revista de pesquisa ISSN 2175-5361

CUIDADO É FUNDAMENTAL

Escola de Enfermagem Alfredo Pinto – UNIRIO

ORIGINAL ARTICLE *DOI:10.9789/2175-5361.rpcfo.v17.13759*

VACCINATION AGAINST COVID-19 AMONG REGULAR RISK PREGNANT WOMEN: AGREEMENT AND PERCEIVED SAFETY

Vacinação contra Covid-19 entre gestantes de risco habitual: concordância e segurança percebida

Vacunación con Covid-19 entre las embarazadas de riesgo habitual: acuerdo y seguridad percibida

Cecília Verones Cândido de Morais[I]
Luana Rafaela da Costa Fachi[2]
Bruna Borlina Monteiro[3]
Jaqueline Garcia de Almeida Ballestero[4]
Thais de Oliveira Gozzo[5]
Mônica Maria de Jesus Silva[6]

RESUMO

Objetivo: analisar vacinação contra COVID-19 entre gestantes de risco habitual, fatores associados, concordância com a vacinação e segurança percebida. **Método:** estudo transversal realizado com 338 gestantes no estado de São Paulo, Brasil. A coleta de dados utilizou um formulário eletrônico. **Resultados:** 97,6% das gestantes se imunizaram contra a COVID-19; 92% concordaram com a vacinação e 84,3% sentiram-se seguras após a imunização. Vacinação contra a COVID-19 apresentou associação com o trabalho remunerado, concordância com a imunização, número de partos e filhos vivos. Gestantes que concordavam com a vacinação possuíam maior chance de sentirem-se seguras com a imunização. **Conclusão:** a taxa de gestantes de risco habitual vacinadas contra a COVID-19, que concordavam e sentiam-se seguras em relação a imunização, foi alta e sugere envolver enfermeiros e profissionais de saúde na assistência pré-natal em intervenções para dissipar a desinformação e promover a cobertura vacinal, a concordância e sentimento de segurança sobre a vacina.

DESCRITORES: Enfermagem; Vacinação; COVID-19; Gravidez.

[1,2,3,4,5,6] Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil.

Received: 2025/01/28. **Accepted:** 2025/04/09

CORRESPONDING AUTHOR: Mônica Maria de Jesus Silva
E-mail: monicamjs@usp.br

How to cite this article: Morais CVC, Fachi LRC, Monteiro BB, Ballestero JGA, Gozzo TO, Silva MMJ. COVID-19 vaccination among low-risk pregnant women: agreement and perceived safety. R Pesq Cuid Fundam (Online). [Internet]. 2025 [cited year month day];17:e13759. Available from: https://doi.org/10.9789/2175-5361.rpcfo.v17.13759.

ABSTRACT

Objective: to analyze COVID-19 vaccination among low-risk pregnant women, associated factors, agreement with vaccination, and perceived safety. **Method:** cross-sectional study conducted with 338 pregnant women in the state of São Paulo, Brazil. Data collection used an electronic form. **Results:** 97,6% of pregnant women were immunized against COVID-19; 92% agreed to vaccination, and 84,3% felt safe after immunization. COVID-19 vaccination was associated with paid employment, agreement with immunization, number of births, and number of live births. Pregnant women who agreed to vaccination were more likely to feel safe with immunization. **Conclusion:** the rate of low-risk pregnant women vaccinated against COVID-19, who agreed and felt safe about immunization, was high and suggests involving nurses and health professionals in prenatal care in interventions to dispel misinformation and promote vaccination coverage, agreement and feeling of security about the vaccine.

DESCRIPTORS: Nursing; Vaccination; COVID-19; Pregnancy.

