






Willingness to get vaccinated with the first-generation vaccines against SARS-CoV-2

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Abstract

Objective: To explore people's decision-making regarding whether or not to get vaccinated against COVID-19.

Methods: A purposive sample of people over the age of 18 who had not yet been vaccinated against COVID-19 was studied. Data were gathered using semi-structured interviews in focus groups and personal in-depth interviews. All interviews were conducted on the Zoom[®] platform and were recorded for subsequent verbatim transcription. Using a grounded theory approach, both open and axial coding of the narrative data were performed.

Results: Information saturation was reached after eight focus group meetings and 14 in-depth interviews ($n = 55$). Six principal themes emerged, with the fear of possible adverse side-effects and the worries generated by the speed of the development and commercialization of the vaccine amongst the main expressed anxieties. Social pressure to get vaccinated was a recurrent subject, as was the desire for clear and understandable information from reliable sources.

Conclusions: The willingness to get vaccinated against COVID-19 is determined by a complex series of interconnected factors that define an explanatory model, which has evolved concurrently with the development of the vaccines and the progress of the vaccination campaigns. This model will be useful for deciding social scenarios aimed at tackling this or future pandemics and for designing formulas that will increase the initial acceptance of these vaccines.

KEYWORDS

COVID-19, health behaviour, infectious diseases, pandemic, public health, SARS-CoV-2, vaccine acceptance immunization, vaccine hesitancy

1 | INTRODUCTION

Immediately after the declaration of the first outbreak in Wuhan and its subsequent transformation into a pandemic (Khan et al., 2021), the sanitary crisis provoked by the SARS-CoV-2 virus set off a race against the clock to develop an effective vaccine that would combat the devastating effects of this disease (Frederiksen et al., 2020).

After the development and commercialization of the vaccines against COVID-19, vaccine acceptance amongst the population has played a decisive role in the successful control of this pandemic. However, worldwide the willingness to be vaccinated against COVID-19 is uneven (Sallam, 2021) and in Europe, for instance, France and Germany stand out as countries with the higher vaccine rejection rates (10%), while, at the other extreme, in Spain and Portugal only 6.7% and 5.0%, respectively of its population has rejected the vaccine (Ministry of Health-Government of Spain, 2021; Neumann-Böhme et al., 2020). Nevertheless, some studies investigating the evolution of vaccine acceptance over time have detected that there has been a positive trend in the willingness to get vaccinated since the start of the pandemic among the general population (Yasmin et al., 2021). Despite this, vaccine hesitancy is still a common phenomenon in many countries (Neumann-Böhme et al., 2020).

Some of the main motives for hesitancy or refusing to get vaccinated against SARS-CoV-2 highlighted by the scientific literature include the fear of adverse side-effects, distrust regarding the vaccine's safety and effectiveness, and the low perceived likelihood of the risk of infection (Kim et al., 2021; Lin et al., 2021; Pogue et al., 2020; Ștefănuț et al., 2021; Wang & Liu, 2021; Zhou et al., 2021). Yet, national COVID-19 mortality rates and the cumulative incidence of coronavirus are directly correlated with vaccination intentions (Lin et al., 2021). Nevertheless, the research performed using closed questions may not provide enough detailed information (Stange et al., 1994) for describing the explanatory model underlying the decision to get vaccinated or not against COVID-19.

Thus, this study aimed to explore and identify the adult population's level of awareness, as well as their perceptions and attitudes, that determine their willingness to get vaccinated against SARS-CoV-2. In this way, we hope to identify potential obstacles to vaccine acceptance and improve knowledge of the factors that cause people to change their minds.

2 | MATERIAL AND METHODS

We conducted a qualitative study using grounded theory methodology (Foley & Timonen, 2015). To gather information, we used focus groups and in-depth interview techniques based on semi-structured interviews (Table 1) using the Zoom digital platform®.

2.1 | Sample recruitment

The target population were adults (>18 years) resident in Spain who had not yet been vaccinated against SARS-Cov-2. People who did not

speak Spanish or those with digital illiteracy were excluded. Subjects were selected using purposive sampling to ensure that all opinions on this phenomenon were represented in the target group, which was as diverse as possible in terms of age, gender, educational level and willingness to be vaccinated. In this sense, the representativeness of the opinions in the study sample was maximized by including subjects who had different perspectives in relation to the willingness to be vaccinated (in favor/against/doubtful) and guaranteeing the inclusion of at least one subject from each of the combinations of the three controlled sociodemographic variables (sex, age, and academic level).

