Pregnancy and COVID-19: Study of trends in brazilian scientific production

Gabriela Colombi de Lima
Specialization in Management and Hospital Care in the Public Health System with an emphasis in the area of Women's and Children's Health Care, Federal University of Santa Maria

Jozéli Fernandes de Lima
Nurse, Federal University of Santa Maria

Liane Bahú Machado
Master in Nursing, Federal University of Santa Maria

Marjana Pivoto Reginaldo
Nurse, Integrated Regional University of Alto Uruguai and das Missões

Raquel Einloft Kleinubing
PhD in Nursing, Federal University of Santa Maria

Tassiane Ferreira Langendorf
Postdoctoral in Nursing, Federal University of Santa Maria

ABSTRACT
COVID-19 has variable symptoms, specific diagnosis, and no safe and effective treatment, in addition to prevention and vaccination measures. Among the risk groups are pregnant and puerperal women, with possible consequences for the fetus. In addition to hospitalization in the Intensive Care Unit (ICU), there is a high number of deaths classified as maternal mortality. Thus, the objective of this study is to identify the trend of Brazilian scientific production regarding pregnancy and COVID-19, with a review question: What is the trend of Brazilian dissertations and theses about pregnancy related to COVID-19? This is a narrative review of the literature, carried out in July 2022, in the theses and dissertations bank of the Higher Education Personnel Improvement Commission (CAPES) portal, with a search strategy "pregnancy AND COVID-19" and clipping temporal. As inclusion criteria, field research theses or dissertations that answered the review question and excluded studies with incomplete abstracts and/or not available in the database. In the analysis, a detailed reading was carried out with the external organization of the data, consisting of eight theses and dissertations. As for the results, six are dissertations and two theses; mostly published in 2021 and 2022; in the Southeast and Northeast regions of Brazil; through four federal universities, two state universities, and one private university. Regarding the approach, four studies were qualitative, two quantitative, and one quali-quantitative; predominating the area of Medicine, followed by Biotechnology, Dentistry, and Collective Health. There was a lack of studies produced by other areas of health sciences on the theme supported by the need for specialized and multidisciplinary care with support for doubts. Complications such as an increase in the prevalence of preeclampsia, laboratory, and vascular alterations have been identified in pregnant women with COVID-19. Thus, care strategies are needed to reduce the risk of infection, such as the development of digital technologies and the use of telehealth. In addition to clinical issues, this group suffered impacts on mental health due to social isolation and changes in maternal-fetal attachment. It concludes the vast approach that pregnancy and COVID-19 can be researched, with gaps in maternal mortality, and reinforces the potential of prevention actions to meet the Sustainable Development Goals (SDGs).

Keywords: COVID-19, SARS-CoV-2, Pandemic, Pregnant women, Complications in Pregnancy.

1 INTRODUCTION

In December 2019, in the city of Wuhan, in the province of Hubei, located in China, a case of severe lower respiratory infection of unknown cause was identified and reported to the World Health Organization (WHO) (WHO, 2021). The International Committee on Taxonomy of Viruses identified

the etiological agent as a BetaCoronavirus (βCoV) which was isolated, sequenced, and named SARS-CoV-2 (GUO et al., 2020).

On February 11, 2020, the WHO announced that the disease caused by this new Coronavirus would be known as "COVID-19", short for "Coronavirus disease 2019". A month after the announcement, on March 11, 2020, the number of countries involved in the outbreak tripled, with over 4,000 deaths and over 118,000 cases reported in 114 countries. The tragic circumstance led the WHO to declare COVID-19 a pandemic (CASCELLA et. al., 2022). Data up to April 30, 2023, bring the identification of 765,222,932 confirmed cases of COVID-19 and 6,921,614 deaths worldwide from the disease (WHO, 2023).

The number of deaths related to COVID-19 is because the infection can manifest itself, in addition to the asymptomatic form, to evolve into Severe Acute Respiratory Syndrome (SARS). Thus, the infection has clinical features ranging from mild or asymptomatic illness to severe or fatal illness. The main symptoms of COVID-19 are fever, cough, and myalgia while other minor manifestations include sore throat, headache, anosmia, nausea or vomiting, diarrhea, and dysgeusia (UMAKANTHAN et al., 2020).

