Article

How Do People Decide on Getting Vaccinated? Evaluating the COVID-19 Vaccination Program through the Lens of Social Capital Theory

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Abstract: The COVID-19 pandemic has disrupted economies at a scale unprecedented in recent history, and vaccination is deemed the only option to ultimately halt its spread. However, vaccine hesitancy remains a global issue that must be addressed. If left unaddressed, it will impede the recovery of both the economy and public health following the pandemic. To better understand the issue, on the premise that individuals have layers of social ties to achieve common goals, social capital theory is proposed to examine the social connections associated with vaccine acceptance. A case study of the Republic of the Philippines' vaccination program, in the form of an online survey involving 430 participants, was conducted using logistic binomial regression to analyze the data. Findings reveal that people's vaccination decisions are influenced by their perceptions of their social ties regarding the vaccines, such as the perceptions one's social ties' trust in the vaccines, safety of use, benefits vaccines can offer, the role of media in information dissemination, and the influence of social networks. Insights regarding these findings are also discussed.

Keywords: social capital theory; vaccine acceptance; vaccine hesitancy; vaccine roll-out; immunization; COVID-19; social ties; media; social network

1. Introduction

The COVID-19 pandemic, as a global public health crisis, closes schools, churches, and even companies, devastating the global economy. As a result, unemployment rates climb on a global scale. This particularly affects the more vulnerable sectors. An exemplary case of this was reported by Gregorio and Ancog (2020) regarding the industry of agriculture, highlighting an aggregate reduction of 3.11% in agricultural produce in Southeast Asia due to the pandemic. In some areas, farmers were forced to destroy their crops due to COVID-19 (Kesling 2020). These were the effects of stringent health protocols, such as lockdowns and quarantine measures to control the spread of the disease (Bagchi et al. 2020; Gautam and Hens 2020; Shrestha et al. 2020). With economic recession as an immediate outcome of these measures, its health impact on people goes beyond acceptable parameters (Cavallo and Forman 2020; Trougakos et al. 2020).

Vaccination is considered the best strategy for controlling pandemics (World Health Organization 2020a). According to a report by the World Health Organization (WHO), vaccines enabled the eradication of polio, the control of dengue fever, malaria, measles, and other highly contagious diseases (World Health Organization 2020b). This report, along with the perspectives of the global scientific community (e.g., Orenstein and Ahmed 2017; Orenstein 2019), espouses that immunizations help prevent diseases and save lives. Government vaccination programs are based on a population immunization framework or herd immunity. To reach herd immunity, the percentage of the population to be vaccinated

varies according to the type of the virus. According to the same report by the World Health Organization (2020a), 95% of the population should be immunized for measles, 80% for polio, and 25% for H1N1 influenza, although some studies in preprints reported that influenza is a notably exceptional case (Jones and Ponomarenko 2022). For COVID-19, much is still unknown, and some argue that it may likely fail due to the emergence of variants that can escape immunity, e.g., Delta (Dyer 2021), and Omicron (Flemming 2022). Herd immunity for COVID-19 is deemed a critical research domain, and the results will almost certainly differ depending on the community, the vaccine, and the populations targeted for immunization, among other factors.

Despite the benefits offered by vaccination, some people are apprehensive about it (Dror et al. 2020; Dinga et al. 2021; Schwarzinger et al. 2021). As defined by the WHO, vaccine hesitancy is described as any delay in accepting or refusing immunization despite the availability of vaccine services (World Health Organization 2014). If left unchecked, it can become a worldwide health concern (Dubé et al. 2013; World Health Organization 2019). According to reports, it impedes the recovery of the economy and public health following pandemics (Schoch-Spana et al. 2021). It is influenced by a variety of factors, including trust in vaccines, the method of vaccination, the government, the media, and other people's views of vaccine risk or harm (Jennings et al. 2021; Sonawane et al. 2021; Verger and Dubé 2020).

