Literature Review

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PREGNANT WOMEN'S COMPLIANCE WITH VACCINATION IN THE CONTEXT OF PANDEMICS: AN INTEGRATIVE REVIEW

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ABSTRACT

Objective: to analyze national and international publications regarding pregnant women's compliance with vaccination in the context of pandemics.
Method: this is an integrative literature review, carried out in August 2021 in the LILACS, MEDLINE, Web of Science and Scopus databases, without language and publication time restriction. The descriptors indexed in DeCS and MeSH, Immunization, Vaccination, Pregnancy and Pandemics, combined using the Boolean operator, were used. The results obtained were exported to the EndNote reference manager software and, later, to the Rayyan – Intelligent Systematic Review application. The sample consisted of 27 studies. Analysis considered frequency and similarities between the studies.
Results: the factors that interfere with compliance with vaccination by pregnant women in pandemic times were highlighted: distrust of vaccines; concerns about vaccination safety in pregnancy or for the fetus' health; lack of information and lack of knowledge about the benefits of vaccine. Moreover, the reasons for compliance were desire to protect the baby, knowledge about the pandemic, concern about the risk of infection, and recommendation and guidance on vaccination during prenatal care.
Conclusion: the factors that may interfere with compliance with vaccination were verified, mainly in relation to new vaccines in the context of pandemics. It is considered that investments in strategies related to immunization during pregnancy can provide health benefits, preventing preventable diseases in pregnant women and their babies.

DESCRIPTORS: Pregnant Women. Pandemic. COVID-19. Vaccination. Nursing.

HOW CITED: Vasconcelos PP, Lacerda ACT, Pontes CM, Guedes TG, Leal LP, Oliveira SC. Pregnant women's compliance with vaccination in the context of pandemics: an integrative review. Texto Contexto Enferm [Internet]. 2023 [cited YEAR MONTH DAY]; 32: e20220117. Available from: https://doi.org/10.1590/1980-265X-TCE-2022-0117en

ADESÃO DE GESTANTES À VACINAÇÃO NO CONTEXTO DE PANDEMIAS: REVISÃO INTEGRATIVA

RESUMO

Objetivo: analisar as publicações nacionais e internacionais com relação à adesão de gestantes à vacinação no contexto de pandemias.
Método: revisão de literatura, tipo integrativa, realizada em agosto de 2021 nas bases de dados LILACS, MEDLINE, *Web of Science* e SCOPUS, sem restrição de idioma e de tempo de publicação. Utilizaram-se os descritores indexados no DeCS e MeSH: *Immunization*, *Vaccination*, *Pregnancy* e *Pandemics*, combinados por meio do operador *booleano*. Os resultados obtidos foram exportados para o *software* gerenciador de referências EndNote e, posteriormente, para o aplicativo Rayyan – *Intelligent Systematic Review.* A amostra foi constituída por 27 estudos. A análise considerou a frequência e as similaridades entre os estudos.
Resultados: foram evidenciados os fatores que interferem na adesão à vacinação pelas gestantes em tempos pandêmicos: desconfiança com as vacinas; preocupações sobre a segurança da vacinação na gravidez ou para a saúde do feto; falta de informações e desconhecimento de benefícios sobre a vacina. Além disso, as razões para a adesão foram o desejo de proteger o bebê, o conhecimento sobre a pandemia, a preocupação com o risco de infecção e a recomendação e orientação sobre a vacinação durante o pré-natal.
Conclusão: foram verificados os fatores que podem interferir na adesão à vacinação, principalmente, com relação às novas vacinas no contexto de pandemias. Considera-se que investimentos em estratégias com relação à imunização na gravidez podem proporcionar benefícios para a saúde, prevenindo agravos evitáveis em gestantes e em seus bebês.

DESCRITORES: Gestantes. Pandemia. COVID-19. Vacinação. Enfermagem.

ADHERENCIA A LA VACUNACIÓN DE MUJERES EMBARAZADAS EN CONTEXTO DE PANDEMIA: REVISIÓN INTEGRATIVA

RESUMEN

Objetivo: analizar publicaciones nacionales e internacionales sobre la adherencia de las gestantes a la vacunación en el contexto de pandemias.
Método: revisión de literatura, tipo integradora, realizada en agosto de 2021 en las bases de datos LILACS, MEDLINE, Web of Science y SCOPUS, sin restricción de idioma y tiempo de publicación. Se utilizaron los descriptores indexados en DeCS y MeSH, Immunization, Vaccination, Pregnancy y Pandemics, combinados mediante el operador booleano. Los resultados obtenidos se exportaron al software gestor de referencias EndNote y, posteriormente, a la aplicación Rayyan – Intelligent Systematic Review. La muestra estuvo compuesta por 27 estudios. El análisis consideró la frecuencia y similitudes entre los estudios.
Resultados: se destacaron los factores que interfieren en la adherencia a la vacunación de las gestantes en tiempos de pandemia: desconfianza en las vacunas; preocupaciones sobre la seguridad de la vacunación en el embarazo o para la salud del feto; falta de información; y falta de conocimiento sobre los beneficios de la vacuna. Además, los motivos de adherencia fueron el deseo de proteger al bebé, el conocimiento sobre la pandemia, la preocupación por el riesgo de infección y la recomendación y orientación sobre la vacunación durante el prenatal.
Conclusión: se verificaron los factores que pueden interferir en la adherencia a la vacunación, principalmente en relación a las nuevas vacunas en el contexto de pandemias. Se considera que las inversiones en estrategias relacionadas con la inmunización durante el embarazo pueden brindar beneficios para la salud, previniendo enfermedades prevenibles en las gestantes y sus bebés.

