

Opposition to Vaccination in the United States

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Infectious disease and vaccines

Infectious diseases have plagued mankind since the beginning of time, but the invention of vaccines has reduced the incidence of morbidity and mortality considerably (Poland et al., 2001). Despite its advantages, vaccination is still a controversial topic. Anti-vaccination movements have existed almost since the origin of vaccination in the 1800s, when the first smallpox vaccine was invented (Stern et al., 2005). After significant smallpox case reduction in the 1830s, a vociferous anti-vaccination movement emerged in the United States and Europe (Kaufman, 1976). Consequently, preventable diseases reemerged, resulting in the loss of herd immunity. Herd immunity is the resistance to the spread of an infectious disease within a community that is based on vaccination and/or prior illness. To protect those that are medically exempt from vaccination, 85-95% of the population needs to be vaccinated for herd immunity to be effective (Stern et al., 2005).

Since the emergence of the internet, news spreads almost instantaneously, regardless of its validity. Social media platforms, such as Facebook, allow people to spread their views on a global scale with a single post, and to create virtual communities of like-minded individuals who seek out information sources with which they feel comfortable. This causes confirmation bias, polarizing the view even further (Larson et al., 2014; Joubert et al., 2019). To complicate matters, most social media do not enforce quality control due to a lack of rewards (Joubert et al., 2019). Consequently, contents are produced by experts and quacks alike, and opinions and facts become blurred, impairing judgment of those who are undecided on vaccines. To eliminate vaccine misinformation, social media platforms have updated their policies. Other social groups

have also been countering vaccine information by disputing the myths and sharing published research and vaccine contents to validate the safety of the vaccines.

To restore trust in vaccines, communities must improve the publics' interactions with the health system and develop effective strategies that can accurately distribute vaccine information online.

Literature Review

Studies from various sources show since the early 2000s, most of the contents about vaccines on social media are anti-vaccination messages (Wilson & Wiysonge, 2020). Klimiuk et al. (2021) found that public Facebook anti-vaccination comments published between May 2019 and July 2019 were related to misinformation and unreliable premises (20%), vaccine safety and effectiveness (14%), noncompliance with civil rights (13.2%), and personal experience (10.9%). In 2019, only seven anti-vax Facebook pages generated nearly 20 percent of the total vaccine posts (Madrigal, 2019).

Kortum et al. (2008) found that people often retain the antivaccination message or vaccine misinformation when they are presented with them. Users who had viewed negative blogs perceived vaccines as unsafe and had reduced intentions to receive the vaccine (Nan & Madden, 2012). Betsch et al. (2010) found that browsing antivaccination websites decreases one's risk perception of omitting vaccines and in turn decreased intentions to vaccinate. Although the internet is increasingly important in delivering health-related information, it contains the largest amount of misinformation about alleged adverse vaccination effects.

Antivaccine movement also relies on confirmation bias. To test the risk of confirmation bias, Meppelink et al. (2019) conducted an experiment to have 480 parents of young children

select, read and rate one of the ten vaccine-related articles. People selected more belief-consistent information and perceived the belief-confirming articles as more credible and convincing (Meppelink et al., 2019). Hansen et al. (2020) found that several cognitive biases were related to weaker clinic recommendations for vaccines. Featherstone & Zhang (2020) conducted an online experiment using two misinformation messages, one based on conspiracy and another based on uncertainty, and found that both messages decreased pro-vaccination attitude; the result was further mediated by anger. Farbey et al. (2011) found that pregnant women who visited mainstream vaccination websites were less likely to receive the H1N1 vaccine compared to those who consulted with medical professionals.

How do social groups use social media to influence public opinion on vaccines in the United States?

