ORIGINAL

Factors associated with the vaccination decision of pregnant women against Covid-19 vaccination: a mixed study

Fatores associados à decisão vacinal de gestantes frente à vacinação contra Covid-19: estudo misto

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ABSTRACT

OBJECTIVE: To analyze the factors that influenced the decision of pregnant women linked to Primary Health Care, to vaccinate against Covid-19. **METHOD:** A mixed study is part of an umbrella project, whose selection was carried out with 42 pregnant women, who answered the questionnaire and participated in a semi-structured interview. The data underwent simple statistical analysis and thematic analysis. **RESULTS:** Significant factors associated with vaccine acceptance: Guidance/stimulation for vaccination performed by the nurse, support of family members, fear of being contaminated or dying from Covid-19 and possibility of protecting the fetus. Factors linked to hesitation: fear of adverse effects from vaccination, fear of needle and fake news on digital media. **CONCLUSION:** Vaccination hesitation can directly impact collective immunization, making it difficult to expand the vaccine coverage needed to protect the population. The permanent need for professional strategies and public policies contributes to increasing confidence in vaccination against Covid-19 in the country.
Keywords: Pregnant women; Covid-19; Vaccination.

RESUMO

Objetivo: Analisar os fatores que influenciaram a decisão de gestantes vinculadas à Atenção Primária em Saúde, em se vacinarem contra Covid-19. **Método:** Estudo misto faz parte de um projeto guarda-chuva, cujo recorte foi realizado com 42 gestantes, que responderam ao questionário e participaram de entrevista semiestruturada. Os dados passaram por análise estatística simples e análise temática. **Resultados:** Fatores significativos associados à aceitação vacinal: orientação/estímulo para vacinação realizados pelo enfermeiro, apoio de familiares, medo de estar contaminado ou morrer por Covid-19 e possibilidade de proteger o feto. Fatores atrelados a hesitação: medo de efeitos adversos provenientes da vacinação, medo de agulha e notícias falsas em mídias digitais. **Conclusão:** A hesitação vacinal pode impactar diretamente na imunização coletiva dificultando a ampliação da cobertura vacinal necessária para proteger a população. A necessidade permanente de estratégias profissionais e políticas públicas contribui para ampliar confiança na vacinação contra a Covid-19 no país.
Descritores: Gestantes; Covid-19; Vacinação.

INTRODUCTION

Brazil has an Immunization Program with extensive activity related to the reduction of morbimortalities caused by immunopreventable diseases. With the advancement of technology related to the development of vaccines it can be observed historically a significant evolution in its capacity to expand vaccine coverage, whose social and economic benefits have proven national and international recognition.

However, the vaccine coverage rate has been falling under the influence of some factors such as the increase in anti-vaccine groups and the spread of false vaccination-related news. This movement opens room for differences of opinion between individual freedom and the

need for organizational decision and collective protection of life [1,2].

With the advent of the pandemic, according to the extraordinary edition of the Covid-19 Fiocruz Observatory, in 2021 the mortality rate due to Covid-19 among Brazilian pregnant women and puerperal women was 7.2%, being a percentage higher than the national mortality rate of 2.8%, characterizing the country with the highest number of maternal deaths [3]. It is important to highlight that pregnant women were more likely to develop severe forms of Covid-19 contributing to the increase in mortality rates compared to non-pregnant people [4,5].

Even if there is still little consensus on vaccination of pregnant women against Covid-19, pointing out a controversial issue when taking into account the difficulty in conducting clinical trials to validate their safety; there are several studies that value the continuity of investigations and the maintenance of vaccination for this population group [6,7]. Therefore, even if the decision to vaccinate is made by the woman herself, the effectiveness of vaccines that overcome the risks for this specific group should be widely disseminated from updated information.

It is worth noting that in relation to vaccination against Covid-19 aimed specifically at pregnant women, fear of post-vaccination adverse events and concerns about harmful effects on the fetus can lead pregnant women to a tendency to have greater resistance to vaccination than non-pregnant people [8-9].

This resistance which has been related to the concept of vaccine hesitancy permeates the process of refusal or delay in relation to the acceptance of vaccines, even if these are available to the population, whose behaviors are influenced by factors that interrelate, whose theoretical model refers to trust, compliance and convenience, which has been proposed by WHO since 2011 [10].

This model can be expanded taking into account issues involving communication and context [11]. Thus, trust is related to the sense of safety of vaccines, the health system and the recommendations of managers or health professionals. Complacency results from the low perception of the need for the vaccine before the low risk of contracting the disease. Convenience considers the conditions of geographic and economic access, as well as the ability to understand health information. Communication is related to the dissemination of knowledge, information and face-to-face guidance or through

technologies and social media, generating the possibility of believing in false information. The context includes ethnicity, education, religion, occupation and socioeconomic status [10,11].