DESCRIPTORES: Mujeres embarazadas. Pandemia. COVID-19. Vacunación. Enfermería.

INTRODUCTION

A disease becomes a pandemic when it affects large proportions, i.e., when a certain agent spreads in several countries and in more than one continent, reaching a large number of people.[1] In recent years, the World Health Organization (WHO) has declared two pandemics: influenza A H1N1 (H1N1), on June 11, 2009[2]; and Coronavirus Disease 2019 (COVID-19), declared on March 11, 2020.[3]

Influenza pandemic is a cyclical and unpredictable occurrence that is related to the emergence of a new viral subtype, resulting from mutations capable of generating a new virus.[4] The COVID-19 pandemic, caused by coronavirus (SARS-CoV-2), is responsible for presenting a broad clinical chart, with complications in the respiratory tract and even death.[5]

Pregnant women represent a vulnerable group to outbreaks of infectious diseases due to the physiological changes typical of pregnancy, which make them more susceptible to infection.[6] For this reason, they are included in priority groups for vaccination against influenza and COVID-19.[7]

COVID-19's clinical manifestations severely impact pregnant and postpartum women, leading to unfavorable obstetric outcomes, such as preeclampsia, fetal distress, miscarriage, maternal respiratory distress, prematurity, intrauterine growth restriction, increased need for surgical delivery, coagulopathies followed by liver dysfunction and death.[6,8–9] With regard to H1N1, pregnant women can present clinically severe forms, such as pneumonia, severe acute respiratory syndrome and deaths, in addition to premature labor.[10–11]

Vaccines contribute to the eradication and effective control of vaccine-preventable diseases, reducing morbidity and mortality due to different diseases with a significant impact on the population's health and quality of life.[12–13] Therefore, vaccines are essential for disease prevention in large population groups and their aggravations, including the impacts on health in relation to COVID-19 and Influenza. Vaccines are effective and safe in pregnant and postpartum women and are well tolerated, with a low percentage of side effects.[10–14]

Despite the importance of vaccines, demonstrated by national and international institutions, pregnant women have a low willingness to receive new vaccines, mainly developed in times of epidemic and pandemic situations.[15–17] Thus, guidance to pregnant women about vaccination is an essential element in immunization programs as it allows them to acquire knowledge about the benefits of immunization.[18]

In the last decade, there have been great advances in the development of new vaccines with the expansion of immunization programs.[19] However, there is a need to know the factors that lead to compliance with vaccination and to consolidate immunization strategies in the population of pregnant and postpartum women, especially in pandemic contexts.[20] Based on this assumption, this integrative review aims to analyze national and international publications regarding pregnant women's compliance in the context of pandemics.

METHOD

This is an integrative review (IR), which consists of a method that provides synthesis of knowledge, allowing the inclusion of experimental and non-experimental studies, for a complete understanding of the phenomenon or problem analyzed with discussions of results for application in evidence-based practice.[21]

The construction of this review covered six steps:[22] research question elaboration; sampling or literature search of primary studies; data extraction from selected studies; assessment of included studies; interpretation of results; and IR presentation.

The guiding question was elaborated based on the PICo strategy:[23] P (Population), I (Phenomenon of Interest) and Co (Context). Population is represented by pregnant women; interest, by compliance

with vaccination; and context, by pandemics. Based on the strategy, the following guiding question was generated: what evidence is available in the literature on pregnant women's compliance with vaccination in the context of pandemics?

For the survey of primary studies, an advanced search was carried out in August 2021, via electronic address, with access through the CAPES portal, in the following databases: Latin American and Caribbean Literature in Health Sciences (LILACS) via Virtual Health Library (VHL); Medical Literature Analysis and Retrieval System Online (MEDLINE/PubMed) via the National Library of Medicine); Web of Science via Clarinet Analytics; and Scopus via Elsevier.

To search for articles, the exact descriptors, Immunization, Vaccination, Pregnancy and Pandemics, were used, located in the Health Sciences Descriptors (DeCS)/Medical Subject Headings (MeSH), combined using Boolean operators "OR" and "AND", according to Chart 1.

Chart 1 – Search strategies used in databases. Recife, PE, Brazil, 2021.

Database	Search strategies
LILACS	Vaccination OR Immunization [Subject descriptor] AND Pregnancy [Subject descriptor] AND Pandemics [Subject descriptor]
MEDLINE/PubMed	((((Vaccination [MeSH Terms]) OR (Immunization [MeSH Terms])) AND (Pregnancy [MeSH Terms]))) AND (Pandemics [MeSH Terms])
WEB OF SCIENCE	Vaccination OR Immunization (Topic) AND Pregnancy (Topic) AND Pandemics (Topic)
SCOPUS	(TITLE-ABS-KEY (vaccination) OR TITLE-ABS-KEY (immunization) AND TITLE-ABS-KEY (pregnancy) AND TITLE-ABS-KEY (pandemics))

We included primary articles that addressed vaccination in pregnant women in the context of pandemics, published without language restriction and without time frame. We excluded literature review articles, reflections, guides, comments, abstracts of annals, theses, dissertations, course conclusion works, letters to the editor, reports, official documents of national and international programs, book chapters and e-books.

