

VACCINE HESITANCY: AN UPSURGING THREAT TO THE SOCIETY

Abstract

Although vaccine reluctance is nothing new, social media's role in disseminating anti-vaccine information has made it more urgent, particularly in the wake of the coronavirus outbreak and anticipations of speedy ideation and implementation of a vaccine. In recent years, the media and public health experts have focused a lot of emphasis on vaccine reluctance, described by the World Health Organization as "the reluctance or defiance to vaccinate regardless of the accessibility of vaccines. Previous studies have shown that a variety of individual characteristics, including low income and educational attainment, certain political or religious beliefs, and perceived risks related to safety and efficacy, significantly contribute to reluctance to vaccination. Satisfaction with a particular vaccine or immunization, in general, is affected by a number of factors, such as other life and health initiatives deemed more critical at the time. The level of immunization service delivery in a convenient and comfortable time, place, and cultural setting can also influence vaccination decisions and lead to reluctance to immunize. A strong vaccine education can help learners engage with the questions that vaccination raises and deepen their knowledge and understanding of those questions by referencing worldview frameworks and contentious issues.

Keywords: Vaccine hesitancy, Anti-vaccination, Vaccine - preventable disease (VPD), Vaccine Aversion, Vaccine Reluctance.

Authors

Aunkumar Subramanian

Department of Pharmacology
SRM College of Pharmacy
SRM Institute of Science and Technology
Chengalpattu, Tamil Nadu India.

Pooja C

Department of Pharmacology
SRM College of Pharmacy
SRM Institute of Science and Technology
Chengalpattu, Tamil Nadu India

Mariyam Susan Joji

Department of Pharmacology
SRM College of Pharmacy
SRM Institute of Science and Technology
Chengalpattu, Tamil Nadu India

Sashtipriyaa R

Department of Pharmacology
SRM College of Pharmacy
SRM Institute of Science and Technology
Chengalpattu, Tamil Nadu, India.

Tamilanban T*

Department of Pharmacology
SRM College of Pharmacy
SRM Institute of Science and Technology
Chengalpattu, Tamil Nadu, India.
tamilant@srmist.edu.in

I. INTRODUCTION

A prompt, safe, and effective way to stop hazardous illnesses before you come into contact with them is immunization. By bolstering your body's natural defenses, vaccinations reduce your chance of contracting a disease by boosting your body's natural defenses. Despite the reach of vaccination services, vaccine hesitancy refers to a delay in refusing or accepting immunizations. The backdrop of vaccination reluctance varies depending on the time, place, and vaccine. It includes elements like complacency, ease, and confidence. Vaccine reluctance has far-reaching consequences [1].

Vaccine hesitation and rejection are not new concepts; they have existed since the smallpox vaccine was introduced. They have, nevertheless, expanded significantly in recent years; the reasons for vaccination depend on the type of vaccine. There are numerous causes why people hold back to get vaccinated [2]. The new coronavirus infectious disease vaccine is no exception. Although vaccine hesitance is not a new issue, social media's role in disseminating anti-vaccination propaganda has made it more urgent, particularly in the wake of the coronavirus epidemic and anticipations of speedy ideation and execution of a vaccine [3]. One of the increasingly important factors for vaccination coverage is vaccination hesitation. This results in delay or refusal of vaccination and extends to delay in acceptance of one or more of the vaccinations offered. Up to full exemption from all vaccinations in immunization programs [4].

Complacency regarding a certain vaccination or, in general, immunization is impacted due to a number of factors, such as other obligations for one's life or health, that could seem to take more importance now. When it comes to vaccination, convenience, proper accessibility, cost, financial preparedness, accessibility in terms of location, capacity to comprehend, and the allure of vaccination services, all play a role. Determinants of vaccination hesitancy, such as education and socioeconomic status, refrain not only clout vaccination hesitancy pointing one way. There are also respective and collective impacts from personal perceptions of vaccines, beliefs, and attitudes towards vaccination, such as perceptions of benefits and effectiveness of vaccines, safety issues, negative impacts, and both social and peer environments. The "4P" technique (place, price, product, and promotion) is a well-known social marketing method that is frequently employed by the general public. Due to its history of success & simplicity of execution, the 4P marketing plan for social media may be a practical choice to reduce the fear of vaccination and increase vaccination coverage among the general public [5].

