



Background

- COVID-19 infection is a potential risk for serious illness in both mother and the fetus. It carries the risk of vertical transmission as well. (1)
- Pregnancy induces physiologic changes in every system of the body, especially the immune system, that aggravates the SARS-CoV2 progression rapidly. (2)
- Studies exhibited severe illness and unfavourable outcomes such as premature birth, miscarriage in hospitalized pregnant women admitted with COVID-19 infection, but neonatal adverse outcomes were not that much visible.(1)
- The management of pregnant women with SARS-CoV2 is more challenging, as it has diverted the medical staff and equipment towards the acute medical necessity. Eventually, this pandemic has elicited extreme psychological stress and anxiety for pregnant women. (2,3)



Objective

Our aim was to study the effect of COVID-19 on maternal health. Care during pregnancy requires a unique and time sensitive approach. There has been limited studies highlighting these areas, so we were curious to explore how obstetricians managed to overcome these challenges.

Method

- We conducted a literature review to identify peer reviewed articles on pregnancy related to COVID-19 using Google Scholar, Centers for Disease Control and Prevention (CDC) and PubMed.
- We searched comprehensively using terms, combining COVID-19, coronavirus, pregnancy, and maternal health for relevant articles published in the last one year (2020-2021).
- Our primary highlights were case series and cohort studies, discussing the course, management and outcomes of COVID-19 on maternal health.

Results

- We were able to demonstrate the direct and indirect impact of COVID-19 on maternal health including physical, mental, and social effects.
- The review data of 1287 SARS-CoV-2 positive pregnant women demonstrated the possibility of COVID-19 transmission from mother to fetus.
- Studies revealed that COVID-19 had no significant effect on neonatal outcomes despite mothers being infected during pregnancy.
- With this new reality of social distancing, the levels of anxiety and depression among pregnant women have been soaring. Many services cancelled all routine antenatal appointments and obstetric surgery, which further added to the emotional and mental strain on maternal health.

