

Understanding Factors That Contributes to Vaccine Hesitancy in the COVID-19 Context: The Intersection of Trust in Institutions, Socioeconomic Status and Demographic Factors

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Abstract: Vaccine hesitancy has become a major global public health challenge, threatening the success of vaccination programs. Despite the fact that vaccines have proven effective in fighting infectious diseases, millions of people are still hesitant to get vaccinated, especially during the pandemic. This paper identifies vaccine hesitancy in the COVID era and examines the factors that contribute to vaccine hesitancy, including a lack of trust in health institutions, misinformation, and other cognitive and demographic factors. Drawing on examples from around the world, including Africa and Brazil, this article further explores the social and political determinants that influence vaccine uptake. While Brazil has shown relatively high vaccine acceptance rates due to trust in local vaccines and the urgency of the pandemic, Africa faces great hesitation due to mistrust and misinformation. By addressing misinformation, restoring public trust and confidence in vaccines, and involving communities in the decision-making process, public health initiatives can effectively combat vaccine hesitancy and mitigate ongoing threats to global health.

Keywords: Vaccine hesitancy, public health challenges, global health response, COVID-19.

1. Introduction

Vaccines have been considered one of the greatest public health achievements in human history. Since their invention, vaccines have saved thousands of lives, eased the burden of various infectious diseases, and contributed to overall health conditions improvement for the general population as a whole. Researchers acknowledged that the mass vaccination programs implemented today rely heavily on low vaccine hesitancy, which refers to people's voluntary attitudes to take the vaccine during the present or future pandemics [1]. However, vaccine hesitancy has now become one of the top 10 threats to global health and a crucial public health challenge, with millions of people, continuing to resist vaccination despite seeing scientific results demonstrating how successfully these vaccination programs saved lives [1]. Vaccine hesitancy can be defined as the delay in acceptance or refusal of vaccines despite the availability of vaccination services [2]. This phenomenon is shaped by a variety of social, contextual and cognitive factors, including lack of public trust in health officials and medical institutions, misinformation on social media, and concerns about potential risks [1]. During COVID-19 pandemic, high vaccine hesitancy has been represented as an important problem,

with public doubts about vaccine efficiency and provenience. People also refused vaccines due to safety concerns or cognitive beliefs that the population had already been immunized. Researchers found that the percentage of COVID-19 vaccine acceptance was 77.6%, considerably higher than that of influenza vaccine (69%), but neither of these indicators can be said to be satisfactory [3]. The consequences of vaccine hesitancy can be profound, as it could prevent the population from reaching the immunization levels required to control the pandemic [2].

By examining academic papers and studies focusing on vaccine hesitancy and local response strategies, this paper aims to explore the factors associated with this socio-medical phenomena and to evaluate the effectiveness of these implemented programs aimed at improving vaccination coverage among target groups. This paper further argues that it is essential for intervention strategies to address all key issues, particularly misinformation, risk perception and lack of trust in institutions, to improve vaccine uptake globally and combat the ongoing public health threats posed by vaccine hesitancy.

2. COVID-19 and vaccine hesitancy

2.1. The definition of vaccine hesitancy

Vaccine hesitancy refers to the delay in acceptance or refusal of vaccination despite the availability of vaccination services. It can be seen as a behavior, with individuals refusing to take a vaccine, refuse all types of vaccines, or delay to take some vaccines while accepting others [3]. Vaccine hesitancy is context specific and complex, with hesitant individuals being critical of certain types of vaccines or general vaccination due to various factors, such as lack of confidence in vaccine or vaccine provider, beliefs that taking vaccines is unnecessary or dangerous, and inconveniences to getting access to vaccine [3]. Terms such as *vaccine acceptance* were also considered by SAGE Working Group (WG) initially when they tried to describe a situation where people are not very confident when taking a vaccine, but this term was eventually excluded because it does not necessarily capture the moment when one decided to ‘delay’ that process [4]. The word ‘hesitancy’ refers to a continuum between those who undoubtedly accept all vaccines and those who undoubtedly refuse all vaccines. Although vaccination acceptance is now a global norm in most populations, there’s still a considerable number of people who refuse to take vaccines or feel unsure about the injection [4].