RESUMEN

Objetivo: analizar la vacunación contra COVID-19 en gestantes de alto riesgo, factores asociados, concordancia con la vacunación y seguridad percibida. **Método:** estudio transversal realizado con 338 mujeres embarazadas en el estado de São Paulo, Brasil. La recogida de datos utiliza un formulario electrónico. **Resultados:** El 97,6% de las gestantes fueron inmunizadas contra la COVID-19; El 92% estuvo de acuerdo con la vacunación y el 84,3% se sintió seguro tras la inmunización. La vacunación contra la COVID-19 se asoció con el trabajo remunerado, el cumplimiento de la inmunización, el número de nacimientos y los hijos vivos. Las mujeres embarazadas que aceptaron vacunarse tenían más probabilidades de sentirse seguras con la vacuna. **Conclusión:** la tasa de gestantes de alto riesgo vacunadas contra COVID-19, que aceptaron y se sintieron seguras respecto a la inmunización, fue alta y sugiere involucrar a enfermeros y profesionales de la salud en la atención prenatal en intervenciones para disipar la desinformación y promover la cobertura vacunal, el acuerdo y el sentimiento de seguridad sobre la vacuna.

DESCRIPTORES: Enfermería; Vacunación; COVID-19; Embarazo.

INTRODUCTION

In the COVID-19 pandemic, Brazil has had alarmingly high rates of infection and deaths among pregnant women, leading the world ranking of maternal deaths, with a lethality rate of 7.22%, above the 0.63% average rate in the Americas. As a result, it was responsible for 77% of the world's maternal deaths from the start of the pandemic until June 2021.[1] This data has confirmed the need for immunization in this population.

Since the launch of the immunizers in December 2020, several national and international societies representing obstetric and reproductive health have released statements in support of public health measures to combat COVID-19, which included the authorized emergency use of vaccines in pregnancy. In 2021, the American College of Obstetrics and Gynecology (ACOG) officially announced a strong recommendation for the COVID-19 vaccine for pregnant women.[2] In the Brazilian context, the Ministry of Health has recommended the vaccination of pregnant women, puerperal women and breastfeeding women as a priority group, who should only be vaccinated with immunizers that do not contain a viral vector.[3]

The COVID-19 vaccine has been shown to be safe during pregnancy[4], with clear maternal and neonatal benefits. Following the start of vaccination of this group in Brazil, the moving averages of cases and deaths from the disease fell, with the highest moving average of 13.57 deaths and 89.86 daily cases falling back to a moving average of 2.71 deaths and 14 daily cases.[5] In addition to its effectiveness in preventing maternal COVID-19 during pregnancy, the vaccine has been associated with the promotion of protective immunity to newborns through breast milk[6], and a decrease in the rate of stillbirths[7] and hospitalization among babies under 6 months of age.[8]

Despite the benefits of vaccines such as COVID-19, the importance of educational and information campaigns for the population should be highlighted, in order to help reduce vaccine hesitancy[9], which is characterized by a delay in accepting or refusing vaccination, despite the availability of immunization services.[10]

In addition, the lack of knowledge on the part of the population about the production of immunizers and the feelings of fear and insecurity caused during the pandemic have led to the emergence and strengthening of doubts and disputes about vaccines.[11]

Considering the alarming data on maternal mortality from COVID-19 in Brazil during the pandemic and the importance of immunization, this study aimed to analyze

vaccination against COVID-19 among pregnant women at usual risk, associated factors, agreement with vaccination and perceived safety.

METHOD

This cross-sectional study followed the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) initiative.

The study was carried out in a usual risk prenatal clinic of a secondary public maternity hospital in a municipality located in the interior of the state of São Paulo, Brazil.

The study population consisted of pregnant women undergoing prenatal care at the service in 2022. The sample calculation considered the number of pregnant women who had prenatal care in the previous year (2021), according to data from the maternity hospital and according to the parameters: prevalence of 50%, confidence level of 95%, margin of error of 5%, totaling 338 pregnant women.

Intentional, non-probabilistic, consecutive sampling was used to recruit participants according to the eligibility criteria. Eligible for the study were pregnant women undergoing normal-risk prenatal care, aged 18 or over. Exclusion criteria were: not being able to read and/or write; inability to communicate verbally and to understand the data collection instruments without the participation of another person.

A total of 363 pregnant women were recruited in person, in the waiting room of the outpatient clinic, while they were waiting for their appointment. Of these, 24 refused to take part, giving a sample of 338 pregnant women.

