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Hesitation to Vaccination for Covid-19 Among the Brazilian Adult Population

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ABSTRACT

Introduction: This study evaluated the perceptions and attitudes of the Brazilian adult population about Covid-19 vaccines, seeking to identify which factors are associated with vaccine hesitancy and lack of confidence in vaccines to support individual or group reception and guidance strategies. *Methods:* This study with 1,700 adults was carried out in June 2021. The survey included sociodemographic questions, general information about Covid-19, and a specific questionnaire for the vaccine. *Results:* Most of our sample expressed favorable opinions regarding vaccination for Covid-19, but a smaller fraction (2.2%) of respondents were hesitant about vaccination for Covid-19. Vaccine hesitant respondents were mainly males aged between 30 and 59 years. They reported that the reasons for vaccine hesitation are mainly due to uncertainty about the safety (57.9%) and efficacy (36.8%) of the vaccines, followed by the concern with its development, that is, the question of time and the adoption of a new development technology (28.9%). In addition, although the impact of groups and peers on those who hesitate to vaccinate was unclear, the perception of a low risk of contracting the disease was evident. *Conclusions:* It is necessary to develop targeted strategies to increase effective communication about the risks and benefits of vaccines for Covid-19. Uncertainty about the safety and efficacy of vaccines and the timing and adoption of new development techniques have significantly affected perceptions about acceptance of the Covid-19 vaccine.

Keywords: Covid-19; Sars-CoV-2; Vaccines.

HESITAÇÃO À VACINAÇÃO PARA COVID-19 NA POPULAÇÃO ADULTA BRASILEIRA

RESUMO

Introdução: Este estudo avaliou as percepções e atitudes da população adulta brasileira sobre as vacinas para Covid-19, buscando identificar quais fatores estão associados à hesitação vacinal e à falta de confiança nas vacinas para subsidiar estratégias individuais ou grupais de acolhimento e orientação. *Métodos:* Trata-se de uma pesquisa tipo survey com 1.700 adultos realizada em junho de 2021. A pesquisa incluiu questões sociodemográficas, informações gerais sobre a Covid-19 e um questionário específico para a vacina. *Resultados:* A grande maioria de nossa amostra expressou opiniões favoráveis em relação à vacinação para Covid-19, mas também houve uma fração menor (2,2%) dos entrevistados que se apresentaram hesitantes sobre a vacinação para Covid-19. A maioria deles era do sexo masculino na faixa etária de 30 a 59 anos, que relatou que um dos motivos para a hesitação da vacina é, principalmente, devido à incerteza sobre a segurança (57,9%) e eficácia (36,8%) delas, seguido pela preocupação com o seu desenvolvimento, ou seja, a questão do tempo e a adoção de uma nova tecnologia de desenvolvimento (28,9%). Além disso, embora o impacto dos grupos e pares sobre aqueles que hesitam em vacinar não tenha sido claro, foi evidente a percepção de um baixo risco de contrair a doença. *Conclusões:* É necessário desenvolver estratégias direcionadas para aumentar a comunicação eficaz sobre os riscos e benefícios das vacinas para a Covid-19. A incerteza sobre a segurança e a eficácia das vacinas e o momento e a adoção de novas técnicas de desenvolvimento, afetaram significativamente as percepções sobre a aceitação da vacina da Covid-19.

Palavras-chave: Covid-19; Sars-CoV-2; Vacinas.

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INTRODUCTION

The year 2019 was marked by the emergence of the severe acute respiratory syndrome coronavirus 2 (Sars-CoV-2), which has gained worldwide exposure since the beginning of 2020. [1] The coronavirus disease 2019 (Covid-19) has spread globally in a short period, and despite the passing of the months, the number of infected people is still increasing rapidly on a global scale.

While the rapid escalation of the Covid-19 continues, the world has taken several measures to contain the disease spread, especially vaccines. [2] Vaccines are one of the most important contributions to public health in the 20th century and are responsible for the sharp decline in vaccine-preventable diseases worldwide. However, there is a need to understand and address the attitudes and beliefs regarding vaccination to achieve herd immunity to Sars-CoV-2 through vaccines.

