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## Exploring vaccine hesitancy determinants during the COVID-19 pandemic: An in-depth interview study

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### ABSTRACT

On January 20, 2020, the CDC reported its first case of the novel coronavirus in the United States. Almost a year and a half after the first COVID-19 vaccine was given in the U.S., efforts to vaccinate individuals in the hopes of achieving herd immunity continue. Despite the amounts of scientific breakthroughs to create and disseminate the vaccines, people continue to express hesitancy. Existing research has explored vaccine hesitancy through survey data, restricting an in-depth understanding for why people remain hesitant. As a result, this research aimed to understand in-depth reasons for vaccine hesitancy as well as what finally got those who, although hesitant, went through with getting inoculated. In addition, we also wanted to know how the vaccine hesitant received information about the vaccine. Using in-depth interviews, we identified key elements that influenced vaccine hesitancy which include social pressure to not get vaccinated and lack of trust in the healthcare system. We also identified reasons why vaccine hesitant individuals ultimately decided to receive the COVID-19 vaccine. These reasons included becoming informed, getting back to normal, and societal pressure. Finally, we sought to understand what served as venues for COVID-19 information and those were media sources like traditional news outlets/legacy media (e.g., TV) and digital/social media, and interpersonal sources like family, friends, and co-workers. In revealing these factors through in-depth interviews, we show how complex vaccine hesitancy is and the elements public health practitioners need to take into consideration when constructing vaccine-related information/messages.

### 1. Introduction

While the ongoing COVID-19 pandemic is starting to see some decline around the world, one cannot dismiss the over 5 million deaths and close to 300 million reported cases worldwide, as of January 2022 (Worldometers, 2022). Facing such a threat, attempts to ease the effects of the virus, its variants, and its health and socio-economic impact center primarily on prevention. With that in mind, the scientific community and pharmaceutical industry, together with government support (federal and state), focused their efforts on developing efficient and safe vaccines such as the Pfizer-BioNTech, Moderna, Johnson & Johnson, and Oxford-AstraZeneca to fight against SARS-CoV-2 (Conte et al., 2020). Despite scientific evidence indicating that the vaccines are safe and effective, and health message dissemination efforts to the general public about the vaccines' development, safety, and efficiency, doubt continues to be embedded in people's minds. This hinders continued efforts to

control the spread of the virus and the goal of herd immunity.

Vaccine hesitancy is defined as “the delay in acceptance or refusal of vaccination despite availability of vaccination services” (MacDonald, 2015, p. 4161). Among the U.S. population, the degree of uncertainty varies among those who are hesitant about the vaccine. One segment of this population, known as anti-vaxxers, firmly refuse to receive a vaccination of any kind and lobby against any efforts that support getting vaccinated. Another portion of the population are undecided on the issue. Unlike anti-vaxxers, these individuals are skeptical of the vaccine but there is still a chance that they eventually will become vaccinated.

To better understand those who are hesitant about the COVID-19 vaccine and develop a better strategy to address this challenge, numerous studies have been conducted to gain an understanding of what makes people hesitant to get the COVID-19 vaccine. These studies have documented the socio-demographic, psychological, and media (especially focused on the spread of misinformation) factors that may

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influence vaccine hesitancy (Abdulmoneim et al., 2021; Troiano & Nardi, 2021). For instance, ethnicity and education were cited as examples of socio-demographic factors that influenced individuals' intention to not take the vaccine. Black/African individuals were found to have a lower acceptance rate of the vaccine as did individuals with low education (Troiano & Nardi, 2021). In their study of psychological factors associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom, Murphy et al. (2021) found that those who were vaccine hesitant, as well as those who were resistant, were more self-serving, held strong religious viewpoints, and held an internal locus of control. Another study from the U.K. that provided examples of other contributors, cited mistrust in politicians and science (Roberts et al., 2021). Additional factors to vaccine hesitancy, particularly in the U.S., included vaccine safety, vaccine effectiveness, anxiety over potential side effects, and mistrust of the healthcare system and government (Khubchandani et al., 2021; Pogue et al., 2020).