2.2. Vaccine hesitancy and COVID-19

Survey results conducted in 33 countries indicate that vaccine hesitancy represents a worldwide problem in controlling the COVID-19 pandemic [2]. The acceptance rates were low in African countries, Russia, the Middle East and several countries in Europe. In the Middle East, vaccine acceptance rates were remarkably low (23.6% in Kuwait and 28.4% in Jordan) due to widespread regional conspiratorial beliefs and subsequent negative attitude towards vaccination. Research has found that the issue of vaccine hesitancy has strong geographical characteristics. Although in some countries such as Ecuador, Malaysia, and China, vaccine acceptance has exceeded 90%, globally speaking, people in many countries and regions still refuse to receive vaccines for various reasons [2]. Therefore, a recommended first step in promoting trust in vaccination efforts is to investigate the factors behind vaccine hesitancy and address this widespread issue observed in various countries.

3. Factors associated with vaccine hesitancy

3.1. Trust in health institutions and medical professionals

Vaccine hesitancy is a dynamic process that can be influenced by national-level political and social conditions, and trust in governments and medical associations is always a crucial component of any public health measures [5]. Prior to the COVID-19 pandemic, trust in government was low with only 45% of citizens in OECD countries claiming trust in national officials. Researchers found that a significantly high proportion of respondents from the United States (78%) fear that vaccine approval process is affected by ‘politics than science’ and 55% of the European respondents have concerns about potential side effects of a vaccine [5]. In Western countries, distrust in politicians is inconsistently related to vaccine hesitancy. In the United States, 44.15 percent of respondents said they were unwilling to receive the COVID-19 vaccine or feel unsure about doing this. In some European countries, such as Germany and Ukraine, the proportion of hesitant population is even higher. Statistical relationships between political trust and vaccine hesitancy suggest that promoting confidence in governmental health institutions can encourage individuals to get vaccinated and reduce their risk perceptions. This could be achieved by building alliances between non-political figures for vaccine-development process to ensure high-standard and safe products. Leaders of medical associations and pharmaceutical companies may also be involved in supervising the process of research and production.

Vaccine related behaviors are also associated with trust in medical professions. Individuals with higher levels of trust in their personal doctor have a significantly greater possibility of taking or seeking the COVID-19 vaccine [6]. Reports from the Health Reform Tracking Survey show that few unvaccinated adults discussed the issue of COVID-19 vaccine with their physician, however, researchers suggest that if trust is built between medical professionals and individuals, hesitators are very likely to be persuaded to get vaccinated. Generally speaking, people's trust in healthcare workers worldwide is much higher than their trust in politicians. Even in Ukraine, a European country with a high degree of vaccine hesitancy (64% of respondents reporting ‘no’ or ‘maybe’ in the COVID-19 vaccine acceptance survey), 71% of people have expressed trust in medical professionals. Universally, more than 80% of respondents expressed their trust in doctors and nurses and in some of the regions this figure was even greater than 90%, which is beneficial for promoting vaccination [5]. The government and health organizations should further promote effective communication between doctors and patients, allowing people with professional medical knowledge to help alleviate ordinary people's concerns and fears about vaccines. Undoubtedly, the premise is that the vaccines provided by medical organizations have been scientifically evaluated for safety and efficiency.

3.2. Cognitive determinants

The ‘3Cs’ model, first proposed to the WHO in 2011 highlighted three important categories: Confidence, Convenience, and Complacency. Among them, ‘Confidence’ is defined as trust in policy-makers, healthcare professionals as well as the effectiveness and safety of vaccines [4]. Researchers find that lack of vaccine confidence and low perceived seriousness of COVID-19 are the two principal factors that can respectively explain 38% and 21 % of vaccine hesitancy variance in Canada and the US [7]. People tend to doubt the effectiveness and legality of vaccines, as some of them believe in conspiracy theories claiming that the vaccine production process has been manipulated by capitalists and politicians. They are also concerned that vaccination in the global pandemic environment may not achieve the expected immune effect, but may have potential side effects on the human body. Besides risk perception on vaccines, cognitive factors may also influence vaccine acceptance rate, as some people believe that since COVID-19 is not life threatening, the

human body's own immune system can well-resist the virus without the need for vaccine intervention. Findings in Turkey, a country with high vaccine hesitancy rate (about 54% of the surveyed population refused to be vaccinated in 2020), those who refuse the vaccine usually are less concerned about the pandemic and have lower anxiety levels [8]. When people have no symptoms, they believe they are healthy and well, therefore less likely to be engaged in virus preventive measures such as vaccination, which controls the spread of virus in the entire community [8]. Such attitude reflects a broader issue of complacency, namely the unpredictable risk of infection, which leads individuals to believe that preventive interventions are unnecessary. This false sense of security not only undermines public health work but also increases the risk of community virus recurrence. Addressing these issues requires targeted communication strategies to increase confidence in vaccines, and emphasize the importance and collective benefits of vaccination in controlling the epidemic.