Database search identified 1,007 publications: 608 in Scopus; 329 in the Web of Science; 69 in MEDLINE; and one in LILACS (Table 1). The results obtained were exported to the EndNote reference manager software, in which 282 duplicate studies were excluded and, later, to the Rayyan application – Intelligent Systematic Review – in which 31 more duplicated studies were excluded, leaving 694 articles that were selected for the review reading of titles and abstracts by two independent reviewers.

Table 1 – Publications found from the combination of descriptors according to database. Recife, PE, Brazil, 2021.

Descriptors	LILACS	MEDLINE	Web Of Science	Scopus	Total publications
(Vaccination OR Immunization) AND Pregnancy AND Pandemics	1	69	329	608	1007

The titles and abstracts of 694 articles were read with the help of Rayyan application to verify their adequacy to the eligibility criteria, and 650 articles were excluded. From pre-selection, there were a total of 44 articles and, after reading the full texts, 27 were selected, which answered the review's

guiding question. Figure 1 shows the steps for selecting articles that were part of IR, following the Preferred Reporting Items for Systematic reviews and Meta Analyzes (PRISMA) recommendations.[24]

As for analysis, two independent reviewers blindly assessed the studies. In case of disagreement, a third reviewer's opinion was requested. The meetings for assessing the articles that would compose the IR took place via Google Meet. The inclusion process of articles was in accordance with the inclusion criteria and the research question; thus, an attempt was made to reduce the risk of selection bias, giving it methodological rigor in the inclusion of studies until the final sample.

Data from studies included in the IR were extracted using the instrument validated by URSI[25], considering the following variables: article identification (journal title, authors, country, year of publication and language); study's host institution; methodological characteristics (study design, sample selection); performed interventions; results and implications; level of evidence; and methodological rigor assessment. The selected articles' methodological rigor was assessed according to the Critical Appraisal Skills Program (CASP)[26] criteria, and, to assess the strength of evidence of the research included, the classification of the seven levels proposed by Fineout-Overholt was used.[27]