Some studies have also focused on the influence of social and legacy media on individuals' intention to get the COVID-19 vaccine. Misinformation and disinformation were already a problem pre-pandemic with people sharing erroneous information online that mislead others to not adhere to public health recommendations, and often promoted dangerous and even fatal alternatives to established medical treatments. One such example is the conspiracy theory surrounding vaccines and their alleged side effects causing autism in children. This came as a result of the infamous, and since withdrawn, article published by the Lancet and written by Andrew Wakefield in which he argued that there was a link between the measles, mumps, and rubella vaccine and autism (Goldenberg, 2021). According to Allington et al. (2021) the more an individual relied on social media for information on COVID-19, the more likely that individual was to believe conspiracy theories related to COVID-19. Conspiracy theories or conspiracy beliefs are defined as "the tendency to assume that major public events are secretly orchestrated by powerful and malevolent entities acting in concert" (Douglas et al., 2019, as cited in; Allington, Duffy, Wessely et al., 2020). In addition, higher rates of conspiracy beliefs and greater reliance on social media were linked with lower levels of preventative behaviors during the COVID-19 pandemic.

When it comes to legacy media, Allington, McAndrew, Moxham, and Duffy (2021) state "it is notable that existing US-based research has found a substantial negative correlation between knowledge about Covid-19 and trust in Trump-supporting media outlets Fox News and The Hill" (p. 2602). However, Piltch-Loeb et al. (2021) proposed that "patterns of homogenization, polarization, and targeted marketing have created a 'one-step flow' of persuasion in legacy media" (p. 2) that while scarce in research as it pertains to misinformation, cannot be ignored. Piltch-Loeb et al. (2021), found that the use of legacy media (e.g., local and national television and newspapers) played a role in increasing the use of vaccines because of their use of credible information that come sources like healthcare, government, and academic data.

Yet, despite the large volume of studies, previous research on the topic of vaccine hesitancy has mostly been conducted using survey data (see meta-analysis by Troiano & Nardi, 2021). Although survey research provides us with a large number of respondents and generates statistically analyzable data, it also restricts the depth of the research.

Against this background, the present study examines a) what makes people hesitant to get the COVID-19 vaccine, and b) through what channels (considering both media and interpersonal sources) people consume COVID-19 vaccine information. The study does this through a series of semi-structured, in-depth interviews conducted in the U.S. Doing so allowed us to understand the reasons for vaccine hesitancy as well as explore effective channels through which experts can reach out to this group.

## 2. Method

### 2.1. Sample

For this research, anyone over the age of 18 who resided in the

southwestern region of the United States and expressed hesitancy about the COVID-19 vaccine was eligible to participate. The research team particularly focused on the southwestern region of the United States for its minority population and fluctuation in COVID-19 cases since the start of the pandemic.

An online advertisement for this study was created and posted to a southwestern public university's Facebook page with their permission. This advertisement was boosted three times to gain a larger audience in states like New Mexico, Arizona, Nevada, Utah, and parts of California and Texas. This advertisement was also shared with a Facebook group called the *Las Cruces Community Watch*, and two Discord communities called *OOTD* and *Shattered Throne* to help increase the study's reach. Snowball sampling was also utilized to recruit participants. An incentive in the form of a \$15 Amazon gift card was provided for individuals who completed all parts of the research study, which included filling out the demographics/screening survey and, if selected, participating in a 30-60-min one-on-one interview through the videoconferencing platform, Zoom.

Interested individuals filled out the 1-min demographic/screening survey and those who met the established criteria were then contacted by the project's two research assistants to set up a day and time for a one-on-one interview. These interactions included the use of a semi-structured interview which allowed for the collection of open-ended data, and more inclusive responses from participants. The research assistants conducted these interviews via Zoom with guidance from the principal researchers. With the semi-structured interview format, the research assistants were able to ask clarifying questions as well as probing questions when needed. Of the 179 screening surveys collected, 60 met the criteria. In all, 20 participants took part in this study from start to finish.

