

COVID-19 Forum: Transformation of Our World and Mental Health Promotion

VACCINE HESITANCY – FROM PARENTAL DISTRUST TO COVID-19 CONSPIRACIES

Helena Jerković¹ & Mirna Šitum^{1,2,3,*}

¹ University Hospital Center Sestre milosrdnice, Vinogradska 29, 10000 Zagreb, Croatia

² School of Dental medicine, University of Zagreb, Zagreb

³ Croatian Academy of Sciences and Arts

* Corresponding author

received: 11.03.2022;

revised: 31.01.2023;

accepted: 06.03.2023

Summary

Worldwide studies continuously confirm that vaccination is a safe and effective method of combating various infectious diseases and a key component of global public health programs. However, the vaccination status of a population is often lower than needed to achieve collective immunity. A key reason that affects lower vaccination coverage is vaccine hesitancy, identified as one of the ten greatest threats to global public health. So far, vaccine hesitancy has been most investigated in the context of parental refusal of children vaccination. The emergence of the COVID-19 pandemic and the development of its vaccines put vaccine hesitancy further in the focus of investigators as well as healthcare workers and policy makers. We have witnessed its immediate effects on public health and mortality rates as well as even more extreme ways of vaccine refusal than previously documented. The aim of this review article is to summarize relevant scientific understandings of vaccine hesitancy, including its psychological determinants, insights from parental refusal of child vaccination, medical distrust, and conspiracy theories related to the COVID-19 pandemic, as well as recommendations for public health services for combating vaccine hesitancy.

Keywords: conspiracy beliefs, COVID-19, pandemic, vaccine hesitancy

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INTRODUCTION

Vaccination is one of the greatest public health strategies for the primary prevention of infectious diseases (CDC 1999, Dubé et al. 2013). Since its introduction, vaccines have reduced morbidity and mortality, even more, minimized social and economic burden associated with several infectious diseases (Jit et al. 2015). Worldwide studies continuously confirm that vaccination is a safe and effective method of combating various infectious diseases and a key component of global public health programs (Greenwood 2014). The European Union member states have their own vaccination calendars which, by systematic immunization through the child's growth and development, achieve collective vaccination (Bechini et al. 2019, Mora & Trapero-Bertran 2018). However, the vaccination status of a population is often lower than needed to achieve collective immunity (Bechini et al. 2019). In developed countries where vaccines are readily available, a key reason that affects lower vaccination coverage is the distrust of vaccination or rejection of vaccines (Bechini et al. 2019), also known as *vaccine hesitancy*, the *vaccine*

backlash, the *vaccine-confidence gap* or *crisis of public trust* (Larson et al. 2011). The same has been identified as one of the ten greatest threats to global public health by the World Health Organization (WHO 2019). So far, vaccine hesitancy has been most investigated in the context of parental refusal of children vaccination. However, the past two years a global health crisis affected the world, forcing us to face with a highly infectious disease caused by COVID-19 virus. The emergence of the COVID-19 pandemic and the development of its vaccines put vaccine hesitancy further in the focus of investigators as well as healthcare workers and policy makers. We have witnessed its immediate effects on public health and mortality rates as well as even more extreme ways of vaccine refusal than previously documented. The aim of this review article is therefore to summarize the most relevant scientific understandings of vaccine hesitancy, including its psychological determinants, insights from parental refusal of child vaccination, medical distrust, and conspiracy theories related to the COVID-19 pandemic, as well as to summarize recommendations for public health services for combating vaccine hesitancy.