2.2 | Data collection and analysis

The number of interviews performed was determined by the principle of information saturation (Trotter, 2012). All the interviews were conducted by two of the researchers (AMC, MTPJ) using the ZOOM platform and were subsequently transcribed word-for-word. The data analysis followed a grounded theory approach using the tool Atlas.ti (v. 8.4)®. Two researchers (AMC, JJGC) systematically reviewed and coded narrative data as interviews were completed using an iterative and comparative method (Glaser & Holton, 2004). Using an open coding approach, we identified and grouped together the categories of the subject area under study as they emerged. These categories were then grouped into core subject areas using an axial coding process (Howel, 2013).

2.3 | Ethical considerations

At the beginning of the interviews, all participants were informed of the aims and nature of the research project. Then, they were asked on video for their consent to take part in the survey. The Ethics in Investigation Commission of the University of Murcia approved this project (ID: 3468/2021).

3 | RESULTS

The interviews were carried out telematically in March–May 2021 towards the end of the third wave of the pandemic in Spain. In all, after conducting eight focal groups and 14 in-depth interviews, information saturation was reached ($n = 55$) (Table 2). The factors determining the decision to get vaccinated or not against SARS-CoV-2 (Figure 1) can be grouped into six core areas, which we discuss in greater detail below.

3.1 | Knowledge and experience of other vaccines

Personal experiences in relation to other vaccines (above all, the flu vaccine) were often a key factor in people's willingness to accept the new anti-COVID-19 vaccine. Participants who regularly had a flu jab and who had noted its benefits were more likely to be willing to be

TABLE 1 Script interview

Main themes	Follow-up questions	Sounding questions
What was your experience with COVID-19?	How has the pandemic affected your life?	Have you felt afraid or at risk?
¿What experiences have you had with vaccines in the past?	¿What is your opinion in general of vaccines?	Why? Can you explain what you mean in more detail?
What do you know about the new vaccines against COVID-19?	What is your opinion of the information you have received?	What source of information do you trust the most?
¿Where did you hear about anti-COVID-19 vaccines?	What is your opinion of what the media is saying about these new anti-COVID vaccines?	Why do you trust one source of information more than another?
What is your opinion of the anti-COVID-19 vaccines?	¿How would you feel if you find out that the people around you have been vaccinated?	Who should get vaccinated? How do you justify that?
Why did you get vaccinated?	In your opinion, how will the pandemic situation change when most people are vaccinated?	¿Why?
What misgivings do you have about getting the anti-COVID-19 vaccine?	In your opinion, how should people be encouraged to get vaccinated against COVID?	

TABLE 2 Sociodemographic characteristics of the sample (n = 55)

	Focus groups		Deep interviews	
	n	%	n	%
<i>Gender</i>				
Female	29	70,7	8	57,1
Male	12	29,3	6	42,9
<i>Age (years)</i>				
18–30	10	24,4	0	0,0
30–60	17	41,5	12	85,7
≥60	14	34,1	2	14,3
<i>Academic level¹</i>				
High	23	56,1	8	57,1
Medium	5	12,2	3	21,4
Elementary	13	31,7	3	21,4
<i>Willingness to be vaccinated</i>				
In favour	30	73,2	4	28,6
Against	5	12,2	7	50,0
Doubtful	6	14,6	3	21,4
Total	41	100,0	14	100,0

(1) High: university studies or equivalent. Medium: secondary education. Elementary: primary education.

vaccinated against COVID-19. Conversely, people who had had flu despite being vaccinated, as well as those with information regarding the severe adverse side-effects of certain vaccines, were far more hesitant.

"I have no doubts about getting the COVID-19 vaccine because I have been vaccinated several times and have always seen more positive than negative effects." (Focus Group-participant SA) (FG-SA). "I was very worried about the hepatitis B vaccine. I saw a study that linked it to certain neurodegenerative illnesses. And so, I am

worried about getting vaccinated." (Deep interview-participant A) (DI-A). "I get the flu jab when it's time and so far so good. So, this morning I'm going to get my anti-COVID-19 jab." (FG-IV) "I don't want the anti-COVID jab! ... when I've had the flu jab I've been ill more often than when I haven't had it." (DI-S).