Of the 20 participants (all vaccine hesitant) interviewed, 7 said "probably yes", 6 said "I don't know/unsure," and 7 said "probably no" when asked about their willingness to take the COVID-19 vaccine. There were more female (75%) than male participants (25%). As our data collection was conducted in southwestern parts of the U.S., Hispanic/Latino participants made up the highest proportion of the sample (45%), followed by White/Caucasian (30%), Asian (10%), others (10%), and Black (5%). Lastly, in terms of party affiliation, 50% identified as either Republican or leaning toward Republican, and the remaining 50% identified as either Democrat or leaning toward Democrat.

#### 2.1.1. Analysis

Using Zoom, the research assistants applied the Live Transcript option when conducting each of the interviews. Because Live Transcript produces transcripts through artificial intelligence, the research assistants conducted a post-interview clean-up to ensure that what was said was reflected in the transcripts. Once that was completed, thematic analysis (Braun & Clarke, 2006) was used to examine the data. The research team (both principal researchers and research assistants) followed several phases of thematic analysis.

First, the research team collectively read through the transcripts. Shared understanding of the data was needed to proceed through the various phases of thematic analysis so meetings between the principal researchers and research assistants were held to ensure understanding and discuss any concerns or questions. Second, the researchers engaged in generating initial codes by examining the transcripts line-by-line (Charmaz, 2006), focusing on what aspects were interesting from the data set (Braun & Clarke, 2006), and creating a spreadsheet with these codes to be shared among the group. Third, the researchers grouped the codes into "significant concepts that link substantial portions of the data together" (DeSantis & Ugarriza, 2000, as cited in Nowell, Norris, White, & Moules, 2017, p. 8). Fourth, these conceptual categories were merged into larger themes as the researchers ensured the emerging themes were grounded in the data. Emerging themes were revised several times during this stage and the themes were also labeled. Finally, the research team discussed the generated themes once again and wrote narratives around each of the themes, supported by exemplars from the data.

### 3. Results

This study sought to understand reasons for vaccine hesitancy as well as the channels through which the vaccine hesitant get information about COVID-19 vaccines in the United States. In terms of vaccine hesitancy, several themes emerged from the data analysis that helped us understand why vaccine hesitancy remains an issue for many and why some opted to get vaccinated despite their hesitance. Aspects of our participants' lives such as social pressure to not get vaccinated, not trusting the government and health agencies and organizations, and the vaccine's untested nature addressed vaccination hesitancy; while themes such as becoming more informed, getting back to normal, protecting family, and the social pressure around getting vaccinated addressed opting to be inoculated despite hesitancy.

#### 3.1. Reasons for vaccine hesitancy

##### 3.1.1. Social pressure to not get vaccinated

Some participants cited pressure from family and friends as a reason to not get vaccinated. They recalled hearing during conversations with family and friends some concerns over what is in the vaccine and whether or not these ingredients are safe: For example, Participant 1 said:

... my folks are planning to visit me here very soon, and even though I had talked to my mother about, you know, her, you're an adult, you know, obviously, but you should make an informed decision. Before you put this in your body, you really should know what it is.

Some participants spoke about their role in providing information that warned family and friends about the vaccine, but ultimately allowing them to make up their mind about the effectiveness of the vaccine. Participant 3 expressed reading information that shared the "negatives" of the vaccine and sharing that with others in their social circle:

... I'll send a few links to them. They can read it and they can make a decision for themselves. So I don't try and hit them over the head with it and make them believe it ...

Overall, social pressures highlighted the duality of the vaccine contributing to participants' hesitancy. Their conversations with others often presented the "good thing" and "bad thing" about the vaccine. Participant 17 said:

I definitely have both sides of the spectrum when it comes to just the immediate people around me that are arguing specifically, saying, hey, like the vaccine is a good thing, you know, go ahead and get it, and then I have other aspects of that that are saying, hey, this vaccine is a bad thing, don't take it. So, it, I believe it's very 50-50.

Through the participants' responses, we can see how some participants' hesitancy toward vaccines is shaped by their conversations with others.

##### 3.1.2. Lack of trust

Our participants also expressed lack of trust as a factor that contributed to their hesitance for the COVID-19 vaccine. Specifically, participants cited suspicion of the government as a reason for not wanting the vaccine. Some expressed not wanting to be "controlled" by the government, while participants who self-identified as a minority or as a person of color, cited the racist and discriminatory history of the government's involvement with public health. For instance, Participant 14 expressed this concern:

The government has been tied to too many experiments in minoritized communities, and so I'm concerned about that.

