

Effect of Covid-19 Vaccines on Lactation

Abstract

Background: Pregnant and breastfeeding women were among the first to question the vaccine's effects, especially on their lactating ability, given the fact these group of women were not included in the clinical trials of any vaccine. The confusion was exacerbated due to the fact that no study has clearly answered the question of safety of the vaccine on lactation.

Methods: A complete literature search using seven databases including: PubMed, Academic Search Ultimate, AccessMedicine, AccessObGyn, Clinical Key, Medline, and ScienceDirect. Eligible studies published since March 11, 2020 till August 20, 2022 were considered. Additionally, our paper aimed to tackle the effects on lactation upon administration of Covid-19 vaccines including but not limited to: Pfizer, Moderna, AstraZeneca, Sputnik, Johnson & Johnson, and Sinovac. The research conducted aimed to look over articles that showcase all the potential and possible complications that could have been the result of available Covid-19 vaccines at the time.

Results and Discussion: After applying inclusion and exclusion criteria, and further reading and analysis across the listed databases, 29 articles were selected to proceed with this literature review. This literature review resulted in a paradox since many articles claim that vaccines have no adverse side effects on lactating women, while others argue the presence of some contradicting findings and effects that negatively impact lactation following administration of the Covid-19 vaccine.

Conclusion: Further tailored and targeted studies that revolve around pregnant women, are needed to confirm current findings and dilemmas, using trusted rigorous methodologies.

Keywords

Vaccine • Lactation • Pregnant • Breastfeeding

Review Article

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Introduction

On March 11, 2020, Covid-19 was declared a global pandemic by the World Health Organization, WHO [1]. According to the John Hopkins Coronavirus Resource Center global map for Covid-19, as of August 8, 2022, the virus has affected more than 550 million individuals and resulted in 6 million deaths [2]. Covid-19 vaccinations were first introduced in the beginning of 2021 and significantly reduced mortality from the virus. Multiple vaccinations such as Pfizer, Moderna, Astrazeneca, and Johnson & Johnson, have been distributed worldwide to aid in fighting the pandemic [3]. The quick development of Covid-19 vaccinations was met by hesitancy from some regarding the possible adverse side effects and their efficacy in preventing the virus. Pregnant and breastfeeding women have been particularly dubious about receiving the Covid-19 vaccination [4]. While it is encouraged and safe for pregnant women to be administered many vaccines during pregnancy, such as the flu and Tetanus-

Diphtheria-Pertussis vaccines [5], the same support hasn't been given to the Covid-19 vaccine [6]. This hesitation may be due to contradicting study findings. Some studies suggest that the Covid-19 vaccine has no effect on breastfeeding women and lactation [7], while others show that breastfeeding women may have a decreased milk supply after receiving the vaccine [8]. In this review of the literature, the discrepancy of the different studies related to Covid-19 vaccine's effect on breastfeeding and lactation is studied and discussed.

Methods

A literature search was conducted and included studies published since the Covid-19 pandemic was declared: March 11, 2020 [9] till August 20, 2022. Sources and databases included the following: PubMed, Academic Search Ultimate, AccessMedicine, AccessObGyn, Clinical Key, Medline, ScienceDirect. Additionally, our paper aimed to tackle the effects on lactation upon administration of Covid-19 vaccines including but not limited to: Pfizer, Moderna, AstraZeneca, Sputnik, Johnson & Johnson, and Sinovac. The research conducted aimed to look over articles that showcase all the potential and possible complications that could have been the result of available Covid-19 vaccines at the time.

Key Terms

The terms included in the research for this paper were "Lactation OR Breastfeeding", "Pregnancy AND Lactation AND Covid-19 Vaccine", and "Pandemic or Coronavirus".

Inclusion Criteria

Included in our review were articles that are peer-reviewed, literature reviews, study papers from diverse backgrounds (any race and ethnicity) and any country, vaccinated and non-vaccinated pregnant women, and any paper that covered post-vaccination effects on lactation and breastfeeding processes.

Exclusion Criteria

Excluded from our article were non peer-reviewed articles, studies published in non-English languages, and articles before 2019, since the first case of Covid-19 virus appeared in November of 2019 [9].

