ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

COVID-19 VACCINE HESITANCY AND SOCIAL MEDIA USE: A LESSON LEARNT FROM PANDEMIC

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ABSTRACT

OBJECTIVE:

This study aims to assess the level of COVID-19 vaccine hesitancy among Vietnamese adults and examine the relationship between social media use and vaccine hesitancy.

METHODS:

A cross-sectional study was conducted from July 26 to August 10, 2021, using an online survey of 702 Vietnamese adults. The Oxford COVID-19 vaccine hesitancy scale was used to measure vaccine hesitancy. A linear regression model was used to analyze the factors associated with vaccine hesitancy.

RESULTS:

Our study found that 15.1% of respondents were hesitant about receiving the COVID-19 vaccine, with an average hesitancy score of 9.52±2.66. Students and the unemployed had higher levels of hesitancy (B=0.58; 95%CI=0.02-1.15; p=0.043 and B=1.59; 95%CI=0.41-2.76, p=0.008, respectively. Hesitancy was also significantly associated with receiving positive information from social media (Facebook, Zalo) (B=-0.31; 95%CI=0.5 to -0.12; p=0.001) and trust in social media information (B=-0.45; 95%CI=-0.72 to -0.19; p=0.001).

CONCLUSION:

The results of this study highlight the need for targeted interventions to address vaccine hesitancy among Vietnamese people, particularly in the context of the shortage of vaccines and low public trust in 2021 and its practical evidence for future preparation in emerging pandemics.

KEYWORDS

COVID-19, vaccine hesitancy, social media, shortage of vaccination, public trust.

INTRODUCTION

Like other nations, Vietnam has been badly impacted by the COVID-19 pandemic. The virus was first discovered in Wuhan, China in December 2019 and quickly spread globally, leading to a worldwide health crisis [1]. To reduce the severity of the disease, vaccine development, and distribution was a top priority for many countries, including Vietnam [2].

In the context of the pandemic, social distancing and isolation policies have made the internet an effective tool for providing information to the public quickly and accurately. Social networks play an important role in this context, helping to disseminate information related to the pandemic and provide it quickly and effectively [3]. However, due to its speed and efficiency, it also led to misinformation and contributed to the spread of "infodemics" or false information that undermines public trust [4, 5].

During the early stages of the pandemic, when vaccine resources were scarce, vaccines were only available for priority groups such as frontline healthcare workers, people with chronic diseases, and the elderly. The source of vaccines and their effectiveness was a source of confusion and uncertainty due to misleading information. This led to hesitation among people when deciding whether to be vaccinated [6,7]. Vaccination hesitancy refers to the reluctance or refusal to be vaccinated, even when vaccines are available and recommended, and is one of the major challenges in vaccine compliance during pandemics. Various factors explain this, such as fear of side effects, lack of trust in vaccines, misinformation, media influence during the pandemic, and the role of pharmaceutical companies [3].

The relationship between COVID-19 vaccine hesitancy and social media is complex. Social networks can spread false information through attention-grabbing headlines or biased opinions, which can influence how users perceive data [8]. Misinformation about the vaccine can increase hesitancy, and it's widely spread on social media. News about severe side effects of the vaccine can also cause fear and anxiety [9]. To combat hesitancy, sharing official information from reputable sources is important. Such information can increase awareness of the vaccine's safety and efficacy and ultimately reduce hesitancy [8] but it remains limited in Vietnam.

Despite the ongoing COVID-19 pandemic and the potential for COVID-19 to become a common illness like the seasonal flu, vaccination must continue to increase herd immunity and reduce the risk of severe illness. Understanding the relationship between vaccine hesitancy and social media use is crucial to identify effective strategies. This study aims to examine the relationship between hesitancy towards COVID-19 vaccines and social media in Vietnam in the context of vaccine shortages and low public confidence during the Vietnam COVID-19 pandemic of 2021. Although the pandemic is now in the past, the findings provide valuable lessons that can be learned to better prepare for future emerging diseases.

MATERIALS AND METHODS

STUDY DESIGNS

A cross-sectional study was conducted from July 26, 2021, to August 15, 2021, through the online platform. A Google form survey was created and distributed to participants via the social media channels such as Zalo, Facebook. The snowball technique was approached to attract the people joining in this study. The Self Reporting Questionnaire has been developed using the Google form as an instrument designed to collect information.