Participant 12 had a similar response regarding their suspicion of the government's involvement:

I started thinking about like other research in the past that the U.S. has done towards like minority communities and how they have been like the guinea pigs. And so I did think like if they're like really focusing on trying to get like minorities to get this vaccine ... I questioned that 'cause you know historically, like the U.S., they've done some messed up things to minorities. So that was the thing ... those were my first fears.

Some spoke about being suspicious of the vaccine itself and its potentially harmful ingredients and effects. Participant 1 shared not wanting to become a "virus factory" as a result of being injected with RNA. Participant 3 compared their experience getting the flu shot with what could potentially happen if they were to get the COVID-19 shot:

I myself don't get the flu vaccine because the few times that I've gotten it, I've gotten really sick, as well as my daughter, my younger daughter. But I've never been diagnosed with the flu illness, with or without the vaccine in my life. And far as sick as I got with the flu, I'm also worried about that with the vaccine, with the COVID vaccine now, to have that happen.

The lack of FDA testing and approval also contributed to participants' hesitancy of the COVID-19 vaccine. Participants expressed concern about how fast the vaccine was made available to the public and mentioned that they might consider getting it until it's gone through more "thorough research" (Participant 17). Surprisingly, one participant, Participant 20, mentioned knowing the vaccine was safe, but expressed individual body response as a concern that was stronger than the actual vaccine itself.

#### 3.2. Consideration of the vaccine

While our first research question focused on understanding why people were hesitant about the COVID-19 vaccine, we also wanted to know why our participants, even with their hesitancy, ended up getting inoculated. With numbers showing an increase in individuals being vaccinated in the U.S. as a result of the Delta variant (Mendez, 2021), our participants discussed reasons they considered for being vaccinated. It is important to note that this was before the rise of the Delta variant and now Omicron.

##### 3.2.1. Becoming informed

Some participants provided insight into why they considered being vaccinated despite their hesitancy. Knowing more about the vaccine swayed some to feel more confident about it. Participant 5 was an example of this viewpoint:

I haven't committed to anything yet but I have no good reason, I guess you can say, I'll end up getting it.

Others cited noticing that more and more people were receiving the vaccine and that making them feel more at ease with it. Additionally, having more information on the seriousness of COVID-19 and how many people fell ill and even died as a result of getting it, made some participants more aware and willing to take the vaccine, with some already being vaccinated with one dose of the vaccine.

##### 3.2.2. Getting back to normal

Another contributing factor for our participants considering or having taken the vaccine, was getting back to normal. The participants' normal was defined as going back to their life pre-COVID or to as much of the life they had as possible. Participant 2 mentioned this as a reason for considering the vaccine:

But, you know, a friend of mine mentioned, well, if I want to get my life back and go back to some version of normal, this is the way to do it. And, to an extent, he's not wrong.

Others, like Participant 7 who had already been inoculated with at

least one of the doses of the vaccine, mentioned:

Moving forward, the hesitancy was still there, but I kind of felt as a society that was something I had to do moving forward.

For other participants, getting back to normal also emphasized being around loved ones. Participant 14 said:

I'll get a vaccine if it means I can go see my dad.

Another participant also shared a story of her best friend's husband passing and wanting nothing but to give her best friend a hug:

I'd be vaccinated in a second for the opportunity to give her a hug.

### 3.2.3. Societal pressure

Some participants cited societal pressure as a factor that could or did contribute to them getting the COVID-19 vaccine. Among those participants, some expressed feeling discriminated against for not getting the vaccine. Participant 3 stated how this discrimination extended to their children:

I've had my kids feel bad, and say well I don't know if they want me around because I'm a kid, and they say I have germs. Everybody has germs so anybody can get the virus anywhere ... and just in general, we're going to be not wanted around, either we don't get the vaccine and ensure still, if we even do get the vaccine all of us together people are still going to say oh, you have your kids? Oh, I don't know if you guys should come back.