Thus, in order to ensure the success of the development and effectiveness of vaccination against Covid-19 for pregnant women it is also necessary to invest more and more in processes that take into account the people's behaviors in order to increase stimulation of acceptance and decrease positions related to hesitation, vaccine resistance or refusal [12,13].

Estimates of acceptance and global hesitation of the Covid-19 vaccine, especially among pregnant women are still unknown, making it necessary to identify the challenges involved in this process, contributing to accelerate vaccination coverage and in turn to increase individual and organizational decision-making power focusing on specifics related to pregnant women.

Thus, from the hypothesis that pregnant women may have greater vaccine hesitancy against Covid-19 than the non-pregnant population, this study aims to analyze the factors that influenced the decision of pregnant women to vaccination against Covid-19.

METHOD

Part of a *web survey* umbrella project entitled Vaccination and Covid-19: Decision-making of users and workers of Primary Health Care, this sequential explanatory mixed study was carried out under the influence of John Creswell, whose collection and analysis of qualitative information will be carried out from the preliminary results produced through the collection and analysis of quantitative data through an online questionnaire applied to pregnant women during the pandemic and subsequent qualitative stage through semi-structured individual interviews [14].

Data collection was carried out between April and June 2022, beginning after approval of the project by the Research Ethics Committee (Approval opinion number 5.569.429). The questionnaires were answered via Google forms with guidelines on the process of participation and signaling regarding the Free and Informed Consent Form - TCLE that enabled the possibility of continuation or refusal of participation. Thus, the participant signaled the acceptance of the conditions to proceed and the knowledge that consent was implicit when reading, clicking and advancing in the filling of the questionnaire sent via digital contact via WhatsApp, for example, whose expected duration

was between 10 to 15 minutes. The interviews had as questions: What do you think about Covid-19 vaccination? What are the reasons why you were vaccinated against Covid-19? What are the reasons why you had the resistance to vaccinating against Covid-19? They were held in clinics of the health unit, at available hours of the participants. Protective measures against Covid-19 were used, such as distance, surgical mask and 70% alcohol. The instruments were elaborated by the researchers.

The prediction of participants was made by non-probabilistic sampling, being expanded from the snowball sampling technique [15]. The inclusion criteria were pregnant women over 18 years old linked to primary care health units and with familiarity with digital resources. As exclusion criteria: pregnant women with intellectual disability.

Quantitative data were analyzed using simple descriptive statistics and the information from the interviews were transcribed and submitted to Thematic Analysis procedures [16].

RESULTS

The average age of the pregnant women was 27 years old, and the majority reported having primary education and income equivalent to a minimum wage. As for skin color, 47.6% self-declared white and 50% black, when added to the quantitative of brown (21.4%) and black (28.6%). More than half (52%) were evangelic and 97% reported being heterosexual. Most of them (40.5%) reported living with three people in the same household and 42.8% having only one child. Among 52.8% of the pregnant women who reported immunization with more than two doses, 46.3% were immunized only with Biontech-Pfizer.

In the midst of situations that interfered with the decision of pregnant women regarding vaccination against Covid-19, significant variables can be observed both regarding the factors associated with acceptance and vaccination hesitation, which were compiled in Table 1.

Table 1 – Factors associated with the decision of pregnant women regarding vaccination against Covid-19. Health region of Médio Paraíba, State of Rio de Janeiro, 2022 (cont.)

Variables	n	(%)
The acceptance to vaccinate against Covid-19 was influenced by *		
Stimulation/guidance performed by nurses	23	54.8
Stimulation/guidance performed by another health team professional	3	7.2
Campaigns carried out on the internet, radio, newspaper and television	4	9.5
Family members	3	7.2
Courses and training for health professionals and workers	2	4.8
Videos and lectures of researchers/experts working with vaccines	2	4.8
Friends	1	2.4
Messages, videos and posts on social networks (Instagram, Facebook/Meta, WhatsApp)	4	9.5
Fear of dying contaminated by Covid-19	4	9.5
Fear of being contaminated by Covid-19	4	9.5
Possibility to protect the fetus via placenta	5	11.9
Possibility to protect the baby by breastfeeding	3	7.2
Gratuitousness of the vaccines provided by the MS facilitates access to vaccination	31	73.8
Availability of vaccines in the health unit as soon as they were released by MS	11	26.2
Vaccination site near the residence facilitates access to vaccination	2	4.8
The resistance to vaccinate against Covid-19 was influenced by *		
Family members	5	11.9
Campaigns carried out on the internet, radio, newspaper and television	3	7.2
Messages, videos and posts on social networks (Instagram, Facebook/Meta, WhatsApp)	4	9.5
Health professional – doctor	2	4.8
Community health agent	3	7.2
Friends	1	2.4