II. VACCINE HESITANCY – A DESCRIPTION

In recent years, the media and public health experts have focused a lot of emphasis on vaccine hesitancy, described by the World Health Organization (WHO) as "the reluctance or a failure to receive a vaccine despite the accessibility of the vaccine." When it comes to context, period, place, and vaccines, vaccine hesitance is complex and can take many different forms. It is impacted by elements like complacency, convenience, and confidence.

Although the majority of cultures recognize vaccination as the norm, less people resist certain vaccines while approving others postpone vaccination or accept it but are not persuaded that they should. Thus, the range of vaccine hesitance is defined as those who accept all vaccinations without reservation to those who completely reject vaccinations

without reservation, with vaccine-hesitant people constituting the middle ground between these two extremes [1].

The terms "anti-vaccine" as well as "vaccine hesitance" are intermittently utilized interchangeably. The idea of vaccine hesitancy marks a change from the binary anti- vs. pro-vaccination attitude to a strategy that describes behavior over a spectrum of probable viewpoints and actions, varying from energetic desire for immunizations to full rejection of all immunizations. Along this spectrum, people who are skeptical of vaccinations make up a diverse group. Ambivalence against vaccination shouldn't be interpreted as unreasonable or "anti-science"; nonetheless, it frequently reflects reasonable skepticism and worries about immunizations. Therefore, vaccine hesitation differs greatly from the opposition to any type of immunization by powerful-minded as well as devoted individuals who make up what is commonly referred to as the "anti-vaccine" movement [6].

The top ten global threat to public health in 2018, in accordance with the WHO, includes vaccination hesitancy. The eradication of re-emerging illnesses like measles as well as rubella that are preventable by vaccination nevertheless faces risk from vaccine hesitance. Previous studies have discovered that a number of individual-level characteristics, such as low income and inadequate education, particularly political or religious beliefs, and perceived risks in the context of safety and effectiveness are substantially connected with vaccine hesitance [7].

III. VACCINE HESITANCE – PAST AND PRESENT SCENARIO

The movement against vaccination has a long history. It started in France in 1763, at a time when vaccine mistrust was justified. The standard of appropriate safety and sanitation in eighteenth-century Europe was relatively low, and there was no suitable quarantine system for persons who had received vaccinations. Because vaccine-infected sick were infecting healthy Parisians, the Parisian parliament had every right to ban immunizations.

As time went on, the toxins included in vaccinations changed from fully functional to weak or dead forms. Despite this, many individuals continued to hold the antiquated belief that immunizations were more harmful than beneficial as science evolved.

The Cambridge, Massachusetts municipal council established legislation requiring immunizations of all citizens in 1902 as a response to a pox outbreak. This was the initial major vaccination campaign spearheaded by the government. They had started to demonstrate that they were quite successful at building herd immunity. However, this resulted in strong reactions, and one case even made it to the Supreme Court [8]. The following list (Table 1) depicts the list of vaccines recommended by Centre for Disease Control and Prevention (CDC) guidelines.

Table1: Recommended vaccination chart as per CDC guidelines

AGE GROUP	RECOMMENDED VACCINES
At birth	BCG vaccine, 3 doses of Hepatitis B
1-2 Months	Hepatitis B (2nd dose), diphtheria, tetanus, and whooping cough (pertussis) (DTaP), <i>Haemophilus influenzae</i> type b (Hib), Polio (IPV), Pneumococcal (PCV), Rotavirus (RV)
4 months	Diphtheria, tetanus, and whooping cough (pertussis) (DTaP), <i>Haemophilus influenzae</i> type b (Hib), Polio (IPV), Pneumococcal (PCV), Rotavirus (RV), Hepatitis B (HepB)
6 months	Diphtheria, tetanus, and whooping cough (pertussis) (DTaP), <i>Haemophilus influenzae</i> type b (Hib), Polio (IPV), Pneumococcal (PCV), Rotavirus (RV), Influenza (flu)
7-11 months	Flu vaccination
12-23 months	Chickenpox (Varicella), diphtheria, tetanus, and whooping cough (pertussis) (DTaP), <i>Haemophilus influenzae</i> type b (Hib), Measles, mumps, rubella (MMR), Polio (IPV) (between 6 through 18 months), Pneumococcal (PCV), Hepatitis A (HepA), Hepatitis B (HepB) and flu vaccination, every flu season
2-3 years	Flu vaccination every flu season.
4-6 years	Diphtheria, tetanus and whooping cough (pertussis) (DTaP), Polio (IPV), Measles, mumps and rubella (MMR), Chickenpox (varicella), Influenza (flu) every year
7-10 years	Flu vaccination every flu season
11-12 years	Meningococcal conjugate vaccine, HPV vaccine, Tdap, Flu vaccine every flu season
13-18 years	Flu vaccination, every flu season
19-26 years	In addition to the seasonal flu (influenza) vaccine and Td or Tdap vaccine (tetanus, diphtheria, and pertussis), HPV vaccine and vaccination against meningitis must be taken
27-60 years	Seasonal flu (influenza) vaccine every year, Tdap vaccine, Td (tetanus, diphtheria) booster shot every 10 years and zoster vaccine
60 years or older	Seasonal flu (influenza) vaccine and Td or Tdap vaccine (tetanus, diphtheria, and pertussis), Pneumococcal vaccines, Zoster vaccine