The Wellcome Global Monitor 2018 study showed that 97% of Brazilians agree or strongly agree that it is important to vaccinate children.[3] Despite being higher than the global average (92%), the need to address the relationship between vaccine hesitancy and ineffective communication remains explicit: there is a drop to 80% among those who expressed themselves positively when asked if vaccines are effective and safe.

Several factors can influence behavior towards vaccination: such as, but not limited to (i) confidence in the efficacy and safety of vaccines; (ii) trust in the system that provides them, and (iii) trust in the motivations of policymakers who decide on the vaccines offered. [4] The Covid-19 pandemic has repeatedly tested these, and several other factors that can influence the decision to accept vaccination and similar results on Covid-19 vaccine acceptance are around the globe, including in England[5], Australia[6], Poland[7], Malaysia[8], Jordan[9], Hong Kong[10] and Nepal[11] among others.

There is a lack of studies covering the Brazilian perceptions towards vaccination for Covid-19. The topic is relevant, as the Brazilian Unified Health System (also known as SUS, for its initials in Portuguese) is one of the largest public health systems in the world, with an excellent track record on vaccination coverage. Brazil's National Immunization Program (NIP) makes available, free of charge, a series of vaccines that guarantee the immunization of children, adolescents, adults, older adults, and pregnant women. Currently, four vaccines for Covid-19 are available at SUS-NIP: Comirnaty (Pfizer/Wyeth), Oxford/Covishield (Fiocruz and Astrazeneca), and Janssen Vaccine (Janssen-Cilag) have definitive registration by the Brazilian National Health Surveillance Agency (Anvisa), while Coronavac (Butantan) has an emergency use approval.

Our central hypothesis was that the Brazilian population has low (less than 5%) hesitation concerning vaccines against Covid-19. We also hypothesized that the reasons for vaccine hesitancy are mainly due to uncertainty about the safety and efficacy of vaccines. Therefore, this study aimed to assess the perceptions and attitudes of the Brazilian adult population about Covid-19 vaccines, seeking to identify which factors are associated with vaccine hesitancy to support individual or group strategies for welcoming and guidance.

MATERIAL AND METHODS

Study design, setting and participants

It is a nationwide online survey of perceptions and attitudes about Covid-19 vaccines among people aged 18+ in Brazil. The study uses social media as a recruitment platform, and the recruitment occurred from June 1st to 30th, 2021. This study was conducted according to the guidelines established in the Declaration of Helsinki, and the Blinded Research Ethics Committee (Number: 45530521.2.0000.5504) approved all procedures involving research study participants. All subjects provided electronic informed consent.

Measurements

The survey included sociodemographic questions, general information on COVID-19, and a vaccine-specific questionnaire.

Vaccine-specific questionnaire

A panel of psychologists and clinicians designed a vaccine-specific questionnaire to assess perceptions and attitudes of the Brazilian adult population about vaccination for Covid-19 and to identify which factors are associated with vaccine hesitancy and lack of confidence in vaccines. It used the Sage Working Group definitions on Vaccine Hesitancy, which defines vaccine hesitancy as the delay in acceptance or refusal of vaccination despite the availability of vaccination services. [4] Responses to "If you have not yet received a dose of the Covid-19 vaccine, do you plan to get vaccinated?" assessed vaccine acceptance with the answer options "yes", "no", and "not sure". Responses "no" and "not sure" were coded into one variable to indicating refusal. The questionnaire consisted of three main sections, including questions on (1) contextual, (2) individual and group, and (3) vaccine/vaccination-specific influences on Covid-19 vaccination.

Sample size

Based on previous findings on the overall prevalence of a positive response on the importance of getting vaccinated in the Brazilian population, we assumed around 4% (3% - 5%) the prevalence of vaccine hesitancy. [3] We calculated a required sample size of at least 1476 respondents with an error margin of 1% and 95% Confidence Interval [CI].