Respondents who met the following inclusion criteria joined in this study: (1) being at least 18 years old; (2) a Vietnamese citizen and currently residing in Vietnam; (3) ability to access the internet and answering the question by themselves. At the end of the data collection period, a total of 702 people had participated in this study.

CONTEXT OF STUDY

COVID-19: Brief the time and COVID-19 situation [10,11]: Looking back at the history of Vietnam since the first case was reported in Wuhan, China, we can see that Vietnam witnessed a victory in the early period of the pandemic with no deaths in seven months. However, as time passed, up until the fourth wave of the pandemic, Vietnam was severely impacted. In summary, there have been four waves of the COVID-19 pandemic in Vietnam. The first wave occurred from January 23 to April 16, 2020, and resulted in 100 cases but no deaths. The second wave took place from July 25 to December 1, 2020, with 554 cases and 35 deaths. The third wave occurred from January 28 to March 25, 2021, with 910 cases but no deaths. The fourth wave began on April 27, 2021, and was also the most severe wave, with the number of COVID-19 infections

reaching nearly 400,000 people and close to 10,000 deaths. The country returned to a new normal in early 2022.

As of August 12, 2021, Vietnam recorded a total of 601,349 COVID-19 cases and 15,018 deaths, with the largest economic city, Ho Chi Minh City, accounting for 58% of infection cases and 80% of the national death toll.

COVID-19 vaccines: As of August 15, 2021 (population 97.47 million), Vietnam received a total of 18,237,060 doses of five different types of COVID-19 vaccines, including AstraZeneca, Moderna, Sputnik V, Pfizer/BioNtech, and Sinopharm. This would allow 1 vaccine for approximately 19% of the population.

STUDY VARIABLES

Outcome variables

COVID-19 Vaccine Hesitancy

COVID-19 vaccine hesitancy was assessed using the Oxford COVID-19 vaccine hesitancy scale, which consists of seven items validated in a previous study [12]. Each item had specific response options that were coded from 1 to 5, with a "don't know" option excluded from scoring. The sum scores ranged from 7 to 35, with higher scores indicating a higher level of vaccine hesitancy [12].

Main Predictor variable

Information sources obtained from social media

The following information was collected about social media use for accessing information on COVID-19 vaccines [3]: currently using social networks, sources of information about vaccines, channels used to look up information, channels used to discuss vaccines, frequency of encountering positive information, positive information encountered, frequency of encountering negative information, and negative information encountered.

COVID-19 vaccine information from social media

The following information was collected regarding the reliability of COVID-19 vaccine information from social media based on previous literature review [3]:

- Frequency of updating the news on COVID-19 vaccine from social networks: (3 times/day; 1-2 times/day; 4-6 times/weeks; 1-3 times/week, less than 1 time/weeks; no update).
- Level of trust in information from social networks.
- Selection of reliable information sources.
- Attitudes about social networks improving knowledge.
- Influence of social networks on vaccine hesitancy for themselves and those around them.
- Influence of social media on attitudes about COVID-19 vaccination.
- Frequency of receiving positive; negative information related to COVID-19 vaccine from social media on a scale from 1 to 5 with a corresponding decreasing level of frequency, including very often (>7 times/week), regularly (5-6 times/week), medium (3-4 times/week), infrequent 1-2 times/week) and hardly seen (<1 time/week).

Covariate variables

Demographic

The following demographic information was collected: age (in years), gender (male or female), ethnicity, place of residence (urban or rural), and education level (high school or below high school, middle school/high school, college/university), occupation, marital status (single, married, divorced/widowed), and household income (poor, near-poor, normal).

Health-related Variables

Information on chronic illnesses, health status in the past two weeks, and COVID-19 history was collected.

STATISTICAL ANALYSES

Stata version 16.0 was used to analyze data. Multivariate linear regression models were utilized to assess the association between social media use and vaccine hesitancy score [13]. A p-value below 0.05 was considered statistically significant.

ETHICS APPROVAL

The protocol of this study was approved by the Ethical Review Board of Hue University of Medicine and Pharmacy (No. H2021/443).

RESULTS

The participation rate was 96.7%, (679) out of 702 study participants who were between the ages of 18 and 60 (n = 702 people), 66% were female. Most of the subjects lived in urban areas (79.6%) and had no religion (81.9%). University education was prevalent, accounting for 69.2%. Civil servants/officers and pupils/students were the two main occupational groups, accounting for 43.9% and 31.6%, respectively. Only 10% of study subjects had at least one chronic disease or more (Table 1).