Most discussions on vaccinations focus on factors of acceptance or hesitancy using various empirical methods (e.g., Aw et al. 2021; Soares et al. 2021; Truong et al. 2022). There is a dearth of literature that examines the role of social capital in the immunization program, although the social capital theory has been used in various COVID-19 related studies, such as social distancing, COVID-19 related deaths, and public health (Arachchi and Managi 2021; Kokubun and Yamakawa 2021; Wong and Kohler 2020), no study has been conducted on social capital regarding vaccine hesitancy. This is the gap that this study seeks to fill. The primary objective of this study was to ascertain the role of social capital in immunization programs. Specifically, it intends to examine the social factors influencing people's behavior regarding COVID-19 vaccination campaigns. Furthermore, it examines the relationship between social capital and vaccination decisions at the individual level. The main motivation for employing social capital is founded on the premise that individuals use a variety of ties to achieve common goals. In the context of COVID-19 immunization initiatives, people would seek advice from their social ties before deciding to be vaccinated. This is an interesting area to pursue as it establishes the extent of influence social ties exerted, such as families, close friends, neighborhoods, and leadership in one's decision whether or not to access vaccination services.

The remainder of this paper is arranged as follows. Section 2 develops the theoretical framework of the study. Section 3 presents the necessary materials and methods in addressing the research gap. The results are shown in Section 4, while Section 5 elaborates upon the insights gleaned by these results. Section 6 highlights some concluding remarks. It ends with a set of study limitations in Section 7.

2. Theoretical Framework

Previous studies have reported that media, social relationships, risks and benefits, trust in vaccines and vaccination initiatives, and trust in the government significantly influence individuals' perceptions of the immunization program (Aloweidi et al. 2021; Harapan et al. 2020). Thus, vaccine acceptance is linked to these factors, and vaccine hesitancy occurs if these factors are not satisfied. Some studies have included other variables to explain people's willingness to take vaccines, such as political affiliations, vaccine origins, and endorsements (Kreps et al. 2020). Additionally, unregulated information, agency approval of vaccinations that were not authorized for emergency use, and reported hazards have contributed to vaccine reluctance (Jennings et al. 2021; Kreps et al. 2020).

In the Global North, factors associated with vaccine skepticism include worries about adverse effects, political influence, and vaccination reluctance (Jennings et al. 2021; Thaker

2021). Misinformation and conspiracy theories, particularly when presented in pseudo-scientific language, social media, and the skeptic attitude in traditional and authoritative journalism, have added to the public's skepticism toward vaccines (Loomba et al. 2021; Murphy et al. 2021; Paul et al. 2021). On the contrary, in the Global South, economic level, little exposure to popular social media, and prior treatment for COVID-19 were associated with willingness to accept vaccination (Ditekemena et al. 2021). Restricting access to social media, regulating content to be posted on popular platforms, and creating a politically neutral vaccination or health program may contribute to improving individuals' perceptions of vaccinations and the government's immunization program. Failure to implement a robust health program, whether related to COVID-19 or not, would likely extend current mitigation strategies, postponing the attainment of herd immunity as a defense against COVID-19 and other serious associated illnesses (Wake 2021).

Empirical methodologies have aided in the knowledge of the interaction of factors, resulting in a complete explanation of any phenomenon. For example, Argote et al. (2021) used bivariate logistic regression models to predict vaccination willingness while controlling for demographics and partisanship. They emphasized that vaccination initiatives need to incorporate information management, political affiliation, trust in governments, and perceived vaccine threats to increase willingness to vaccinate. Ditekemena et al. (2021) used multivariate regression analysis to measure the population's willingness to be vaccinated against factors associated with vaccine hesitancy. They found that a low willingness to vaccinate does not warrant an increase in community transmission. In Malaysia, univariate studies revealed an association between vaccine reluctance and unemployed parents, younger parents, parents with fewer children, and non-Muslims. Multivariate models were also adopted to examine vaccine reluctance associated with pregnant mothers. Azizi et al. (2017) observed that this group of cohorts who were expecting their first child was four times more likely to be vaccine-hesitant than those who had one or more children.

Due to its relevance in a closely related phenomenon, the social capital theory has been used in a few studies related to COVID-19. Kokubun and Yamakawa (2021) used the mediating role of social capital in obtaining compliance with social distancing as a minimum requirement to prevent disease spread. They pointed out that social distancing alone is insufficient to prevent spread and that compliance with social distancing measures requires social capital. They argued that this insight could be used to develop strategies for the next COVID-19 wave and future preventive measures against a range of infectious viruses. If social capital is more effective than low population density at containing infections, it could prevent diseases in a large population. In another work, social capital was found to effectively slow down the spread of COVID-19 infection (Varshney and Socher 2020). Using bivariate linear correlation analyses, their insights revealed that the impact of social capital on health and wellbeing is more evident on community levels. The impact of social capital activities is related to the spread of the coronavirus. Hence, the suggestion to distinguish various associational life in the implementation of health protocols, such as social distancing. This finding proved that constructs of social capital could be incorporated into planning measures aimed at containing the spread of COVID-19, such as requiring observance of the minimum health protocol in different localities. In a related study, Nawa and Fujiwara (2019) reported that the second dose of measles immunization in Japan was associated with social bonds and social trust, attributed to social norms of mothers from pursuing immunizations for their children in their communities with high bonding social ties. They recommend that social capital be integrated with the immunization plan, possibly by providing accurate medical information. At this point, especially with the evolving domain literature, few studies have the role of social capital on vaccination acceptance, specifically at the time of COVID-19. This agenda remains a gap in the literature, and this work intends to fill in such a gap.