PSYCHOSOCIAL DETERMINANTS OF VACCINE HESITANCY

Vaccine hesitancy has been shown as a very complex phenomenon associated with a variety of factors (Dube et al. 2013). It represents a continuous spectrum in which some people use all available and recommended vaccines, while other people accept some but not all vaccines, and some people completely refuse all vaccines. One of the first determinants investigated in this context was the lack of knowledge and unavailability of accurate information on vaccines which was associated with avoidance of recommended vaccination (Braczkowska et al. 2018, Smith et al. 2017). From a psychological perspective, adequate knowledge and information are crucial for an individual to decide whether he or she wants to use a vaccine. However, further research has gone beyond this and shown that the decision to get vaccinated is far more complex and involves an elaborate reasoning process related to several other psychological factors apart from knowledge, such as emotional, cognitive, political, religious, moral, and cultural factors (Dube et al. 2013). Thereby, studies demonstrated that people who refuse vaccination more often support a life philosophy that does not fit into the traditional biomedical paradigm, hold less trust towards the health system, more often use alternative medicine, perceive the risk of vaccines higher than the risk of infectious diseases, more often believe that vaccines are not effective, and more commonly focus on vaccine side effects as well as rely on various anecdotal examples and personal experiences (Tomljenović 2020). They are also more likely to believe that they can control whether they become infected or not and believe that it is better to acquire immunity in ways they consider natural rather than through vaccines. Moreover, believe that they are not at a risk of infection because other people have been vaccinated, and for many individuals the obligation to vaccinate represents a violation of their moral values such as freedom and purity, because vaccines can be considered something that pollutes the body (Amin et al. 2017).

PARENTAL HESITANCY TOWARDS CHILD VACCINATION

The decision-making process on vaccination is particularly complex when it comes to vaccinating children because it is a decision that the parent makes for the child and thus takes on a greater responsibility. Research has shown that people make different decisions depending on whether they decide for themselves or for others, since the latter can become more emotionally saturated (Suter

et al. 2015). This is confirmed by recent research which showed that unpleasant emotions which parents feel towards vaccines can strongly predict vaccination status itself (Tomljenović et al. 2019). Parents who feel fear, anxiety, and even anger or disgust towards vaccination more often decide not to vaccinate their children (Tomljenović et al. 2019). In addition, it has been shown that this intensity of various unpleasant emotions is commonly related to the belief in various conspiracy theories related to vaccination (Tomljenović et al. 2019). Some authors furthermore warn that refusing vaccination could be linked to certain parenting styles present today, especially the so-called intensive parenting, in which parents feel a special need to be involved in all aspects of the child's life (Smyth & Craig 2017). For some parents, distrust seems to also be perpetuated by various unpleasant experiences that they experienced within the health system and in contact with health professionals. Recent research has shown that parents are often dissatisfied with communication about vaccination with health professionals, especially regarding side effects, and feel stigmatized when they ask their doctors about vaccines (Tomljenović et al. 2020). Although unprofessional behaviour is a recognized phenomenon that is estimated to be present in about 5% of all health professionals (Stewart et al. 2011), additional research is needed to examine it in the context of vaccination. It can generally be said that due to dissatisfaction with vaccination communication, parents often seek answers to their questions and concerns on the Internet, and then become exposed to additional risks that can aggravate their mistrust (Betsch et al. 2010). Consequently, they develop an inaccurate and exaggerated picture of the number of individuals who are distrustful of vaccination, which leads to the so-called confirmation bias (Jacobson et al. 2007).

MEDICAL DISTRUST AND VACCINE CONSPIRACY THEORIES DURING THE COVID-19 PANDEMIC

As expected during the COVID-19 pandemic, numerous outbreaks have impacted both countries' disease burden and economy as well as individual's daily lifestyle. The changes in daily life, unpredictability, restrictive epidemiological measures, social isolation, and quarantine have shaken the population's mental health as well, which is clearly demonstrated in extensive research (Lazari et al. 2020, Rajkumar 2020). Disrupted mental health, particularly anxiety, stress, and depression, are furthermore associated with increasing levels of distrust and suspicion toward others and institutions, and consequently to