The severity of COVID-19 cases has been variously classified, despite this, 80% of confirmed cases are mild or asymptomatic and show recovery without sequelae (RAOULT et al. 2022). However, 15% of affected patients develop symptoms that require oxygen support and 5% evolve to severe conditions and may use mechanical ventilation in a hospital environment. Individuals with risk factors, such as immunosuppression, hypertension, diabetes, or cardiovascular diseases, are more likely to develop a serious illness and have a higher mortality rate (WHO, 2021).

In addition to clinical diagnosis through symptomatology, diagnostic methods for COVID-19 are carried out in two ways. Through nasopharyngeal respiratory samples by laboratory diagnostic methodologies with RT-PCR (Real-time Polymerase Chain Reaction), or the detection of antibodies by immunochromatographic, immunosorbent, and chemiluminescent tests (NETO et al., 2021).

As for the transmission of COVID-19, it occurs directly from person to person, mainly through the inhalation of respiratory secretions or droplets contaminated by the virus that are suspended in the air. Viral shedding happens from the respiratory tract, saliva, feces, and urine, resulting in other possible sources of virus dissemination (LI et al., 2020).

 The necessary precautions to avoid transmission include social distancing, mask-wearing, and hand hygiene. It is also recommended to follow the vaccination schedule for COVID-19 to prevent injuries. The National Operational Plan (PNO) for Vaccination against COVID-19, in addition to having guidelines for planning, operationalizing, and implementing the vaccine, prioritizes risk groups (BRASIL, 2021).

Despite the initial findings about COVID-19 showing that the most vulnerable people were only the elderly or those with comorbidities, the Ministry of Health (MOH) in April 2020 included pregnant women, puerperal women, and mothers of newborns (NB) with up to 45 days of life, in the risk group (BRASIL, 2020). Such inclusion was based on the guidelines of the National Policy for Integral Attention to Women's Health (PNAISM), since pregnancy modifies the response of the woman's immune system, especially when related to a previous clinical condition, such as hypertensive syndromes in the pregnancy, gestational diabetes mellitus or pre-gestational diabetes mellitus (MAIA et al., 2020).

It is known that during pregnancy, anatomical and physiological changes, especially in the respiratory system, and the state of immunosuppression contributes to the increased risk of respiratory infections in this population. Pregnant women symptomatic of COVID-19 have a higher hospitalization rate in the Intensive Care Unit (ICU) compared to the general population and, when compared to pregnant women without the disease, they have a higher death rate (VIVANTI et al., 2020).

Worldwide, maternal mortality from COVID-19 is similar to that of the general population and, in Brazil, a study that analyzed data from the Influenza Epidemiological Surveillance Information System (SIVEP Gripe), for the period from February to June 2020, revealed that 978 pregnant and puerperal women were diagnosed with SARS by COVID-19 and, of these, 124 died (AMORIM et al., 2020; TAKEMOTO et al., 2020). In Brazil, according to the Brazilian Obstetric Observatory of Severe Acute Respiratory Syndrome (OOBr SRAG), from 2020 to 2023, 24,365 cases of COVID-19 have been registered so far in pregnant and puerperal women, of which 2,054 evolved to death (OOBr, 2023).

In addition to COVID-19 offering risks to pregnant and puerperal women, other negative outcomes related to the NB were found, such as the risk of prematurity and fetal growth restriction (BEEN et al., 2020). Given the above, COVID-19 consolidates itself as a severe acute respiratory infection that deserves attention when it reaches the public of pregnant women, since in addition to offering risks to the pregnancy-puerperal period, it can trigger consequences for the NB.

Thus, the objective of this study is to identify the trend of Brazilian scientific production regarding pregnancy and COVID-19. For the proposed objective to be achieved by the research, the following review question was delimited: What is the trend of Brazilian dissertations and theses about pregnancy related to COVID-19?

