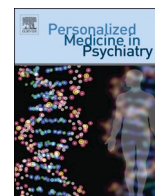




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Expert opinion in mental disorder: Why is acceptance of the COVID-19 vaccines so problematic?

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ABSTRACT

A substantial number of people say they will probably or definitely not have a vaccine for COVID-19. We place the reasons for vaccine hesitancy and refusal into three categories: fears that the vaccines are not safe, misinformed ideas, and agreement with conspiracy theories. Evidence-based approaches are available that account for the psychological factors underlying vaccine hesitancy and refusal that should form the basis for counter-acting facts and persuasion.

With two vaccines against the coronavirus that causes COVID-19 (SARS-CoV-2) already available and others likely to be approved soon, optimism has grown that the pandemic may come under control as long as the vaccines remain efficacious against new viral variants. This requires, of course, that a sufficient number of people are actually vaccinated in order to establish community (herd) immunity. With the unprecedented negative effects of the pandemic on people's lives, it seems axiomatic that most people who are candidates for a COVID-19 vaccine would accept one.

Nevertheless, an alarmingly large number of people say in surveys that they are either reluctant to be vaccinated (vaccine hesitant) or have already determined not to be vaccinated at all (vaccine refusal). According to a Kaiser Family Foundation poll released on 15 December 2020, 27% of the public will probably or definitely not be vaccinated [1]. This number jumped to 35% among Black adults and 36% among rural Americans.

In our work we have encountered multiple reasons for COVID vaccine hesitancy. We will place them here into three categories:

1. Fears that the vaccines are not safe due to the speed with which they have been developed
2. Misinformed ideas about the mechanism of the vaccines and their necessity
3. Agreement with conspiracy theories about the vaccines.

1. Vaccine safety concerns

COVID-19 vaccines have been developed with unprecedented speed. There are several good reasons for this, including recent developments in vaccine biology and technology [2]. To the public, however, the speed with which the COVID vaccines have been developed is discomfiting. People recognize that it usually takes years to develop a new vaccine and the fact that COVID vaccines are appearing in less than a year since the pandemic began seems rushed. Many wonder if politics instead of science has pushed vaccine programs along, making the ultimate product untrustworthy [1].

In fact, the phase three trials conducted to establish efficacy and safety of the new vaccines are very similar to the standard procedures employed for vaccines in the past. Each trial was placebo-controlled and involved at least 30,000 volunteers. We have seen many people insist they will not accept the vaccines as safe until years of use accrue. In fact, vaccines are always released after sufficient phase three testing and have proven remarkably safe over the long-term [3].

In dealing with fears over vaccine safety, it is important to consider that this involves understandable concerns. The public has been treated to headlines about a very small number of serious adverse reactions to the vaccines that do not put these in context. At one point, for example, there were six adverse reactions out of over 500,000 vaccines received, for a rate of approximately 0.0012%, far lower than the risk of dying from the infection itself. Yet in making risk assessments, people naturally gravitate to reliance on stories instead of data [4]. Scientists, on the

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other hand, favor the latter. Stories about the adverse effects of vaccines capture the public's attention more than statistics showing that they are rare events.

Several things are needed, then, to counteract these understandable fears about vaccine safety. First, it is important to respond immediately as new fears arise. The longer falsehoods are allowed to circulate without debunking, the more likely it becomes that people will see and believe them.

Second, simple ways of explaining how medications are developed and why COVID-19 vaccines could be developed so quickly must be created. Scientists who understand the nature of clinical trials may overlook the fact that to non-scientists the phases of testing and methods of recording and assessing adverse events in a clinical trial are complex and unfamiliar. It is not necessarily reassuring to the public to be told that no serious adverse events occurred during a phase three clinical trial. In rare cases medications have been approved that later turn out to have significant safety problems and even need to be recalled e.g., rofecoxib. Rather, it makes sense to set reasonable expectations. It is fair to point out that there are always risks with new medications, but the instances in which long-term use of approved medications have proven unsafe are extremely uncommon. The risk of serious illness from the coronavirus is much worse.