For another participant, societal pressure was more than enough of a reason to be vaccinated, stating "I felt like I had to get it" (Participant 7). Participant 15, who also felt the societal pressure to get vaccinated, shared:

I mean I was fully vaccinated in February. That's how shocking all of this was. I didn't even want it, I'll sign up to shut everybody up.

The workplace was also presented as a potential source of societal pressure that made some individuals take the vaccine even though they were hesitant about it. Several participants shared the collective effort of some workplaces to encourage their workers to get the vaccine by providing paid administrative leave to get vaccinated. Another participant shared their workplace organizing days in which they brought the vaccine to the employees. Though this participant did not get inoculated right away, they finally did after a few of these opportunities were offered.

So far, we have analyzed why people were hesitant about the COVID-19 vaccine and why some who were hesitant ended up getting inoculated. In the following paragraphs, we discuss through what channel — considering both media and interpersonal sources — people consume information related to the COVID-19 vaccine.

## 4. Getting information regarding the COVID-19 vaccine

### 4.1. Media sources

In terms of media sources, participants tend to consume news from a variety of sources, including traditional news outlets/legacy media (e.g., TV) and digital/social media (e.g., Google, social media platforms, alternative news media). Interestingly, many participants revealed they also consume news from the CDC, while some get information from academic journals. Another important characteristic of this study's participants was that they tend to rely on multiple news sources rather than solely relying on one or two dominant sources. For instance, Participant 7 said:

Um, just a variety of media everything from local newscasts and broadcasts to national broadcast in the or general CNN format. (...).

Everything from Facebook to YouTube, anything that's kind of come across the airwaves. I consume a lot of media and a lot of different channels, so it's just kind of a hodgepodge.

Another participant said:

Um, okay yeah, Facebook, but the stuff that I see on Facebook I'll research it myself. I'll go back and look. I'm not going to believe everything that's on the internet. You don't believe everything that's on Facebook. (...) I'll go research it but I do keep an eye on the CDC website and New Mexico Department of Health website.

Some participants specifically reported using social media platforms to get information about COVID-19 and/or the COVID-19 vaccine, but only one of them solely relied on social media to get such information. Many of the participants still relied on legacy media to get COVID-19 news, but most of them used it along with social media (rather than exclusively relying on legacy media).

For legacy media users, news channels' ideological orientations did not play a major role in determining which television news outlet they got their information from; only two people (out of all the participants who reported using legacy media to get COVID-19 information) said they consume COVID-19 information exclusively from Fox News. Many of them reported that they consume information in a balanced way. For instance, Participant 19 said:

I actually do get a pretty good balanced diet of, I guess you could say like Fox News, CNN, and then I do watch some of the standard channels ABC, NBC, so I do get it from, you know, TV but I also seek out print news.

Overall, our results show that people tend to consume various media sources — channels (e.g., legacy media, social media, internet sources, etc.), news markets (local vs. national news), and ideology (e.g., right-wing sources, left-wing sources, and neutral sources like the CDC).

### 4.2. Interpersonal sources

Our participants also tend to talk to various people about the COVID-19 vaccine. Some participants spoke with their family members about the vaccine, and others said they spoke to their friends about it. More importantly, a few participants stated that they spoke about the COVID-19 vaccine "exclusively" to either family or friends. Others reported that they spoke about it with their co-workers. For instance, Participant 16 said:

Well, I talked to my coworkers like other doctors, other nurses in my workplace. Of course my family friends. Other people on social media from other friends that I have from like across the globe and other countries.

Overall, we can see that the majority of participants rely on multiple media sources as well as multiple interpersonal sources to get information about the COVID-19 vaccine.

## 5. Discussion

Vaccination against COVID-19 has been rolled out in many countries, perhaps most aggressively in the United States, as countries race to build herd immunity against the virus. And yet despite availability of vaccines in the United States, some individuals remain hesitant. This study sought to understand reasons for vaccine hesitancy by reaching out directly to those hesitant, as well as explore the ways these individuals sought information about COVID-19 vaccination.