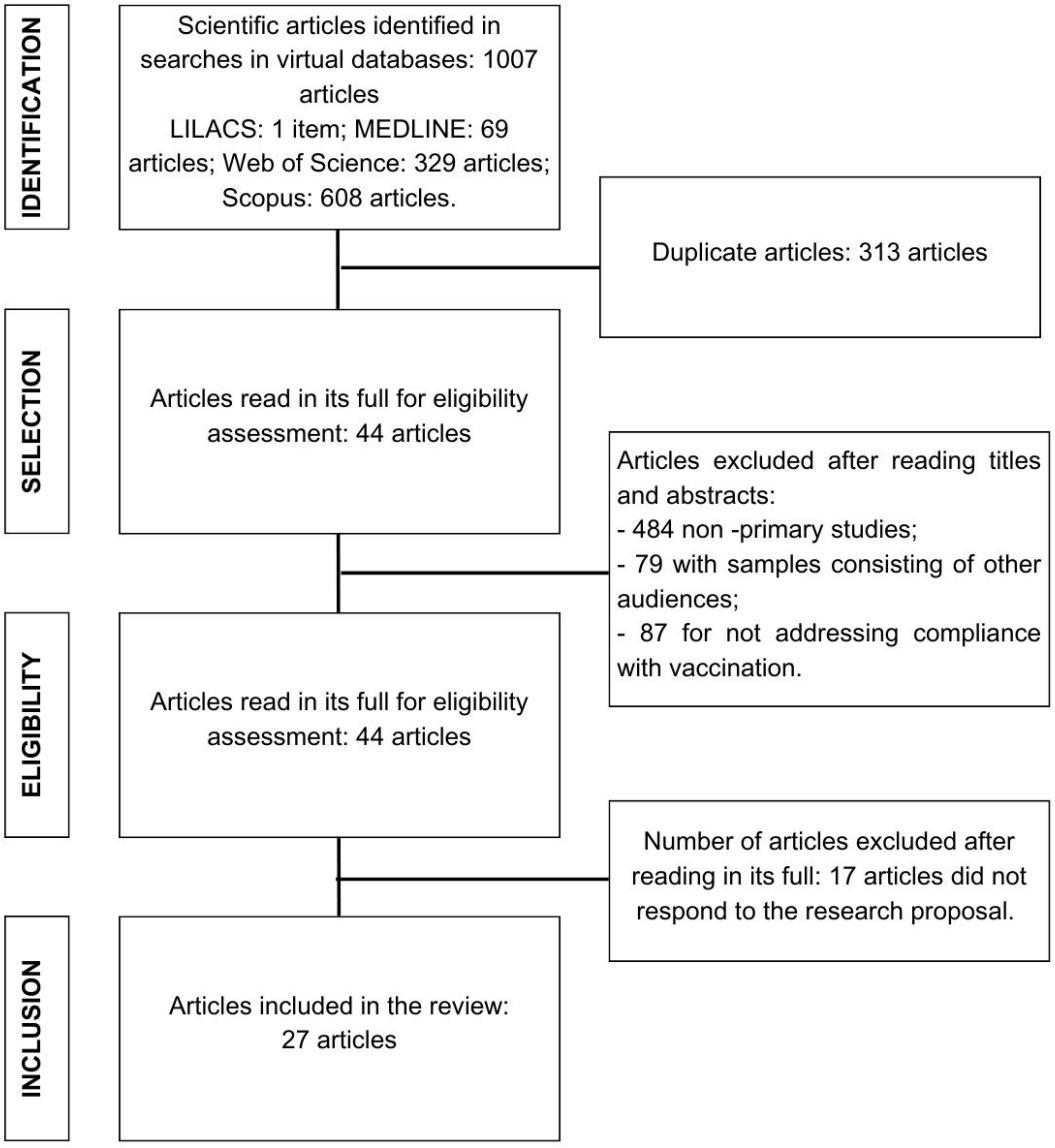

Figure 1 – Flowchart of sample selection steps from integrative review articles. Recife, PE, Brazil, 2021.

In Figure 1, the screening and the process of selecting studies assessed to the final sample is presented following the PRISMA criteria.[24] In Chart 2, there are the results presented descriptively aiming at synthesizing and fostering the discussion. Regarding the interpretation of results, they were analyzed qualitatively based on analysis of frequency and similarities between related studies, having as its central point the analysis of factors regarding pregnant women's compliance with vaccination.

RESULTS

Of the articles selected to compose the IR, 22 addressed vaccination in H1N1 pandemic, and five, the COVID-19 pandemic, and 26 studies were in English and published in 19 different journals. As for study origin, the commonly found countries were the United States, Canada, Turkey, China, South Korea, Australia and Switzerland. They were less often identified studies in Qatar, Iran, Morocco, Ivory Coast, Brazil, the United Kingdom and India. The articles were, in their entirety, classified as level six of evidence. As for methodological rigor, 24 articles were classified as level A, good methodological quality and reduced bias (Chart 2).

With regard to study limitations and risks of bias presented by the authors, issues related to selection bias,[28–34] memory bias[32,35–38], limitation in sample size[31,35,39–42], results that cannot be generalizable,[36–37.42–43–45] and data limited to a single institution stood out.[38,46]

The studies of this IR have evidenced the factors that interfere with compliance with vaccination by pregnant women, such as: distrust of future problems not yet discovered that vaccines can cause in the long run[28–29,46–47]; concerns about vaccination safety in pregnancy or related to side effects[29,31,35–36,40,45–46,48–49]; concern about damage or any risks to the fetus' health[34,37,41–42,50,51]; lack of information about vaccine and ignorance of benefit of vaccines[32,42,52]; listening or reading negative news in the media[45]; concern with vaccine effectiveness[53]; perception that they were not at risk of severe illness[36,49] (Chart 2).

With regard to the reasons for vaccination compliance, evidence points to the desire to protect the baby,[31,38,48] knowledge about the pandemic and concern about the risk of infection,[36,43,52–53] the recommendation and guidance on vaccination during prenatal care[29,47] and reading about vaccine efficacy or positive feedback from family or friends[28] (Chart 2).

Chart 2 – Synthesis of primary studies related to pregnant women's compliance regarding the vaccination offered in pandemic times. Recife, PE, Brazil, 2021.

Author/year/LoE* RM†	Objective and sample	Result
Mohan S, et al[28] 2021 LoE:6 MR: Level A	- Explore attitudes towards COVID-19 vaccination between women in the perinatal period. - Sample of 341 pregnant and breastfeeding women.	The distrust of future vaccine problems (70.6%) was a main reason for vaccination hesitation. Factors that would increase confidence in accepting the vaccine were reading about efficacy (33.8%) or positive feedback from family or friends (8.1%).
Gencer H, et al[45] 2021 LoE:6 MR: Level A	- Determine the opinions of pregnant women about vaccines during pregnancy and childhood and the effect of COVID-19 pandemic on these opinions. - Sample of 152 pregnant women.	The reasons for vaccination hesitation were listening or reading negative media news (21.7%) and believing that vaccines were not safe or were concerned about side effects (21.7%).

Chart 2 – Cont.