Data analysis

Categorical variables are presented as counts (percentages). Comparisons between groups were performed using Pearson's Chi-squared test with Yates' continuity correction for categorical variables. All analyses were conducted using R version 4.0.3 (The R Foundation for Statistical Computing, Vienna, Austria) in R-Studio 1.3.1093 (RStudio Inc., Boston, USA).

RESULTS

From 1st to 30th June 2021, we collected data from 1700 Brazilian adults. There were no invalid responses. Table 1 shows the sociodemographic and health characteristics of the study population. Most were females (1154/1700, 67.9%) within the age range of 30 and 59 years, about three-fourths of them, had professional training (1273/1700, 74.9%), and had no personal history of the previous infection by Covid-19 (1416/1700, 83.3%) nor among their household familiars (1299/1700, 76.4%).

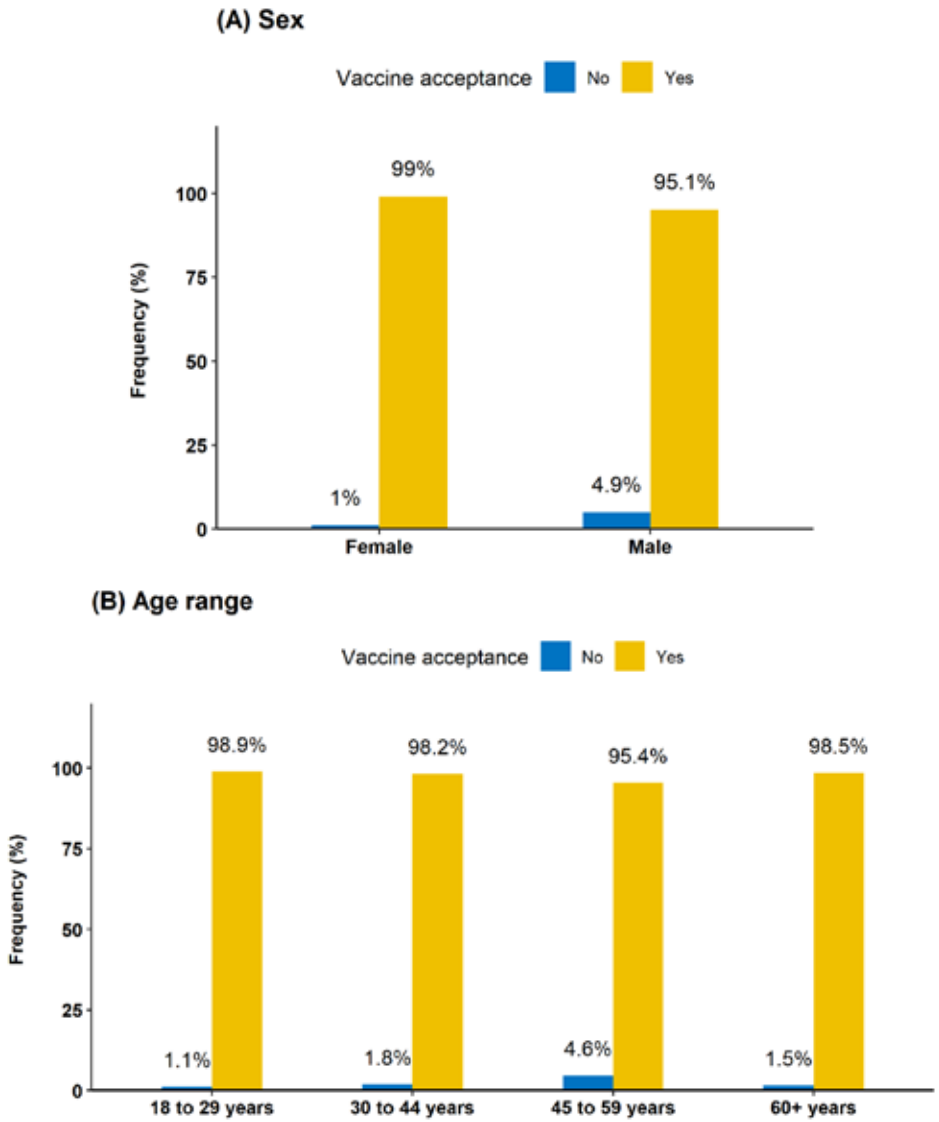
Table 1 – Sociodemographic and health characteristics of the study population