The data was collected from April 27 to July 12, 2022, through visits to the outpatient clinic from Monday to Friday, from 7 am to 12 pm, by two researchers, undergraduate nursing students, who had received previous training to standardize the conduct. Adequate distancing and the use of recommended personal protective equipment (PPE) were used considering the COVID-19 pandemic.

Data was collected using an electronic form hosted on the research website, using the Google Forms® survey management tool, which was accessed by the researchers using a tablet and/or cell phone belonging to the research team. The form consisted of two parts: data on the participant's characterization and data on vaccination status.

The participant's characterization data contained socioeconomic, demographic and obstetric variables, such as: age, marital status, religion, schooling, income, skin color, housing, work, number of pregnancies, births, children and miscarriages. The data on vaccination contained variables on vaccination status, dose, vaccine received, COVID-19 contamination, perceived safety in relation to the vaccine, reason for vaccine hesitancy and agreement with vaccination, with interchangeability between vaccines and with the booster dose. Vaccination status was considered positive when it was confirmed that at least one dose of COVID-19 vaccine had been received.

It should be noted that a pilot study was carried out with 33 participants, or 10% of the established sample, to evaluate the electronic form. After the test, there was no need to change the wording or format of the form, and it was considered easy to understand by pregnant women.

For analysis, the data was exported from the Google Forms® platform to a structured Microsoft Excel® spreadsheet. The data regarding the characterization of the participants was analyzed descriptively using simple frequencies for categorical variables and measures of central tendency and variability for quantitative variables. The Chi-square test was used for independence, and Fischer's exact test and the Mann-Whitney test were used to check the homogeneity of categorical variables.

The Variance Inflation Factor (VIF) was used to detect the presence of multicollinearity between the variables in the logistic regression model. The Odds Ratio was calculated from the parameters obtained with a 95% confidence interval for all the variables and a significance level of 5% ($\alpha = 0.05$) was considered in all the statistical tests. The R program (R Core Team, 2021), version 4.1.1, was used.

The research complied with the ethical principles of Resolution 466/12 of the National Health Council and was approved by the Research Ethics Committee (opinion number 5.339.664; CAAE: 5584.3521.9.0000.5393.

RESULTS

The study included 338 pregnant women undergoing normal-risk prenatal care, predominantly young women with restricted socioeconomic conditions. All the participants were in the third trimester of pregnancy, with gestational ages ranging from 28 to 41 weeks, with an average of 36.7 weeks (Table 1).

Table 1 - Socioeconomic, demographic and obstetric characterization of the participants (n=338). Ribeirão Preto, SP, Brazil, 2022

Socioeconomic, demographic and obstetric variables	n*	%
Age (years)		
18 - 20	44	13,0
21 - 25	110	32,5
26 - 30	92	27,2
31 - 35	56	16,6
36 - 30	28	8,3
41 - 45	08	2,4
Monthly family income		
0 to 5 minimum wages	291	86,1
6 or more minimum wages	47	13,9
Color/race		
Brown	162	47,9
White	129	38,2
Black	45	13,3
Yellow	2	0,6
Marital status		
Married/with partner	291	86,1
Single/without a partner	47	13,9
Schooling (education)		
Elementary school	51	15,1
High school	253	74,9
Higher education	34	10
Religious belief		
Yes (Catholic, Evangelical, Spiritist or other)	205	60,7
No	133	39,3
Occupation		
Housewife, unemployed, student	202	59,8
Paid work	136	40,2
Housing		
Property not owned (rented, borrowed, invaded)	172	50,9
Own property	166	49,1
No. of pregnancies		
1 pregnancy	116	34,3
≥ 2 pregnancies	222	65,7

Socioeconomic, demographic and obstetric variables	n*	%
Nº births		
0 births	135	39,9
1 births	116	34,3
≥ 2 births	8769	25,8
Abortions		
Yes	69	20,4
No	269	79,6

*n = number of participants

The data on vaccination is shown in Table 2. In short, there was a predominance of pregnant women vaccinated for COVID-19 (97.6%); who agreed with vaccination (92%) and who felt safe after immunization (84.3%).