3. Materials and Methods

3.1. Data Gathering

Data were collected between March and June 2021 in the Republic of the Philippines, using an online survey following the restrictions associated with intermittent lockdowns imposed by the government to curb its pandemic curve. This strategy has been utilized in different studies (Ditekemena et al. 2021; Thaker 2021; Zhang et al. 2021). However, in this study, the principal investigator (PI) used Google form in carrying out the survey. The online survey was designed to gather the following information: (1) demographic data, (2) educational attainment, (3) social connections maintained during these pandemic times, (4) perceptions of COVID-19 vaccinations, (5) trust in vaccines and vaccination programs, (6) perceptions of the media's role in information transmission, (7) perceptions of trust in the government, and (8) vaccination decisions. The survey participants assessed a total of 16 items: two items for personal information; two items for social network and information; five items for perceptions of COVID-19 vaccines; two items for perceptions of trust in the vaccines and government's vaccination program; three items for trust in the media's role in information dissemination; two items for decision for vaccination. Responses were recorded on a four-point scale.

The snowball method was used to obtain recruit participants (RPs). The qualifications for a legible RP include the following: (1) can be trusted to answer all items truthfully, (2) must belong to any level of the social capital of both the referee and the referral, (3) above 18 years old, and (4) be computer literate. The data collection process commenced when some close connections of the PI residing in the Republic of the Philippines were requested to complete the survey questionnaire. Additionally, these social ties of the PI were asked to share the online survey with their immediate acquaintances, social connections, or social networks. Similarly, the process was adopted for the subsequent referral. The online survey includes a provision for electronic informed consent, and RPs can only respond if consent is granted.

Following the snowball method, 430 replies were generated, with 75% coming from female RPs. The prevalence of women participants in this survey may have reflected the global trend of vaccination (Vijayasingham et al. 2021). Globally, women received 53% of vaccines (Gender in Humanitarian Action 2021). The significance of sex-disaggregated data on vaccination was discussed by Vijayasingham et al. (2021). Moreover, the RPs range from 20 to 59 years of age and include both students and professionals, with the former representing most of it.

3.2. Data Processing and Analysis

From the total of 430 responses, the PI performed some data cleaning to eliminate responses from individuals who refused consent, and only 360 participants were used in this study after data cleaning. Frequencies and percentages were used to analyze categorical variables and means and standard deviations (SDs) for continuous variables. The relationships between the dependent and independent variables were quantified using odds ratios (ORs) with 95% confidence intervals. Statistical significance was set at $p < 0.05$. Jamovi, an R-based statistical software for Mac, was used for the logistic binomial regression.

4. Results

Table 1 and Figure 1 show participants' social connections and media use in their vaccination decisions. Table 1 presents the RP utilization of their social ties in their vaccination decisions. RPs tend to consider the suggestions and advice from their social contacts to consider vaccination as a form of protection against COVID-19. The influence came from the social connections, such as the bonding social capital (54.38%), followed by the bridging social capital (12.3%), and linking social capital (3.19). At the community level, social capital is used by communities to attain common goals, and communities are structured in such ways to achieve common goals, including security, mutual aid, and reciprocity.

These findings corroborate previous reports highlighting that communities or organizations may have been primarily structured on bonding social relationships, and through various social transactions, bridging social and linking social connections are formed (Fraser 2021; Ryu 2017; Vachette et al. 2017).

