

Viewpoints

Vaccine hesitancy and its determinants – a way forward?

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The availability of highly effective SARS-CoV-2 vaccines brought about renewed hope worldwide to overcome the pandemic, becoming an integral part of public health measures. However, vaccine hesitance, defined as the reluctance of people to receive the recommended vaccines, threatens to stand in the way. Understanding why people are not taking up the recommended vaccines can assist in strategy development, which is critical for increasing vaccine uptake. Unfortunately, during the pandemic, social media has often been involved in misinformation and misinterpretation of the scarce research data. This has widened the existing chasms in the society, causing strong polarisation of vaccine-uptaking vs vaccine-hesitant people. Confrontation and stigmatisation can turn hesitance into defiance, and this will have additional detrimental effect. Researchers and medical workers must lead the forefront of honest and respectful communication, acknowledging the concerns that vaccine hesitant people have. This is particularly important as most vaccine hesitant people neither have a political agenda nor are they committed to an anti-scientific cause. Although it may sound trivial, public health needs to revert to its roots of teaching medicine to the people.

BACKGROUND

The availability of highly effective SARS-CoV-2 vaccines brought about renewed hope worldwide to overcome the pandemic, becoming an integral part of the backbone of our public health measures. However, vaccine hesitancy, defined as the reluctance of people to receive the recommended available vaccines, threatens to stand in the way.¹ Understanding why people are not taking up the existing SARS-CoV-2 vaccines could aid in strategy development and consequently have a favourable effect towards increased uptake.^{1,2} Vaccine hesitancy is context-specific, complex and varies across time, the type of vaccine and place.^{2,3} There are both individual and structural barriers that contribute to vaccine hesitancy.⁴ According to the 5 C model of drivers of vaccine hesitance, there are five levels that drive vaccine hesitance at an individual level, namely; confidence, complacency, convenience or constraints, risk calculation and collective responsibility.⁴ Interestingly, vaccine hesitancy remains high, despite numerous approaches used in vaccination against the SARS-CoV-2 virus ([Table 1](#)).^{5,6}

The main reason driving vaccine acceptance is the interest in personal protection, while the main driver of hesitancy is the fear of side effects, based on the individual weighing of risks and benefits.^{1,3} This factor ought to be thoroughly acknowledged and addressed. The other factors influencing vaccine acceptance have been identified as contextual, individual, group and vaccine-specific attributes.³ Some governments are now offering monetary incentives to people to get vaccinated, with limited results.⁷ However,

there may be a cheap and powerful countermeasure, available to policymakers.

SOCIAL MEDIA AND INFODEMIC

The COVID-19 pandemic is the first pandemic in the time of widespread social media, resulting in the new concept of an infodemic. Infodemic is defined as too much information in physical and digital environments incorporating both false and misleading facts.⁸ The ensuing confusion can lead to risk-taking behaviours as well as mistrust in authorities, undermining public health responses.^{8,9} Though digitalization (social media and the internet) enables information to spread quickly, it also can amplify harmful messages⁸ and further widens already existing chasms in society. Confrontation can turn hesitance into defiance and obstinacy. Researchers and medical workers must lead the forefront of honest and respectful communication, acknowledging the concerns that vaccine-hesitant people have. This is particularly important as most vaccine-hesitant people neither have a political agenda nor are they committed to an anti-scientific cause.¹⁰ Although it may sound trivial, public health needs to revert to its roots of teaching medicine to the people.

NEW TECHNOLOGY, FEAR, TRUST, CHOICE AND THE NEED FOR SENSITIVITY IN COMMUNICATION AND UNDERSTANDING

Medical decision-making psychologists argue that the

Table 1. A brief summary of the types of SARS-CoV-2/COVID-19 vaccines

Sars-CoV-2/ COVID-19 vaccine	Nucleic Acid (RNA and DNA) Messenger m RNA vaccines	Vector vaccine	Protein subunit vaccine	Whole virus
Description	Messenger RNA vaccines use genetically engineered mRNA that codes for the S-protein of the surface of SARS-CoV-2. mRNA is stabilized and transported via lipid particles	Genetic sequences encoding for the S-protein of Sars-CoV-2 is placed into the genome of a viral vector, adenovirus. The modified virus is used for immunization.	These include only the parts of a virus e.g. Epitopes of the relevant S-protein of Sars-CoV-2 ^{5,6}	Whole inactivated /attenuated (different approaches possible) viruses are used in combination with an adjuvant, ^{5,6}
How they work	After vaccination, mRNA enters the cytoplasm of the cells and instructs cells how to synthesize the S protein. mRNA is only viable for 48 h hours and then disintegrates. It does not enter the cell nucleus. The synthesized S protein is displayed on producing cell surfaces, causing the immune system to mount an immune response, particularly antibodies that block the docking of the S-protein of SARS-CoV-2 with human host cells.	When the viral vector enters the cell, it delivers instructions through the genetic material from S-protein of SARS-CoV-2 to synthesize S protein copies. The synthesized S protein is displayed on producing cell surfaces, causing the immune system to mount an immune response, particularly antibodies that block the docking of the S-protein of Sars-CoV-2 with human host cells.	The vaccine contains the S protein. The immune system recognizes the proteins as foreign and mounts an immune response, particularly antibodies that block the docking of the S-protein of SARS-CoV-2 with human host cells.	The attenuated virus induces antigen-specific T-cell responses towards the SARS-CoV-2 spike, membrane, and nucleocapsid proteins, as opposed to just the spike protein as with the currently deployed vaccines.
Examples of currently available vaccines (not comprehensive particularly places of registration)	Pfizer/BioNTech and Moderna-registered (registered e.g., in US, Germany, Switzerland, UK, Europe)	AstraZeneca and Johnson and Johnson (registered e.g., in UK); Sputnik V (registered in Russia, Argentina, Belarus, Hungary, Serbia, Pakistan and in and the United Arab Emirates	Novavax (currently seeking registration)	Sinovac; Sinopharm (registered in China); VLA2001 (under clinical trials)