Results

Database search initially included 471 articles, upon scanning the various databases listed above, using the key terms and Boolean operators mentioned earlier. Checking for duplicates and redundant articles, 86 articles were removed, leaving us with 385 records to be screened. Following further reading of the articles, 235 articles were excluded due to title irrelevance, and 37 due to abstract incompatibility. A final elaborate analysis of the articles led to the exclusion of many articles due to irrelevance (66) and redundancy (18), leaving a total of 29 reports to be used and reviewed (Figure 1).

Discussion

Several studies have shown that pregnant women are at higher risk of severe illness due to the novel coronavirus [10]. However, pharmaceutical companies, such as Pfizer and Moderna, have excluded this vulnerable population from phase II and phase III clinical trials for Covid-19 vaccinations [10]. The fact that this population is not included in the scope of these studies enforces the doubt felt by some pregnant women about receiving the vaccine and increases the lack of trust that may exist. Since the potential effects on the fetus and breast feeding are still undefined and unclear, pregnant women may refuse to participate in clinical trials [11]. Therefore, the lack of trust results in less evidence, and vice versa.

According to Gangi et al. there is no absolute contraindication, neither in pregnant, nor in lactating women, for the administration of the FDA and EMA approved Covid-19 vaccines, which include Pfizer-BioNTech, Moderna, Novavax, and Janssen vaccines [12]. Moreover, several expert panels suggest that Covid-19 vaccine does not possess significant risk to the breastfeeding infant [13-19]. Further reassurance was provided by the Academy of Breastfeeding Medicine, which states that during lactation, it is unlikely that the vaccine lipid would enter the bloodstream and reach breast tissue, and if it does, it is even less likely that the mRNA or vaccine nanoparticle transfers into the milk [20]. An online prospective cohort study comparing different vaccine reactions among pregnant and lactating women, concluded that Covid-19 vaccines are well tolerated when compared to similar control groups of similar age who were not pregnant or lactating [21,22]. Reactogenicity across those women does not seem to differ from the general population [23].

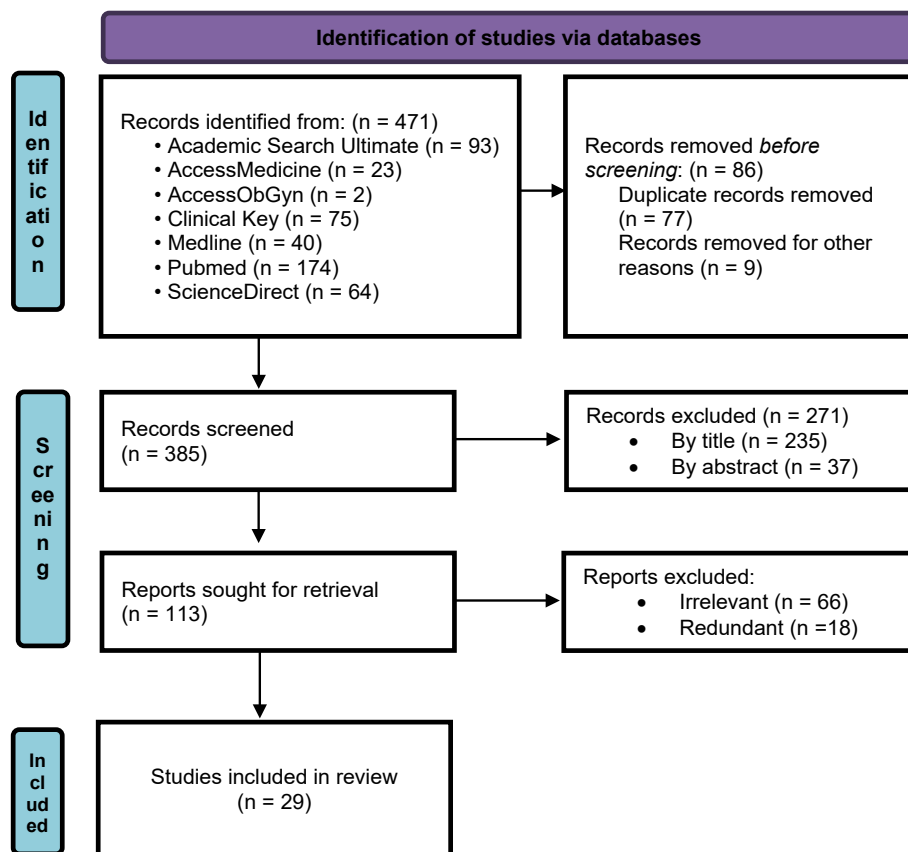


Figure 1. PRISMA 2020 flow diagram for study screening, selection, & inclusion/exclusion.

