

Potential risk of brain damage and poor developmental outcomes in children prenatally exposed to SARS-CoV-2: a systematic review

Risco potencial de danos cerebrais e de alterações de desenvolvimento em crianças expostas ao SARS-CoV-2 no período pré-natal: uma revisão sistemática

Maria Tereza Rebello Corrêa^a , Vêronica Canarim de Menezes^{a,*} , Elonir Gomes^a ,
Elliane Mazzuco dos Santos^a 

Dear Editor,

It is with great pleasure that we read the study “Potential risk of brain damage and poor developmental outcomes in children prenatally exposed to SARS-CoV-2: a systematic review”, of great quantity and quality. We can see, even if in a limited way, the characteristics of the virus and its influence on the life of pregnant woman. For example, SARS-CoV-2 uses angiotensin-converting enzyme 2 (ACE2) as its receptor, contributing to the infection of human cells. Therefore, as ACE2 receptors are displayed in many tissues of the biological systems, including the brain, it may function as part of a biological mechanism that can lead to neurological complications.¹

From this perspective, studies point to complications due to severe acute respiratory syndrome disease (SARS) and Middle East respiratory syndrome (MERS), which are associated with miscarriage, preterm delivery, intrauterine growth restriction, and maternal death.² Therefore, it was not possible to find any studies on related abnormalities in the embryonic or fetal stages of brain development or to report a direct link between the virus and neurological abnormalities in human embryos, fetuses or children induced by SARS-CoV, MERS-CoV or SARS-CoV-2.¹

Likewise, no evidence of in utero transmission was observed in SARS or MERS.² However, there are studies showing that the presence of antibodies to SARS-CoV in breast milk can be influenced by the time of infection in relation to pregnancy.³ In addition, clinical and laboratory findings were similar to those seen in the non-pregnant population. Nonetheless, complications and adverse outcomes were more common among pregnant women: women who were pregnant had longer hospital stay, were statistically significantly more likely to develop renal failure, sepsis, and DIC, and were more likely to require intensive care unit admission.²

However, there are studies that prove that SARS-CoV can possibly infect multiorgan systems, and that the CNS could potentially be involved.⁴ Notwithstanding, there are still no studies directly proving the potential risk of brain damage and negative developmental outcomes of children prenatally exposed to SARS-CoV-2. In summary, an immediate conclusion cannot be drawn, as the discovery that the Zika virus is one of the factors for the increase of neurological damage in newborns in Maranhão⁵ is still recent, and was not accounted for at the time of the peak of the disease, the same can happen in cases with SARS-CoV-2.

REFERENCES

1. Leyser M, Marques FJ, Nascimento OJ. Potential risk of brain damage and poor developmental outcomes in children prenatally exposed to sars-cov-2: a systematic review. *Rev Paul Pediatr.* 2022;40:e2020415. <https://doi.org/10.1590/1984-0462/2022/40/2020415>.
2. Rasmussen SA, Smulian JC, Lednický JA, Wen TS, Jamieson DJ. Coronavirus Disease 2019 (COVID-19) and pregnancy: what obstetricians need to know. *Am J Obstet Gynecol.* 2020;222:415-26. <https://doi.org/10.1016/j.ajog.2020.02.017>

*Corresponding author. E-mail: ve_cmenezes@hotmail.com (V. C. Menezes)

^aUniversidade do Sul de Santa Catarina, Tubarão, SC, Brazil.
Received on September 18, 2021; approved on April 7, 2022.

3. Stockman LJ, Lowther SA, Coy K, Saw J, Parashar UD. SARS during pregnancy, Unites States. *Emerg Infect Dis.* 2004;10:1689-90. <http://doi.org/10.3201/eid1009.040244>
4. Lau KK, Yu WC, Chu CM, Lau ST, Sheng B, Yuen KY. Possible central nervous system infection by SARS coronavirus. *Emerg Infect Dis.* 2004;10:342-4. <https://doi.org/10.3201/eid1002.030638>
5. Reis LC, Barbian MH, Cardoso-dos-Santos AC, Silva EVL, Boquett JA, Schuler-Faccini L. Prevalence of congenital anomalies at birth among live births in the state of Maranhão from 2001 to 2016: temporal and spatial analysis. *Rev Bras Epidemiol.* 2021;24:E210020.Supl.1. <https://doi.org/10.1590/1980-549720210020.supl.1>