choice to get a vaccine is a result of many complicating factors that need to be addressed sensitively if a public health acceptable level of herd immunity is to be reached.^{10,11} The fear of new technology is not new; the emergence of microcomputers in the 1980s and video games, smartphones and social media also brought about fears.¹² New technology-related concerns may arise from a lack of meaning surrounding such advancements, with frightening stories that fill the gap and create meaningful context.¹²

Similarly, there are fears that mRNA technology is new and that these vaccines have not been adequate, i.e. ethically and scientifically correctly tested.¹⁰ Many hesitant people fear potential, not yet known of, rare or very rare side effects. The mixture of these parallel effects was termed the syndemic,^{13,14} a blend of the pandemic of fear, fear of the virus, and fear of the unknown.^{13,15} Trust is the prerequisite of vaccine acceptance, societal responsibility and solidarity. The issue of trust cannot be over-em-

phasized since low trust has been associated with low vaccine uptake,^{16–19} well before COVID-19. People undertake an individual or family/household-based risks-benefit assessment that leads to vaccination acceptance or hesitance. The societal dimension, the public health level assessment of risks and benefits, along with the responsibility for decisions made, is particularly difficult in a fear-based environment. Additionally, it is difficult to reconcile the individual and public health dimensions of the SARS-CoV-2 vaccines. A recent study has shown that the restriction of vaccine choice elicited anger and that the freedom to choose a vaccine type improved willingness to be vaccinated.²⁰ Traditional vaccine technology, particularly protein subunit vaccines are generally viewed as more trustworthy.^{21,22} If many vaccine-hesitant people are indecisive about vaccine choice,¹⁰ could an increase in SARS-CoV-2 vaccine choices (beyond mRNA and vector-based vaccines) reduce vaccine hesitancy and move us closer to herd immunity? Can the

registration of Novavax, a SARS-CoV-2 vaccine, developed using well known and more broadly trusted vaccine technology, be an additional game changer?²²

CHOICE AND OPEN COMMUNICATION OF RISK AND EVIDENCE BASE WITH UNDERSTANDING AND SENSITIVITY

According to the World Health Organization, the systematic use of risk and evidence-based analysis and approaches are needed to combat the infodemic. This includes listening to concerns and questions vaccine hesitant people, including those against vaccination, have. Equally important is the ability to communicate the risks and benefits of the SARS-CoV-2 vaccines with openness, acknowledging what is known and is unknown, with sensitivity and understanding (Figure 1).¹¹

CONCLUSION

The increased choice of SARS-CoV-2 vaccines beyond mRNA and vector technology is a welcome development. While the fear of new technology is not new, we have to bear in mind that we live in syndemics, including a pandemic of fear, amplified largely by the infodemic, the ability to communicate openly with respect, honesty, understanding and sensitivity becomes paramount in public health. This includes, among others, the open communication of what it entails to develop and scientifically and ethically validate the safety and efficacy of vaccines of any type, including those of SARS-CoV-2 vaccines,^{18,19} to enhance trust and thus acceptance. Addressing the issues of trust, sensitive, open communication with understanding and respect, acknowledging what is known and unknown, equitable procurement and access to SARS-CoV-2 vaccines and widening and allowing a choice of vaccine, are well known, simple and cheap solutions that have the potential to be an additional game-changer in addressing SARS-CoV-2 vaccine hesitancy.^{11,18} Although it may sound trivial, public health needs to revert to its roots of teaching medicine to the people.

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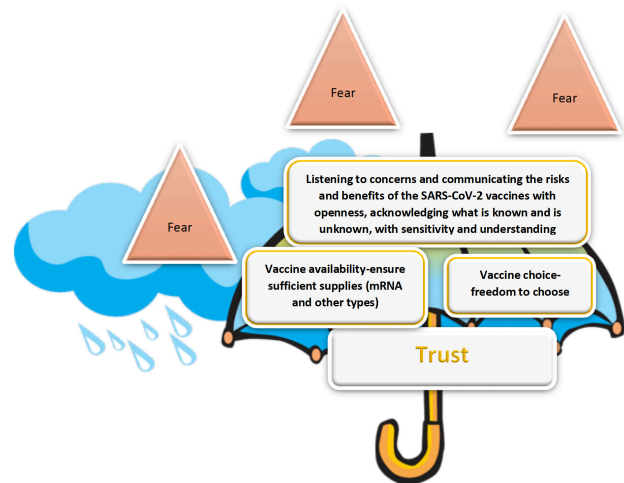


Figure 1. Vaccine hesitancy in the midst of other pandemics, including fear

AUTHOR CONTRIBUTIONS

JM and MT had the initial concept. JM, TCS and MT developed the concept further and were involved in manuscript writing, and contributed to the final draft

DISCLOSURE STATEMENT

The authors completed the ICMJE Unified Competing Interest form at (available upon request from the corresponding author), and declare no conflicts of interest.

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