a lack of empathy (Jakovljević et al. 2020). Low empathy is known to encourage people to blame others. These blame games rely often on misinformation and perpetuate conspiracy theories which not only lower the effective response to COVID-19 challenge (Jakovljević et al. 2020, Romer & Jamieson 2020), but can also lead to civil unrest, protest, and violence (Šrol et al. 2022). Conspiracy beliefs have for long been investigated in the context of social instability and anxiety-provoking situations (e.g., war, natural disasters, other global pandemic outbreaks), but also in relation to vaccine hesitancy (Prooijen & Douglas 2018), as well as in the COVID-19 pandemic. In general, vaccine conspiracy beliefs refer to the belief that large pharmaceutical companies and governments falsify data about vaccines (e.g., safety of vaccines) in order to obtain some specific maleficent objectives (Jolley & Douglas 2014), mostly financial gain. For example, that they bribe corrupt scientists to falsify or fabricate data on the effectiveness of vaccines, or to not report vaccine side-effects. The most common conspiracy beliefs specific to COVID-19 are that the virus was artificially designed and is a biological weapon, or that it was designed to boost vaccine manufacturers' profits (Chayinska et al. 2021), that it is connected with 5G mobile network radiation (Allington et al. 2021), that it presents a way to manage overpopulation (Leibovitz et al. 2021), as well as that the mRNA based vaccines change human DNA (Department of Health Australian Government 2021), and lead to fertility issues (Wise 2021).

Much research has been dedicated to finding precursors of the proneness to general conspiracy thinking. Although some research had linked it to certain pathological traits (Dyrendal et al. 2021), it is generally not defined as a psychopathological occurrence (Jolley & Douglas 2014, Swami et al. 2014) and seems to be relatively frequent in the general population (Oliver & Wood 2014). Conspiracy thinking is generally found to correlate with different factors, including lower trust in authorities, lower education (Prooijen & Douglas 2018), feelings of anxiety and lack of control (Šrol et al. 2021), logical fallacies and less analytical thinking styles, as well as socio-political factors, such as marginalization and authoritarian or right-wing orientation (Goreis & Kothgassner 2020). It is important to note that, apart from raising academic interest, conspiracy beliefs have been clearly shown to strongly predict real-life decision-making, health-related behaviours and vaccination uptake. A study on parental conspiracy beliefs showed it to directly predict child's vaccination status (Tomljenović et al. 2019). Similar findings have been demonstrated in the context of COVID-19 vaccination as well (Allington et al. 2021), those who believe in COVID-19 related conspiracies, have a lower

intent to vaccinate and lower vaccination uptake levels (Imhoff & Lamberty 2020).

Similarly, to other conspiracy beliefs, the COVID-19 related ones, are shown to be related to lower trust in authorities and science (Chayinska et al. 2021), as well as political powerlessness and ideology (Romer & Jamieson 2020, Tonković et al. 2021, Ward et al. 2020). An interesting global study on 67 countries also found COVID-19 public health behaviours to be related to national identity (Van Bavel et al. 2022). Even more, beliefs in such conspiracy theories have commonly been related to media influence (Romer & Jamieson, 2020, Ward et al. 2020). Namely, the inconsistencies between public health messaging and that emanating from some prominent media personalities and political leaders made it difficult for the health community to satisfy a key precondition of a vaccine-positive public narrative that would encourage preventive health behaviours (Romer & Jamieson 2020). More specifically, anti-vaccination messages also come from within the health-workers community which further disrupts the public trust, namely it was shown that a significant number of health professionals also would not recommend the vaccine to a patient or family member (Sirikalyanpaiboon et al. 2021). A particularly concerning example of such a negative public narrative and conspiracy thinking is the misbelief that COVID-19 vaccines are not safe in pregnancy and are associated with reproductive health issues. Although COVID-19 infections in pregnancy are clearly associated with adverse foetal and maternal outcomes and mortality (Akhtar et al. 2020, Villar et al. 2021), the vaccination rates in pregnant women are especially low. A recent study showed that COVID-19 vaccine coverage in pregnant women was substantially lower than in the general female population in a reproductive age; 32.3% versus 77.4% (Stock et al. 2022). Moreover, another study showed that the majority of women would consider vaccinating if not pregnant (Skirrow et al. 2022).