Table 1 – Factors associated with the decision of pregnant women regarding vaccination against Covid-19. Health region of Médio Paraíba, State of Rio de Janeiro, 2022

Variables	n	(%)
Fear of needle	6	14.2
Lack of time	4	9.5
Possibility of having adverse events from vaccination against Covid-19	3	7.2
Regret not having vaccinated as soon as vaccines were made available	3	7.2
Refusal of vaccine(s) such as CoronaVac and Oxford-AstraZeneca	2	4.8
Discredit in effective/prolonged protection of Covid-19 vaccines	1	2.4
Questioning about the origin of Covid-19 vaccines	1	2.4
Specific type of vaccine available on the day of vaccination makes it difficult to access vaccination	2	4.8
Health unit or vaccination site away from the residence makes access difficult	6	14.2
Delay of MS to guarantee vaccines for the population makes access difficult	8	19.0
Delay in existing lines at vaccination sites makes access difficult	7	16.7
Dates programmed by age group and specific groups limited access to vaccination	10	23.8
Lack of vaccine on the day he or she went to the health unit / vaccination site	1	2.4

In addition to the quantitative data, interviews were also analyzed, and themes that were repeated forming categories associated with acceptance and vaccination hesitation were identified: The dissemination of *fake* news or scientific content on Covid-19 vaccines, based on information technologies influencing the vaccination decision of pregnant women; fear associated with Covid-19 raises a feeling of vaccine acceptance and fear associated with vaccination increases hesitation; friends, family and professionals can stimulate the acceptance or hesitation of pregnant women; the influence of educational practices carried out by health professionals increases the possibility of vaccine acceptance.

One of these identified factors was the influence exerted by the health professional. It can be noted that 11.9% of pregnant women indicated that health professionals had vaccination--resistant positions.

The participant's speech elucidates this question:

> *I saw doctors saying that over the years other diseases appear (G28)*

However, it was also pointed out by the pregnant women that the stimulus/guidance performed by the nurse (54.8%) and the stimulus/guidance performed by other health professionals (7.2%) made a link to the vaccination acceptance. The influence of educational practices carried out by health professionals, in this study, especially nurses, increase the possibili-

ty of vaccine acceptance. This question can be exemplified from the following statements:

> *But if it is necessary and the nurse or doctor says I need it, I will take it (G029)*

> *The professionals study and I trust, in the guidelines of the staff working at the health center near home (G030)*

The campaigns carried out on the internet, radio, newspaper and TV, were identified by 9.5% being linked to acceptance and 7.2% associated with hesitation. Messages, videos and posts on social networks (Instagram, Facebook/Meta, WhatsApp) were also pointed out by 9.5% of pregnant women being associated with acceptance and 9.5% with resistance. As a way to characterize the respective associations, one can observe the statements of these pregnant women:

> *I saw a lot of videos and had reports of friends who took and who didn't feel weel[...] I saw it in kwaia. I don't believe, I saw on the internet, I don't take it (G028)*

> *I found it good, I saw reports on the internet that was improving the cases and decided to take, the news helped to see what was happening (G031)*

> *On social networks there is always a lot of things, negative message about vaccine, ideal to know where to read and what to do, I vaccinated even with fear, we receive a lot of message, Facebook and sometimes on WhatsApp(G032)*

Family members were also pointed out influencing both acceptance (7.2%) and vaccination hesitation (11.9%). However, the qualitative information highlighted aspects related to acceptance, as it can be seen from the participant's report:

> *My family kept me also telling me to take it (G029)*

Specifically, regarding the acceptance, 19% of the participants indicated, respectively, that the concern with the protection of the fetus via placenta and the fear of being contaminated or dying from Covid-19 were indicative for vaccination as soon as the doses were made available by SUS. The participant's speech highlights this question:

> *I vaccinated because I was afraid to die and harm my baby (G037)*

Among the factors that stood out most related to vaccine hesitation are the fear of needle (14.2%) and the possibility of having adverse events from vaccination against Covid-19 (7.2%). The regret of not having vaccinated once the vaccines were made available appears to be signalized by 7.2%. The following statements can exemplify how fear can influence the behavior of pregnant women:

> *I was afraid of the third dose, fear of thrombosis (G020)*

> *Many people where I live were having reaction, pain in the arm, fever. I was afraid (G028)*

DISCUSSION

Even if the vaccination rate of this group of pregnant women was high (95.2%), and only two participants (4.8%) reported that they did not vaccinate, it should be considered the possibility of correlation between the factors identified by them that lead to doubts and questions directed both to acceptance and confidence as to resistance or even refusal.