IV. IMPLICATIONS OF VACCINE HESITANCE ON WORLDWIDE HEALTH

For instance, Ukraine has one of the lowest rates of routine immunization across the continent and is dealing with a significant influx of refugees [9][10]. Children in Ukraine receive less vaccinations than what is advised by the WHO against measles, polio, and tuberculosis. Over 82,000 measles cases were reported in Europe between 2017 and 2018, with 53,000 of those cases occurring in Ukraine. A COVID-19 vaccination was only administered in two doses to 35% of the populace before the conflict. As medical facilities are damaged and forced displacement hinders scheduled vaccination appointments, it is anticipated that the war in Ukraine may severely interrupt routine vaccination programs for children. Conflict zones frequently exhibit this risky trend of low vaccination rates and a conducive setting for the spread of illnesses [11].

Measles infections in Europe increased dramatically in the case of 53,000, an initial seventy-five percent of 20185, which ensued around deaths totaling 40 to date. It is estimated that seven countries, including Italy and France in Western Europe, each had more than 1,000 cases. Israel experienced measles outbreaks as well. The WHO has reported an increase of

thirty percent compared to 2016, indicating that Europe's recovery is part of a broader worldwide rebound. 2017 saw a horrific measles outbreak in Minnesota's Twin Cities, and 220 cases of the disease have been reported nationwide in 2018—mostly among those who haven't had the vaccine, in the states of New York as well as New Jersey, Kansas, and Missouri. Another notable event of the year 2018 was one of the deadliest US influenza outbreaks in decades, during which 80,000 fatalities were seen, involving a number of small children who disregarded instructions and did not receive the flu vaccine [12].

V. FACTORS BEHIND VACCINE HESITANCE

Fears about vaccines are influenced by a variety of reasons. Vaccines have fallen prey to their own fame. Early childhood parents are less well-known for illnesses since vaccines successfully restrained many once-prevalent infectious ailments. Instead, concern has turned to alleged adverse vaccine reactions, wherein frequently pediatric symptoms of health problems that occur around many immunizations are directed [11].

As vaccination hesitance increases, more kids are being given "alternative" vaccine schedules that deviate from the advised immunization schedule. As a result, the "risk exposure" for developing a vaccine-preventable disease (VPD) is unduly extended. Several diseases that can be prevented by vaccination have seen an increase in occurrence, which is consistent with this [14].

Social media is not only a possible source of the (mis)information that makes people hesitant, but it also allows for two-way interaction in line with audiences as well as people enhances access, opportunity, and suitability of the knowledge, and offers a platform for highly effective and inexpensive policy advocacy prospects. Health experts have been urged to utilize social media more, to respond to vaccination scares in a proactive rather than reactive manner, and to use analysis of networks likewise social computing techniques to comprehend the information shared by anti- vaccines via way of social media to encourage the advancement and social media execution measures. But given that social media is a dynamic technology that is continually evolving and changing, it is difficult to give specific definitions since it may result in a wide range of complex actions, interactions, and exchanges involving many different types of interrelated players [14].