Table 2 - Characterization of vaccination and health information of participants (n=338). Ribeirão Preto, SP, Brazil, 2022

Variables	n*	%
History of positive COVID-19 test		
Yes, before pregnancy	42	12,4
Yes, during pregnancy	50	14,8
No	246	72,8
Vaccination against COVID-19		
Vaccinated	330	97,6
Not vaccinated	8	2,4
COVID-19 vaccine doses received		
One dose or single dose	12	3,6
Two doses	136	40,2
Three doses (initial and booster)	182	53,8
I haven't been vaccinated	8	2,4
Vaccine received		
Pfizer-BioNTech®	177	52,4
Corona Vac® (Sinovac/Butantan)	126	37,3
Oxford AstraZeneca®	15	4,4
Janssen®	2	0,6
I don't know which vaccine I received	10	2,9
I haven't been vaccinated	8	2,4

Variables	n*	%
Agreement with vaccination for pregnant women		
I agree	311	92,0
I disagree	27	8,0
Agreement with vaccine interchangeability		
I agree	196	58,0
I disagree	142	42,0
Agreement with the booster dose for pregnant women		
I agree	296	87,6
I disagree	42	12,4
Perceived safety in relation to vaccination		
Safe	285	84,3
Insecure	45	13,3
I haven't been vaccinated	8	2,4
Reason for vaccine hesitancy		
Fear of vaccine damage to self and/or baby	2	0,6
I don't think the vaccine is safe	2	0,6
I didn't have the opportunity/conditions to go to a vaccination center	2	0,6
I was advised by a health professional not to get vaccinated	1	0,3
I don't think vaccination is important	1	0,3
I got vaccinated	330	97,6

*n = number of participants

Vaccination against COVID-19 showed a statistically significant association with paid work, number of births, number of living children and agreement with vaccination against COVID-19 in pregnant women. Due to the small number of participants who were not vaccinated (n=8), logistic regression was not carried out (Table 3).

Table 3 - Distribution of pregnant women according to COVID-19 vaccination (n=338). Ribeirão Preto, SP, Brazil, 2022

Variable	Vaccination against COVID-19		p
	Yes n* (%)	No n* (%)	
Paid work			
Yes	136 (100,0)	0 (0,0)	
No	194 (96,0)	8 (4,0)	0,0240†
Number of births			

Variable	Vaccination against COVID-19		p
	Yes n* (%)	No n* (%)	
0 births	135 (100,0)	0 (0,0)	
1 or more births	195 (96,1)	8 (3,9)	0,0240†
Children			
Median (IQR)	0 (0,0)	1,5 (1,2)	0,0180‡
Agreement with vaccination for pregnant women			
I agree	308 (99,0)	3 (1,0)	
I disagree	22 (81,5)	5 (18,5)	0,0010†
Total	330 (97,6)	8 (2,4)	

*n - number of participants; † p-value calculated by Fisher's Exact Test; ‡ p-value calculated by Mann-Whitney Test

The feeling of perceived safety in relation to vaccination against COVID-19 was higher among participants who agreed with vaccination against COVID-19, who were 6.50 times more likely to feel safe with the vaccine against COVID-19 than those who disagreed with immunization (Table 4).

Table 4 - Distribution of pregnant women according to their feelings about the safety of vaccination against COVID-19 (n=330). Ribeirão Preto, SP, Brazil, 2022

Variable	Perceived safety of COVID-19 vaccination		p †	OR 95%	IC
	Safe n*(%)	Insecure n* (%)			
Agreement with vaccination for pregnant women					
I agree	273 (88,6)	35 (11,4)		6,50	2, - 16,15
I disagree	12 (54,5)	10 (45,5)	0,0010	0,00	
Total	285 (86,3)	45 (13,7)			

* n - number of participants; † - p-value calculated by Fisher's Exact Test

The variable agreement with vaccination against COVID-19 (agree) remained significantly associated with feelings of safety in relation to vaccination against COVID-19 in pregnant women ($p \leq 0.05$) in the final model, at the 5% level (Table 5).