3.2 | Information received about the anti-COVID vaccine

The main sources of information about the anti-COVID-19 vaccine were the television (basically, news programmes) and Internet. Trust in the mass media was very low in almost all participants, who felt that they were being blatantly manipulated, although there were some who admitted that their only option was to believe the information they received. In general, people felt that the amount of information available from these sources was excessive and overwhelming. They expressed a desire for clear, precise instructions from medical staff or official spokespeople. Although the words of the health officials were generally accepted as credible, some found them unconvincing. One of the main recurring sources of mistrust and insecurity in participants was their perception of continuous contradictions in the information provided by these sources.

"We find out (about the anti-COVID vaccine) from the TV, radio and Internet. But that's not the same as being informed. It should be your doctor that tells you!" (DI-PT). "Everything they say on the TV is a lie." (FG-PT). "I don't believe anything they tell me! It's all just theatre! From the news to the cheapest reality show. Everything is scripted and decided beforehand." (DI-P). "There's a tsunami of information ... the problem is that it's not easy to separate the truth from the lies," (DI-JR). "When it comes to the vaccine, I don't even understand 10% of what they're saying. In the end, I accept it because

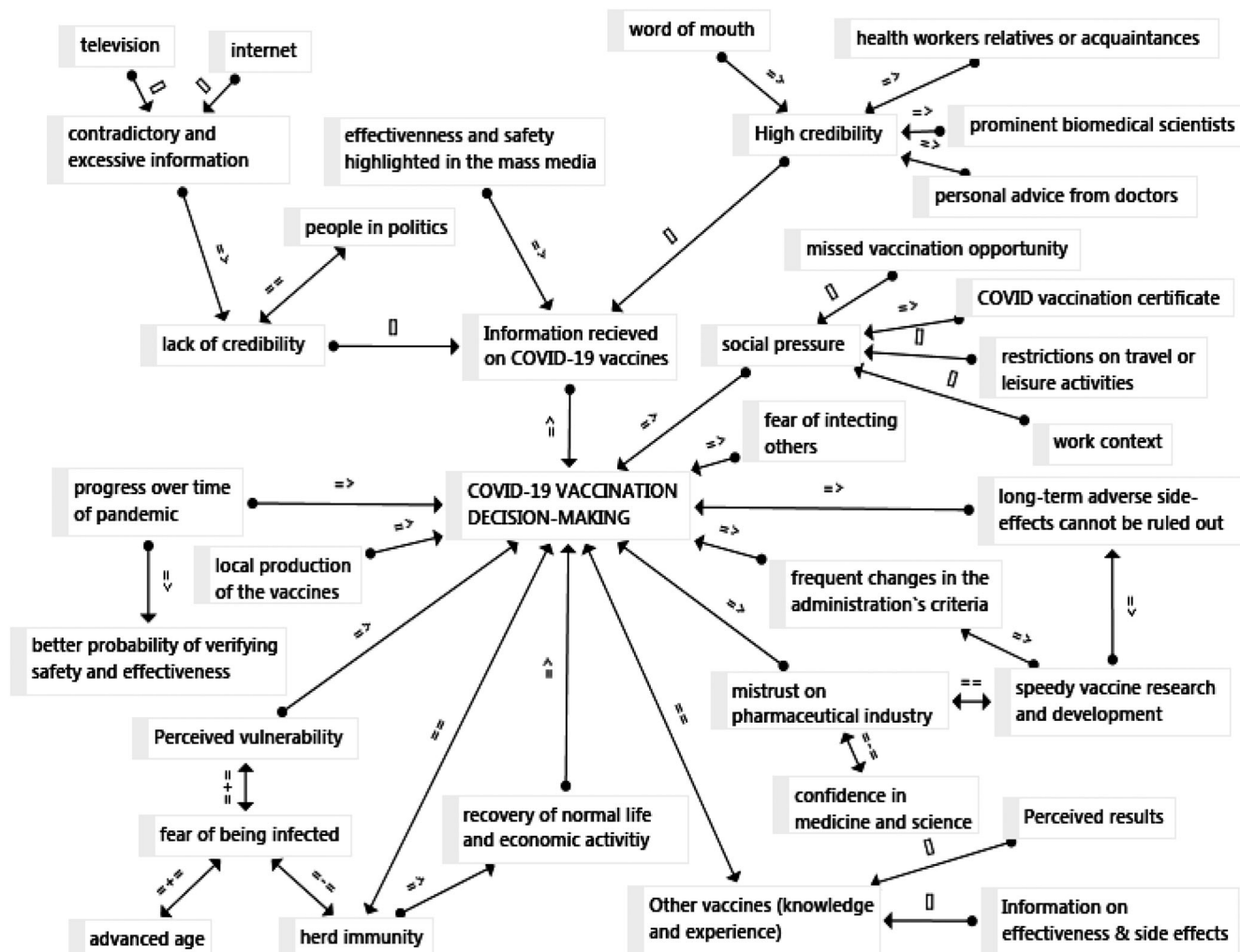


FIGURE 1 Comprehensive model of the COVID-19 vaccination decision-making process.

I don't have any choice." (FG-AR). "...We must trust (the health authorities) because, at the end of the day, there's no other way!" (FG-IV). "...every day they say something different (in the press) and they themselves don't even know what they are talking about. ... you can't trust them." (DI-CP).

Information received directly by 'word of mouth' was seen as the most reliable, above all if it came from friends or acquaintances working in the health service. Also warranting trust was information gained personally from health workers. No doubt was cast on the role of prominent scientists as providers of reliable information; by contrast, information originating from people in politics was often treated with distrust. Many people mentioned the vaccines manufactured in Europe, which even many sceptics said they would be prepared to accept.

"As you see more friends getting vaccinated and hearing them say they had no problems, you feel better about getting vaccinated too." (DI-A). "Above all, I trust