However, there have been studies that reported some side effects in breastfeeding women. Several studies and randomized clinical trials that included vaccinated women, particularly with the Pfizer and Moderna vaccines [24], found that 1.7% of vaccinated women reported experiencing adverse side effects including negative effects on lactation and milk production [25]. Side effects reported included pain at the injection site, fatigue, myalgia, headaches, and chills, especially following the administration of the second dose of the vaccine [25,26]. A study conducted by Kachikis et al. on breast feeding women, found that 2.3% of women reported interrupted breastfeeding after the first vaccine dose, and 2.2% after the second. In addition, decreased milk supply for less than 24 hours was also reported by 5% following first dose, and by 7.2% following the second.

It is important to note the fact that pregnancy itself is a complex process prone to multiple complications and comorbidities [27]. Recent reports of lactating women receiving the Covid-19 vaccination failed to distinguish whether the side effects that are happening are directly

due to the vaccine itself or linked to another ongoing biological process [28]. Some mechanisms happening independent of vaccination have the power to alter and impact the lactation process. For instance, prolonged fatigue can affect milk supply, and severe symptoms from a nosocomial infection tend to have detrimental effects on breastfeeding such as decreased milk production [25]. In addition, a potential vaccine reaction is fever [29], which increases body metabolism and water loss. Thus, less body water will be available to produce milk [30].

Furthermore, current knowledge regarding long term Covid-19 vaccine safety and effectiveness when it comes to lactating women is limited to observational data [28]. For instance, among observations of young pregnant and lactating women, rare cases of thrombotic and thrombocytopenic events have been reported, especially with adenovirus vector vaccines such as the AstraZeneca and Janssen/Johnson vaccines [31,32]. In fact, in Brazil, AstraZeneca vaccine was suspended following the death of a 35 years old pregnant women from a hemorrhagic

stroke that happened post-vaccination [33]. Such events raise fears about the vaccination's safety. There are concerns about the effect of the vaccine on breastfeeding women in the immediate post-partum period as the data is scarce and limited to the intrapartum period.

Limitations

Many articles did not include every Covid-19 vaccine and were restricted to Pfizer and Moderna only [24]. Moreover, findings can be biased and non-generalizable to the entire population of concern, since many articles recruited a small number of participants from one ethnicity ([34] sample size = 24, in Portugal; as well as [35] sample size = 86, in Spain). A lack of a standard manner of reporting evidence concerning the experience side effects was noticed. Non-standardized surveys were used by many articles, with discrepancies in self-reported symptoms and adverse side effects experienced. In addition, there is still no unanimous timing in which pregnant women are advised to take the vaccine during the gestational duration which creates more variability between articles that might not even be related to the vaccine itself.

Conclusion

As a conclusion, this paper aims to highlight the contrast between several articles which discuss the effects caused by Covid-19 vaccines on lactating women. We stand in a paradox while many articles claim that the vaccines have no adverse side effects on lactating women, others argue the presence of some contradicting findings and effects that negatively impact lactation following administration of the Covid-19 vaccine.

The literature about the topic of Covid-19 vaccination and

lactation is restrained by the small sample sizes studied, geographical barriers, and by the focus on certain Covid-19 vaccines while completely disregarding others. Additional research must be conducted to determine the impact of Covid-19 vaccination on breastfeeding, and to come up with definitive conclusions that facilitate the decision making process for pregnant women. With all that being said, the issue of vaccine's impact on lactation remains open for personal interpretation, anecdotal beliefs, and physician preference, complicating the decision making process.

Authors Contributions

Conceptualization, J. J., G. J., A. R. and B. J.; data curation, J. J.; writing—original draft preparation, J. J., G. J, A. R and B. J.; writing—review and editing (provided feedback on analyses, and critically reviewed the manuscript for important intellectual content), H. J, J. J. and G. J; supervision, B. M and H. J.

All authors have read and agreed to the published version of the manuscript.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships to disclose, that could have appeared to influence the work reported in this paper.

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