2 METHOD

This is a narrative literature review. Narrative research is appropriate for carrying out the state of the art on the topic studied (ROTHER, 2007). It has a broad research question, its search sources

can be both databases and portals, virtual libraries, among others. The synthesis of studies can be developed through qualitative analysis (BRUM et al. 2016).

In addition, narrative reviews contribute to the theoretical foundation of scientific works, enabling the updating and coverage of a given topic in a short period. Finally, it also allows for broader critical interpretations from a theoretical or contextual point of view, highlighting production gaps (BRUM et al. 2016).

The search for data was carried out in the database of theses and dissertations on the website of the Higher Education Personnel Improvement Commission (CAPES). In the portal, the combination of the alternative term for the descriptor "Pregnancy" was used, "gestation", followed by the Boolean operator AND and after the descriptor "COVID-19" in the search box. It looks like this: "gestation AND COVID-19".
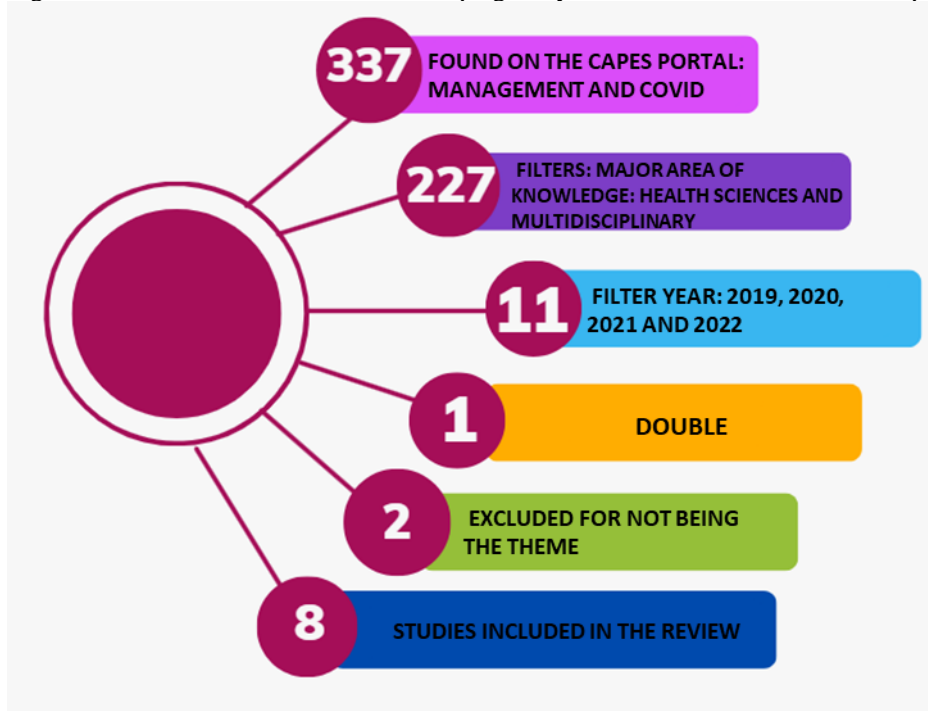
The research inclusion criteria were: theses or dissertations arising from field research that answered the review question. Exclusion criteria were: studies with incomplete abstracts and/or not available in the database. From the search, the titles and abstracts were read, applying the inclusion and exclusion criteria. Data collection took place in July 2022 and the results obtained made up a database that was later analyzed. A time frame was applied according to the time frame of the COVID-19 pandemic starting in December 2019 until the current year of collection, 2022.

Data analysis was based on a deep and detailed reading of dissertations and theses relevant to this research.

At first, in the CAPES portal of theses and dissertations, with the combination "pregnancy AND COVID-19" in the search box, 337 studies were found. Thus, the filter "Large area of knowledge: Health Sciences and Multidisciplinary" was first used, which resulted in 227 studies. After the filter "year: 2019, 2020, 2021, and 2022", 11 studies were found. Of these, 02 studies were excluded because they were not related to the theme addressed and 01 was a duplicate study. Finally, the database consisted of 08 dissertations/theses.

Thus, Figure 1 presents the flowchart for selecting studies.

Figure 1: Figure from the selection of studies about pregnancy and COVID-19 on the CAPES portal, 2022.