Table 1: Pharmacological management of COVID-19 in pregnancy

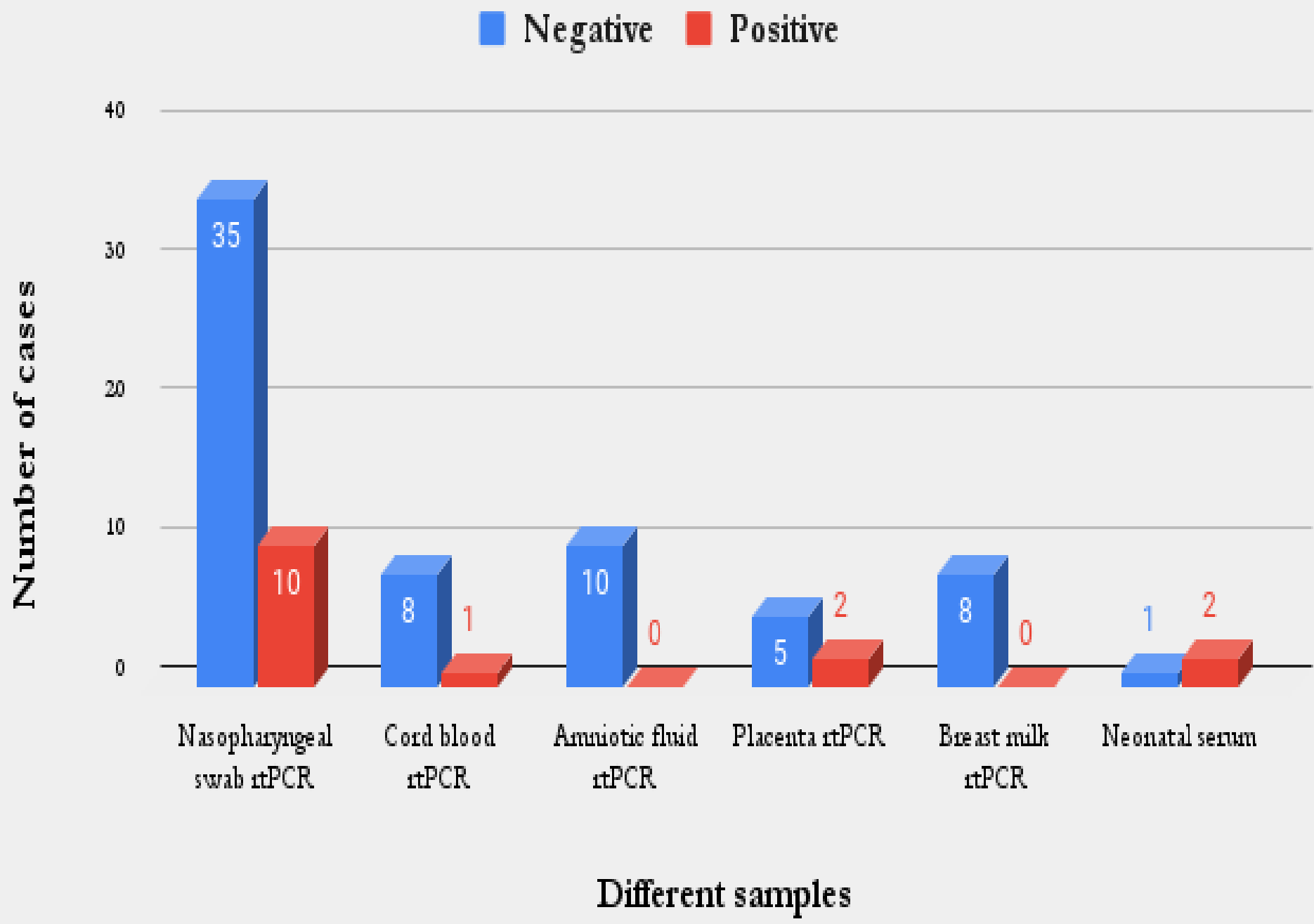
Name of Drug	Drug Class	Use in COVID-19	Administration	Adverse Effects	Indication in pregnancy
Remdesivir	RNA polymerase inhibitor	Reduce viral load	IV	Severe liver dysfunction, diarrhea, skin rash and renal dysfunction	Yes
Ritonavir Ropinavir	Protease inhibitors	Reduce viral load	Oral	Headache, GI upset, dizziness, drowsiness, bad taste	Yes
Hydroxychloroquine and Azythromycin combination	Antimalarial and Antibiotic	Reduce viral load (Recent studies failed to show it)	Oral or IV	Headache, dizziness, loss of appetite, GI upset, Rash, BM suppression in long term use.	Yes
Corticosteroid	Analogues of steroid hormones	Anti-Inflammatory	Oral or IV	Fluid retention, HTN, Hyperglycemia, Stomach upset, Secondary infection, Osteoporosis, Adrenal insufficiency	Yes
Convalescent plasma	Polyclonal human antibodies		IV		Yes
Tocilizumab	Anti IL-6 monoclonal Ab	Effective in COVID-19 with severe Pneumonia	IV		Debatable
Ribavirin				Miscarriage, cranio facial and limb defect.	Avoid in early pregnancy
Baricitinib				Embryotoxic	Avoid in early pregnancy
Favipiravir	RNA polymerase inhibitor	Reduce viral load	Oral	Teratogenic	No
LMWH		Reduce risk of Pulmonary Embolism in hospitalized COVID 19 Pregnant patient	IM		Contraindicated