1. The 3C Model: -The reasons for Vaccine Hesitancy revolve around the following factors (depicted in Fig. 1)

- **Complacency:** It refers to the satisfaction regarding a specific vaccine or vaccination generally influenced by a variety of circumstances, including other life or health obligations that may be perceived as of greater significance at that moment.
- **Convenience:** It refers to the factors like accessibility (geographic, linguistic, and health literacy), price, desire to pay, and attraction to immunization services that affect adoption; the convenience of vaccination is a key consideration. The degree whereby vaccination services are provided at a time and location, as well as in a cultural setting that is comfortable and convenient, also influences the decision to be immunized and may cause vaccine hesitancy.
- **Confidence:** Confidence is described as having faith in the efficiency and security of vaccinations, the delivery system for vaccines, and the goals of policymakers who choose the necessary vaccines. Vaccine hesitance directs people to lose confidence [1].

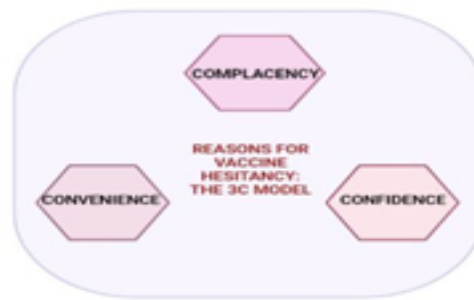


Figure 1:The 3C model in Vaccine Hesitance

VI. APPROACH TO ALLEVIATE VACCINE HESITANCY

The use of "incentives" to encourage people to avoid health hazards is an approach that health policy is employing more frequently. It's important to consider if incentive programs are more efficient than direct policy measures to remove obstacles to "healthy" behavior, particularly those that disfavor underprivileged populations [15].

For parents to decide whether or not to vaccinate their children, their level of trust or lack thereof and their relationship with a pediatrician or other significant person were crucial factors. The goal of working with parents who are wary about immunizing their children should be to build positive connections as well as to provide them with information regarding vaccinations.

The majority of the research studies on hesitancy to vaccines focused on either informing or educating the intended audience about the complications as well as advantages of immunization using a society-based health issues based training strategy, as it was found that not having an understanding of the goal of raising vaccination awareness was the main contributing factor to vaccine hesitancy [13].

VII. STRATEGIES TO OVERCOME VACCINE HESITANCY - THE 4P MODEL:

The "4Ps" social marketing technique significantly increased vaccination coverage, decreased vaccine hesitance, and gave healthcare providers a more reliable and effective way to promote their services in the face of future vaccines and virus mutations (depicted in Figure. 2) [5].



Figure 2: Strategies to overcome vaccine hesitancy: The 4P model

VIII. CONCLUSION

A wide range of strategies, treatments, and system changes are necessary at the person's, provider's, health systems, and country's level to address the multiple as well as complex reasons for vaccine hesitance. Millions of children have been spared the suffering of what were formerly common diseases thanks to childhood vaccinations, which have saved hundreds of thousands of lives. In recent years, measles outbreaks in high-profile US communities that were notable for their low vaccination rates, such as outbreaks in Waldorf schools, a significant outbreak in Rockland County, New York, among an orthodox Jewish community, and 49 cases among children in Clark County, Washington, where the measles vaccination rate in the schools was only 40 percent, have been caused by vaccine opposition and hesitancy, as well as nonmedical exemptions to school vaccine laws. One of the top ten risks to the health of the entire world, according to the World Health Organisation, is vaccination hesitance.

There are various ramifications for health policy and communication when it is acknowledged that vaccination hesitancy is essentially an issue of trust rather than information and that it has both emotional and rational drivers. Rebuilding trust should be the goal of vaccine communication, which should begin from a place of empathy. Working with dependable messengers and dependable connections is necessary for this. One crucial aspect of the Ebola response, for instance, was educating local community health workers.

To sum up, it is crucial to comprehend the unique worries of the numerous types of vaccine-hesitant people, including healthcare experts, as reluctance can lead to immunization hesitation or lag. It is necessary to increase the ability of nations to pinpoint the context-specific causes of vaccination reluctance and to create customized responses.