Source: elaborated by the authors, 2022.

3 RESULTS AND DISCUSSION

Regarding the characterization of the included studies, six are dissertations (65%) and two theses (25%) were published mostly in 2021 (87.5%) and subsequently in 2022 (12.5%). There was a predominance of studies carried out in the Southeast and Northeast regions of Brazil, with three studies for each region (37.5%), followed by the Midwest region and the South region with one study each (12.5%).

The country's Higher Education Institutions (HEIs) involved in the studies were four (50%) from federal universities (Federal University of Rio de Janeiro - UFRJ; Federal University of Rio Grande do Sul - UFRGS; Federal University of Alagoas - UFAL and Federal University of Espírito Santo - UFES), two (25%) studies from state universities (University of São Paulo - USP and University of Brasília - UnB) and two (25%) studies from a private university (Centro de Estudos Superiores de Maceió – CESMAC).

As for the approach of the studies, four were qualitative (50%) (BATISTA, 2022; BARBOSA, 2021; VANDERLEI, 2021; SILVA, 2021), two quantitative (25%) (BIANCOLIN, 2021; PAZZIM, 2021) and one qualitative study. -quantitative (12.5%) (MARINHO, 2021).

Regarding the areas of knowledge, there was a predominance of studies in the area of Medicine (62.5%); followed by Biotechnology (12.5%), Dentistry (12.5%), and Collective Health (12.5%). There was a lack of studies produced by other areas of health sciences related to pregnancy and COVID-19. However, it should be noted that pregnant women in a high-risk situations, such as

COVID-19 infection, need care from a specialized and multidisciplinary health team. Considering the importance of shared care, coordination must be guaranteed by Primary Health Care (PHC), about prevention and health promotion actions, allowing the pregnant woman to remain linked to the territory (BRASIL, 2022).

Prenatal care, even if shared, should continue to be offered by the unit of origin, considering the individuality of each clinical case. This assessment takes place through medical and nursing consultations and home visits. This guarantees the responsibility and resolution of the care of the pregnant woman and the fetus (BRASIL, 2022).

Also, prenatal care in PHC has, as one of the professional's responsibilities, the support doubts and anxieties in each consultation (BRASIL, 2013). Especially when dealing with COVID-19, which so far does not have a consensual treatment protocol for the general population, including pregnant women (FURLAN et al., 2020; MASCARENHAS et al., 2020). For Marinho (2021), during pregnancy, COVID-19 can result in important and often unknown complications for the pregnant woman and the fetus, requiring further clarification.

Although COVID-19 is considered a new infection, it is already known that, during pregnancy, women undergo several physiological changes necessary for fetal development, such as hormonal, circulatory, and immunological changes. Because of this, the response to COVID-19 infection, as well as its signs, symptoms, and complications, may be different in this population (ALVES, BEZERRA 2020; RIBEIRO et al., 2020).

As one of the outcomes of COVID-19 infection in pregnant women, there may be an increase in the prevalence of preeclampsia. This finding can be explained by endothelial damage caused by placental oxidative stress and by an anti-angiogenesis effect that causes hypertension, proteinuria, increased liver enzymes, renal failure, and even thrombocytopenia in infected pregnant women (SOUZA et al., 2020). This is in line with the findings of Batista (2022) who identified the deregulation of inflammatory, immunological signaling pathways and mainly vascular changes in pregnant women with COVID-19.

Thus, it becomes necessary to plan strategies to help reduce the risk of COVID-19 infection in pregnant women, such as the implementation of digital health technologies for prenatal care, such as telehealth. This tool contributes to reducing the frequency of face-to-face prenatal consultations and home visits while ensuring care (BRASIL, 2020).

In addition, the expansion of telehealth services expands the access of high-risk pregnant women to specialized, articulated, and interdisciplinary obstetric care (BRASIL, 2022). Concerning digital technologies, there has been an increase in the development of these tools for professional use, such as the example of the study by Barbosa (2021) who produced an application for monitoring

prenatal care with an emphasis on COVID-19, which, in addition to providing information on health to the community, acts in favor of health promotion and education for pregnant women.

