Public Attitudes towards COVID-19 Vaccination

Subjects: Health Care Sciences & Services | Anthropology | Allergy

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Major hindrances to getting a COVID-19 vaccine include vaccine hesitancy, skepticism, refusal, and anti-vaccine movements. Several studies have been conducted on attitudes of the public towards COVID-19 vaccines and the potential influencing factors.

COVID-19 vaccine hesitancy acceptance refusal willingness ecological model scoping review

1. Introduction

Coronavirus disease 2019 (COVID-19) is a contagious and pathogenic viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a specific type of coronavirus that was first discovered in Wuhan, China [1]. It was declared a global pandemic by the World Health Organization on the 11 March 2020. The pandemic caused by COVID-19 has infected more than 125 million people and killed at least 2.5 million globally and is becoming a leading cause of death [2]. This virus has become a major concern around the globe, having so many consequences on the healthcare system and economy and instilling fear in communities [3][4]. The main mode of transmission is through droplets, direct contact with infected patients; it can also be transmitted through fomites, by touching contaminated surfaces or objects [5]. People who are at increased risk of getting severe infection include the elderly and those who have chronic diseases [6].

Although many efforts have been dedicated to the implementation of suppression strategies including travel bans, partial/full lockdown, contact tracing, and social distancing, the transmission of the virus is more likely to rebound when these strategies are lifted [7]. Consequently, for a long-term approach to combating this epidemic, the development and use of vaccines is essential [8].

Vaccination stimulates the immune system to develop antibodies to fight a specific infectious agent in the body [9]. They have been used to eliminate and significantly decrease morbidity and mortality associated with different infectious diseases [10] by providing benefit to those who get vaccinated and also protecting communities through reducing transmission of the disease [10]. Via herd immunity, a high uptake of COVID-19 vaccines can also help protect people who cannot get a vaccine such as those with compromised immune systems and young children [11]. Getting efficacious results from a vaccine does not solely rely on accessibility/uptake, but also depends upon the public's acceptance and willingness to get vaccinated [11]. Other major hindrances to getting a vaccine include

vaccine hesitancy, skepticism, refusal, and anti-vaccine movements [12]. In 2019, vaccine hesitancy was identified as one of the ten challenges to global health [13], and this concern has grown throughout the COVID-19 pandemic [14]. While prior studies looked at predictors of vaccine acceptance and uptake, it is worth noting that emergency-released vaccines differ from established vaccinations in many aspects [15], and newer vaccines are usually met with greater skepticism [16].

2. Factors Influencing Public Attitudes towards COVID-19 Vaccination

This scoping review of 50 articles systematically maps evidence on the influencing factors that may lead to COVID-19 vaccine hesitancy worldwide. Vaccine hesitancy and anti-vaccination movements represent an old phenomenon that threatens global health [17][18][19][20]. With the current situation of the COVID-19 pandemic, this can be a stumbling block in the global efforts to control the disease and its devastating consequences.

Vaccination is considered a vital element for public health; it is the most effective intervention for the primary prevention of communicable diseases. To enhance acceptance and uptake of vaccines, it is crucial to gain insight into the common factors that influence an individual's decision-making process to help inform policymakers to develop effective strategies. This scoping review updates the latest information on the determinants that impact COVID-19 vaccine uptake. The review included studies that reported global data which offer an insight on how public attitudes towards COVID-19 vaccination varies around the world. It also demonstrated that these attitudes are influenced by a wide range of factors on multiple levels of the socio-ecological model. Sizeable evidence showed that sociodemographic factors such as age, gender, and income status, individual factors such as personal beliefs and risk perception, and social and organizational factors such as the role of significant others are among the most related determinants. In addition, certain characteristics of the COVID-19 vaccines themselves like efficacy, safety, and side effects influence public attitudes (Table S1).