It can be observed the existence of factors identified by pregnant women who interfere in the vaccination decision process, both of acceptance and of hesitation: the use of information technologies related to the dissemination of subjects about vaccination against Covid-19, the fear of the pregnant woman being contaminated or dying from Covid-19, the concern to protect the fetus, the fear of side effects of vaccination for oneself and the fetus, and the influence of friends, family and health professionals.

Digital media and social networks can influence the decision-making process of pregnant women, from access to both false news that expand vaccination hesitation or refusal, making it difficult to prevent diseases and health protection; as for the accurate and up-to-date information that contributes to increasing vaccine acceptance and health care. The newspaper, radio, TV, digital media and social media (Instagram, Facebook/Meta, WhatsApp) , may be a vehicle of information associated with acceptance [17], but also hesitation. The advancement of *fake* news and misinformation characterizes the epidemic process that has been affecting the modes of communication in everyday life and in turn, health around the world [18] leaving the population less confident and more complacent about the vaccination process [19,11].

The fear of being contaminated or dying from Covid-19 led the pregnant women of this study to report a greater possibility of vaccine acceptance. It was identified in the studies [12,20] confirming how much can increase the desire of the pregnant woman to get vaccinated.

In turn, fear of adverse events from vaccination, fear of needle and concern to generate harm to the fetus also appear to be signalized by pregnant women as a possibility of vaccine hesitation in the following studies [9,11].

In this context of tensions and contradictions, family members, friends and health professionals can also influence both acceptance and vaccination hesitation. Thus, the decision to vaccinate can be influenced by conflicting views. Regarding the professionals, this study can highlight the records related to the nurses' work related to vaccination orientation. The importance of stimulation/guidance performed by health professionals in relation to vaccination can be identified in a study conducted by Dara, et al. (2021) in India [20]. However, there are also vaccination-resistant positions that raise questions and reflections that hinder the population's discern-

ment[21]. The communication process between professionals and population should be experienced taking into account the context and existence of factors related to ethnicity, education, religion, occupation and income that interfere with people's decision-making power. Thus, it is important to carry out approaches in a sensitive and transparent manner in order to instrumentalize attitudes consistent with the dissemination of updated scientific evidence.

Specifically, among the factors that stood out the most, associated by pregnant women with vaccine acceptance, was the expectation of ensuring the fetus protection. The concern with the protection of the fetus via placenta is an indication identified by pregnant women for vaccination as soon as they were made available by SUS, being a factor widely mentioned in the studies [22,11] increasing the possibility of confidence and acceptance of vaccination.

Among the factors that stood out the most in the records of pregnant women linked specifically to vaccination hesitation, are the dates programmed by age group and specific groups, the delay by the Ministry of Health to guarantee the vaccines and the delay in the existing lines at the vaccination sites.

Another factor identified in the pregnant women's records that contributed to hesitation was the concern with the rapid approval of Covid-19 vaccines for emergency use, being also identified by Skjefte, et. al. (2021) in an online and cross-sectional study with more than 17 women from 16 countries. However, the authors point out that the advance in the development of vaccines can contribute to increase confidence and acceptance of vaccines in different contexts [9].

It is worth noting that the hesitation related to vaccination against Covid-19 is in a context of resistances and refusals that has been expanded through disinformation or safety concerns, also impacting the reliability directed to the use of other vaccines, for example, against influenza, polio and measles [10]. Thus, vaccine hesitancy can directly influence collective immunization, making it difficult to expand vaccine coverage necessary to protect the health of the population, both in relation to Covid-19 and diseases such as measles, polio, flu, etc. Regarding pregnant women, when they are part of a group with specificities that are also associated with the fetus, they live with more factors associated with vaccination hesitation against Covid-19 than the non-pregnant population.

Thus, it is ratified how important it is to operationalize public health policies in the SUS context, reinforcing the vaccination process as a public good managed by a competent network of health services, which must remain with the perspective of gratuitousness with a view to greater population reach.

CONCLUSION

The challenges to reverse the low vaccination coverage of pregnant women in the context of the pandemic are part of the daily reality of health services in Brazil and other countries of the world. In a context in which one can observe increasing movement related to vaccine hesitation, disseminate updated information about the decision of pregnant women regarding vaccination against Covid-19, enables the sharing of updated scientific knowledge with a view to conscious decision making.

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