found to 8.64 on an average
from all the available data of the eight articles (Table 1).
Table 1: The analysis of eight article showing pregnancy outcomes of COVID-19 positive women (N=185)

| Articles | Article 1 | Article 2 | Article 3 | Article 4 | Article 5 | Article 6 | Article 7 | Article 8 |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Number of women (N) | 7 | 13 | 7 | 55 | 32 | 43 | 17 | 11 |
| Median Maternal Age (range) in years | 30 (29-35) | 30 (22-36) | 33 (29-34) | 31 (23-40) | 30 (25-40) | 29 (23-35) | 29 (24-34) | 32(27-37) |
| Gestational age at delivery (weeks) | 34 (31-39) | 35 (25-38) | 38 (37-41) | 34 (29-40) | 36.5 (31-39) | 37.0 (32.6-38.9) | 37.82 (35-41) | 37(36-38) |
| Comorbid conditions | None | None | Hypothyroidism:1, Poly Cystic Ovaries: 1 | NA | 12.5 % | Obesity:60.5% | Diabetes: 7 % | None |
| Events during pregnancy | Fetal distress, Vaginal bleeding | Fever, Dyspnoea | Fever: 6 Abdominal Pain: 4 Fetal movements:1 | Fever :84% Cough:28% Dyspnoea:18% | Fever, Sore throat | Fever: 48.3% Cough:65% Dyspnoea: 24.1% | Fever: 18% Cough:35% Dyspnoea:12% | Fever: 9 Cough:6 Dyspnoea: 0 |
| C-section proportions | 71.42 % | 76.92 % | 100% | NA | 84.37 % | 18.6 % | 100% | 90.9 % |
| Birth weight (grams) | 2325 (1520-3800) | NA | 3250 (3000-3500) | NA | NA | NA | 3104 (2300-3750) | NA |
| Maternal Complications | NA | Premature rupture of membrane: 1 Multi Organ Dysfunction: 1 | Uterine scarring :3 | Mechanical ventilation: 2 | Mechanical ventilation: 2 Multi organ dysfunction :1 | Respiratory failure: 1, Septic shock: 2 | Preterm delivery: 5 | None |
| Foetal Complications | NA | Foetal distress:3 Still birth: 1 | None | IUGR: 9 Still birth: 2 | Yes : 43 | Yes: 15 | Yes : 5 | NA |
| Premature delivery | NA | Yes : 6 No: 4 | NA | NA | NA | NA | NA | None |
| APGAR at 1 & 5 mins | 1 min: 8.5 (7-10 5 min: 9.5 (8-10) | 1 min: 10 (NA:3) | 1 min: 8-9 5 min: 9-10 | NA | 10 (time unspecified ) | For n=18 1 min: 9 5 min: 9 | 9-10 (94.1%) | 1 min: 8 5 min: 9 |
| Neonatal outcome | Small for date: 1 Large for date: 1 | All survived | All survived | Death: 2 | Death: 1 | Respiratory distress: 1 Dysplastic kidneys: 1 | Death : 0 | Death : 0 |
| Neonatal RT-PCR for SARS-CoV-2 | Negative: 8 | Negative :10 NA:3 | Negative: 2 Positive : 1 NA: 4 | Negative: 46 NA: 9 | Negative: 25 NA: 7 | Negative : 18 NA: 25 | Negative: 17 | NA |

*NA: Data Not Available
Neonatal death was observed only in 3 occasions from all the extracted data.

The maternal complications (e.g. mechanical ventilation) or the foetal complications (e.g. still birth, foetal distress etc.) were found to be negligible (Table 1). The rate of premature births was variable across the studies and it ranged from 2.32% to 78.18%. 14,17 The neonatal death proportion only 1.62% from all the studies. The neonatal testing data showed that 68.1% of the results turn out to be negative and only 1 neonate had a positive result from all the data. Rest of the test results cannot be extracted from the articles.

4. Conclusion

The fate of a COVID-19 pregnancy was observed to be much similar to a non-infected one from the current systematic review. The outcomes of the pregnancies were also comparable to uninfected ones. The possibilities of vertical transmission were almost nil. The rates of premature births were found higher. However, lack of sufficient research, inclusion of only last trimester of pregnancy and rapid progression of the current pandemic warrants further triangulation in the topic for obtaining valid conclusions.

5. Limitations

Few data pertaining to some aspects of pregnancy and its outcome were not available. The pandemic is continuing and the data are updating thus the observations and their interpretations need to be looked with caution. The data of infection in first and second trimester were not included for the analysis.

6. Source of Funding

None.

7. Conflict of Interest

None.

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