Still, about interdisciplinary care, Vanderlei (2021) concluded that the creation and application of the mobile technology "Gestação Florescer" for oral health and stated that it will continue after the pandemic due to its thematic diversity and understanding that the use of these technologies qualifies the prenatal care.

In addition to the clinical issues related to the care of pregnant women, as specifically demonstrated by Biancolin (2021), when he concluded that the use of ultrasound (USG) and computed tomography (CT) is efficient for pulmonary evaluation in pregnant women. Other references indicate the need to assess the impact of the pandemic on mental health resulting from social isolation. According to Brooks et al. (2020), the COVID-19 pandemic associated with social isolation suggests the triggering of significant levels of anxiety, anger, confusion, and stress, which converges with the study by Soares (2021) who identified an association of lower scores in several domains of quality of life in pregnant women during the pandemic related to depressive episodes.

Also, corroborating this result, the study by Paixão et al. (2021) demonstrated that the pregnant women's need for isolation interfered with their contact with their social support network. This contributed to the increase in depressive signs and symptoms, anxiety, and insecurity, compared to pre-pandemic numbers in this same group.

The impact of the pandemic on maternal health was also reported by Pazzim (2021) who identified depression scores, normal and/or mild stress, and high anxiety, as well as negative effects on the quality of maternal-fetal attachment when there is a maternal illness.

Faced with the diagnosis of COVID-19 infection, the establishment of the maternal-fetal bond is also impaired, due to difficulties in breastfeeding and restriction in skin-to-skin contact with the NB. All of these situations cause anxiety and can lead to significant maternal-fetal complications such as premature birth, intrauterine growth restriction, obstetric complications during labor, and changes in the child's neuro psychomotor development, such as Attention Deficit Hyperactivity Disorder (ADHD).) (TRAPANI et al., 2020; DING et al., 2021)

Finally, the study by Silva (2021) points out the importance of establishing care practices that advocate active listening, the protagonism of women, and all the actors involved, so that it is possible to face the challenges that are already known and that have not yet been addressed. were overcome, such as the COVID-19 pandemic.

4 FINAL CONSIDERATIONS

The present study made it possible to identify that the theme of pregnancy and COVID-19 is broad and can be approached and researched by different areas of knowledge. The need to boost research involving the gap in maternal mortality and COVID-19 given its relevance as an indicator of health in the pregnancy-puerperal period.

As it is an unknown and recent clinical condition, there is still no indication of specific, safe, and effective drug treatment for COVID-19, in addition to preventive measures, which reinforces the potential of health promotion actions developed by the multidisciplinary team, especially the professional nurse.

Also, the WHO on May 5, 2023, declared the end of the international health emergency for COVID-19, however, the pandemic is not over. Thus, a plan was published for the long-term emergency response to COVID-19 until 2025, with a focus on preventing harm to risk groups.

This is fundamental, since the aim is to reduce Brazilian maternal mortality, in line with the Sustainable Development Goals (SDGs), which focus on sequential reductions up to the ratio of 30 maternal deaths for every 100,000 live births by 2030.

REFERENCES

Amorim, m. M. R. Et. Al. Matenal deaths with coronavírus disease 2019: a diferente outcome from low – to middle – resource countries? Am j obstet gynecol, v.223, n. 2, p. 298-299. Disponível em: https://pubmed.ncbi.nlm.nih.gov/32348744/. Acesso em: 30 jun. 2022.

Alves, t. V., bezerra, m.m. principais alterações fisiológicas e psicológicas durante o período gestacional. Revista multidisciplinar e de psicologia [internet]. 2020;14(49):
114-126. Doi http://dx.doi.org/10.14295/idonline.v14i49.2324. Available from: https://
Idonline.emnuvens.com.br/id/article/view/2324

Barbosa, m. C. S. Desenvolvimento de um móvel para acompanhamento de gestantes no pré-natal, com ênfase na covid-19. Dissertação (mestrado em biotecnologia em saúde humana e animal). Centro universitário de estudos superiores de maceió, maceió, 2021.

