

STUDY FINDS EVIDENCE OF VERTICAL TRANSMISSION OF CORONAVIRUS ACROSS THE PLACENTA

Relevant for: Developmental Issues | Topic: Health & Sanitation and related issues

Route of spread: From the mother's blood, the virus causes placental infection and inflammation, gets into the neonate's blood. | Photo Credit: [Getty Images](#)

Transmission through droplets and contact with contaminated surfaces seem to be the major routes of novel coronavirus spread. The World Health Organization recently acknowledged that "short-range aerosol transmission" of the virus "cannot be ruled out" in specific indoor locations which are crowded, inadequately ventilated and where exposure to the infected person is over a prolonged period of time. Now, a study has found evidence that confirms vertical transmission of SARS-CoV-2 virus from the mother to the foetus. The route of infection is through the womb (*in utero*) well before the onset of labour and delivery of the baby.

About half-a-dozen studies published in medical journals have already suggested vertical transmission as a possible route but have not been able to provide strong evidence about the route of spread — transplacental or transcervical — of the virus from the mother to the child. These studies could not confirm the transmission route because samples of placenta, amniotic fluid and blood of the mother and the newborn were not collected and tested in every mother–infant pair.

For instance, in a study published recently in the journal *CMAJ (Canadian Medical Association Journal)*, only the placenta and nasopharyngeal swab samples of the mother were tested for the virus. Though nasopharyngeal swab samples of the newborn collected on the day of birth and on two other days, plasma and stool samples tested positive for the virus, the researchers did not collect and test the cord blood. Hence the researchers classified it a "probable" case of congenital route of vertical transmission.

In contrast, the results published recently in *Nature Communications* involving one mother–newborn pair provide strong evidence of "confirmed" vertical transmission of the SARS-CoV-2 virus through the "transplacental" route.

Studying how the virus reaches the foetus, the researchers of the *Nature Communications* paper led by Daniele De Luca from Paris Saclay University, France, found that the virus first occurs in the mother's blood and later causes placental infection and inflammation. The virus then gets into the blood of the neonate following placental infection. The neonate also showed clinical manifestation of COVID-19 in terms of neurological signs and symptoms.

The mother aged 23 years, at 35 weeks of gestation, was admitted to the hospital in March with symptoms of coronavirus infection. Real-time PCR detected the presence of two genes (E and S) of the virus in the blood and in nasopharyngeal and vaginal swab samples.

To check for vertical transmission, the researchers first collected clear amniotic fluid prior to rupture of membranes. The amniotic fluid tested positive for two genes of the virus. The baby was delivered through caesarean section to avoid infection during normal childbirth; caesarean delivery is routinely done in the case of HIV positive mothers to cut the risk of vertical transmission.

To confirm infection in the newborn, the researchers collected blood and bronchoalveolar lavage samples soon after birth and tested them for the virus. Both samples tested positive. They also collected nasopharyngeal and rectal swab samples at three time points — one hour after birth, and three and 18 days of postnatal age. These too tested positive for the virus, confirming infection with SARS-CoV-2.

The amount of virus in different tissues both in the mother and newborn varied. “Viral load was much higher in placental tissue, than in amniotic fluid and maternal or neonatal blood,” they write. In the case of the newborn, the nasopharyngeal sample collected on day three after birth had higher viral load, while the blood contained the least amount of the virus.

“Our findings confirm that transplacental transmission is indeed possible in the last weeks of pregnancy, although we cannot exclude a possible transmission and foetal consequences earlier during the pregnancy,” they write.

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