Table 1. Social capital of survey participants during the COVID-19 pandemic.

| Levels of Social Capital	f (*n* = 360)	%	SoCap Mean%	SD
bonding social capital			54.38	30.1
family members	326	90.56		
close friends	229	63.61		
neighbors	157	43.61		
barangay (community-based) health workers	71	19.72		
bridging social capital			12.3	2.43
faith-based organizations	54	15.00		
local leaders	42	11.67		
local politicians	37	10.28		
linking social capital			2.41	1.58
municipal/city political leaders	20	5.56		
national politicians	9	2.50		
private organizations	9	2.50		
charitable institutions	8	2.22		
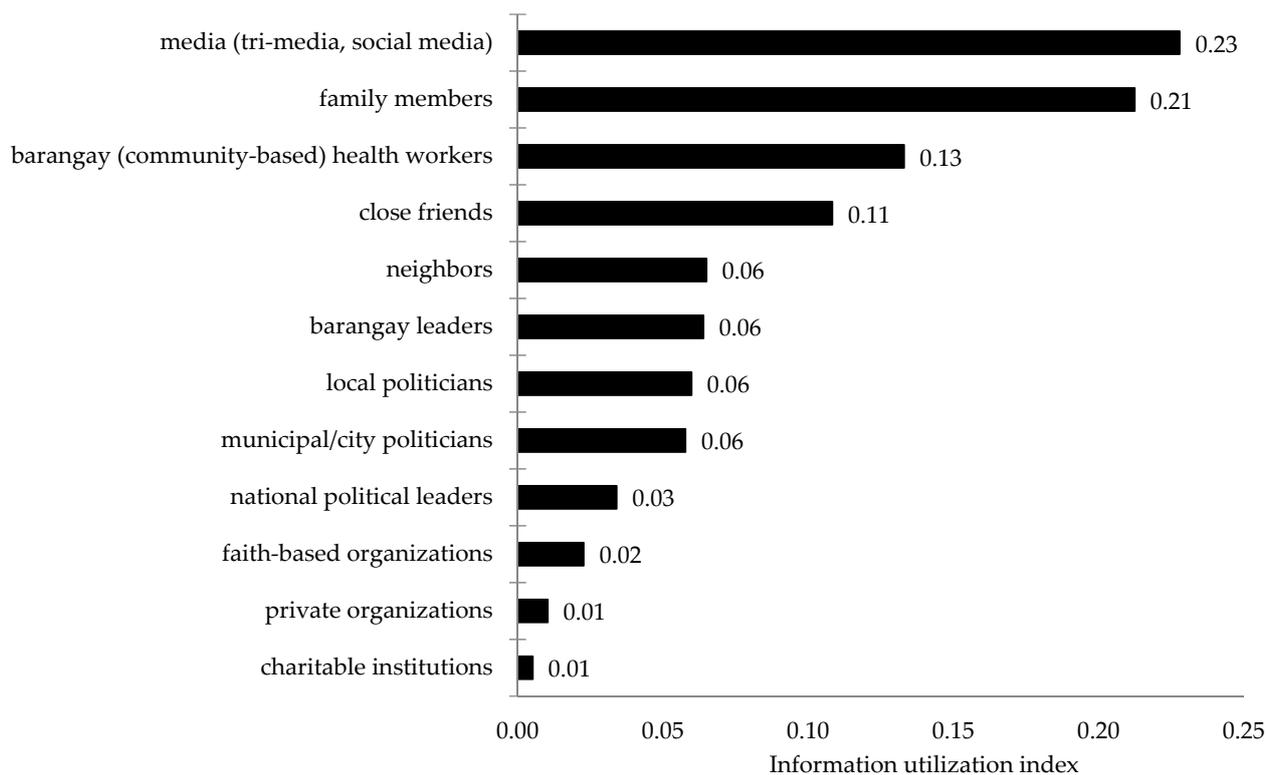
Figure 1. Information utilization index of survey respondents on COVID-19 and vaccination initiatives.

On the other hand, information-seeking strategies are critical for understanding the vaccination decisions of participants; hence, the use of channels of information is a critical factor in all decisions. The information utilization index (Figure 1) indicates the intensity of use of the media as a source of information regarding COVID-19 and the ongoing vaccination activities. The information survey participants received from the media are used in their vaccination decisions.

Table 2 shows that decisions for vaccinations are associated with perceptions of social contacts pertaining to trust in vaccines and vaccination (OR = 1.892, CI: 1.3194–2.713; $p < 0.001$), perception of the safety of vaccines (estimate = −0.590; OR = 0.554, 95% CI: 0.411–0.747; $p < 0.001$), perception of the benefit of vaccines (estimate = 0.762, OR = 2.143, CI: 1.547–2.969; $p < 0.001$), and information utilization (estimate = 1.49, OR = 4.4423; CI: 2.92950–6.7363; $p < 0.001$). These results are consistent with the findings of similar studies (e.g., Jennings et al. 2021; Muto et al. 2020; Thaker 2021). Consequently, this finding informs us that those decisions regarding vaccination are an outcome of influence.