TABLE 1: CHARACTERISTICS OF THE RESPONDENTS

Characteristics		Number (n)	Percent (%)
Age group	< 20	38	5.4
	20-25	288	41.0
	26-30	169	24.1
	31-40	156	22.2
	>40	53	7.3
Gender	Female	463	66
	Male	239	34
Religious	None	574	81.8
	Buddhism	88	12.5
	Catholic	34	4.8
	Others	6	0.9
Residential areas	Urban	559	79.6
	Rural	143	20.4
Education level	Under primary school	2	0.3
	Secondary school	21	3
	High school	40	5.7
	College/University	486	69.2
	Postgraduate	153	21.8
Current occupation	Public servants	316	45
	Student	222	31.6
	Staff	50	7.1
	Business	36	5.1
	Worker	30	4.3
	Unemployment	21	3
	Other	7	1
	Farmer	2	0.3
	Housewife	9	1.3
	Retire	9	1.3
Married status	Single	478	68.1
	Married	212	30.2
	Widow	4	0.6
	Separation/divorce	8	1.1
Household economic status	Poor/near poor	24	3.4
	Average	678	96.6
History of chronic diseases	No	632	90
	Liver	20	2.8
	Cardiovascular	6	0.9
	Hypertension	16	2.3
	Chronic kidney disease	2	0.3
	COPD	1	0.1
	Diabetes	2	0.3
	Dyslipidemia	6	0.9
	Others	25	3.5

Three popular social networks in this study are Facebook (95.9%), Zalo (90.6%), and YouTube (78.8%). The most widely used social network for learning and exchanging information is Facebook (34.7%).

There were many sources of information on social networks, with the most popular being government websites (86%) and medical knowledge pages (51.7%). Over 80% of study participants regularly see positive information and encouragement for vaccination, including the benefits of vaccination in protecting against COVID (53%), reducing disease severity if infected (75.2%), vaccines being safe for health (28.3%), creating herd immunity (74.5%), and the policy of rational use of vaccines (37%). In addition, 34.2% of the subjects also frequently see negative information about the COVID vaccine, including information about side effects after injection (80.8%), anaphylaxis or death after injection (75.8%), worsening of existing diseases (10.5%), and vaccines not being effective in preventing disease (23.2%), inappropriate vaccine policies (29.9%), and abuse of relationships for the benefit of vaccines (2.3%) (Table 2).

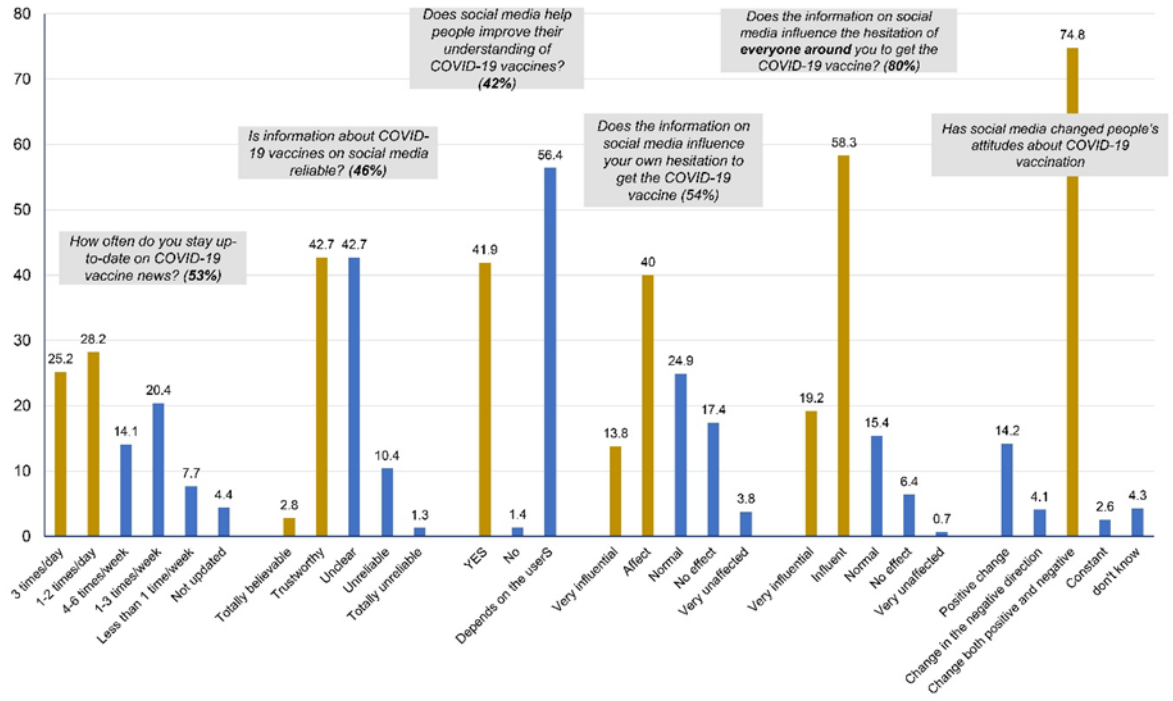
67.5% of subjects updated their information on vaccines daily. Trusted sources of vaccine information include government websites, health ministries, etc. (92.3%) and medical journals (56.3%), as well as medical websites (43.3%) and electronic newspapers (33.8%). 53.8% of subjects said that information about vaccines on social networks influenced their decision to vaccinate, and 77.5% said that people around them were also influenced by this information (Figure 1).