Antivaxxers often manifest confirmation bias, selecting scientific information from open-access journal articles that is consistent with positions they already hold. They then share the information on social media, propagating distrust of vaccinations. For instance, Baughman commented on several posts on the Vaccines Work – Work Vaccines Facebook page, expressing his view on vaccines. He claims that the vaccines cause the diseases that they are preventing, and that natural cures are better than “that poison” (Baughman, 2020). Anderson (2021) on the same Facebook page claimed that government agencies and pharmaceutical companies are promoting vaccines to “mislead people into thinking all vaccines are safe,” and the “way they sensor vaccine related truth” only shows that the people have the right to question vaccines. Vermont Coalition for Vaccine Choice (VCVC) (2021) also questions the safety of the vaccine, specifically the COVID-19 vaccine, since it was only released for emergency used, and that the

“vaccines were rushed, skipped animal testing, skipped toxicology evaluations, skipped safety monitoring.” VCVC (2021) calls the vaccine “junk science at best.” Some even trust the validity of the vaccines in general, claiming that the decrease in the case of infection diseases was due to improved sanitation and better living environments, and that “we cannot give vaccine credit for these improvements” (George, 2018). Others see vaccines as a scam: “they want you to sign up and pay money” (Ness-Yorke, 2021).

Many parents, from a commitment to their children’s safety, seek vaccine information; when the experts have no answers, they may turn to others and the internet. Dawn asked on Facebook: “I’m hearing about the transmission of the mRNA thru bodily fluids. It makes sense, but can anyone provide info and sources that can support this?” Morcan and Morcan (2019) also observe: “what the FDA fails to include is whether it’s okay to inject multiple vaccines simultaneously.” Comments like “people should ask questions before getting the vaccines.... After, it doesn't make much sense” appears on numerous social media platforms as many lack knowledge on vaccines (Marziano, 2021). User-generated online content can affect people’s perception of vaccines and people are more vulnerable to online antivaccination messages with newer vaccines since they have less knowledge and greater uncertainty about them. With most online vaccine related contents unreliable, parents are more prone to accept misinformation and act upon it, thinking it is the best for their children. Comments like “vaccine trust cost too many families their children” often make parents doubt their choice about vaccination (Mattia, 2020). One was worried about the toxicity of the vaccine that they came up with a raw potato placebo: “you can vaccinate your kids, and then hold a raw potato to the wound where the needle entered, and it will suck the toxins from the vaccines out, leaving the only non-toxic parts!” (Felton, 2019). Organizations like Children’s Health Defense (CHD), New Jersey Coalition for

Vaccination Choice (NJCVC), and Texans for Vaccine Choice (TVC) have also contributed to vaccine hesitancy in the U.S. CHD believes that the long-term health effects have not been aquatically studied and that “vaccines contain many ingredients, some of which are known to be neurotoxic, carcinogenic and cause autoimmunity” (CHD, 2020). Both NJCVC and TVC are dedicated to protecting vaccine choice rights.

Public anti-vaccine statements of many celebrities also contributed to the anti-vaccine movement. In 2015, Jim Carrey tweeted: “I am not anti-vaccine. I am anti-thimerosal, anti-mercury. They have taken some of the mercury laden thimerosal out of vaccines. NOT ALL!” (Nolan, 2020). Jessica Biel wrote in an Instagram post in support of vaccine choice rights: “I am not against vaccinations — I support children getting vaccinations and I also support families having the right to make educated medical decisions for their children alongside their physicians” (Dickson, 2020). Biel explains that the supporting vaccine choice right is common among those who are skeptical of vaccines. Along the same line, actress Alicia Silverstone questions the validity of vaccines and their side effects: “there has not been a conclusive study of the negative effects of such a rigorous one-size-fits-all, shoot-’em-up schedule” (Dickson, 2020).

Anti-vaccination advocates also selectively use the positions of the very small minority of health professionals who agree with them to increase their credibility. For instance, many antivaxxers cite a published article that links vaccine and autism, which was later retracted and all of the co-authors except Wakefield himself disavowed it (Salzberg, 2018). It is the comments like “Dr. Andrew Wakefield is a genius,” and “his study has been replicated many times since. Only takes a quick search to find this out” that helps the public to associate vaccines and autism (Oliver, 2020). The World Doctors Alliance (WDA), a collaboration between medical professional from Europe, claimed that vaccines are made “with the intention of manipulating

people into feeling safer about undergoing a medical treatment,” and that “the benefits of the treatment are being greatly exaggerated, the risks are being ignored, and the unknowns are being brushed aside. Because they are being deceitful and manipulative, I will not gamble my personal wellbeing on their integrity” (Weissman, 2021). The WDA also published a video stating that “COVID-19 is a disease that can be compared with the flu, but which is been blessed with better marketing” (Coleman, 2021). Similarly, Dr. Leonard G. Horowitz claimed that “the greatest lie ever told is that vaccines are safe and effective” (Connecticut General Assembly, 2019). The support of medical professionals increases the credibility of vaccine misinformation presented on social media. Many celebrities were also mentioned in the context of the link between vaccines and autism on over 50 percent of the websites, with Donald Trump most frequently (Arif et al., 2018). Regional organizations like NJCVC and TVC also support candidates who share their value with the organization, hoping the candidates would draft legislations to further solidify vaccine choice rights.