Batista, l. A. Modulação epigenética presente na covid-19 durante a gestação.
Dissertação (mestrado em medicina tropical). Universidade de brasília, brasília, 2022.

Been, j. V. Et. Al.impact of covid-19 mitigation measures on the incidence of preterm birth a national quasi-experimental study. The lancet, v. 5, n. 11, p.604-611, 2020. Disponível em: https://www.thelancet.com/journals/lanpub/article/piis2468-2667(20)30223-1/fulltext. Acesso em: 07 mai. 2023.

Biancolin, s. E. Ultrassom pulmonar vs. Tomografia computadorizada de tórax em gestantes internadas com covid-19. Tese (doutorado em medicina: obstetrícia e ginecologia). Universidade de são paulo, são paulo, 2021.

Brasil. Manual de gestação de alto risco [recurso eletrônico] / ministério da saúde, secretaria de atenção primária à saúde. Departamento de ações programáticas. Brasília : ministério da saúde, 2022.

Brasil. Ministério da saúde. Atenção ao pré-natal de baixo risco. Brasília: ministério da saúde, 2012. (cadernos de atenção básica, 32)

Brasil. Ministério da saúde (br). Recomendação nº 039, de 12 de maio de 2020.conselho nacional de saúde. 12 de mai. 2020.

Brasil. Ministério da saúde. Manual de recomendações para a assistência à gestante e puérpera frente à pandemia de covid-19 [recurso eletrônico]. Secretaria de atenção primária à saúde, departamento de ações programáticas e estratégicas. – 2. Ed. – brasília : ministério da saúde, 2021.brooks, samantha k. Et al. El impacto psicológico de la cuarentena y cómo reducirla: revisión rápida de las pruebas. Lancet, v. 395, p. 912-20, 2020.

Brum, c. N. Et al. Revisão narrativa de literatura: aspectos conceituais e metodológicos na construção do conhecimento da enfermagem. In: lacerda, m. R.; costenaro, r. G. S. (orgs). Metodologias da pesquisa para a enfermagem e saúde: da teoria à prática. Porto alegre: moriá, 2016.

Cascella, m. Et. Al. Features, evalution, and treatment of coronavírus (covid-19). Statpearls publishing, 2021.

Ding, wenping et al. Knowledge, attitudes, practices, and influencing factors of anxiety among pregnant women in wuhan during the outbreak of covid-19: a cross-sectional study. Bmc pregnancy and childbirth, v. 21, n. 1, p. 1-9, 2021.

Furlan, m.c.r., et. Al. Gravidez e infecção por coronavírus: desfechos maternos, fetais e neonatais - revisão sistemática. Revista cuidarte. V. 11, n. 2, p. E1211. 2020. Doi: https://doi.org/10.15649/cuidarte.1211

Li, q. Et al. Early transmission dynamics in wuhan, china, of novel coronavirus-infected pneumonia. N engl j med, v. 382, p. 1199-1207, 2020. Disponível em: https://www.nejm.org/doi/full/10.1056/nejmoa2001316. Acesso em: 27 jun. 2022.

Mascarenhas, v.h.a. et. Al. Covid-19 e a produção de conhecimento sobre as recomendações na gravidez: revisão de escopo. Rev. Latino-am. Enfermagem, ribeirão preto, v. 28, e3348, 2020. Doi: https://doi.org/10.1590/1518-8345.4523.3348

Guo, y. R. Et. Al. The origin,transmission and clinical therapies on coronavirus disease 2019 (covid-19) outbreak - an update on the status. Mil med res, v.7, n.2, p. 1-11, 2020.

Maia, l. L. Q. G. N.et. Al. Pandemia do coronavírus (covid-19): recomendações para gestantes e puérperas. Universidade federal de são joão del-rei. 1ª ed.,2020.

Marinho, p. S. Arboviroses. Gravidez. Sars-cov-2. Covid-19;transmissão vertical. Tese (tese em clínica médica). Universidade federal do rio de janeiro, rio de janeiro, 2021.

Neto, a. G. S. Et. Al. Covid-19: metodologias de diagnóstico. Research, society and development, v.10, n.5, p. 1-15, 2021. Disponível em: https://rsdjournal.org/index.php/rsd/article/view/15114/13622. Acesso em: 29 jun. 2022.