Table 5 - Logistic regression model: variables associated with feelings of safety in relation to vaccination against COVID-19 in pregnant women. Ribeirão Preto, SP, Brazil, 2022

	Estimate	Standard error	p †	OR‡	IC 95% §
Agreement with vaccination among pregnant women (Agree)	2,02	0,52	0,0001*	7,6	2,7 - 21,4
Constant	-0,96	1,25	0,4431		

†p - p-value; ‡ OR - Odds ratio; § 95% CI - Confidence interval; *Statistically significant difference for P≤0.05.

DISCUSSION

Considering the repercussions of COVID-19 on maternal and fetal health, contamination during pregnancy is a cause for concern. The data from this study is in line with previous research which reported non-contamination rates of 85.5%[12] and shows that pregnant women globally are adhering to measures to prevent and protect against COVID-19, such as vaccination.

When assessing vaccination coverage, it should be noted that it is reported variably according to the different settings and cohorts surveyed, where context-specific factors must be addressed to understand local barriers and devise efficient strategies for maternal immunization that encourage vaccine uptake.[13]

In this study, more than 90% of pregnant women were vaccinated with at least one dose, exceeding the vaccination coverage target in this population for the Brazilian context.[14] This is positive and different from what happened in England, where vaccinated pregnant women accounted for 66.2%.[12] This finding highlights the potential of the measures in the scenario studied, which can lead to the prevention of COVID-19 and a reduction in mortality in this population, as well as a reduction in costs for the health system related to fewer hospitalizations.[15]

Vaccine acceptance is necessary to achieve immunization coverage. In this study, 2.4% of participants did not receive the vaccine, which is of interest for understanding different health education strategies to reach this population.[16]

The continuous assessment of hesitancy can, together with the monitoring of vaccination coverage, help both in coping with the COVID-19 pandemic and in preventing new epidemics, as evidenced in another Brazilian study.[17-19]

Several reasons have influenced readiness for COVID-19 vaccination around the world. Data from Belgium, Norway, the Netherlands, Switzerland, Ireland, the United Kingdom[18] and Italy[19] showed that hesitancy towards the COVID-19 vaccine may occur more frequently during pregnancy. In this period, some of the reasons for hesitancy are the same as for non-pregnant patients and some are specific to pregnancy.[20]

The Matrix of Determinants of Vaccine Hesitation highlights the factors that influence the behavioral decision to accept, delay or reject some or all vaccines in three categories: contextual, individual and group influences, and vaccine/vaccination-specific.[21] According to the Matrix, in this study the contextual influences are related to geographical barriers (lack of opportunity/conditions) and communication barriers (professional advice against the vaccine); the individual and group influences are marked by perceived risk/benefit (fear of the harm of the vaccine for themselves and their child) and immunization as a social norm versus unnecessary/harmful (lack of importance given to the vaccine); the vaccine-specific influences are related to reliability and/or source of vaccine supply and/or vaccination equipment (feeling of insecurity).

The recommendation of a health professional is the most important predictor of acceptance/compliance with the vaccine by pregnant women.[22] However, when analyzing the reasons for refusing vaccination in this study, the results become particularly intriguing, especially when one observes, albeit in isolation, the advice of a health professional against vaccination, as well as the lack of importance given to vaccination.

This data highlights the communication gap between national and international guidelines and the healthcare provider[23] and the need to provide guidance on vaccination several times, which can help healthcare service users understand the importance of immunization.[20]

It is important to emphasize the importance of health education during prenatal care, so that there is no loss of opportunities to vaccinate pregnant women due to misinformation.[24] This also applies to organizational aspects, which should not be a barrier to the population's access to the vaccination room.[25]

The complete vaccination schedule predominated among pregnant women, in a similar way to what happened in England.[12] It is worth emphasizing the importance of women being vaccinated with the basic schedule and the booster dose during the puerperal pregnancy cycle, given the mutations resulting from the still uninterrupted circulation of the virus.[25]

The rates of perceived safety in relation to the vaccine and agreement in favour of immunizing pregnant women were high among the participants, which was not corroborated by other authors, who reported 49% of pregnant women in favour of immunization.[26]

The high level of agreement with vaccination against COVID-19 by pregnant women in this study is in line with the high number of pregnant women vaccinated, demonstrating that although some did not agree with vaccination, they were immunized, confirming the importance of collective actions to achieve results that benefit the health of the population.