Anti-vaccine sentiment has also been associated with individualism. Many question the existence of freedom if the freedom of medical consent is absent; “If we don't have the freedom to consent or to not consent then are we truly free?” (Maynard-Grathle, 2021). Some argue that vaccine choice rights should not be a partisan issue, and that “all Americans should have the freedom to take the COVID vaccine. All Americans should also have the freedom to decline the vaccine” (VCVC, 2020). Using the mandatory vaccine acts as a justification, many said that the authorities have “no respect for personal freedoms nor personal responsibility,” and that they will not inject “a toxic substance” into their body for any amount of money (Anderson, 2021; Vaccine Awareness Movement, 2021). Such comments can taunt individuals who have a strong sense of individualism, thus fighting against mandatory vaccines.

NJCVC and TVC also believe that vaccination should be a personal choice. NJCVC focuses on “promoting vaccination choice, informed consent and personalized medical decisions” (NJCVC, 2020). Like NJCVC, TVC promotes vaccination choice and personal rights: “we promote the preservation of personal liberties and informed consent by opposing measures to limit vaccine choice rights or discriminate against those who exercise such rights” (TVC, n.d.). Broniatowski suggests that as vaccine opposers become more organized, they are gaining more political clout, and that “framing vaccine refusal as a civil right allows vaccine opponents to sidestep the science and instead debate about values—especially the value of freedom of choice” (Donovan, 2020).

Many shares their negative experience about the vaccines to further solidify their dangerous side effects. For instance, VCVC shared an incident in which a child suffered from a tragic death by flu shots, which resulted in an upsurge of support for vaccine exemption rights (VCVC, 2020). There has been an increase in cases of major side effects from the novel COVID-19 vaccine, convincing people away from the vaccine. Vidiella (2021) claimed that after getting the Moderna vaccine, her tongue started to spasm and her whole body has been convulsing all day, sharing videos of her symptom with the post. Both members from the Vaccine Awareness Movement and VCVC have shared personal experiences about losing loved ones after they have been vaccinated with the COVID-19 vaccine. Neckelmann (2021) and Hawley (Hatch, 2021) claimed that their loved ones show no sign of any life threatening symptoms before receiving the second dose of the vaccine. These incidents let the public, especially the vaccine undecideds, question vaccine safety and the technologies involved, and delay or refuse to vaccinate themselves and their children.

Social media has also created a space for antivaxxers to spread their ideas and engage people. Johnson et al. (2020) found that vaccine-undecided individuals have a higher online activity and that anti-vaccination groups provide more sites for engagement compared to pro-vaccination groups. Vaccine skeptic sites also provide guest speaker sessions and email subscriptions to engage the public on regular basis. For instance, the Educate Before You Vaccinate Facebook page (EBYV, n.d.) organizes annual marches for medical freedom and invites medical professionals to speak about vaccine choice rights. The availability of the engagement sites enables antivaxxers to entangle themselves in various sites and platforms that pro-vaxxer cannot, and vaccine-undecided individuals are more likely to be persuaded.