Variable	**n (%)**
Sex	
Female	1154 (67.9)
Male	546 (32.1)
Age range	
18 to 29 years	459 (27)
30 to 44 years	655 (38.5)
45 to 59 years	389 (22.9)
60 to 74 years	180 (10.6)
75+ years	17 (1.0)
Schooling	
Primary school	5 (0.3)
Secondary school	43 (2.5)
High school	379 (22.3)
Professional degree	1273 (74.9)
Self-perceived health status	
Excellent	482 (28.4)
Very good	772 (45.4)
Good	428 (25.2)
Poor	18 (1.1)
Healthcare assistance	
Public healthcare system	356 (20.9)
Health insurance plan	1300 (76.5)
Private Doctor	44 (2.6)
Personal history of past COVID-19 infection	
Past infection	284 (16.7)
No history of infection	1416 (83.3)
History of COVID-19 infection among household familiars	
Yes	401 (23.6)
No	1299 (76.4)

Vaccine hesitancy

More than half of the participants were vaccinated (956/1700, 56.2%). Accordingly, the overall prevalence of vaccine hesitancy was rather low, 2.2% (95% CI, 1.5% – 2.9%) of participants responded negatively about Covid-19 vaccination intention. When considering only those who haven't received a dose of the Covid-19 vaccine, 5.1% (95% CI, 3.5% – 6.7%) of the participants were resistant to Covid-19 vaccination. Moreover, there was a significant variation in the prevalence of vaccine hesitancy among certain population subgroups. (Figure 1) Higher proportions of vaccine hesitancy was observed among males ($p < 0.001$) and those aged between 45 and 59 years ($p < 0.001$). Other characteristics, such as levels of schooling, self-perceived health status, type of healthcare assistance, and personal history of past Covid-19 infection or among household familiars, were not significantly associated with variations in vaccine hesitancy.

Figure 1 – Proportions of vaccine acceptance according to (A) sex and (B) age range. (N=1700)



Those who responded resistant to Covid-19 vaccination were predominantly males (27/38, 71.1%), within the age range of 30 and 59 years (30/38, 79%). About three-fourths of them had professional training (28/38, 73.7%) and had no personal history of the previous infection by Covid-19 (30/38, 78.9%) nor among household familiars (26/38, 68.4%). Notably, when assessed the reasons for vaccine hesitancy, the responses were mainly due to uncertainties about the safety (22/38, 57.9%) and efficacy (14/38, 36.8%) of the vaccines, followed by concerns about their development, i. e., the problem of timing and the adoption of a new development technology (11/38, 28.9%), contraindications for health reasons (4/38, 10.5%) and personal history of Covid-19 infection (3/38, 7.9%). There were no significant differences in the reasons for vaccine hesitancy between population subgroups.

Perceptions and attitudes

We also assessed perceptions and attitudes about Covid-19 vaccination considering a set of factors that may influence the decision to accept or not to be vaccinated. To this end, we explored some of the principal determinants in each category of the Sage Working Group on Vaccination Hesitance Matrix among those who responded resistant to Covid-19 vaccination.