Interchangeability between vaccines, i.e. the use of doses from different manufacturers during the vaccination schedule, was a strategy that the participants agreed with. Another Brazilian study recalled the use of heterologous vaccination schemes in countries such as Canada, England and other European nations, and revealed that it is applied due to fluctuating stocks of doses and also because of evidence of "more robust" immune responses when compared to two doses of the same vaccine.[27]

Vaccination against COVID-19 was higher among pregnant women with paid work, previous childbirth, living children and those who agreed with vaccination against COVID-19 in pregnant women. Similar data was found in a study carried out in Palestine, where vaccination coverage was higher among employed pregnant women.[28]

The feeling of safety is fundamental in the vaccination process, since pregnant women have additional concerns about the safety of their babies and their own. Our findings showed that the feeling of perceived safety in relation to vaccination was higher among pregnant women who agreed with vaccination against COVID-19. Perceptions and attitudes about COVID-19 vaccination are one of the main determinants of vaccine acceptance, since they influence people's behavior.[29]

The study's limitation is the concentration of pregnant women in a specific geographical region.

CONCLUSION

The findings of the study showed high rates of pregnant women vaccinated against COVID-19, who agreed with vaccination and felt safe about immunization. Immunization was influenced by paid work, number of births, number of living children and agreement with vaccination. It is suggested that nurses and other health care providers be more widely involved in prenatal care, for health education actions aimed at pregnant women, seeking to dispel false or mistaken information and backed up by science, in order to promote adherence to vaccinations during pregnancy.

This study has the potential to contribute to the development of appropriate strategies to increase coverage and acceptance of the COVID-19 vaccine among pregnant women, as well as to guide educational activities in preparation for vaccination campaigns specific to this population. Its results can collaborate with legislators to develop public policies and make responsible health decisions for a beneficial vaccination campaign for pregnant women in the Brazilian scenario.

REFERENCES

1. Pan American Health Organization/World Health Organization. Epidemiological Update: Coronavirus disease (COVID-19). Washington, D.C.: PAHO/WHO; 2021 [cited 2023 oct 24]. Disponível em: https://iris.paho.org/handle/10665.2/54283.

2. American College of Obstetricians and Gynecologists. ACOG COVID_19 vaccines and pregnancy: conversation guide. ACOG; Washington, DC: 2021 [cited 2024 jul 20]. Available from: https://www.acog.org/covid-19/covid-19-vaccines-and-pregnancy-conversation-guide-for-clinicians.

3. Ministério da Saúde (BR). Secretaria Extraordinária de Enfrentamento à COVID-19. Nota técnica nº6/2021-SECOVID/GAB/SECOVID/MS; 2021. Orientações referentes a intercambialidade das vacinas COVID-19. 2021 [acesso em 28 de outubro 2024]. Disponível em: https://www.gov.br/saude/pt-br/assuntos/covid-19/notas-tecnicas/2021/nota-tecnica-no-6-2021-secovid-gab-secovid-ms.pdf/view.

4. Shimabukuro TT, Kim SY, Myers TR, Moro PL, Oduyebo T, Panagiotakopoulos L, et al. Preliminary Findings of mRNA Covid-19 Vaccine Safety in Pregnant Persons. N Engl J Med. [Internet]. 2021 [cited 2024 jul 24];384(24). Available from: https://doi.org/10.1056/NEJMoa2104983.

5. Francisco R, Lacerda L, Rodrigues AS. Obstetric Observatory BRAZIL - COVID-19: 1031 maternal deaths because of COVID-19 and the unequal access to health care services. Clinics. [Internet]. 2021 [cited 2024 jul 24];76:e3120. Available from: https://doi.org/10.6061/clinics/2021/e3120.

6. Rawal S, Tackett RL, Stone RH. et al. COVID-19 vaccination among pregnant people in the United States: a systematic review. Am J Obstet Gynecol MFM. [Internet]. 2022 [cited 2024 jul 24];4(4):100616. Available from: https://doi.org/10.1016/j.ajogmf.2022.100616.