3.3. Media consumption habits and misinformation

Social media platforms were used by various public health institutions and organizations to create awareness of pandemic control, this method was proved to be effective as it improves forecasts of COVID-19 spread [9]. However, these platforms also became a venue for conspiracy theories, with Vaccine opposition individuals in English-speaking Twitter discussing critical themes such as 'Negative Health Impacts', 'Policies and Politics', 'Vaccine Safety' and 'Ingredients', and an overall increase (80%) in vaccine opposition on the platform [9]. In Ukrainian social media, people frequently mentioned ideas like 'vaccines can be dangerous', 'well-proven vaccines do not exist', and a few more inclined to conspiracy theories which include 'USA test its vaccine on Ukrainians' and 'Ukrainian officials take Russian vaccines in secret.' This shows that the Ukraine public lacks basic confidence in the COVID-19 vaccine and they do not have a unified channel to receive official vaccine information to help them eliminate these concerns. Researchers also suggest that people with different political standpoints report different expectations of health-related issues, and social media has a considerable impact on shaping and providing framework for these expectations. In the United States, individuals with extreme political ideologies are more likely to support ideas 'published by an ideological congruent source', and 79% of the authors who wrote about discouragement of vaccination also express right-wing political opinions [9]. While immunization against COVID-19 is one of the themes influenced by social media diets, misinformation can lead to other more dangerous outcomes. It has been reported that in Iran, people drink methanol to avoid COVID-19 which directly leads to number of deaths [9]. To mitigate the negative effects brought by misinformation, it is crucial for authorities to focus more on social media marketing and try to build trust in public health information about vaccination. Scholars also advised that official information should be established by distinct communication strategies which makes it clearer and easier for people to follow.

3.4. Demographic factors

Females are more represented than males in vaccine hesitancy rates, and this higher prevalence has been widely documented in various reports. Researchers hypothesized that this phenomenon may be a result of lower trust in scientific community and health institutions among female population. On the other hand, higher prevalence of severe infection rates and death rates among males may increase their risk perception and lead to more vaccine acceptance [10]. Unemployed individuals and those with lower incomes also tend to have lower vaccine acceptance, likely due to socioeconomic constraints. Religiosity has been found to negatively correlate with COVID-19 vaccination, and individuals aligned with radical parties or those who do not feel close to any political party are more likely to refuse vaccination [3]. Additionally, individuals with low levels of education demonstrate lower acceptance rates. Younger individuals tend to be more hesitant, although some studies indicate

that middle-aged and elderly groups can also show high hesitancy. And lastly, while working in a healthcare setting generally contributes to higher acceptance of vaccine, in some specific countries such as the United States (36%) and the Democratic Republic of Congo (27.7%), the vaccine confidence rates were very low [10]. High vaccine hesitancy among healthcare workers is particularly concerning due to their critical role during the pandemic, not only in daily patient care but also in promoting health literacy among the general population. Therefore, it is crucial to raise awareness within this group to improve the success of vaccination campaigns [10].

The relationship between geographical location and vaccine hesitancy reveals significant variation. Despite their vastly different cultures, both Hong Kong and the Democratic Republic of the Congo reported some of the lowest vaccine acceptance rates (4.2%-38% and 15.4%, respectively). Both regions have experienced recent political instability which may have contributed to higher vaccine hesitancy. In contrast, China, Malaysia, and Indonesia have the highest acceptance rates. These countries are among the first to face severe consequences from the pandemic, which could increase their population's confidence in vaccines [10]. In Europe, acceptance rates vary widely, with higher acceptance rates in the United Kingdom (82%) and lower acceptance rates in Italy (40.9%) and France (53.7%), reflecting the influence of cultural and socio-demographic diversity on vaccine-related attitudes [10]. Data variation illustrate that local factor, such as political stability and regional pandemic experience, can heavily impact vaccine hesitancy.