Table 2. Social capital perceptions on the factors of vaccination.

Perceptions	Estimate	SE	Z	Odds Ratio	Lower	Upper
trust	0.638	0.184	3.47	1.892 *	1.3194	2.713
harm	−0.590	0.152	−3.88	0.554 *	0.411	0.747
benefit	0.762	0.166	4.58	2.143 *	1.547	2.969
media	1.49	0.212	7.02	4.4423 *	2.92950	6.7363
social network	3.8009	0.340	11.204	45.0833 *	23.15692	87.771

* Significant at $p < 0.001$ level.

Trust in vaccines is founded on numerous but intertwined factors. In this study, trust in vaccines is associated with the safety of use, implying that vaccines do not have adverse or fatal side effects. If there are, they should only be kept at a minimum. Perceptions that vaccines can cause harm places one's confidence in the vaccines to the limit, which may result in vaccine reluctance or hesitancy (estimate = −0.590; OR = 0.554, 95% CI: 0.411–0.747; $p < 0.001$). The negative estimated value of −0.590 indicates that the vaccines are not safe and may be a factor in why some research participants postponed, delayed, or maintained a wait-and-see attitude toward the immunization initiative. As perceived by RPs, there are risks associated with vaccines, resulting in developing vaccine hesitancy.

The perceptions of the benefits that vaccines can offer are associated with vaccine safety; thus, decisions for vaccination are linked to these factors (estimate = 0.762, OR = 2.143, CI:1.547–2.969; $p < 0.001$). The social connections of survey participants understood that vaccines are beneficial, expressed at 0.762 points in the index (see Table 2). Considering the odds ratio, if the index is improved by a point, then decisions for vaccination would increase, and more individuals would be vaccinated.

However, perceptions of social contacts concerning the vaccines used in the vaccination program are founded on the information they received from the media and popular social media platforms. Data shows that the media plays a critical role in the spread of information and in building vaccine confidence (estimate = 1.49, OR = 4.4423; CI: 2.92950–6.7363; $p < 0.001$). The quality of information has contributed to building vaccine confidence, which is a crucial characteristic in the fight against COVID-19 (Brunson et al. 2020; Brunson et al. 2021; Loomba et al. 2021). If vaccine confidence can be increased by a point, vaccine acceptance would increase, resulting in a high vaccination roll-out. In contrast, negative information contributes to vaccine hesitancy.

5. Discussion

Success in the fight against COVID-19 depends on a range of responses, and these responses are the primary indicators of the appropriateness and efficiency of any health program. In the context of COVID-19, the acquisition of herd immunity is the primary goal of population protection, particularly carried out by governments. Herd immunity is the indirect protection from an infectious disease that occurs when a community is immune to the disease, either through vaccination or a previous infection (World Health Organization 2020a). Through vaccination, a large proportion of the population is protected from an illness and acquires protective antibodies against future infections, yielding herd immunity. This approach is recommended by the WHO (World Health Organization 2020b), although there have been issues raised against it, such as vaccine efficacy, safety, and the duration of protection offered by these vaccines (Paul et al. 2021).

In most governments, such as the Republic of the Philippines, vaccination depends on one's willingness to submit to it. Willingness to be vaccinated has been linked to factors, such as trust, safety, benefits, information, and the influence of social ties. Results of this work demonstrate that individuals got immunized because of the influence of their social network. This insight shares similarities with Kokubun and Yamakawa (2021) on the mediating role of social capital between social distancing and COVID-19 prevalence. Previous studies proved the significant contributions of social capital, specifically the bonding social capital in community life, and suggested the inclinations of these types of social relations in community development planning for COVID-19 (Jennings et al. 2021; Paul et al. 2021). The justification was anchored on previous studies that bonding social ties during post-disaster recovery efforts are the first responders, and were used to speed up post-disaster recovery activities (Cinner et al. 2018; Eadie and Su 2018; Field 2017; Bernados et al. 2020). In the context of the COVID-19 pandemic, people's compliance with social distancing leads to a decrease in the coronavirus infection rate attributed to social capital (Kokubun and Yamakawa 2021; Varshney and Socher 2020). On this note, there is a great need to investigate the role of social capital in vaccination and control vaccine hesitancy.

