Vaccine Hesitancy and Potential Solutions by Using the Health Belief Model as a Guideline

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Type of Publication: Literature Review
Conflicts of Interest: Nil

Abstract
Vaccine hesitancy, a delay in acceptance or refusal of vaccination despite availability of vaccination services, is one of the threats to global health. Since COVID-19 pandemic has emerged, vaccination is a hope for solving this problem. Remarkably, once the COVID-19 vaccine has developed and existed, some people have refused to get it. The purpose of this literature review is to use the Health Belief Model to define the factors associated with vaccine hesitancy and propose ways to help promote vaccination by using the literature review method. The results are that Vaccine hesitancy is positively influenced by Perceived barriers and is negatively influenced by Self-efficacy and Perceived benefits. Vaccination behavior is negatively influenced by Perceived barriers and vaccine hesitancy and can be positively influenced by recommendations from friends and family. Knowing this we can formulate a plan to combat Vaccine hesitancy, that being decreasing dishonest information and creating information that caters to the part of the public that are vaccine hesitant. Furthermore, we can also target the friends and family of the patient as recommendations from them can be of benefit to Vaccination behavior. Cues to action can be addressed also by creating incentives to instigate vaccination.

Keywords: COVID-19, Health Belief Model, Vaccination, Vaccine hesitancy

Introduction
The COVID-19 epidemic is caused by the SARS-CoV-2 virus also known as the coronavirus. Initially discovered in Wuhan city, Hubei Province, China in late 2019 and declared a global health emergency by the WHO on July 30th of 2020, the COVID-19 now has spread all over the world [1, 2]. Those who are ill with this disease can be faced with a plethora of dangerous symptoms. A few examples might be Hypoxia, Liver injury [3]. Even when the patients are discharged from hospitals, they can still be faced with “Post-Covid” symptoms from mild ailments like fatigue to chronic organ impairment such as the kidneys and lungs [4].

Vaccines are the way to protect both the individual and their community without running the risks of actually contracting the disease. When an adequate amount of the population has attained immunity, the result is the otherwise previously unprotected part will be safe. This is called “Herd immunity” [5]. The WHO recommends vaccinating those with high risk of exposure first, for example health workers, older persons, and those with other health issues [6]. However, only 77.6% of the general population are accepting the COVID-19 vaccines [7].

In this study, I aim to find the cause of vaccine hesitancy and propose potential ways to combat it by using the Health Belief Model as a framework of analyzing vaccine hesitancy behavior.

Vaccine hesitancy
Vaccine hesitancy was defined by the SAGE Working Group as “a delay in acceptance or refusal of vaccination despite availability of vaccination services.” [8].
In a recent study, it was found that 53% of people in 19 countries are showing COVID-19 vaccine hesitancy [9]. This problem is not something new as it has happened to many vaccines before, such as the HPV vaccine and the term vaccine hesitancy itself has been defined as early as 2015 [10].

The “3 Cs” model has been proposed to explain vaccine hesitancy; it consists of confidence, convenience and complacency.

1. Confidence is how much a person trusts in the effectiveness and safety of the vaccine, the system that distributes them and the people who make the policies in regard to vaccination [8].

2. Convenience is how accessible the vaccine is, this factor plays a big role when physical availability, affordability and willingness-to-pay, geographical accessibility, ability to understand why they should get vaccinated, and appeal of immunization services affect the choice to vaccinate [8].

3. Complacency is something that happens when a person sees that the difference between the risks of getting vaccinated and the risk of the disease isn’t much. How much this factor will affect vaccine hesitancy also depends on the person’s self-efficacy [8].

COVID-19 vaccine hesitancy is a major threat to vaccination as patients who are open to vaccines are nearly 8 times more likely to get vaccinated than those who exhibit vaccine hesitancy [11].

Using the Health belief model (HBM) as a guide we can define what factors have a play in vaccine hesititation and how we can propagate the use of vaccines.

HBM

The health belief model (HBM) is a theoretical framework that explains why a person takes a specific health-related action. Initially conceived in the 1950s and continually built upon, it is an effective way to analyze and encourage the patient to improve their behavior [12,13]. The earliest model hypothesizes that there are three main factors to inspire action: The existence of sufficient motivation, the person’s vulnerability, and the belief that the action will lead to reducing said vulnerability [13]. With these three components, the HBM proves to be able to help a number of people change their behavior [12].

However, when it comes to addressing those who are with chronic illnesses, the HBM of that time lacks another critical idea, self-efficacy. Efficacy expectations or self-efficacy is a term coined to describe a person’s beliefs on their abilities to succeed in performing an action in a specific situation. The preliminary model didn’t have to take this factor into account as its main focus was on circumscribed preventative actions rather than long-term changes which are more demanding on the patient’s part. With this in mind, self-efficacy is implemented into the model, but not explicitly as it is added under the component of the “perceived barriers” then, later on, becomes a standalone subject [13]. At this time, the HBM has six main constructs:

1. Perceived susceptibility. “Perceived susceptibility” represents the person’s belief about their vulnerability to a condition.