Author/year/LoE* RM†	Objective and sample	Result
Goncu Ayhan S, et al[51] 2021 LoE:6 MR: Level A	- Define COVID-19 vaccine acceptance and hesitancy status in a sample of pregnant women in Ankara, Turkey. - Sample of 300 pregnant women.	63% of pregnant women would refuse the vaccine COVID-19 vaccine even if recommended. Of these, 65.6% declared concern about lack of data on vaccine safety in the pregnant population, and 41.7%, the possibility of harm to the fetus.
Stuckelberger S, et al[30] 2021 LoE:6 MR: Level A	- Investigate the COVID-19 vaccine availability among pregnant and breastfeeding Swiss women if the vaccine was available as well as the factors that contributed to its acceptance or hesitation. - Sample of 1551 Swiss women (515 pregnant and 1,036 breastfeeding up to 90 days).	29.7% of pregnant women and 38.6% breastfeeding women were willing to be vaccinated against SARS-CoV-2. Among participants, 10.5% mentioned fear of potential consequences for the fetus/baby. Women in the third trimester of pregnancy who had received influenza vaccination in the previous year were more likely to receive the vaccine.
Tao L, et al[53] 2021 LoE:6 MR: Level A	- Explore COVID-19 vaccine acceptance and factors related to vaccine acceptance based on the health belief model. - Sample of 1,392 pregnant women.	Among the 315 pregnant women who answered “no” or “not sure” of their intention to be vaccinated with a COVID-19 vaccine, 54% refused any vaccination during pregnancy due to concern about side effects; 47.0% were concerned about safety; and 44.1% were concerned about vaccine efficacy.
Im JH, et al[48] 2020 LoE:6 MR: Level A	- Assess changes in influenza vaccination coverage rates and the related factors that influence them in pregnant women. - Sample of 550 pregnant women.	The common reasons for receiving the vaccine were preventing the flu (49.7%) and ensuring fetal health (46.3%). The most common reason for non-vaccination was lack of sufficient information about vaccination (36.9%).
Bettinger JA, et al[39] 2016 LoE:6 MR: Level A	- Investigate pregnant women’s and new mothers’ attitudes and behaviors in relation to seasonal and pandemic influenza vaccination. - Sample of 26 pregnant women and eight postpartum women in the focus group (FG); of these, 22 composed the online survey.	67.6% of FG participants agreed “somewhat” about vaccine safety during pregnancy and, for most of the, the vaccine’s unknown risks do not outweigh the benefits and were concerned about adverse effects of vaccination. In the online survey, 42% of unvaccinated women did not feel informed enough to make the decision to receive the vaccine; 42% were concerned about safety; and 50% did not discuss vaccination with their health professional.
Jung EJ, et al[29] 2016 LoE:6 MR: Level A	- Assess coverage rate and perceptions of Korean women of reproductive age about influenza vaccine during pregnancy and conduct a virtual intervention to increase their intention to receive vaccination. - Sample of 500 pregnant women and 500 women of reproductive age.	Among 764 participants, 62.7% did not receive the vaccine during pregnancy and the reasons for not vaccinating were concerns about harmful effects on the fetus (29.6%) and lack of vaccine recommendation by health professionals (12.9%). Of those who received the vaccine, the reasons for vaccination were perceived risk of influenza infection in babies (22.8%), health professionals’ recommendation (26.7%) and belief in vaccine efficacy (15.8%).

Chart 2 – Cont.

Author/year/LoE* RM†	Objective and sample	Result
Mccarthy EA, et al[38] 2015 LoE:6 MR: Level A	- Review facilitating and impeding factors in promoting influenza vaccination during pregnancy to inform future lay and professional educational efforts. - Final sample of 1,086 postpartum women.	65.0% of participants who remembered vaccination being discussed or recommended by a health professional were subsequently vaccinated. The main reason for vaccinating was the desire to protect the baby, which increased from 66.7% in 2010 to 89.2% in 2014, while 47.1% chose not to vaccinate during pregnancy because they do not usually be vaccinated during pregnancy.
Halperin BA, et al[49]. 2014 LoE:6 MR: Level A	- Explore and compare pregnant women's pre- and post-pandemic knowledge, attitudes, beliefs and intended behaviors regarding influenza vaccination (seasonal and/or pandemic) during pregnancy in order to determine the main factors influencing their decision to comply with the influenza vaccine recommendations. - Sample of 662 pregnant women in the pre-pandemic period (2005-2006) and 159 in the post-pandemic period (2011).	The reasons for seasonal flu vaccination were protection against the disease for themselves and their family (44% pre- and 45% post-pandemic) and health professionals' recommendation (19% pre and 38% post), reasons for vaccination H1N1 (48% and 20%, respectively). Reasons for not vaccinating against seasonal flu were that they did not need to receive immunization (36% pre and 70% post) and concern about side effects (5% and 26%); reasons also cited by women who did not receive the vaccine against the H1N1 pandemic (26% and 14%, respectively).
Lohiniva AL, et al[34] 2014 LoE:6 MR: Level A	- Describe pregnant women's perceptions related to H1N1 influenza, to identify the factors that encourage or discourage them to take the A(H1N1) monovalent vaccine pdm09 during the response to the pandemic (2009-2010), and the sources of information that influenced their process of decision-making. - Sample of 123 pregnant women.	Women feared that the vaccine could negatively affect their health and that of their babies, and speech analysis identified the interference of the social network in the decision-making to receive the vaccine: discussions with health professionals were a positive factor for the decision-making for vaccination, while rumor-based discussions about complications and side effects with neighbors and friends often fuel the decision not to vaccinate.
Ahluwalia IB, et al[37] 2014 LoE:6 MR: Level A	- Examine disparities in vaccination coverage among women who gave birth during the 2009-2010 influenza season, when two separate influenza vaccinations were recommended. - Sample of postpartum and breastfeeding women, 27.153 for seasonal influenza and 27.372 for H1N1.	Reasons cited for not receiving vaccination include: lack of recommendation by health care provider about a flu shot during pregnancy; concern about vaccine side effects; concern of harm to the fetus; habit of not getting the flu shot.
Kfouri RA, Richtmann R[46] 2013 LoE:6 MR: Level B	- Describe the vaccination coverage of pregnant women for influenza and factors associated with vaccine refusal or acceptance. - Sample of 300 postpartum women.	95.7% received the vaccine against influenza during pregnancy and, of these, 73.2% knew that the vaccine would protect their child. Among those who did not receive it, all were unaware of the fact that the vaccine would protect the baby, and 69.2% would have been vaccinated if they had been informed of neonatal protection.