As evidenced in this work, survey participants consult their social capital in their vaccination decisions (estimate = 3.8009, OR = 45.0833; CI: 23.15692–87.771; $p < 0.001$). The findings suggest that, as the influence of social ties strengthens, the decisions will be made in favor of vaccination (Table 2), thus ruling out vaccine hesitancy. This insight counters the Philippine government's vaccination program. The government's strategy in vaccination roll-out, which assigns priority levels, excludes social relations in the program. Though assigning priority levels may work, it does not address vaccine hesitancy. In the rural areas, vaccine hesitancy is strong (Marzo et al. 2022); the Republic of the Philippines' experience with Dengvaxia still haunts Philippine society (Fatima and Syed 2018). To address it, social capital needs to be strengthened and included in the management of health protection programs as well as vaccination programs.

As a component of an effective health protection program, efficient information management needs to be incorporated. Information proliferating in popular social media outlets is often unreliable due to the prevalence of COVID-19 fake news (Yang and Tian 2021; Apuke and Omar 2021; Rocha et al. 2021). Some regulatory measures need to be designed, not necessarily on information censorship. Information released in popular social media may need to pass regulatory bodies to ascertain its veracity. Due to the absence of a regulatory body or any policy regulating the use of social media in connection with COVID-19, fake news and false information are unavoidable to proliferate, which contributes to vaccine hesitancy or vaccine rejection. Hence, information authenticity should be safeguarded to prevent fake news from multiplying, which only creates an apathetic attitude toward vaccination initiatives (Murphy et al. 2021; Palanisamy et al. 2018; Paul et al. 2021; Thaker 2021). Nevertheless, not to undervalue its role, social media provides critical support in various aspects of COVID-19 response. Insights on how social media can advance emergency preparedness are discussed thoroughly by Selerio et al. (2021).

6. Concluding Remarks

Vaccine hesitancy is linked to a range of factors, and the current literature has extensively explored these factors and their dynamics. On the other hand, some policy documents have designed protocols on how to handle vaccine-hesitant communities, including some applicable mitigation strategies for COVID-19 vaccination response. This work advances the domain literature by integrating social capital theory in the analysis of vaccine acceptance. With the case in the Philippine vaccination program, insights of the results suggest that research participants consider their social contacts in their vaccination against COVID-19. Among the three layers of social connections, the bonding social capital yields the highest influence, followed by bridging social capital and linking social capital. Regarding the extent to which participants utilize the information from social connections, results indicate that the media (i.e., tri-media, social media) represents the most source

of information regarding the COVID-19 vaccination program, followed closely by family members, with charitable institutions on the bottom of the list. Furthermore, decisions for COVID-19 vaccinations are associated with perceptions of trust in vaccines (i.e., the safety of use) and vaccination, perceptions of vaccine safety, perceptions of benefits, the quality of information, and social network.

These findings suggest that the use of social capital theory must be integrated into any policy measure on vaccine hesitancy response. Development planners and government workers need to consider the inclusion of social capital (i.e., with emphasis on bonding social capital) to increase vaccine acceptance and uptake. Understanding the role of social capital in health can provide insights on how to manage recovery programs that can be best implemented to ensure the effective provision of COVID-19 health services. Strategizing appropriate control measures of popular social media platforms is essential for increasing vaccine acceptance and confidence. In general, the media plays a significant role in promoting individuals and communities to access government information on vaccines. To prevent the proliferation of fake news and other information that would contribute to confusion, government official online information repositories may be established, for instance, where all information about the pandemic and control measures can be accessed.

7. Limitations of the Study

Since data collection was mainly conducted online and no information on the place of origin of information, the generalizability of the findings is difficult to establish. Further investigation is recommended to widen the scope of participation. Furthermore, the data gathered may have already been influenced by predetermined choices for the survey conducted during the vaccination period. Hence, in making assumptions relating to the findings of this study, careful attention must be paid.

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Institutional Review Board Statement: This study used an online data gathering method using Google Forms. The information sought was limited to the research questions but excluded information that would expose the identity of survey participants. Only the principal investigator keeps the information gathered and stored in an encrypted electronic medium. The study was granted exempt status by the institutional research ethics committee.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. No written consent has been obtained from research participants to publish this paper for the data has been completely anonymized.

Data Availability Statement: The data presented in this study are available upon request from the first author. The data are personally kept by the primary researcher.

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