Contextual influences

Table 2 shows the influences arising from historical, sociocultural, environmental, health system / institutional, economic, or political factors. According to the table, those who are resistant to Covid-19 vaccination ranked healthcare workers (30/38, 78.9%) as the ones they trust most for information, while social media (19/38, 50%), government (8/38, 21.1%), and pharmaceutical companies (7/38, 18.4%) as the least trustworthy. Although most indicate that community leaders and influencers support Covid-19 vaccines (37/38, 97.4%), a significant portion was neutral (18/38, 47.4%) to the position of some in not agree to vaccination for different reasons. Moreover, most also pointed knowing someone who does not take a Covid-19 vaccine because of religious or cultural reasons (29/38, 76.3%). Mostly, they do not disagree with these people (18/38, 47.3%), nor do they think they are risking their health or the community's health if they do not take the Covid-19 vaccine (30/38, 78.9%). Notably, most are convinced that the government purchases the highest quality vaccines available (18/38, 47.4%), but they do not believe that vaccine producers are interested in their health (32/38, 84.2%).

Table 2 – Contextual and individual / group influences on those resistant to COVID-19 vaccination. (N=38)

Survey questions to assess contextual influences on Covid-19 vaccination	**n (%)**
Who do you trust the most for information?	
Healthcare workers	30 (78.9)
Government	3 (7.9)
Social media	3 (7.9)
Friends / Family	2 (5.3)

Who do you trust the least for information?	
Social media	19 (50)
Government	8 (21.1)
Pharmaceutical companies	7 (18.4)
Drugstores	2 (5.3)
Friends / Family	1 (2.6)
Healthcare workers	1 (2.6)
Do leaders (religious, political, teachers, healthcare workers) in your community support Covid-19 vaccines?	
Yes	37 (97.4)
No	1 (2.6)
Some groups or leaders do not agree to vaccination for different reasons. In general, do you agree or disagree with these groups?	
0 (Strongly disagree)	4 (10.5)
1	2 (5.3)
2	18 (47.4)
3	7 (18.4)
4 (Strongly agree)	7 (18.4)
Do you know anyone who does not take a vaccine because of religious or cultural reasons?	
Yes	29 (76.3)
No	9 (23.7)
Do you agree or disagree with these persons?	
0 (Strongly disagree)	14 (36.8)
1	6 (15.8)
2	12 (31.6)
3	2 (5.3)
4 (Strongly agree)	4 (10.5)
Do you think they are risking their health or the community health if they do not take the Covid-19 vaccine?	
Yes	8 (21.1)
No	30 (78.9)
I'm convinced that my government purchases the highest quality vaccines available.	
0 (Strongly disagree)	5 (13.2)
1	3 (7.9)
2	12 (31.6)
3	5 (13.2)
4 (Strongly agree)	13 (34.2)
Do you believe the vaccine producers are interested in your health?	
Yes	6 (15.8)
No	32 (84.2)

Individual and group influences

Table 3 presents the influences arising from the personal perception of the vaccine or social environment. Most participants reported knowing anyone who had a bad reaction to the Covid-19 vaccine (30/38, 78.9%). Although most do not think vaccines overload the immune system (27/38, 71.1%), a notable portion

was neutral (18/38, 50%) on whether it is better to develop immunity by getting sick than getting vaccinated. Moreover, most pointed out that they do not feel they have enough information about vaccines and their safety (31/38, 81.6%) and that mass immunization campaigns do not provide sufficient information to address concerns around vaccination (22/38, 57.9%). Yet, although these individuals think that vaccines are still needed even when the disease is no longer prevalent (26/38, 68.4%), about a half indicated that it is relevant to get a vaccine to protect those that cannot get vaccinated (21/38, 55.3%).