Chart 2 – Cont.

Author/year/LoE* RM†	Objective and sample	Result
Tarrant M, et al[41] 2013 LoE:6 MR: Level A	- Examine factors associated with the adoption of the 2009 influenza A/H1N1 vaccine among pregnant women in Hong Kong. - Sample of 549 postpartum women.	91.1% did not receive any of the influenza A (H1N1) and/or seasonal vaccines during pregnancy, and the reason cited was the fear that the vaccine would cause side effects to them or their fetus (69.7% and 75.7%, respectively), and reported that vaccination should be avoided during pregnancy (78.8%).
Kouassi DP, et al[52] 2012 LoE:6 MR: Level A	- Assess awareness of the pandemic and A(H1N1) pdm09 vaccine awareness and acceptance in February 2010, prior to the local availability of the vaccine. - Sample of 411 pregnant women.	Of the 80 women who said they would not accept being vaccinated, 45% reported lack of information about the vaccine as the reason for not vaccinating. Women who are aware of the pandemic and believe they are susceptible to H1N1 flu were more likely to accept vaccination (75.4%).
Honarvar B, et al[32] 2012 LoE:6 MR: Level A	- Determine the acceptance rate of influenza vaccination, including the 2009 pandemic influenza H1N1 and seasonal influenza vaccination, and the reasons for acceptance or rejection among pregnant women. - Sample of 416 pregnant women.	Out of 92.06% of pregnant women who refused the H1N1 influenza vaccine, 30.28% reported lack of information about vaccination as the main reason for refusal. Of the 25 vaccinated pregnant women, 60% reported having been vaccinated on the advice of someone other than a health professional.
Schindler M, et al[33] 2012 LoE:6 MR: Level A	- Examine Swiss pregnant women's representations of the risks associated with seasonal flu and its vaccination in the first wave. - Sample of 29 postpartum women.	The lack of recommendation, by health professionals, about the dangerousness of seasonal flu and the protection afforded by vaccines may have left pregnant women in a state of indecision regarding vaccination.
Moukarram H, et al[50] 2012 LoE:6 MR: Level B	- Assess vaccine awareness and uptake among pregnant women in the local community. - Sample of 200 pregnant women.	42.5% of pregnant women said they would take the vaccine. Regarding the main reasons for refusal, 43.5% reported concern about possible risks to the fetus and 40.9%, risk to themselves.
Bhaskar E, et al[42] 2012 LoE:6 MR: Level A	- Identify pandemic influenza vaccination rates among pregnant women in Chennai during the first two months after influenza vaccine rollout and to analyze factors associated with vaccination. - Sample of 140 pregnant women.	The influenza vaccination rate was 12.8%. The reasons for refusal were fear of complications (28.5%), not knowing where the vaccine was available (28.5%) and not knowing the benefits of vaccination (28.5%).
Kay WK, et al[36] 2012 LoE:6 MR: Level A	- Estimate pH1N1 vaccination coverage among women in King County during the third trimester of pregnancy and identify sociodemographic factors, beliefs and practices associated with vaccination. - Sample of 4,205 postpartum women.	The reasons cited by women not vaccinated against H1N1 were not being able to find a vaccination provider (20.6%) and the perception that they were not at risk of serious illness (26.1%). The reasons reported for not being vaccinated against the flu were safety issues (58%) related to the effects of the vaccine on the mother's or fetus' health.

Chart 2 – Cont.

Author/year/LoE* RM†	Objective and sample	Result
Steelfisher GK, et al[35] 2011 LoE:6 MR: Level B	- Examine drivers and barriers to pregnant women receiving the H1N1 vaccine through a national survey conducted during the pandemic. - Sample of 514 pregnant women.	The main reason for refusing to receive the vaccine was concern about safety risks to the fetus (62%) and to herself (59%). Pregnant women who knew that the H1N1 vaccine provided protection against H1N1 flu for their babies were more likely to receive the vaccine.
Dlugacz Y, et al[54] 2011 LoE:6 MR: Level A	- Identify factors associated with acceptance or refusal of the 2009 H1N1 vaccination during pregnancy. - Sample of 1,325 postpartum women.	34.2% received the 2009 H1N1 vaccine during pregnancy; 54% unvaccinated women indicated, as reason for refusal, concern about the vaccine safety for the fetus. Health professionals' recommendation was one of the reasons for accepting the H1N1 vaccine. Of those who received the recommendation, 56% were vaccinated.
Goldfarb I, et al[31] 2011 LOE:6 MR: Level A	- Define the uptake of H1N1 and seasonal influenza vaccination among women who delivered at an urban teaching hospital during the 2009-2010 H1N1 pandemic and explore barriers to vaccinating pregnant women. - Sample of 366 postpartum women.	81% received H1N1 and seasonal flu vaccines. Factors for compliance were the desire to protect themselves (>60%) and their babies (>80%) and recommendation from a health professional (>60%), while refusal was motivated by media attention and recommendation from government agencies (<20%).
Fisher BM, et al[40]2011 LOE:6 MR: Level A	- Determine influenza vaccination rates, both seasonal and H1N1 pandemic, in pregnancy during the 2009-2010 influenza season and for those women not vaccinated during pregnancy to determine reasons for non-compliance. - Sample of 813 postpartum women.	64% of participants received vaccination against seasonal flu, and 54%, against H1N1 flu during pregnancy. Of women who did not receive both vaccines, 25% reported not being well-informed about the importance of the vaccine, 18% reported concern about the vaccine's effects on fetal health, and 9%, about maternal health.
Sakaguchi S, et al[43] 2010 LOE:6 MR: Level A	- Determine how many pregnant women received the H1N1 vaccine after their call to Motherisk and explore pregnant women's perceptions of the H1N1 vaccine and factors surrounding the decision to receive vaccination. - Sample of 130 pregnant women.	Among pregnant women who received the vaccine, 73.1% reported concern about the risk of H1N1 infection in the fetus and/or themselves as a reason for their decision; 34.6% cited recommendations to encourage vaccination; and 3.8% mentioned a previous history of complication or illness due to influenza. Of those who did not receive the vaccine, 42.3% reported concerns about safety for themselves and/or their fetus, and 23.1% did not find the vaccine necessary.
Ozer A, et al[46] 2010 LOE:6 MR: Level A	- Determine factors that affect pregnant women's decisions in Turkey whether or not to be vaccinated against 2009 H1N1 influenza. - Sample of 314 pregnant women.	The H1N1 vaccination rate was 8.9%. 75.5% of the unvaccinated thought the vaccine was harmful in the long term; 70.1% believed it could cause miscarriage, 74.2% deformity in their children and 72.3% infertility.