the opinion of friends of mine who work in the health sector because they really are in the thick of things." (FG-IV). "Familiarity with your doctor or nurse. After all, the closer the source, the more trustworthy it is ... much more than a minister who you've never met." (FG-AR). I like that woman virologist. She says: "Better this (a mask) and the vaccine than getting Covid." (FG-PT). "The only thing our politicians like doing is boasting..." (FG-AM). "I trust the vaccines that have been created and manufactured here in Europe... I trust the knowledge, techniques, research and the guarantees provided by the testing process. It makes me feel safer" (DI-LH).

3.3 | Knowledge of and belief in the new anti-COVID vaccines

Of the reasons for rejecting or having doubts about the SARS-Cov-2 vaccine (aside from the lack of transparency in the information received), some of the commonest fears were the possible adverse,

mid-to-long-term side-effects that can't be ruled out given the speed of the development and commercialization processes of the anti-COVID vaccine. Some participants, nevertheless, were not at all worried and even rationalized the appearance of possible side-effects as the logical consequence of any vaccine or medicine.

"I've been vaccinated as often as anybody but with vaccines that have been studied for many years and you know beforehand if there will be any adverse side-effects. In this case (anti-SARCOV-2 vaccine), you're in the dark." (DI-PM). "I'm not so much afraid of the reaction I could have to the vaccine when I get it but of what it could do to me within a few years. A vaccine that they've created in such a short period of time is a bit worrying. We don't know how people are going to react ..." (FG-AR). "It's obvious that the vaccine will have adverse side-effects. It's causing thrombosis! But what about contraceptive pills? (...) All medicines have positive as well as negative effects." (DI-JR).

People were also suspicious of the pharmaceutical companies and suggested that the only reason why this industry developed the anti-SARCOV-2 vaccine was to make money. By contrast, participants generally trusted the science and the medicine behind the vaccines and many called for more investment in R+D on anti-COVID vaccines.

"I believe that (the campaign to be vaccinated) is motivated by economic interests. If not, why are they extending the age limits for getting the vaccine? Because they've got to use up all the doses!" (FG-AP). "We live in a society based on lies, deceit and economic interests. And that goes for the pharmaceutical companies as well." (DI-CM). "We should invest more in research because it's the only way we have of ending this (the pandemic)." (FG-PA).

3.4 | Perceptions of COVID-19 and the potential benefits of herd immunity

The degree of vulnerability to COVID-19 is closely linked to the perception of the risk of infection, which was greater in the over 60 s than in other participants. Conversely, the desire to avoid transmitting the virus – if COVID-positive – to anybody in the immediate circle of friends and family was shared by all participants, regardless of age.