Results

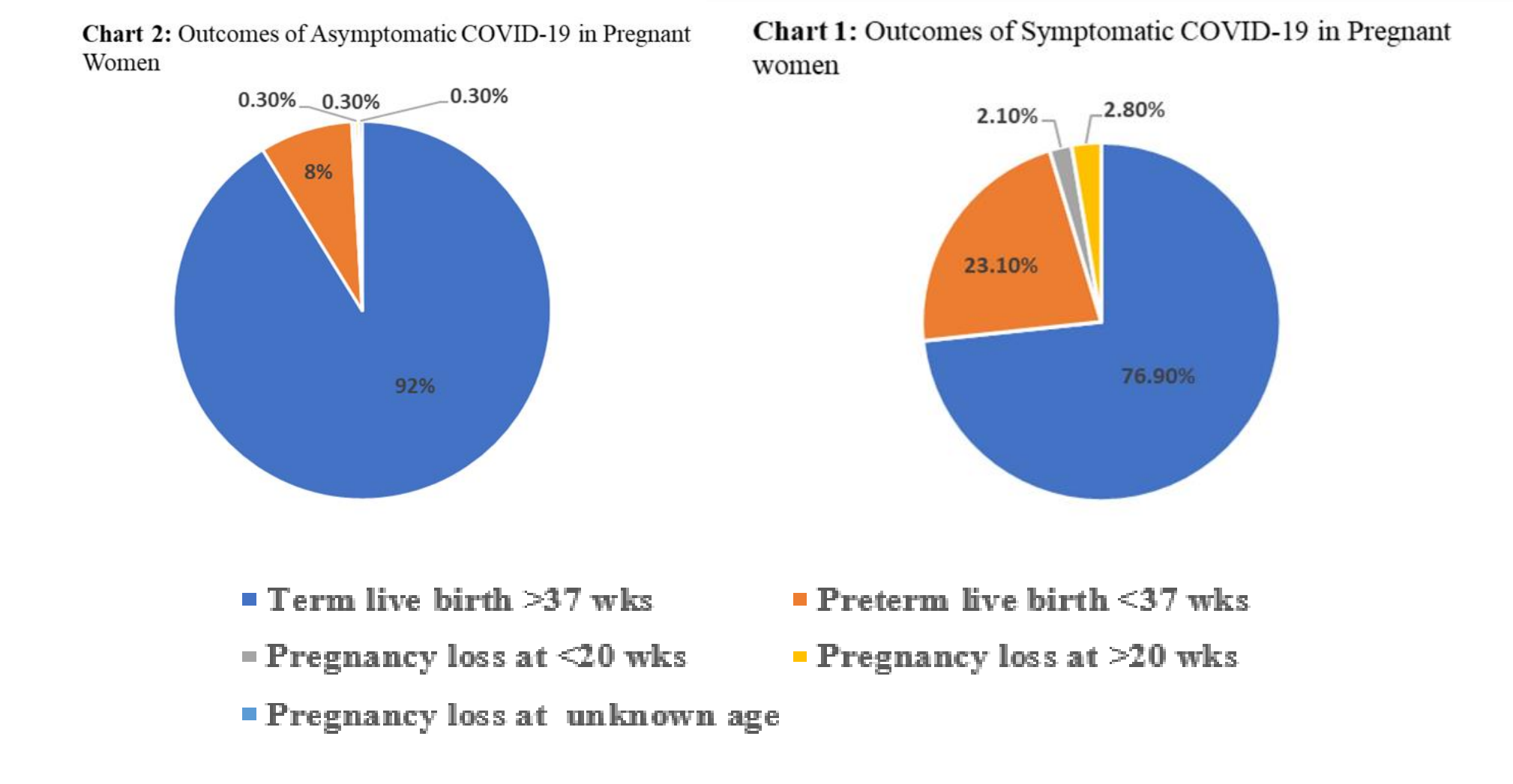
Table 2: Different types of vaccines used as prophylaxis against COVID-19 infection in pregnancy