Third, we must understand that most people will base their risk assessments on what they read in headlines on traditional and social media and what they will find there is more likely to be narratives than data. As much as scientists may dislike telling graphic stories, data need to be accompanied by compelling narratives of people with severe COVID-19.

2. Misinformed ideas about the mechanism of COVID-19 vaccines and their necessity

Even for scientists, the mRNA platforms used for the first two vaccines made available are novel and intriguing. Once again, a thorough understanding of the biology behind this method of vaccination alleviates many fears. That depth of understanding, however, is unavailable to most people and therefore what they will hear is that genetic material is being injected, surrounded by something with the word “nano” in it (i.e. the lipid nanoparticles used to deliver the mRNA). This leads to fears that the vaccine will alter a person's genetic makeup and that some weird “nanotechnology” is being used that has never been tried before.

There are also persistent claims that the vaccine is not needed because the recovery rate from COVID-19 is high. Some insist that letting everyone get infected will establish so-called “natural” immunity and in this way accomplish community immunity, but a recent study of the situation in Manaus, Brazil, shows that this is not an option [5].

These notions of how the vaccine works and that it is not really needed are, of course, based on misinformation. The small sequence of mRNA coding for the coronavirus spike protein in the Pfizer/BioNTech and Moderna vaccines does not incorporate into the human genome. The word “nano” refers to the size of the lipid particles and has nothing to do with nanotechnology. Although most people who acquire SARS-CoV-2 infection recover, some need ICU admission or develop long-term symptoms and over 400,000 have died in the U.S. alone. Immunity acquired from being infected is not superior to vaccine-induced immunity (and is likely inferior) and will not work to establish community immunity.

Given these facts, scientists may be tempted to employ what motivational interviewers call the “righting reflex,” the tendency to leap into the conversation with facts. Although supplying corrective information in the face of misinformation is important, we know that a lack of information—that is, knowledge deficit—is not the primary cause of science denial [6,7]. As noted above, difficulties with accurate risk assessment and susceptibility to narratives rather than data are more germane to vaccine hesitancy than a lack of knowledge about them.

Misinformation, unlike disinformation, is not based on a deliberate intention to spread falsehoods or to cause harm. Misinformation must

appear credible, albeit incorrect, in order to attract widespread attention. Counteracting it involves understanding what parts of misinformation seem reasonable to people. People who know a little bit about how viruses work, for example, may know that HIV does in fact incorporate itself into the human genome and that coronaviruses operate by hijacking a human cells' protein manufacturing apparatus. Thus, wondering if genetic material from the virus might be capable of altering human genes is understandable.

Similarly, while it is absolutely the case that most people recover from COVID-19 without sequelae, people have been mistakenly led to believe that only those with other medical conditions and the elderly are susceptible to serious illness and that a positive COVID antibody test means you have already had it and are not going to get it again.

Thus, misinformation about COVID-19 vaccines and about the epidemiology and immunology of the illness itself occur amidst a slew of information the public receives. It is therefore important to acknowledge how easy it is to be confused or misled. This effect is exaggerated when charismatic figures take up anti-vaccination campaigns. Such people gain the public's trust because of their dramatic presentations and skill at manipulating emotions. It is thus critically important to discover what sources of information people trust. Although Americans now have low confidence in elected officials and government institutions, they maintain a high level of trust in healthcare professionals [8]. Pro-vaccine messages should include references to publicly trusted sources that can counteract the effects of charismatic anti-vaccination influencers.

Since solely providing counteracting facts may not be sufficient to change attitudes and behaviors toward vaccination, in addition to relying on trusted sources three evidence-based approaches may be useful: motivational interviewing, inoculation, and self-efficacy.

2.1. Motivational Interviewing is a client-centered approach to affecting change that relies on locating a person's values and goals. Rather than instructing a person to make changes the therapist believes are necessary, motivational interviewing seeks to encourage changes a patient is most interested in making. Motivational interviewing therapists proceed by asking open-ended questions, affirming the patient's goals and values, and summarizing their position on what should and can be changed.