Almost all the participants – and even those who did not want to be vaccinated – agreed that they would feel safer if the people around them were vaccinated, especially if herd immunity had been achieved, which would, they claimed, lead to life getting back to normal. Moreover, some people openly admitted that they hoped to benefit from herd immunity in order to avoid having to be vaccinated and suffering any possible side-effects. Nevertheless, many participants believed that immunization is a necessary step on the way back to normality

and economic recovery. Others went further still and stated that vaccination was not only necessary but the only possible solution to the pandemic.

"I'm a bit scared as you can see what's happening. The older you are, the more dangerous it is... and so you get worried" (FG-PA). "...above all for fear of infecting someone and that they could die or be very ill because of me, because I caught it before they did" (FG-J). "I would be really much less worried if the people around me were already vaccinated" (FG-AM). "If you want to live peacefully, if you want to work, if you want to meet up with people ... you have to get vaccinated!!" (FG-MM) "I want to see herd immunity! All you 'vaccinators', you'll suffer the consequences whilst I remain fully protected" (DI-JV). "Get yourself vaccinated and don't pass anything on to me. But I'm not getting vaccinated!" (DI-RA). "Before I was very sceptical but now I can see that we either get vaccinated or this crisis will never end. As I am so desperate to get back to normal, in the end I reckon vaccination is the only solution" (DI-JT).

3.5 | Social pressure vs. the right to decide

It is worth highlighting the views of those who accept the vaccine unwillingly. They see getting the anti-COVID vaccine as something they inevitably will have to do – despite their misgivings – due to the social pressure. A number of participants claimed to have felt obliged to get vaccinated due to their work, while some felt that it was obligatory *de facto* in light of the future difficulties – including restrictions on entering shops, bars and restaurants, and when travelling – they predicted for non-vaccinated people. The COVID certificate was seen by some as a method of social control, but as a useful tool for containing the spread of the virus by others. In some extreme cases, it was the only reason that some participants would finally accept getting the vaccine.

"I know that I'll probably end up getting vaccinated, although I wouldn't swear to it 100%." (FG-AR). "In the end I'll have to get vaccinated because we'll all be obliged to do so, not because I want to." (DI-ST). "I feel a bit under pressure because they put me on the list (of workers) to be vaccinated without telling me." (DI-CA). "We all have the feeling that it is obligatory because having the vaccine will allow you to do things that, if you weren't, you wouldn't be able to. I look on it as obligatory!" (DI-Q). "The COVID certificate is a means of control! But, I suppose that, if it is for the common good, we'll have to accept it and that's that." (DI-CL). "If I have to get the damned vaccine to visit my parents in France, then I'll probably get it. But for that reason alone." (DI-JV).

3.6 | Increase in trust in the vaccine over time

The change in people's willingness to get vaccinated is worth underlining since a number of people admitted having modified their views as the vaccination campaign progressed or simply over time.

"Yes, I've changed my mind... it's now or never! I mean, months have gone by and people are getting vaccinated and I can't see any bad side-effects." (DI-CG). "At first I said to myself "No way! What's this muck they want to inject me with". But, over time, I've become more convinced, especially after seeing friends who have got the vaccine and are perfectly OK. I admit to having changed my mind quite radically." (FG-AR).

The timeframe of the evolution of the pandemic plays an overarching part in the construction of a person's views on vaccination. Three temporal factors can be highlighted: time to develop the vaccines, time to test their effectiveness and safeness once the vaccination programme is underway, and the long-term perspective as a horizon for understanding their positive or negative effects. The time taken to develop the vaccines has been vital in the increase in people's trust and in persuading many hesitant people to change their ideas regarding the new vaccines.

"Time, that is, seeing that over time that the situation is improving and just how many people have been vaccinated with only a few negative side-effects." (DI-LH). I need time to be able to trust it, for example, after a year the vaccine has really worked and there have been no bad side-effects. (FG-AM).

4 | DISCUSSION

According to our results, the decision-making process in relation to vaccination against COVID-19 is a complex process in which many factors interact. Thus, knowledge and experience of other vaccines (particularly, the flu vaccine); information, knowledge and beliefs about the new anti-COVID vaccines; perceptions of COVID-19 and herd immunity; social pressure and evolution of trust in the vaccine over time seem to play a crucial role in deciding whether or not being vaccinated against COVID-19.