Name of Vaccine	Type of Vaccine	Placental Crossing	Doses	Efficacy	Adverse Effects
Biontech Pfizer	mRNA vaccine (mRNA, encodes stabilized spike lipid nanoparticle)	Low likelihood	2	95%	Fever, fatigue, headache, chills, and muscle and joint pain. Neonates born to pregnant persons with fevers in their first trimester have been shown to have an increased risk for certain types of birth defects, although the absolute risk is small.
Moderna mRNA 1273	mRNA vaccine (mRNA, encodes stabilized spike lipid nanoparticle)	Low likelihood	2	94.5%	Fever, fatigue, headache, chills, and muscle and joint pain. Neonates born to pregnant persons with fevers in their first trimester have been shown to have an increased risk for certain types of birth defects, although the absolute risk is small.
Astrazeneca and the University of Oxford AZD 1222	Based on Viral Vectors (Replication incompetent Chimpanzee adenovirus vector, wild type spike)	Low likelihood	2	70.4%	Mild to moderate Injection site pain. Mild to severe systemic adverse reaction including chills, fatigue, malaise, headache.
Johnson and Johnson Janssen Pharmaceuticals AD26.COVS.2.S	Based on Viral Vectors (Replication incompetent human adenovirus 26 vector stabilized spike)	Low likelihood	1	64% overall efficacy. 82% against Beta variant	Localized and general side effects like injection site pain, swelling, malaise, muscle ache etc. Blood clots in brain, abdomen, legs along with low level of platelet have occurred in some patients.
Novavax	Protein subunit vaccine Baculo virus (DNA virus that infects insect cells) expressed stabilized spike protein (recombinant)= Substance that are added to vaccines to boost immune response) + Matrix M adjuvant)	Low likelihood	2	93% effective against predominantly circulating variants.	Mild to moderate localized adverse effect like localized pain, tenderness. Systemic side effects like headache and fatigue most common. Increased adverse event with adjuvant.
GSK Sanofi	Protein subunit vaccine Baculo virus (DNA virus that infects insect cells) expressed stabilized spike protein (recombinant = Substance that are added to vaccines to boost immune response) + ASO3 adjuvant)		2		# Phase 3 clinical Trial has been started in late May, 2021

Perinatal transmission of COVID-19



Results



Conclusion

- There has been no discrepancies in the outcome of COVID-19 in pregnant women compared to non-pregnant women, except for the added risk of maternal-fetal transmission of SARS-CoV2.
- Special attention should be drawn towards the psychosocial crisis of COVID-19 in maternity and develop ways to mitigate it.
- Neonatal course of illness has not been concerning thus far. However, we cannot exclude the possibility of congenital malformations due to COVID-19. Implementing scheduled vaccination during pregnancy may prevent adverse outcomes.
- Pregnant women being ethically challenging study subjects, have not been investigated enough. More research is required to comprehend the impact of COVID-19 in pregnancy and devise successful management plans.

References

- Centers for Disease Control and Prevention. (2020, September 24). *Characteristics and Maternal and Birth Outcomes of Hospitalized Pregnant Women with Laboratory-Confirmed COVID-19 - COVID-NET, 13 States, March 1–August 22, 2020*. Centers for Disease Control and Prevention. https://www.cdc.gov/mmwr/volumes/69/wr/mm6938e1.htm?s_cid=mm6938e1_w
- Wastnedge, E. A. N., Reynolds, R. M., van Boeckel, S. R., Stock, S. J., Denison, F. C., Maybin, J. A., & Critchley, H. O. D. (2021, January 1). *Pregnancy and COVID-19*. Physiological reviews. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7686875/>.
- Dashraath, P., Wong, J., Lim, M., Lim, L. M., Li, S., Biswas, A., Choolani, M., Mattar, C., & Su, L. L. (2020). Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *American journal of obstetrics and gynecology*, 222(6), 521–531. <https://doi.org/10.1016/j.ajog.2020.03.021> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7270569/>
- Centers for Disease Control and Prevention. (2020, September 24). *Characteristics and Maternal and Birth Outcomes of Hospitalized Pregnant Women with Laboratory-Confirmed COVID-19 - COVID-NET, 13 States, March 1–August 22, 2020*. Centers for Disease Control and Prevention. https://www.cdc.gov/mmwr/volumes/69/wr/mm6938e1.htm?fbclid=IwAR0luYKOW5FBtXIJg5evJ0umpPjsD0YS9coR_6jkaJZqpxDFBf67OnGOxUA.