Chart 2 – Cont.

Author/year/LoE* RM†	Objective and sample	Result
White SW, et al[44] 2010 LOE:6 MR: Level A	- Audit the 2009 pandemic (H1N1) influenza vaccine acceptance in pregnant women entering the 2010 influenza season in Western Australia and identify why some women did not receive the vaccine. - Sample of 479 pregnant women.	The H1N1 vaccination rate was 6.9%. Reasons for not vaccinating were lack of discussion or dialogue about the vaccine with health professionals during prenatal care (63.9%), concern about vaccination safety by pregnant women (61.6%) and active discouragement of prenatal vaccination (19.6%).

*LoE: Level of Evidence proposed by Fineout-Overholt. †MR: methodological rigor through CAS instruments.

DISCUSSION

This IR presented articles on compliance with vaccination in pregnant women in two pandemics that occurred in the last ten years: the Influenza A/H1N1 pandemic, which occurred in 2009, and the current COVID-19 pandemic, which started in 2019[2,3].

When analyzing the vaccination coverage rate evidence in the H1N1 pandemic, studies showed that 95.7% of pregnant women were vaccinated in 2013 in Brazil,[47] Canada (80%),[43] USA (76.9% to 38.8%),[37–41,52] Australia (6.9%) and[44] Turkey (8.9%)[46]; however, in Iran, there was 92.06% refusal of influenza vaccination by pregnant women.[32]

Regarding the COVID-19 pandemic, in studies carried out before the vaccine was available, the proportion of acceptance/willingness to receive the vaccine by pregnant women ranged from 29.7% to 77.4%[30,45,51,53]. However, a study in Qatar showed a 75% rate of vaccine hesitancy, in which 25% of women reported that they would probably or definitely not accept vaccination; 25.9% remained insecure; and 28.3% would not have their children vaccinated.[28]

Vaccine hesitancy is defined as delay in accepting or refusing vaccines despite the availability of vaccination services. It is a behavioral phenomenon that varies across time, place and types of vaccines and includes factors such as complacency, convenience and trust. Complacency results from low perceived risk of contracting vaccine-preventable disease. Convenience considers physical and financial availability, geographic accessibility, ability to understand and access health information. Ultimately, trust is about vaccine efficacy and safety, health services' and professionals' competence and managers' motivations to recommend them.[55]

Concerns about vaccine safety and efficacy, distrust of vaccines, lack of knowledge about vaccines during pregnancy as well as the lack of recommendations by health professionals were some of the factors that influenced vaccine acceptance and/or hesitation.[30,36,42,45,48,51]

Although vaccines are safe, effective and recommended by health policies[7], vaccine hesitancy is often cited as a particularly present problem during pregnancy, as pregnant women are encouraged to avoid medications with known or uncertain risks to the fetus.[56] In this IR, studies showed that women choose not to vaccinate during pregnancy because they are not usually vaccinated during pregnancy[37,49] and that unvaccinated pregnant women were more likely to agree that vaccines should not be taken during pregnancy because they believe that the risk would be greater in receiving vaccination during pregnancy than in developing the disease.[41]

Authors stated that most pregnant women indicate their intention to receive COVID-19 vaccines, but they prefer to wait until the end of pregnancy so as not to expose their baby or after weaning their children because the COVID-19 vaccine safety is relatively new and, probably, not yet widespread.[57,58] Distrust of vaccination ranks second in predicted reasons for not wanting to be

vaccinated during pregnancy.[59] Strengths cited in the study with regard to vaccine acceptance and confidence were perception of virus and disease risk, public trust, belief in the importance of having a COVID-19 vaccine, and vaccine efficacy during pregnancy.[58]

Overall, pregnant and breastfeeding women reported vaccine safety for the child and the mother as top priorities in relation to the COVID-19 vaccine and had a higher level of acceptance in the third trimester of pregnancy, as a series of vaccines, including influenza (H1N1) and Tdap vaccines, is particularly recommended during the third trimester.[57]