TABLE 2. SOCIAL MEDIA AND ITS DISTRIBUTION AND INFORMATION

Information	Number (n)	Percent %
Current use social media		
Government/State website	369	52.6
Facebook	673	95.9
Zalo	636	90.6
Instagram	376	53.6
Twitter	88	12.5
TikTok	241	34.3
YouTube	553	78.8
Linkedin	100	14.2
Pinterest	106	15.1
Newspaper	332	47.3
Others	6	0.9
Most popular social media to access to information on COVID-19 vaccine?		
Government/State website	208	29.6
Facebook	243	34.7
Zalo	65	9.3
Instagram	5	0.7
TikTok	3	0.4
YouTube	19	2.7
Newspaper	142	20.2
Most popular information sources on COVID-19 vaccine you are following		
Government information sites	604	86
Pages about medical knowledge	363	51.7
Facebook Pages with green ticks	158	22.5
Artists or celebrities	20	2.8
Share from the groups you join	175	24.9
Posts shared by friends and family	212	30.2
Other sources	15	2.1

Information	Number (n)	Percent %
When you have a question/question about the COVID-19 vaccine, what information channels do you usually look up through?		
Social network: Facebook, Zalo, …	225	32.1
Government state website	562	80.1
Newspaper	253	36
Google	29	4.1
Others	22	3.2
What platform that you discuss on COVID-19 vaccine		
Facebook, Zalo,..	365	52
Newspaper	67	9.5
How often do you see positive information and encouraging COVID-19 vaccination on social media?		
Very often (>7 times/week)	159	22.6
Regularly (5-6 times/week)	223	31.8
Medium (3-4 times/week)	182	25.9
Infrequent (1-2 times/week)	101	14.4
Hardly seen (<1 time/week)	25	3.6
What positive news about the COVID-19 vaccine have you seen/heard/read? (Multiple choice question)		
Protect your body from covid-19	372	53
Reduce the severity if you have an illness	528	75.2
Vaccines are not harmful to health	199	28.3
Create herd immunity	523	74.5
Policy on rational use and distribution of vaccines	260	37
How often do you see negative information and encouragement not to get the COVID-19 vaccine on social media sites?		
Very often (>7 times/week)	51	7.3
Regularly (5-6 times/week)	68	9.7
Medium (3-4 times/week)	121	17.2
Infrequent (1-2 times/week)	267	38
Hardly seen (<1 time/week)	183	26.1
What negative information about the COVID-19 vaccine have you seen/heard/read? (Multiple choice question)		
Side effects after vaccination: fever, nausea, headache, pain at the injection site, etc.	567	80.8
Anaphylaxis or death	532	75.8
Exacerbating other comorbidities	74	10.5
Vaccines had low effectiveness in preventing COVID-19	163	23.2
Unreasonable policy for vaccine uses and allocation	210	29.9
Inappropriate vaccine storage; Taking advantage of relationships to receive vaccine; Vaccine is a toxic drug; and Vaccine use if for profit purposes	16	2.3

FIGURE 1. PERCEPTIONS OF COVID-19 INFORMATION ON SOCIAL MEDIA



The mean score on the COVID-19 vaccine hesitancy scale was 9.5±2.7. Factors associated with vaccine hesitancy were gender and age, with men having higher levels of hesitancy than women, and the highest level of hesitancy being in the age group of 45 to 59 years old (33.21 ± 3.468) and the lowest level of hesitancy being in the age group 60 years and older (27.43 ± 11.356). Using the mean cut-off point, we found that 15.1% of people had vaccine hesitancy (Figure 2).