Ribeiro, a. M. C. Et al. Diabetes gestacional: determinação de fatores de risco para Diabetes mellitus. Revista portuguesa de endocrinologia, n.1 p.8-13, 2019.

Souza, hayanna cândida carvalho et al. Covid-19 e gestação: manifestações clínicas, alterações laboratoriais e desfechos maternos, uma revisão sistemática de literatura. Brazilian journal of health review, v. 3, n. 6, p. 15901-15918, 2020.

Oobr. Observatório obstétrico brasileiro. Painel: síndrome respiratória aguda grave (srag). 2023. Disponível em: https://observatorioobstetricobr.org/paineis/

Trapani, alberto et al. Childbirth, puerperium and abortion care protocol during the covid-19 pandemic. Revista brasileira de ginecologia e obstetrícia, v. 42, p. 349-355, 2020.

Paixão, gilvânia patrícia do nascimento et al. A solidão materna diante das novas orientações em tempos de sars-cov-2: um recorte brasileiro. Revista gaúcha de enfermagem, v. 42, 2021.

Pazzim, j. V. L. Apego materno-fetal, estado emocional materno e modos de enfrentamento de problemas em gestantes de alto risco durante a pandemia de covid-19. Dissertação (mestrado em medicina). Universidade federal do rio grande do sul, porto alegre, 2021.

Raoult, d. Et. Al. Coronavirus infections: epidemiological, clinical and immunological features and hypotheses. Cell stress, v. 4, n.4, p. 66-75. Disponível em: https://pubmed.ncbi.nlm.nih.gov/32292881/. Acesso em: 29 jun. 2022.

Rother, e. T. Revisão sistemática x revisão narrativa. Acta paulista de enfermagem, v. 20, n. 2, p. V–vi, jun. 2007. Doi: 10.1590/s0103-21002007000200001

Silva, m. C. Narrativas de mulheres com gestação de alto risco em tempos de pandemia de covid-19: desafios para a humanização do cuidado. Dissertação (mestrado em saúde coletiva). Universidade federal do espírito santo, vitória, 2021.

Soares, a. C. P. Impacto da pandemia pela covid-19 na saúde mental e qualidade de vida de gestantes de alto risco atendidas em um centro de referência no nordeste do brasil. Dissertação (mestrado em ciências médicas). Universidade federal de alagoas, maceió, 2021.

Takemoto, m. L. S. Et. Al. The tragedy of covid-19 in brasil: 124 maternal deaths and counting. Int j gynaecol obstet, v.151, n.1, p.154-156. Disponível em: https://pubmed.ncbi.nlm.nih.gov/32644220/. Acesso em: 30 jun. 2022.

Umakanthan, s. Et al. Origin, transmission, diagnosis and management of coronavírus disease 2019 (covid-19). Postgrad med j., v.96, n.1142, p.753-758. Disponível em: https://pubmed.ncbi.nlm.nih.gov/32563999/. Acesso em 27 jun. 2022.

Vanderlei, g. S. Desenvolvimento de aplicativo para gestantes: saúde gestacional, bucal e pandemia da covid-19. Dissertação (mestrado em odontologia). Centro universitário de estudos superiores de maceió, maceió, 2021.

Vivanti, a. J. Et. Al. Retrospectivw description of pregnant women infected with severe acurte respirtory syndrome coronavirus 2, france. Emerg infect dis, v.26, n.9, p. 2069- 2076. Disponível em: https://pubmed.ncbi.nlm.nih.gov/32633712/. Acesso em 29 jun. 2022.

World health organization. Novel coronavirus (online). [cited 2021 jan 16].available from: https://www.who.int/westernpacific/emergencies/novel- coronavirus.

World health organization. Who coronavirus (covid-19) dashboard (online). [cited 2022 jul 22]. 2023. Available from: https://covid19.who.int/

World health organization. Coronavirus disease 2019 (covid-19) situation report (online). [cited 2020 mar 06]. Available from: https://www.who.int/emergencies.