4. Case studies of COVID-19 vaccine hesitancy responses

4.1. Africa

The case of vaccine hesitancy in Africa demonstrates that despite the development and availability of COVID-19 vaccines, low vaccine acceptance remains a significant issue across the continent due to mistrust of government responses, misinformation and lack of community involvement. Historically, Africa has faced challenges in vaccine promotion, such as the 2003-2004 polio vaccine boycott in Nigeria, which was triggered by distrust of vaccines by religious leaders [11]. Similar challenges have been observed during the pandemic, where slow government responses and widespread misinformation have led to public skepticism and resistance. To address these challenges, several strategies have been implemented to increase vaccine uptake, with community engagement being a key factor, aiming to engage traditional leaders, community leaders, and religious figures in mobilizing support for vaccines [11]. This bottom-up approach aims to combat misinformation and build up trust within the communities. Vaccine promotion programs could also become more successful if community stakeholders are involved in decision-making and ensuring that vaccines are available at community-approved sites. In addition, global initiatives such as COVAX, which aims to provide equitable vaccination opportunities for low-income countries, have also played a key role [11]. At this stage, vaccine hesitancy still poses a significant threat to the success of COVID-19 vaccine rollout in Africa, and even to people's trust in the vaccine itself. In the future, governments and international health organizations will need to address this issue on multiple fronts, leveraging the influence of communities and leaders, as well as effective health education, to reduce vaccine resistance when a pandemic hits.

4.2. Brazil

Researchers also examined resident Brazilians' intentions to vaccinate for COVID-19 by surveying 173,178 participants [12]. Brazilians reported a relatively high rate of vaccine acceptance (89.5%), and even among those reported to be vaccine hesitant, 8% were unsure or only unwilling to get a specific vaccine. This low vaccine hesitancy can be attributed to several factors, such as strong public trust in vaccines. In Brazil, vaccines like CoronaVac and Covishield were perceived as reliable as

they were produced in partnership with respected national research institutes such as FIOCRUZ. This trust in locally produced vaccine over international vaccines helped mitigate hesitancy. Additionally, the overall high fear of COVID-19 and its severe impact on Brazil is likely encourage many people to overcome their concerns. Even those who have traditionally been skeptical of vaccines, including a small group of vaccine recipients, seem more willing to get vaccinated due to the widespread consequences of the pandemic. In fact, Brazil's main challenge is obtaining vaccines, not refusing to receive them. Therefore, the country's trust in local vaccines, coupled with the urgent public health crisis, has led to relatively low hesitation towards vaccines in Brazil [12].

4.3. Comparation

The cases of vaccine hesitancy in Africa and Brazil offer different perspectives on how public trust, government response, and local context shape vaccination behavior. In Africa, vaccine hesitancy remains a significant issue due to widespread mistrust, misinformation and lack of community engagement about government responses. On the other hand, Brazil presents a contrasting case, with relatively low vaccine hesitancy. In Brazil, trust in locally produced vaccines, such as CoronaVac and Covishield, produced in collaboration with highly respected national research institutes, has played an important role in reducing hesitation. In addition, the severe impact of the coronavirus in Brazil may encourage more people to get vaccinated. The public's willingness to get vaccinated highlights the importance of strong trust in health institutions and an immediate response to a public health crisis. Therefore, while both regions face vaccine hesitancy, the root causes and effectiveness of interventions are very different.

5. Conclusion

Vaccine hesitancy continues to pose a significant threat to global public health, especially in the face of pandemics such as COVID. Vaccine acceptance is influenced by a wide range of factors, including social, cultural, and cognitive determinants. Trust in government health institutions and medical professionals plays a crucial role, as low levels of trust can significantly reduce vaccination rates. Misinformation spread through social media and the internet has further exacerbated hesitation, leading people to question the safety and efficacy of vaccines. In addition, factors such as socioeconomic status, gender, education level, and occupation can all complicate acceptance rates, with studies showing that women, low-income people, and those with less education tend to show higher levels of hesitancy. While regions such as Brazil have shown relatively low levels of hesitation, others such as Africa face greater challenges stemming from historical mistrust and lack of community engagement. To address these challenges, governments, healthcare providers, and public health organizations must develop strategies that strengthen public trust, provide clear communication, and facilitate vaccine access. By learning from the root causes of vaccine hesitancy, public health initiatives can ensure higher vaccination rates, better prepare for future public health crises, and safeguard global health.

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