Table 3 – Individual and group influences on those resistant to Covid-19 vaccination. (N=38)

Survey questions to assess individual and group influences on Covid-19 vaccination	**n (%)**
Do you know of anyone who has had a bad reaction to a Covid-19 vaccine?	
Yes	30 (78.9)
No	8 (21.1)
Do you think vaccines overload the immune system?	
Yes	11 (28.9)
No	27 (71.1)
It is better to develop immunity by getting sick than to get vaccinated.	
0 (Strongly disagree)	6 (15.8)
1	2 (5.3)
2	19 (50)
3	3 (7.9)
4 (Strongly agree)	8 (21.1)
Do you feel you get enough information about vaccines and their safety?	
Yes	7 (18.4)
No	31 (81.6)
Mass immunization campaigns provide you with sufficient information to address your concerns around vaccination.	
0 (Strongly disagree)	16 (42.1)
1	6 (15.8)
2	9 (23.7)
3	4 (10.5)
4 (Strongly agree)	3 (7.9)
Vaccines are still needed even when diseases are rare.	
0 (Strongly disagree)	3 (7.9)
1	1 (2.6)
2	8 (21.1)
3	7 (18.4)
4 (Strongly agree)	19 (50)
Do you think it's important to get a vaccine to protect those that cannot get vaccinated?	
Yes	21 (55.3)
No	17 (44.7)

Vaccine/vaccination-specific influences

Table 4 presents the influences that are directly related to the vaccine or vaccination. Although the fear of pain or needles when receiving a vaccine does not significantly influence hesitancy to be immunized (35/38, 92.1%), most of the participants indicated that before administering the vaccine, the healthcare worker does not always have provided enough information on the side-effects that might follow (17/38, 44.7%). Moreover, for the most part, they do not believe that the new Covid-19 vaccines were tested with the same rigorous standard as any prescribed drug (21/38, 55.3%) and that they are concerned that the Covid-19 vaccine does not prevent the disease (27/38, 71.1%). They also disagree (19/38, 50%) that vaccines made in Europe or America are safer than those made in other countries such as Russia, India, China, and Brazil.

Table 4 – Vaccine/vaccination-specific influences on those resistant to Covid-19 vaccination. (N=38)

Survey questions to assess vaccine/vaccination-specific influences on COVID-19 vaccination	**n (%)**
Before administering the vaccine, the healthcare worker always provided me with enough information on the side-effects that might follow.	
0 (Strongly disagree)	13 (34.2)
1	4 (10.5)
2	9 (23.7)
3	9 (23.7)
4 (Strongly agree)	3 (7.9)
Do you believe that the new Covid-19 vaccines are trialed to the same rigorous standard as any normally prescribed drug?	
0 (Strongly disagree)	16 (42.1)
1	5 (13.2)
2	8 (21.1)
3	5 (13.2)
4 (Strongly agree)	4 (10.5)
Are you concerned that the Covid-19 vaccine does not prevent the disease?	
Yes	27 (71.1)
No	11 (28.9)
Do you feel that the fear of pain or needles when receiving a vaccine make you hesitate to be immunized?	
Yes	3 (7.9)
No	35 (92.1)
Vaccines made in Europe or America are safer than those made in other countries such as Russia, India, China and Brazil.	
0 (Strongly disagree)	10 (26.3)
1	9 (23.7)
2	7 (18.4)
3	5 (13.2)
4 (Strongly agree)	7 (18.4)

DISCUSSION

We assessed the perceptions and attitudes in a sample of the Brazilian adult population about Covid-19 vaccines. Although most of our participants expressed favourable opinions regarding Covid-19 vaccination, we also observed a fraction (2.2%) of hesitation. Among these, most were males within the age range of 30 to 59 years and reported that their reasons for vaccine hesitation are mainly due to uncertainty about safety (57.9%) and efficacy (36.8%) of vaccines, followed by concern with their development, that is, the issue of timing and the adoption of a new development technology (28.9%).

Several studies have identified similar results on Covid-19 vaccine acceptance around the globe, including England[5], Australia[6], Poland[7], Malaysia[8], Jordan[9], Hong Kong[10] and Nepal[11], among others. The reasons to delay or refuse vaccines are practically the same across studies. The uncertainties about the safety and efficacy of vaccines, the timing, and the adoption of new development techniques seem to be the principal factors associated with COVID-19 vaccine hesitancy.