The individuals' attitudes towards the COVID-19 vaccination varied among the studies, with acceptance ranging from 29.4% to 86%. This discrepancy could be attributed to variations in the study population. Sallam et al. [21] reported a very low rate of acceptance among people in three Arab countries, Jordan, Kuwait, and Saudi Arabia (29.4%), as compared to a relatively higher acceptance of 53.1% reported in one study in Kuwait [22]. In contrast, as high as 86% of people in UK (mainly elderly and middle-aged at-risk adults) expressed their willingness to receive a vaccine [23]. This is in line with the findings of a recent systematic review [20] that showed a global variation in the rate of vaccine acceptance, with the Middle East being among the regions having the lowest rates. The review related this finding to the widespread embrace of conspiratorial beliefs in the region, which subsequently resulted in negative attitudes towards vaccination. This negative attitude in the Arab region is alarming.

In this review, 28 studies depicted the sociodemographic factors associated with public attitudes toward the COVID-19 vaccination. Coherent to findings from the literature [24], the most common factors found to influence vaccine acceptance at the microlevel were age, educational level, gender, race, and income status [25][26][27][28][29]

[30][31][32][33][34][35][36][37][38][39][40][41][23][22][21][42][43][44][45][46][47][48][49][50][51]. More willingness to receive a vaccine was reported in the older age group [25][27][29][33][36][37][52][45][47], while resistance, hesitancy, and lack of intention to be vaccinated emerged in the younger age group [31][37][43]. This could be attributed to differences in age distribution between countries, literacy level, and the fact that older adults are at a higher risk of morbidity and mortality than young adults.

Assessment of the role of gender in COVID-19 vaccine hesitancy revealed that men are more willing to accept the vaccine than women [30][31][32][52][22][21], and this held true across cultures (Arab countries [22][21], China [30], Ireland, and the UK [31]). Only one cross-sectional study in the USA reported lower acceptance among men [34]. Women were reported to have adopted more negative views about vaccination [32] while men showed a lower belief in rumors and conspiracy theories surrounding COVID-19 and higher risk perception for the disease [21][20]. However, this finding should be interpreted with caution in light of sex distribution, as sampling bias cannot be ruled out.

Similar to previous findings, the current review found variations in vaccine acceptance and uptake across different race and ethnic minorities. Blacks, Hispanics, Chinese, Asian, non-Irish, mixed, or other ethnicities were more hesitant and more likely to reject the vaccines. The literature attributed this attitude to religious and cultural beliefs, norms, and concerns [53][54]. High education level and high-income status were associated with positive attitudes toward vaccination, owing to minimal barriers related to knowledge, health literacy, and cost concerns [25][26][27][29][32][37][38][55][23][21][42][43][46][47].

In addition, other factors were included, such as health condition, people with chronic diseases, occupation status, marital status, place of residence, women being pregnant or having children, and having health insurance or not. More willingness and acceptance were reported among married individuals [7][30][44], those who reside in rural or suburban areas [31][48], being employed [29][41][42][45][51], especially in professional and managerial occupations [42][45], being at risk or belonging to a vulnerable group [36][40][47], and having insurance [32][33][38][43][48]. Knowing these factors can provide guidance for organizations and professionals on people and settings that need to be targeted to enhance vaccine acceptance and improve vaccine uptake rates [54].

More publications (36 studies) reported several individual factors influencing public attitudes towards COVID-19 vaccines. The most cited factors were beliefs [32][34][36][37][21][56][57][58][59][60][48][61], knowledge, and health literacy [25][35][36][37][62][58][47][48]. Other factors such as perceived susceptibility, threats and benefits, social, religious, and political views, previous exposure to flu vaccines, and lack of trust in the governments and companies producing the vaccines were also reported. This is consistent with findings from other reviews related to COVID-19 vaccines and other vaccines [20][24][63].

Knowledge about COVID-19 vaccines is limited as illustrated in numerous studies [25][35][36][37][62][58][47][48]. Unfavorable attitudes toward vaccination was related to misbeliefs, conspiracy beliefs, and antivaccine beliefs [37][23][21][57][58][59][60][48], inadequate knowledge and health literacy [35][58][47], lower perceived risk, threat, severity, and susceptibility [26][30][52][64][65][40][41][23][22][57], political conservatism, partisanship and engagement [31][34][66][67][60], and religious conviction [53]. Nevertheless, the factors associated with more vaccination acceptance included

positive subjective norms and attitudes towards vaccination in general and COVID-19 vaccination in particular [38][57][68][60], high perceived benefits [41], self-efficacy [38], institutional and government trust [27][37][53][62][68], previous exposure to flu or other vaccines [30][32][44][57][69], and prosocial concerns [67][61]. Enhancing these factors may improve the vaccination uptake rate.