This study used in-depth interviews, a method that allows participants to narrate and articulate their own sensemaking, giving us a holistic overview of their personal experiences and meaning making. In analyzing the responses, an overarching theme that emerged is the



important role that social groups play in fostering, reinforcing, as well as in breaking vaccine hesitancy. When asked for their reasons for being hesitant, most respondents referred to not fully trusting the government as well as having doubts on the safety and efficacy of the vaccines. Such lack of trust stems from, or was reinforced, by conversations they have with family and friends. Similarly, those who admitted to being hesitant about the vaccine, but taking it nonetheless, also cited social pressure as an important consideration. Some were afraid of being discriminated against by peers or in the workplace; others highlighted wanting to be able to visit and be around family members and getting vaccinated was one way to make this happen.

The salience of social groups also emerged when we explored the ways the vaccine hesitant get information about COVID-19 vaccines. The majority of participants rely on multiple media sources, with some accessing the CDC site directly. Many of them also highlighted how they get information from interpersonal interactions such as informal or brief conversations with friends and family members. These findings are consistent with the recent findings that unlike vaccine resistant individuals, vaccine hesitant people consume a great amount of COVID-19 information (Murphy et al., 2021). Our findings here also support what others have claimed that despite initial talk on filter bubbles online, where algorithms supposedly limit users only to perspectives aligned with their own, many individuals actually get exposed to a diverse set of views (Scharkow et al., 2020). Some participants shared how they access multiple news channels, news and government websites, as well as social media to get or come across information about COVID-19. But given the important role of interpersonal sources, it is also crucial to investigate in future studies whether vaccine hesitant individuals engage only with those having similar perspectives as them, or if they also discuss with different-minded individuals. We see a snapshot of this in this current study as several of the interviewees who admitted being hesitant but ended up getting vaccinated (or are now willing to get vaccinated) shared that this was due to social pressure. From this we can surmise that these vaccine hesitant individuals also engaged in interpersonal interaction with pro-vaccination individuals, and that vaccination was a topic during these conversations.

The results reported here must be contextualized within a set of limitations. First, while our findings provide an in-depth understanding of the range of reasons for vaccine hesitancy, these are not generalizable to the U.S. population, nor to the southwest region where we recruited participants. Generalization, however, is not the main goal of qualitative exploration, but depth of understanding. Through our interviews, we were able to get our participants to narrate in their own words their sensemaking about vaccination, allowing us to document and examine their reasons and justifications—something that quantitative approaches are not designed to uncover. Thus, our results can help inform future studies that seek generalizability. Secondly, in our survey demographics section, we did not offer an open-ended section for participants to disclose their race and/or ethnicity. Therefore, we were unable to know how those who picked “other” identified as. Third, while we achieved theoretical saturation in our analysis, our sample is relatively small and confined to a certain geographic region. This also meant that we were not able to draw comparisons between individuals with varying levels of hesitancy. In addition, those who oppose vaccines generally opt to not participate in research that deals with the topic, making recruitment a challenge. Fourth, as the pandemic is ongoing at the time of study, the situation remained fluid. For example, the Delta variant and now the Omicron variant have spread and continued to ravage the United States after our interviews, and attitudes toward vaccination may have changed following this surge in cases.

Despite these limitations, we hope that our results here can contribute

<sup>1</sup> We also acknowledge that the efforts for vaccines should not be overestimated. For example, in the South African countries rates of vaccination remain under 10%.

to a more nuanced understanding of vaccine hesitancy during the COVID-19 pandemic. This data can inform our academic understanding of vaccine hesitancy, as well as interventions specific to COVID-19 vaccination at a time when countries around the world are trying to get as much of the population vaccinated.<sup>1</sup> In the US, where vaccine supply is not a problem unlike in many countries in the Global South, vaccine hesitancy is a crucial concern. We hope that our findings can help address this.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Ethical statement

This manuscript represents original work and went through the Institutional Review Board process at New Mexico State University.

### CRediT authorship contribution statement

**Gabriela I. Morales:** Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Supervision. **Sangwon Lee:** Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing, Supervision. **Amanda Bradford:** Investigation. **Adam De Camp:** Investigation. **Edson C. Tandoc:** Writing – original draft, Writing – review & editing.

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