Motivational Interviewing has been shown to be effective in hundreds of placebo-controlled trials in areas like substance use disorder [9] and adherence to medication [10]. More recently, it has been shown work to increase vaccine uptake [11,12]. These studies suggest that motivational interviewing may be a useful technique for increasing acceptance of COVID-19 vaccines. More extensive studies should be done to see if motivational interviewing will work in online settings to encourage groups of people to accept the COVID-19 vaccine.

2.2. Inoculation is another evidence-based technique that has proven useful in laboratory studies aimed at counteracting misinformation [13,14]. It is analogous to inoculation against a pathogen. A warning is provided that there are some people who will provide misinformation about a topic and a small “dose” of the misinformation is provided. Then, after the “inoculation,” corrective information is provided. van der Linden and colleagues have proposed that this technique could be used to counteract misinformation about COVID-19 [15]. For example, someone trying to intervene with a misinformed idea about a COVID-19 vaccine could begin by saying “you are going to hear some people say that a new strain of the virus isn't covered by any of the vaccines, so being vaccinated is useless.” This is the warning and weakened version of the complete misinformation. After issuing this statement, the intervener could follow up with corrective information, such as “so far there is absolutely no evidence that the new strains can elude any of the vaccines. The COVID-19 virus mutates very slowly, and it is very unlikely that a strain could have developed this quickly that would go unrecognized by the

vaccines already available.” Time is of the essence with this technique—it is preferable that people be exposed to inoculation before they ever see the misinformation “in the wild.”

2.3. While simply providing facts to counteract misinformation appears to be a necessary but insufficient approach [16], helping people see that they are capable of finding and evaluating the facts themselves may be helpful. There is a long literature on the benefits of fostering self-efficacy in order to affect behavior change [17,18]. It is important then to provide links to reliable sources of information and help people recognize that they can read these sources in the course of forming their own opinions about health issues. At the same time, there is a broader need to educate the public about how to apply critical reasoning to what they see and hear.

3. Conspiracy theories

The most difficult aspect of vaccine hesitancy and refusal is rooted in conspiracy theories. Most of the conspiracy theories regarding COVID-19 vaccines are irrational and some of them are politically motivated. Examples include the notion that the virus is a hoax created by the government and pharmaceutical companies to earn money selling vaccines; that the virus contains nanotechnologically-created particles with tiny antennas that broadcast personal information into the cloud; and that celebrities and public officials who have publicly received a COVID-19 vaccine are really being given a placebo. Each of these conspiracy theories includes secret plots intended to do harm to the general public. Information about the conspiracy is held to be available only to a privileged few who often represent themselves as victims of retaliatory actions for revealing them.

Conspiracy theories serve several purposes for individuals [19]. In the case of COVID-19 vaccines, they provide a simple explanation for a complex topic. They offer a feeling of control over a situation and also provide a social group with which to belong. These powerful psychological benefits obviate the need to attempt to understand the complicated biology of coronaviruses and vaccines and make some people believe that by refusing a vaccine they are taking control of the “alleged” health crisis on their own. Once a person has become affiliated with a group that promulgates anti-vaccination conspiracy theories, it becomes extremely difficult to shake that identity and dislodge them from the group. New ideas and evidence are filtered through what is known as the confirmation bias and made to agree with whatever the group holds to be true.

We have found that trying to change the minds of iconoclastic adherents to conspiracy theories is nearly impossible. This does not mean, however, that the conspiracy theories themselves should be left unchallenged. The goal in this case is to prevent people hearing such ideas for the first time from becoming adherent to them. People on the fence about a conspiracy theory may still be swayed to dismiss it. Thus, there remains value in ensuring that messages counteracting conspiracy theories are publicized, especially on social media platforms where they proliferate [20].

4. Conclusion

We have put the extensive number of reasons that some people are COVID-19 vaccine hesitant into three categories and attempted to point out that each entails substantial psychological motivations. Fears about safety is the largest category. Finding misinformation credible is also a substantial problem. Both of these can be counteracted when facts are placed in the context of evidence-based methods for promoting health attitudes and behavior change. Conspiracy theories are nefarious, but even these can be counteracted when underlying psychological motivations are considered.

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.

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