From the studies that were part of the IR sample, it was observed that the lack of recommendation by health professionals about vaccination and/or insufficient information were reasons for not vaccinating pregnant women.[29,33,37,40,44,48,52] On the other hand, there was compliance with vaccination by pregnant women who received recommendations or face-to-face discussions with health professionals during the gestational period.[31,34,36,38]

Therefore, it is important that health professionals take advantage of vaccination experiences on previous occasions and the perception that women have about vaccines, to provide effective advice to increase vaccination coverage during pregnancy.[59] Health professionals have a relevant role in prenatal care as providers of information and encouragers for vaccination, with an impact on women's compliance with vaccines in the pregnancy-postpartum period.[7]

Information support and provision about vaccination by health professionals is a great opportunity to achieve a complete vaccination history of women. Thus, vaccination during pregnancy should be analyzed as an opportunity to improve vaccination coverage of all vaccines, which are low in the general population.[60]

The studies included in the IR stated that pregnant women who had knowledge about the pandemic and the perception that they were susceptible to infection were more likely to accept vaccination.[35,52,53] Women who believed they were at high risk of serious illness or complications, if infected with H1N1, had a higher prevalence of vaccination.[36,49] However, the level of perceived knowledge regarding the COVID-19 vaccine alone cannot predict vaccine acceptance.[57]

When analyzing the population profile of the IR studies, it was identified that H1N1 vaccination coverage varied with age, as younger women had the lowest coverage[31,37], while education did not show a significant association with vaccine acceptance.[31,41–43,52] However, a study carried out in the USA showed that women with complete higher education and aged over 35 years were more likely to have been vaccinated against the H1N1 flu.[35]

With regard to the COVID-19 pandemic, it was found that greater COVID-19 vaccine acceptance was associated with young age, low level of education and high score of knowledge about COVID-19.[53] However, another study pointed out that age over 40 years and educational level higher than high school are associated with a higher rate of COVID-19 vaccine acceptance.[30] However, women who claimed to have a low economic situation and concern about the risks of vaccination had a high vaccine hesitancy rate.[45]

Evidence indicates that women had opinions and attitudes favorable to the vaccine when a health professional was the main source of information[38,39,45,49], positive experience of personal vaccination or those close to them[34,50], previously vaccinated family members[41] or when agreed with the benefits of vaccination in the gestational period[34] and for advice and incentives for vaccination by others.[32,43]

In addition to this, women with a previous vaccination history are more likely to be vaccinated in pandemic situations. Thus, having received influenza vaccination in the previous year was a positive predictor for accepting H1N1[,54] and SARS-CoV-2 vaccines[49].[30] However, rumor-based discussions about complications and side effects with neighbors and friends discouraged the decision to be vaccinated.[34]

The information found in the media for compliance with vaccination was rarely cited by studies[43,45,49,50] as well as the recommendations from the official government campaign.[31,47] However, hearing or reading negative news in the media can be a factor in vaccine hesitancy.[45]

The internet is an increasingly used tool for obtaining information. Social media platforms such as Facebook, Twitter and Instagram are complex and fluid ecosystems in which vaccine-related misinformation can spread widely.[61] Additionally, mobile applications, considering the epidemiological scenario of COVID-19 in the world, are an innovative digital technology that offers convenience and benefit to the population and managers in accessing knowledge and an attractive alternative for health professionals' continuing education.[62]

Regarding the vaccine against COVID-19, the dissemination of correct information in a transparent manner must be reinforced, in order to avoid giving wrong or worrying information as a resource to increase vaccine acceptance, especially for vulnerable populations[53], since fake news circulate more easily and because politicians with national visibility issue personal opinions against vaccines.[63]

The main limitation of this IR is the possibility of losing relevant studies indexed in other databases. Furthermore, the analysis performed on the publications is related to the search selection criteria proposed in this study. However, it was possible to infer the factors related to pregnant women's compliance with vaccination in the context of pandemics. It should be noted that publication biases may be related to the particularities of each host institution where the studies included in the review were carried out.

CONCLUSION

The main factors in the vaccine decision of pregnant women in pandemic situations are related to concerns about vaccine safety, fear of complications and its side effects, lack of information about the vaccine and lack of recommendation by health professionals. Moreover, the desire to protect the baby, knowledge about the pandemic and the recommendation and guidance on vaccination are factors for compliance with vaccination during the gestational period.

In view of this, it can be considered that investments in strategies related to immunization during pregnancy provide health benefits, preventing preventable diseases in pregnant women and their babies. Strengthening immunization programs as an advanced practice and having prenatal care as a window of opportunity for compliance with vaccines is considered relevant in vaccination acceptance among pregnant and postpartum women, especially in the context of pandemics.

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NOTES

ORIGIN OF THE ARTICLE

This study is part of a dissertation – *Fatores associados à adesão da vacinação contra covid-19 no período gestacional*, presented to the Graduate Program in Nursing, *Universidade Federal de Pernambuco*, in 2022.

CONTRIBUTION OF AUTHORITY

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Data analysis and interpretation: Vasconcelos PP.
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ACKNOWLEDGMENT

To CAPES and UFPE, for financial support to the researcher linked to the Graduate Programs at UFPE, Notice 02/2021– PROPG.

CONFLICT OF INTEREST

There is no conflict of interest.

HISTORICAL

Received: May 13, 2022.
Approved: December 06, 2022.

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