Several studies examined the role of the social network and organizational factors [26][27][30][33][53][55][65][39][70][71]. Healthcare professionals appeared to be a trusted source of information. Their recommendations [30][65][39][71] in addition to support of family and friends [33][39] play an important role in shaping perceptions and behaviors towards vaccination. Significant others were reported in the literature to influence one's attitude and behavior. Information, acknowledgement, and recommendations from family members, friends, employers, and community members were associated with favorable attitudes and a higher uptake of vaccines [27][24][63].

On the other hand, the misinformation encountered, particularly on social media, the type and frame of massages received may influence the attitude to vaccination and intention [26][53][55][70]. Propagation of myths and conspiracy theories around vaccines and promotion of the antivaccine sentiment, combined with exposure to persuasive tactics, can convince the person that the vaccine is harmful, as indicated by Sarah Ashfield et al. [72]. Accordingly, public health organizations, healthcare professionals, and media platforms can collaborate to guarantee information accuracy, deliver health promotion programs to improve levels of health literacy to enable the target population to make an informed decision. In addition, this psychosocial environmental impact implies that strategies to overcome hesitancy can be framed within models that consider these multifaceted and multileveled factors.

Regarding vaccine characteristics, many publications included in this review focused on efficacy, safety, adverse effects or toxicity of the vaccines, and cost [30][37][73][65][40][41][23][46][47][48][50][51], which were the most significant characteristics and concerns about COVID-19 vaccines. These were also common factors highlighted in other reviews about COVID-19 vaccines and other vaccines [20][24][63].

Beyond these, the present review also found other factors that further contribute to our understanding of the barriers to vaccination uptake. Immunity duration [48], vaccination timeframe [46], fake or low-quality vaccines [53][41], beliefs about the consequences [23], country of vaccine origin [48], information about inactivated vaccines [50], and doubts about technology used in production [53][74] allow a detailed understanding of how to approach vaccine-hesitant groups to increase acceptance and uptake of the vaccines. These concerns can be addressed via awareness campaigns guided by physicians and other healthcare professionals to foster trust in health authorities, assure the public, and illustrate the role of vaccination in acquiring herd immunity and preventing disease transmission.

As illustrated above, the majority of the studies in this review addressed factors associated with vaccination attitude at the micro-meso level; however, there is a lack of publications that address the factors on the upper level of the socio-ecological model. Determinants on the macro-level of the model, including policy/regulations, broad sociocultural, religious, political, and environmental factors, and the influence they may exert on COVID-19 vaccine

uptake are underexplored to date, at least in the results presented in our review. This gap in evidence necessitates further research to comprehensively tackle the issue of vaccine hesitancy. Another important output for this scoping review reflects the gap in clinical evidence concerning the COVID-19 vaccine efficacy, safety, and side effects to date, which showed an influence in shaping public hesitancy and refusal of the vaccines. Clinical research is needed to fill this gap and manage sharing evidence that will alleviate public concerns and enhance vaccine acceptance.

The included studies reported global data which can be seen as a strength of this review. On the other hand, our review has some limitations. Only the articles in English were included; this may have potentially introduced bias or resulted in missing important literature. We did not include one keyword, “Antivax,” in our search strategy; however, when we did, only one new publication was found, therefore, this would unlikely have a noticeable effect on our results. The majority of the included studies are cross-sectional, which limits the ability to infer the causation between the various factors and public attitudes towards the COVID-19 vaccination. Most of these studies used self-administered surveys that may lead to biases. Furthermore, uncontrolled health conditions of the target populations and the various global healthcare systems in the studies included in this review may have had a misleading influence on the results.

Understanding various population needs and the factors shaping public attitudes towards the vaccines would support planning for evidence-based multilevel interventions in order to enhance the vaccine uptake globally. In our findings, we were able to report factors on the individual, social, and organizational levels. Future research should focus on exploring the cultural, economic, and political factors influencing public attitudes towards the COVID-19 vaccination.

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