Most respondents to our study reported that before administering a vaccine, they did not always receive sufficient information about the vaccines and their safety and the side effects that may occur. Such notes reflect ineffective communication about the risks and benefits of vaccines. Therefore, it is essential to think about how the population is receiving information about Covid-19 vaccines. A survey on a nationally representative sample (n = 1600) of American parents with children <6 years of age showed the three principal resources that parents use when seeking information about immunizations: their healthcare providers, the media, and the Internet [12, 13]. Our results also identified health professionals as the most reliable source for obtaining information, but the vast majority also pointed a lack of confidence in the content propagated in social media and by the government and pharmaceutical companies. It is worth noting that many of the barriers mentioned in our study can be overcome or mitigated by timely and effective communication between the healthcare workers and the population. Our results point to the need to strengthen this bond. While social media platforms have become a common source of health information globally, they are also recognized as unreliable sources. But confidence that vaccination can reduce the chance of contracting the disease and that the vaccine is safe are not the only aspects to be addressed.

Rosenstock et al. performed one of the first studies on vaccine hesitancy. Although more than half a century has passed, our results show little has changed. According to the authors, four psychosocial domains influence parents' decisions to vaccinate their children for polio. First is the parents' assessment of their child's risk of contracting the disease. Second, parental evaluation of whether the condition is a sufficient health concern to warrant vaccination. The third is the parents' assessment of whether their child's vaccination may reduce their child's chance of contracting the disease and whether the vaccine is safe. And the fourth is the concerns and influences that facilitated or discouraged parents' decision to vaccinate their children [14]. Therefore, personal perception

about the disease and the vaccine and the effects from the social environment are fundamental aspects to be considered.

Traditionally, groups and peers play an important role in shaping an individual's thinking and decision-making. However, although most of those hesitant affirmed that leaders (religious, political, teachers, and healthcare workers) in their community support Covid-19 vaccines, they position themselves as neutral when asked if they agree or not with some groups or leaders who do not agree to vaccination for different reasons such as religious or cultural. Likewise, they do not perceive it as a risk to their health or the community's health if these groups or leaders do not take the Covid-19 vaccine. Therefore, while the impact of groups and peers on those who hesitate to vaccinate is still unclear, the perception of a low risk of contracting the disease was evident. The current pandemic scenario has changed, and perhaps such perceptions have also changed. Future studies are needed to reassess these aspects.

Our research has some limitations. A methodological limitation is the study's design as an online survey: specific populations are less likely to access the internet and respond to online questionnaires. On the other hand, it allows survey respondents to increase or decrease the pace as per their convenience leading to better response quality. Moreover, this study reports data collected in June 2021. The current pandemic scenario has changed; perhaps our results on the perceptions and attitudes of the Brazilian adult population about Covid-19 vaccines may have also changed. Sampling is another limitation; our results are not fully generalizable to the adult Brazilian population due to the sex ratio and age range of the sample differing from the percentages of the Brazilian adult population, as well as the high level of education of the participants and the high rate of those already vaccinated. Thus, little information is available about the population belonging to the most vulnerable social groups. This is relevant as they are the ones who have difficulty accessing information about vaccines and are at greater risk of contracting the disease for various reasons. As sociocultural differences configure a significant reality in Brazil, our results must be carefully analyzed. Despite that, our sample provided a significant picture of the perceptions and attitudes of this population, which can inform the development of individual or collective support strategies for embracement and guidance.

CONCLUSIONS

Most of our sample expressed favorable opinions about Covid-19 vaccination. However, the results presented here are not fully generalizable to the adult Brazilian population due to the sex ratio and age range of the sample differing from the percentages of the Brazilian population, as well as the high level of education of the participants and the high rate of those already vaccinated. Even so, the uncertainties about the safety and efficacy of vaccines, the timing, and the adoption of new development technologies suggest the need for more effective communication strategies about the risks and benefits of Covid-19 vaccines. These strategies should strengthen the relationship between healthcare workers and the population. They also should focus on searching

for alternative strategies to provide adequate information to the population to contribute to maintaining high levels of vaccination coverage.

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