Results from the linear regression model showed that respondents who were students (B=0.58; 95%CI=0.02, 1.15; p=0.043) or unemployed (B=1.59; 95%CI=0.41, 2.76; p=0.008), receiving a positive information from social media (Facebook, Zalo) (B=-0.31; 95%CI=(-0.50, -0.12); p=0.001) and trust in social media information (B=-0.45; 95%CI=(-0.72, -0.19); p=0.001) were significantly associated with a reduced score of vaccine hesitancy(p < 0.01) (Table 3).

FIGURE 2. COVID-19 VACCINE HESITANCY SCORE BY CHARACTERISTICS

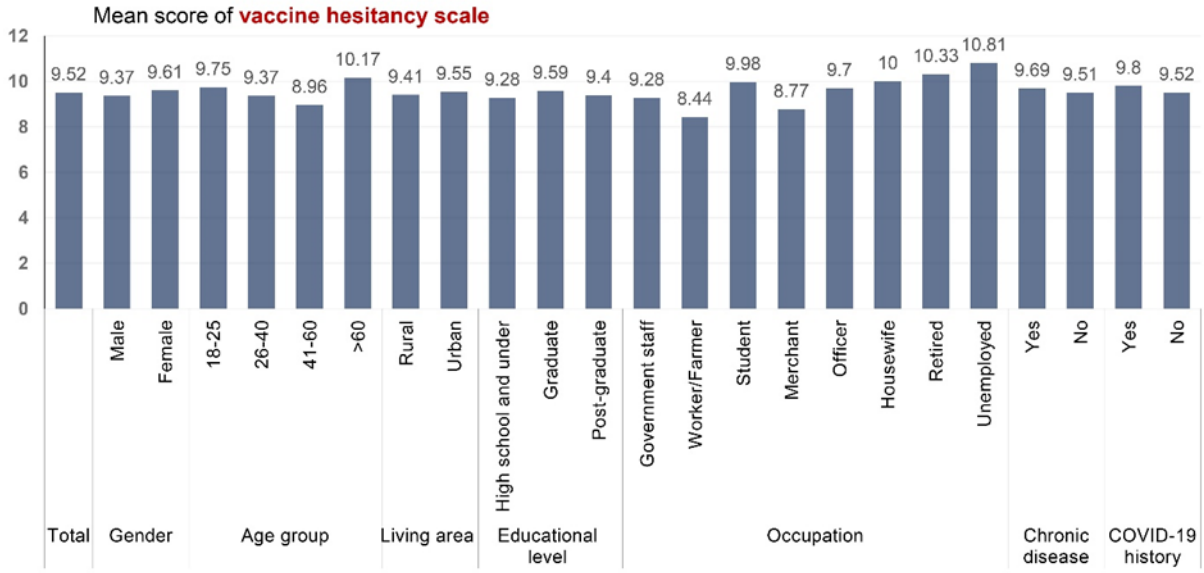


TABLE 3: BIVARIATE AND MULTIVARIATE LINEAR REGRESSION ANALYSIS FOR FACTORS ASSOCIATED WITH COVID-19 VACCINE HESITANCY

Variables		COVID-19 Vaccine Hesitancy			
		Bivariate		Multivariate	
		B (95%CI)	p	B (95%CI)	p
Age		-0.03 (-0.05, -0.004)	0.023	-0.01 (-0.05, 0.03)	0.681
Gender					
	Men	Reference		Reference	
	Women	0.24 (-0.18, 0.66)	0.256	0.19 (-0.25, 0.63)	0.391
Ethnicity					
	Kinh	Reference		Reference	
	Others	-0.99 (-2.58, 0.59)	0.218	-1.18 (-2.75, 0.39)	0.142
Religion					
	None	Reference		Reference	
	Catholicism	-0.42 (-1.29, 0.46)	0.349	-0.23 (-1.11, 0.66)	0.615
	Buddhism	0.32 (-0.28, 0.92)	0.299	0.33 (-0.27, 0.94)	0.279
Living area					
	Rural area	Reference		Reference	
	Urban area	0.14 (-0.36, 0.64)	0.584	0.22 (-0.30, 0.74)	0.399
Education level					
	High school/ less than HS	Reference		Reference	
	Bachelor's degree	0.21 (-0.22,0.65)	0.339	0.17 (-0.67, 1.01)	0.674
	Post-graduate	-0.16 (-0.64, 0.32)	0.509	0.37 (-0.59, 1.32)	0.451
Occupation					
	Government staff	Reference		Reference	
	Farmer/Worker	-1.14 (-2.08, -0.2)	0.018	-0.58 (-1.60, 0.43)	0.261
	Student	0.65 (0.22, 1.08)	0.003	0.58 (0.02, 1.15)	0.043
	Merchant	-0.8 (-1.66, 0.06)	0.068	-0.67 (-1.55, 0.21)	0.137
	Officer	0.19 (-0.62, 1.01)	0.641	0.17 (-0.67, 1.01)	0.698
	Retired/Housewife	0.63 (-0.48, 1.73)	0.265	0.95 (-0.24, 2.14)	0.116
	Unemployed	1.33 (0.17, 2.48)	0.024	1.59 (0.41, 2.76)	0.008
Marital status					
	Single	Reference		Reference	
	Married	-0.55 (-0.98, -0.12)	0.012	-0.20 (-0.78, 0.37)	0.491
	Widowed/Divorce	-0.36 (-1.88, 1.16)	0.639	-0.47 (-2.09, 1.14)	0.565
Economic status					
	Non-poor	Reference		Reference	
	Poor	0.28 (-0.81, 1.36)	0.615	0.36 (-0.80, 1.47)	0.561
Chronic disease					
	No	Reference		Reference	
	Yes	0.19 (-0.47, 0.84)	0.578	0.33 (-0.34, 0.10)	0.34
Diagnosed with COVID-19					