Pro vaccination groups have also been using social media to express their perspectives on vaccines and to counter misinformation posted. Using social media platforms, many counters preexisting misinformation on both pro- and anti-vaccine pages, backing them up with credible sources. Guy (2021) explained that the COVID-19 vaccine was not “experimental,” as the antivaxxers calls it, and “no safety or efficacy steps were skipped during vaccine development or FDA review.” He also indicated that the emergency use authorization simply streamlines the vaccine approval process and does not skip any steps, compared to the regular FDA process (Guy, 2021). To further assert the safety of the vaccine, especially to vaccine undecideders and skeptics, Simpson (2021) shared a credible article regarding the safety and the efficacy of the AstraZeneca vaccine. Pro vaccination pages, like Vaccines Save Lives, also provide a space for people to exchange ideas on vaccines and related topics. People will be provided with factsheets or directed to reliable sources, like the WHO and other official sites, if they have any questions regarding the vaccine (Solomon, 2020; Glover, 2020). In one case, Chapman (2021) provided evidence of the MMR vaccine can protect one from COVID-19. This offers an alternative

solution to skeptic individuals and can increase the MMR vaccination rate to retain herd immunity.

Others have joined antivaccination groups to share their experiences to alleviate the distrust in vaccines. Starks (2021) commented in one of the antivaccination pages: “I have basically no side effects from my vaccine aside from a sore arm.” Noorchashm (2021), a physician and immunologist, explains the idea of IgG and his experience with the vaccines, convincing readers to vaccinate. Kell (2020) shared her perspective and her thought process on vaccine decisions, hoping to warn the public about potential danger. Similarly, Immunization Alliance is committed to raising the immunization level by increasing vaccine awareness and optimizing communication between the public and the health officials (AAP, n.d.).

Individuals have also created Provaccination pages that mask as antivaccination pages to attract those who oppose vaccines, hoping to slowly change their perception. For instance, the Vaccine-Haters Facebook page provides Provaccination information and messages, as well as the latest findings. Oftentimes, ideas are presented by indisputable statements with amusing images, such as a meme. This novel method can be used to target youth before their beliefs solidifies.

Government agencies have been taking part in the battle against antivaccination the movement by updating the public with new findings and by collaborating with social media platforms to tag potential misinformation. Major platforms have updated their policies to fight against vaccine misinformation. Twitter started applying labels to potentially misleading Tweets and have “removed the most harmful COVID1-9 misleading information” (Twitter Safety, 2021). In Facebook’s policy update, it indicated that the company will “engage with experts like the WHO, [and] government health authorities” (Facebook, n.d.).

Regulatory organizations and companies have provided additional information to the public to guarantee vaccine safety. WHO has stated that one of the common misconceptions about immunization is that “vaccines cause many harmful side effects, illness, and even death – not to mention possible long-term effects we don’t even know about” (WHO, 2013). WHO (2020) also explains that to decrease the case of infection, the community has to achieve herd immunity to prevent “a disease to spread through any segment of the population,” and how vaccine choice is not about personal benefits, but rather as a communal effort against viruses. CDC (2020) has disputed the link between autism and vaccines, a common reason why parents refused to vaccinate their children.

Pharmaceutical companies and organizations have increased transparency by disclosing vaccine ingredients and technologies used to reduce vaccine safety concerns. Bharat Biotech (n.d.) revealed that its vaccine contains inactivated SARS-CoV-2 antigen, aluminum hydroxide, and other inactive ingredients. Hagen et al. (1997) described the purification process of the Hepatitis A VAQTA vaccine from Merck, and Brisse et al. (2020) published an article on the emerging concepts and technologies in vaccine development. These information will help eliminate any vaccine related controversies. Both regulatory organizations and pharmaceutical companies will continue to share information to dispute misconceptions.

Conclusion

Antivaxxers formulate arguments based on confirmation bias and selective scientific information to sway the public from vaccination; many shared their negative experiences. Less knowledgeable individuals, especially parents, are more easily persuaded with a lack of answers for experts, fearing the vaccine would negatively impact their loved ones. Others utilize individualism as a tool to expand the audience reach. To battle against it, pro vaccination groups

dispute misinformation by citing and directing the public to credible sources, and by sharing personal experiences. Individuals have created antivaccination accounts and pages to provide accurate information about the vaccine and the technologies used, as well as promoting vaccination. Government agencies and organizations have been disputing vaccine misinformation that concerns many vaccine skeptics. This would reduce some of the safety concerns for vaccine undeciders and motivate them to support vaccination. Pharmaceutical companies have also been publishing vaccine ingredients and vaccine production processes to increase transparency. To prevent the reemergence of infectious diseases and to maintain herd immunity, groups must work together and continue to share information to dispute misconceptions.

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