2. Perceived severity. “Perceived severity” is how serious someone thinks the condition is.

3. Perceived benefits. “Perceived benefits” is how much a person thinks the change will benefit them or how much it will lessen the threat.

4. Perceived barriers. “Perceived barriers” represent the negative effects that the person believes will come from taking the action.

5. Cues to Action. “Cues to Action” is a factor, usually external, that instigates the action.

6. Self-Efficacy. “Self-Efficacy” is to what extent a person thinks they can complete the action.

Other than the main 6, other factors, for example, the person’s background will also influence their perception thus indirectly affecting their health-related behavior.

HBM & COVID-19 Vaccine Hesitancy

Now that we know about the HBM we can use it to assess the COVID-19 Vaccine vaccine hesitancy in the population. By using the HBM we can get a higher understanding of what factors make people exhibit vaccine hesitancy.

From the study of Maraqa et al., they found that in Palestinian health care workers the statically significant different of means regarding COVID-19
perceived susceptibility is 3.3 out of 4 (±0.62) among those who exhibit vaccination behavior and 3.4 (±0.62) in the group who are vaccine hesitant. Regarding vaccine perceived barriers, it is at 2.7 (±0.47) for those who are willing to get vaccinated and 2.8 (±0.037) for those who are COVID-19 vaccine hesitant. For COVID-19 perceived severity it is 3.3 (±0.58) for those with vaccination behavior and 3.4 (±0.55) for those with vaccine hesitancy. Regarding COVID-19 vaccines, perceived benefits are 2.6 (±0.63) for those who are willing to get vaccinated and 2.7 (±0.58) for those who are hesitant [14].

The findings are similar to the study which was conducted in China by Chen et al. They found that those who had high COVID-19 perceived susceptibility or high perceived barriers to vaccination are less likely to get vaccinated. However, vaccination behavior can be promoted with high perceived benefits of vaccination, high self-efficacy for vaccination, agreement with the recommendations from authorities and finally recommendations from friends and family [11].

According to Chen et al.’s research, Vaccine hesitancy is positively influenced by the existence of Perceived barriers and negatively influenced by Self-efficacy and Perceived benefits. Which, along with Perceived barriers, negatively influences Vaccination behavior. Furthermore, Vaccination behavior can be positively influenced by recommendations from friends and family [11].

Using the information we have; we can use the HBM constructs to fix Vaccine hesitancy behaviors and promote vaccination behavior.

**HBM & Promoting COVID-19 Vaccination**

Individuals with adequate levels of self-efficacy, low perceived barriers and high perceived benefits are the most likely to exhibit vaccination behavior [11]. Perceived barriers and Perceived benefits should be mainly addressed as the former directly affects Self-efficacy, vaccine hesitancy and vaccination behavior and the latter has the most effect on Self-efficacy which can lower Vaccine hesitancy the most.

So, to help with the vaccine hesitancy problem we can help lower the perceived barriers to vaccination and increase the perceived benefits. This can be done by stopping or at least lowering the amount of dishonest anti-vaccination information that is spreaded through social media and instead spreading factual information about the vaccine to the population, especially those who are vaccine hesitant. However, we can not just dismiss the population’s concerns as we should also acknowledge them [15]. The information that is spreaded should be tailored to address the concerns of the people. While it is true that the vaccine isn’t perfectly safe since it is impossible to know for a fact whether it will have any long-term effects or not, it should be in our best interest to reassure the public that it is safe to get vaccinated. Some main points that should be conveyed to the public are Herd immunity and how getting vaccinated could help other people, the benefits and empirical evidence about the vaccine’s safety and the disadvantages of not getting vaccinated. By doing this it will increase the patient’s self-efficacy too [16].

Another way to help is to target the patients’ friends and family. According to Chen et al's research, recommendations from friends and family can directly increase self-efficacy and is the only factor that directly positively influences vaccination behavior [11]. Informing the masses with factual information about the vaccine can be a good first step. The person with the information can then continue to spread it to their friends and family which can further relay the correct information. Herd immunity can be the main point in the information that is targeted to this group.

Cues to action should be addressed too, even if it wasn’t explicitly said in the journals that were reviewed. Many governments around the world have created an incentive for people to get vaccinated like the US offering money. If the aforementioned methods are lacking in success, implementing an incentive might be able to help.

**Conclusion**

The pressing problem of the COVID-19 can be alleviated by the use of vaccination. However, a significant number of the world’s population are hesitant to take it. So, using the Health Belief Model (HBM) to assess Vaccine hesitancy, we have concluded that the factors that affect Vaccination are Perceived barriers, recommendations from friends and family and Vaccine hesitancy. And that the factors that affect Vaccine hesitancy are Perceived barriers and Perceived benefits and Self-efficacy.
With this in mind, we can then create a way to combat Vaccine hesitancy. Those being, spreading tailored information to the population, relying on friends and family of the patient to spread the information and creating cues to action in the form of incentives.

References