7. Prasad S, Kalafat E, Blakeway H, et al. Systematic review and meta-analysis of the effectiveness and perinatal outcomes of COVID-19 vaccination in pregnancy. Nat Commun. [Internet]. 2022 [cited 2024 jul 24];13(1). Available from: https://doi.org/10.1038/s41467-022-30052-w.

8. Halasa NB, Olson SM, Staat MA, et al. Effectiveness of maternal vaccination with mRNA COVID-19 vaccine during pregnancy against COVID-19-Associated hospitalization in infants aged <6 Months - 17 states, july 2021-january 2022. MMWR Morb Mortal Wkly Rep. [Internet]. 2022 [cited 2024 jul 24];71(7). Available from: https://doi.org/10.15585/mmwr.mm7107e3.

9. Batista SR, Souza ASS, Nogueira J, de Andrade FB, Thumé E, Teixeira DSC, et al. Comportamentos de proteção contra COVID-19 entre adultos e idosos brasileiros que vivem com multimorbidade: iniciativa ELSI-COVID-19. Cad Saúde Pública. [Internet]. 2020 [acesso em 24 de julho 2024];36(15):e00196120. Disponível em: https://doi.org/10.1590/0102-311X00196120.

10. MacDonald NE; SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: Definition, scope and determinants. Vaccine. [Internet]. 2015 [cited 2024 jul 24];33(34). Available from: http://doi.org/10.1016/j.vaccine.2015.04.036.

11. Ester Paiva Souto1; Juliana Kabad2. Vaccine hesitancy and the challenges of dealing with the COVID-19 pandemic among older adults in Brazil. Rev. Bras. Geriatr. Gerontol. [Internet]. 2020 [cited 2024 jul 24];23(5):e210032. Available from: https://doi.org/10.1590/1981-22562020023.210032.

12. Husain F, Powys VR, White E, Jones R, Goldsmith LP, Health PT, et al. COVID-19 vaccination uptake in 441 socially and ethnically diverse pregnant women. PLoS ONE. [Internet]. 2022 [cited 2024 jul 24];17(8):e0271834. Available from: https://doi.org/10.1371/journal.pone.0271834.

13. Moschese V, De Angelis L, Capogna MV, Graziani S, BaglivoF, Pietropolli A, Del Giudice MM, Rizzo C. Vaccine hesitancy and knowledge regarding maternal immunization among reproductive age women in central Italy: a cross sectional study. Front Glob Womens Health. [Internet]. 2023 [cited 2024 jul 24];4:1237064. Available from: https://doi.org/10.3389/fgwh.2023.1237064.

14. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde e Ambiente. Departamento de Imunização e Doenças Imunopreveníveis. Estratégia de vacinação contra a covid-19 – 2024. 1ª ed. Brasília: Ministério da Saúde, 2023.

15. Piekos SN, Price ND, Hood L, Hadlock JJ. The impact of maternal SARS-CoV-2 infection and COVID-19 vaccination on maternal-fetal outcomes. Reprod Toxicol. [Internet]. 2022 [cited 2024 jul 24];114. Available from: https://doi.org/ 10.1016/j.reprotox.2022.10.003.

16. Freeman D, Loe BS, Chadwick A, Vaccari C, Waite F, Rosebrock L, Jenner L, Petit A, Lewandowsky S, Vanderslott S, et al. COVID-19 Vaccine Hesitancy in the UK: The Oxford Coronavirus Explanations, Attitudes, and Narratives Survey (Oceans) II. Psychol. Med. [Internet]. 2022 [cited 2024 jul 24];52. Available from: https://doi.org/10.1017/S0033291720005188.

17. Souto EP, Kabad J. Vaccine hesitancy and the challenges of dealing with the COVID-19 pandemic among older adults in Brazil. Rev. Bras. Geriatr. Gerontol. [Internet]. 2020 [cited 2024 jul 24];23(5):e210032. Available from: https://doi.org/10.1590/1981-22562020023.210032.