RECOMMENDATIONS FOR PUBLIC HEALTH SERVICES

Finally, the question remains which measures have countries adopted to lower COVID-19 vaccine hesitancy and have these been effective in motivating vaccine hesitant individuals to consider vaccination. In the European Union, several public policy measures attempted to increase vaccination rates – some countries have, for example, offered financial incentives (e.g., Greece), most have adopted restrictions to travel and use of public services (e.g., EU COVID digital certificate,

European Commission 2022), and some aimed to make the COVID-19 vaccine mandatory (e.g., Slovenia, Austria). Yet it seems vaccine hesitant individuals have found ways to adapt to such measures using malingering, for example, adulteration of vaccination certificates (RTL vijesti 2021), and false vaccination with other substances as well as bribing medical staff (DNEVNIK.hr 2022). Reports of such behaviour have been observed prior to the COVID-19 pandemic as well, regarding parental-child vaccination. Namely, a study conducted in Croatia has found that vaccine hesitant parents also included malingering in trying to avoid mandatory vaccination, e.g., adulteration of medical records or bribing their physicians (Tomljenović et al. 2020). This demonstrates why it is difficult to develop universal and completely effective interventions and calls for a multidisciplinary approach which will be largely based on behavioural science.

In this context, current literature suggests that accurate expert information on vaccination needs to be provided (Rickert et al. 2015). The provision of valid information from reliable sources such as health professionals and teachers, as well as individual and group counselling should be first steps in the successful implementation of all preventive activities, including vaccination. Within the school system, in addition to providing valid information, it is also necessary to emphasize individual's critical thinking to understand and accept preventive measures (such as vaccination), in order to reduce personal risk of developing a disease. Moreover, such education in critical thinking should be aimed at education on conspiracy beliefs, as such beliefs make individuals resilient to various preventive behaviours including vaccination.

However, education-based interventions are not enough to achieve greater vaccination coverage since some individuals refuse vaccines even though they have accurate and complete information about vaccines (Sobo 2016). To accomplish an effective immunization program, it is furthermore necessary to understand individuals' risk perceptions about disease, acceptance of a vaccine, and confidence in media sources, especially during the current situation of COVID-19 pandemic when non-health professionals usually gain information from media (Malik et al. 2020). Healthcare providers, policymakers, and media play an important role in countering this misinformation spread and improving public trust (Romer & Jamieson 2020, Williams et al. 2020). Therefore, they should prioritize effective COVID-19 vaccine-acceptance messages, provide accurate information about vaccine and minimize misinformation, as well as promote individuals'

mental health in order to maintain population's well-being and effectively control the pandemic (Anjum et al. 2020, Malik et al. 2020, Palamenghi et al. 2020). Thereby it may be particularly important to emphasize the notion that healthcare professionals work in the individual's best interest to reduce the societal polarization between pro and anti-vaccination groups (Tomljenović et al. 2020), in other words to generally support health professionals to provide accurate and convincing information about vaccination. Next, as emotional, and moral reasoning was shown to be important in vaccination decision making (Tomljenović et al. 2019), it is suggested to consult literature on moral and emotional persuasion in designing specific strategies (Edwards & von Hippel 1996), because giving logical arguments is not effective in this context. For example, this may include shaping pro-vaccine messages which emphasize that getting a vaccine is one's basic health right and not a limitation to one's freedom. Also, it is necessary to focus on reducing fear and anxiety that individuals often feel about vaccination.

CONCLUSION

Although the COVID-19 vaccines are proven to be safe and effective, thus saving numerous human lives, a significant part of citizens refuse them. This behaviour can be clearly understood in the context of general vaccine hesitancy and related insights. Understanding the psychological background of individuals' attitudes and opinions regarding vaccination plays an important role in planning and implementing public health interventions focused on preventing reluctance to vaccination. Specific interventions based on evidence coming from behavioural sciences are necessary to tackle emerging hesitancy and decrease mortality and should also be targeted at specific vulnerable populations (e.g., pregnant women, elderly).

Acknowledgements

None.

Conflict of interest

None to declare.

Contributors

HJ and MŠ both contributed to literature search, interpretation and critical evaluation of relevant studies which were included in this review, as well as designing, writing, and proofreading the manuscript.

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Correspondence:

Mirna Šitum, University Hospital Center
Sestre milosrdnice, Vinogradska 29,
10000 Zagreb, Croatia,
mirna.situm@kbcsm.hr, (00385) 1/3787-422