REFERENCES

- [1] N. E. MacDonald, "Vaccine hesitancy: Definition, scope, and determinants," *Vaccine*, vol. 33, no. 34, pp. 4161–4164, 2015, doi: <https://doi.org/10.1016/j.vaccine.2015.04.036>.
- [2] C. C. McClure, J. R. Cataldi, and S. T. O'Leary, "Vaccine Hesitancy: Where We Are and Where We Are Going," *Clin. Ther.*, vol. 39, no. 8, pp. 1550–1562, 2017, doi: <https://doi.org/10.1016/j.clinthera.2017.07.003>.
- [3] H. J. Larson, C. Jarrett, E. Eckersberger, D. M. D. Smith, and P. Paterson, "Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012," *vaccine*, vol. 32, no. 19, pp. 2150–2159, 2014, doi: <https://doi.org/10.1016/j.vaccine.2014.01.081>.
- [4] M. Siddiqui, D. A. Salmon, and S. B. Omer, "Epidemiology of vaccine hesitancy in the United States," *Hum. Vaccine. Immunother.*, vol. 9, no. 12, pp. 2643–2648, Dec. 2013, doi: 10.4161/hv.27243.
- [5] B. Zheng, J. Yan, X. Wang, Y. Tang, and Y. Xiang, "Using the '4Ps' social marketing strategy to overcome vaccination hesitancy: COVID-19 vaccine coverage in a Chinese college as an example," *Saudi Med. J.*, vol. 44, no. 6, p. 560–596, Jun. 2023, doi: 10.15537/smj.2023.44.6.20220696.
- [6] È. Dubé, J. K. Ward, P. Verger, and N. E. Macdonald, "Vaccine Hesitancy, Acceptance, and Anti-Vaccination: Trends and Future Prospects for Public Health," *Annu. Rev. Public Health*, vol. 42, pp. 175–191, 2020, doi: 10.1146/annurev-publhealth-090419-102240.
- [7] V. Carrieri, S. Guthmuller, and A. Wübker, "Trust and COVID-19 vaccine hesitancy," *Sci. Rep.*, vol. 13, no. 1, p. 9245, 2023, doi: 10.1038/s41598-023-35974-z.
- [8] J. Hammond, "Vaccine Confidence, Coverage, and Hesitancy Worldwide: A Literature Analysis of Vaccine Hesitancy and Potential Causes Worldwide," *Sr. Theses*, 2020, [Online]. Available: https://scholarcommons.sc.edu/senior_theses/344
- [9] S. Thompson, J. C. Meyer, R. J. Burnett, and S. M. Campbell, "Mitigating Vaccine Hesitancy and Building Trust to Prevent Future Measles Outbreaks in England," *Vaccines*, vol. 11, no. 2, 2023, doi:

- 10.3390/vaccines11020288.
- [10] T. Shato *et al.*, “Influences of sociodemographic characteristics and parental HPV vaccination hesitancy on HPV vaccination coverage in five US states,” *Vaccine*, vol. 41, no. 25, pp. 3772–3781, 2023, doi: <https://doi.org/10.1016/j.vaccine.2023.04.082>.
 - [11] G. Troiano and A. Nardi, “Vaccine hesitancy in the era of COVID-19,” *Public Health*, vol. 194, pp. 245–251, 2021, doi: <https://doi.org/10.1016/j.puhe.2021.02.025>.
 - [12] D. A. Salmon, M. Z. Dudley, J. M. Glanz, and S. B. Omer, “Vaccine hesitancy: Causes, consequences, and a call to action,” *Vaccine*, vol. 33, pp. D66–D71, 2015, doi: <https://doi.org/10.1016/j.vaccine.2015.09.035>.
 - [13] P. Hotez, “America and Europe’s new normal: the return of vaccine-preventable diseases,” *Pediatr. Res.*, vol. 85, no. 7, pp. 912–914, 2019, doi: 10.1038/s41390-019-0354-3.
 - [14] P. Singh *et al.*, “Strategies to overcome vaccine hesitancy: a systematic review,” *Syst. Rev.*, vol. 11, no. 1, p. 78, 2022, doi: 10.1186/s13643-022-01941-4.
 - [15] L. Li, C. E. Wood, and P. Kostkova, “Vaccine hesitancy and behavior change theory-based social media interventions: a systematic review,” *Transl. Behav. Med.*, vol. 12, no. 2, pp. 243–272, Feb. 2022, doi: 10.1093/tbm/ibab148.
 - [16] S. Goldstein *et al.*, “Health communication and vaccine hesitancy,” *vaccine*, vol. 33, no. 34, pp. 4212–4214, 2015, doi: 10.1016/j.vaccine.2015.04.042.