18. Ceulemans M, Foulon V, Panchaud A, Winterfeld U, Pomar L, Lambelet V, Cleary B, O'Shaughnessy F, Passier A, Richardson JL, et al. Vaccine Willingness and Impact of the COVID-19 Pandemic on Women's Perinatal Experiences and Practices—A Multinational, Cross-Sectional Study Covering the First Wave of the Pandemic. IJERPH. [Internet]. 2021 [cited 2024 jul 24];18:3367. Available from: https://doi.org/10.3390/ijerph18073367.

19. Carbone L, Mappa I, Sirico A, Di Girolamo R, Saccone G, Di Mascio D, Donadono V, Cuomo L, Gabrielli O, Migliorini S, et al. Pregnant Women's Perspectives on Severe Acute Respiratory Syndrome Coronavirus 2 Vaccine. Am. J. Obstet. Gynecol. [Internet]. 2021 [cited 2024 jul 24];3:100352. Available from: https://doi.org/10.1016/j.ajogmf.2021.100352.

20. Rand CR, Olson-Chen C. Maternal Vaccination and Vaccine Hesitancy. Pediatr Clin North Am. [Internet]. 2023 [cited 2024 jul 24];70(2). Available from: https://doi.org/10.1016/j.pcl.2022.11.004.

21. MacDonald NE, SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: Definition, scope and determinants. Vaccine. [Internet]. 2015 [cited 2024 jul 24];33(34). Available from: https://doi.org/10.1016/j.vaccine.2015.04.036.

22. Chamberlain AT, Seib K, Ault KA., et al. Improving influenza and Tdap vaccination during pregnancy: a cluster-randomized trial of a multi-component

antenatal vaccine promotion package in late influenza season. Vaccine. [Internet]. 2015 [cited 2024 jul 24];33(30). Available from: https://doi.org/ 10.1016/j.vaccine.2015.05.048.

23. Frawley JE, McKenzie K, Sinclair L, Cummins A, Wardle J, Hall H. Midwives' knowledge, attitudes and confidence in discussing maternal and childhood immunization with parents: A national study. Vaccine. [Internet]. 2020 [cited 2024 jul 24];38(2). Available from: https://doi.org/10.1016/j.vaccine.2019.10.006.

24. Ayhan SG, Oluklu D, Atalay A, Beser DM, Tanacan A, Tekin OM, et al. COVID-19 vaccine acceptance in pregnant women. Int J Gynaecol Obstet. [Internet]. 2021 [cited 2024 jul 24];154(2). Available from: https://doi.org/10.1002/ijgo.13713.

25. Duarte DC, Oliveira VC de, Guimarães EA de A, Viegas SM da F. Vaccination access in Primary Care from the user's perspective: senses and feelings about healthcare services. Esc Anna Nery. [Internet]. 2019 [cited 2024 jul 24];23(1):e20180250. Available from: https://doi.org/10.1590/2177-9465-EAN-2018-0250.

26. Zapletal J, Drochýtek V, Vařbuchtová A, Halaška MJ, Rob L. Analysis of awareness and acceptance of SARS-CoV-2 vaccination among pregnant women. Ceska Gynekol. [Internet]. 2022 [cited 2024 jul 24];87(2). Available from: https://doi.org/10.48095/cccg2022100.

27. Maciel E, Fernandez M, Calife K, Garret D, Domingues C, Kerr L, et al. A campanha de vacinação contra o SARS-CoV-2 no Brasil e a invisibilidade das evidências científicas. Ciência & Saúde Coletiva. [Internet]. 2022 [acesso em 24 de julho 2024];27(03). Disponível em: https://doi.org/10.1590/1413-81232022273.21822021.

28. Nazzal Z, Mohammad A, Qub L, Masri H, Abdullah I, Qasrawi H, Maraqa B. Coverage and Determinants of COVID-19 Vaccination Among Pregnant Women: An Experience From a Low-Income Country. Am J Health Promot. [Internet]. 2023 [cited 2024 jul 24];37(2). Available from: https://doi.org/10.1177/08901171221111107.

29. Limbu YB, Gautam RK, Pham L. The Health Belief Model Applied to COVID-19 Vaccine Hesitancy: A Systematic Review. Vaccines. [Internet]. 2022 [cited 2024 jul 24];10:973. Available from: https://doi.org/10.3390/vaccines10060973.