Compared to previous studies, the participants in this study were already aware of the general positive effect of the vaccines but were concerned about possible negative side-effects (Sherman et al., 2021), especially in the long term. In the case of the anti-COVID-19 vaccines, participants placed great emphasis on the brevity of the development and testing periods of the vaccines (Guidry et al., 2021). This is a unique situation, as previously no other vaccine has even been subject to such social scrutiny and nowhere have people ever been so well informed.

Most participants in this research declared that they were willing to get vaccinated, even though many still had some doubts and con-

cerns. As in previous studies, people expressed a clear preference for locally produced over foreign vaccines (Lin et al., 2020). As a novelty in the acceptance or otherwise of a vaccine (given the current epidemiological situation), for our study subjects scientific knowledge has been reinforced by the peer pressure people feel to get vaccinated (Yıldırım et al., 2022) and the instrumental view that vaccination is the only way of getting life back to normal and the economy back on its feet.

People's willingness to get vaccinated is the product of a series of factors that have been highlighted in previous research (Galanis et al., 2022; Kim et al., 2021; Lin et al., 2021; Pogue et al., 2020; Ştefanuţ et al., 2021; Wheelock et al., 2014; Zhou et al., 2021). Confidence in the vaccines, experience, available information and the credibility of information sources are the keys to encouraging people to get vaccinated (Dubé et al., 2018; Singh et al., 2022).

Even the most hardened anti-vaxxers involved in this study recognize the value of active immunization as a key tool for controlling infectious diseases. These people expressly hope that herd immunity will be reached, and that this external factor (i.e. collective immunity) (Siciliani et al., 2020) will benefit them without them having to risk a bad reaction from a jab. Available information and the credibility of information sources are vital in generating trust in the population and forming people's views on vaccination (Fridman et al., 2020; Soares et al., 2021). Nevertheless, according to our results and those of other studies, it is clearly important to appreciate people's fear and provide them with accessible and understandable information (De Vries et al., 2022); this is the task of professional health workers (nurses and doctors), who are seen as solid references in terms of knowledge and credibility (Thomson et al., 2018). It is thus comprehensible that sanitary workers (nurses and doctors) have traditionally been regarded as an efficient way of transmitting information about vaccines, especially when the level of risk is so extraordinarily high and the personal commitment of many is so great (Wang & Liu, 2021).

The quality of the available information, as well as the extent to which people understand it, are key elements when promoting healthy behavior such as vaccination and when attempting to reduce social permeability to fake messages propagated in the media (Allington et al., 2021; Reno et al., 2021). Thus, it would be advisable to set up information and communication campaigns aimed at raising the scientific level of the general population, possibly using modern technology that can provide information designed to improve people's health in future vaccination campaigns (Steffens et al., 2019).

Our study does have certain limitations related to the characteristics of the sample and the time period in which it was conducted. As in all qualitative studies, the generalization of the results to other socio-economic realities should only be performed with great care. Moreover, in our sample people between 18 and 30 years old were underrepresented in the in-depth interviews; however, this phenomenon was offset by a high participation of this age group in the focus groups. In fact, this population represented 18.2% of the population included in this study, similar to the specific weight of this age group in the Spanish adult population (16.3%). Additionally, it would also be interesting to differentiate the results according to the different cultural ethnic groups (Kelly et al., 2021; Yasmin et al., 2021). Although this objective

was not part of our study, it could be assessed in future works carried out in multicultural societies.

The phenomenon under study has developed in a rapidly changing scenario (towards the end of the third wave of the pandemic). Hence, despite not being our primary aim, it might help complete the research to consider the variability in anti COVID-19 vaccine acceptance in accordance with subsequent progress of the pandemic and the technological development of the vaccines against this virus (Rzyski et al., 2021; Weitzer et al., 2022).

To conclude, the results of this study reveal that the willingness of people to get vaccinated against COVID-19 can be explained by a series of interrelated factors that, together, configure a complex decision-making model. This model could be useful when institutions, doctors and nurses facing up to people's reactions in future pandemics and for designing efficient communication strategies aimed at promoting people's acceptance of newly developed vaccines.

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CONFLICTS OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.


DATA AVAILABILITY STATEMENT

Research data are not shared.

ETHICAL STATEMENT

This research study was granted approval from the Ethics in Investigation Commission of the University of Murcia (ID: 3468/2021).

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