

Impact of timing and severity of COVID-19 infection in pregnancy on intrauterine fetal growth- A registry-based study from Qatar

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RATIONALE

The novel coronavirus disease (COVID-19) pandemic has impacted pregnant women, increasing maternal and neonatal morbidity. The placenta is a potential target for the pathophysiological processes due to the increased thrombotic inflammatory activation and inadequate uteroplacental perfusion and oxygenation, potentially causing intrauterine growth restriction. The study has patients from the Q-PRECIOUS National COVID registry.

Outcome variables N=1063		Total N= 1063	1 st trimester infection N=218	2 nd trimester infection N=399	3 rd trimester infection N=446	P value
Gestational age at delivery (days) Mean (SD)		267.7(± 13.2)	267.7 (± 12.6)	267.6 (± 13.3)	267.9 (± 13.8)	0.947
Birthweight in grams; Mean (SD)		3171 (± 536)	3170 (± 541)	3173 (± 531)	3169 (± 537)	0.994
Customised birthweight centile; Median (Range)		47.0 (0-100)	47.6 (0-100)	45.9 (0-100)	46.1 (0-100)	0.752
Birthweight centile; Number, %N	<10 th - SGA	130 (12.2%)	25 (11.5%)	40 (10.0%)	65 (14.6%)	0.302
	10-90 th	807 (75.9%)	164 (75.2%)	310 (77.7%)	333 (74.7%)	
	>90 th - LGA	126 (11.9%)	29 (13.3%)	49 (12.3%)	48 (10.8%)	
Preterm births; Number, %N		113 (10.6%)	25 (11.5%)	36 (9.0%)	52 (11.7%)	0.418

AIM: This study aims to evaluate the impact of maternal COVID-19 infection on placental function measures as intrauterine fetal growth. Does the trimester of infection affect fetal growth? Does symptomatic disease affect fetal growth and fetal growth velocity?

Outcome variables N=1063		Asymptomatic (N=339)	Symptomatic (N=724)	p value
Birthweight in grams, Mean (±SD)*		3222 (± 528)	3147 (± 537)	0.033
Customised birthweight centile; Median (Range)**		54.0 (0.2-100)	43.9 (0-100)	0.004
Birthweight centile Number, %N	<10th centile (SGA)	36 (10.6%)	94 (13.0%)	0.190
	10-90th centile	255 (75.2%)	552 (76.2%)	
	>90th centile (LGA)	48 (14.2%)	78 (10.8%)	
Preterm birth; Number, %N		35 (10.3%)	78 (10.8%)	0.825

Variables	Asymptomatic (n=43)	Symptomatic (n=132)	P value
Total women = 175			
Birthweight in grams, Mean (SD)	3284 (468)	3061 (554)	0.019
Birthweight centile, Median (Range)	71.2 (4.4-100)	48.2 (0-100)	0.010
Daily increment in EFW in grams/day Median (Range)- growth velocity	29.5 (7.8-52.4)	29.4(-3.0-53.3)	0.413
Standardised Z score, Median (Range)	0.75 (-4.1-5.2)	0.63 (-6.4-5.6)	0.368

RESULTS

Symptomatic disease:

- Lower birthweight
- Lower customized birth-weight centile
- Higher risk of SGA
- Difference is more when infected in the first 20 weeks of gestation, but no difference in growth per day

Trimester of pregnancy:

- No evidence of any impact on growth

Q-PRECIOUS

CONCLUSION:

This study shows that the maternal immune activation during COVID-19 can impact the placental circulation. This was regardless of the gestational age at which they were infected. Early symptomatic disease seems to have an impact on fetal growth velocity; however, larger studies are needed to corroborate these findings. The impact of maternal immune activation on the placenta on child neurodevelopment needs to be studied.