	No	Reference		Reference	
	Yes	0.28 (0.82, -2.06)	0.816	0.26 (-2.04, 2.56)	0.82
Frequency of receiving *positive* information regarding COVID-19 vaccine on social media		-0.35 (-0.53, -0.17)	<0.001	-0.31 (-0.50, -0.12)	0.001

Variables	COVID-19 Vaccine Hesitancy			
	Bivariate		Multivariate	
	B (95%CI)	p	B (95%CI)	p
Frequency of receiving *negative* information regarding COVID-19 vaccine on social media	0.02 (-0.15, 0.19)	0.847	-0.08 (-2.6, 0.09)	0.35
Trust in information regarding COVID-19 vaccine via social media	-0.49 (-0.75, -0.23)	<0.001	-0.45 (-0.72, -0.19)	0.001

DISCUSSION

A study conducted in Vietnam on 702 individuals aimed to determine vaccine hesitancy and its relationship with social media use through an online survey. The study was conducted in the context of vaccine shortages and low public trust in the COVID-19 vaccines. The survey found that a significant percentage of participants used popular social networks such as Facebook, Zalo, and YouTube to access information about the COVID-19. In fact, 34.7% of participants accessed information about the vaccine through Facebook, compared to 29.6% who accessed government information channels. The study found that one in six people hesitated to get vaccinated, indicating a notable proportion of vaccine hesitancy. In addition, the level of trust and frequency of using social networks in Vietnam were positively associated with a reduced hesitancy score.

Previous studies in Vietnam found that TV and electronic newspapers were the main sources of COVID-19 and vaccine information, but our study shows that social networks are now primarily due to the pandemic severity and lockdown measures [14,15]. Social media's speed in spreading information about the disease may be driving this change, as people increasingly rely on it for vaccine-related news.

In this study, the average COVID-19 vaccine hesitancy score (9.5±2.7) was lower than that reported in prior research utilizing the same scale, such as the study conducted by Tuyen VD et al. (2021) [16] which reported a score of 11.2±2.7, and the study by Daniel Freeman (13.6±7.3) [12] or study by in Malaysia (11.3±4.9) [17]. This disparity could potentially indicate that the Vietnamese populace exhibits a greater propensity for vaccine acceptance when compared to individuals residing in higher-income nations such as Taiwan or the UK or Malaysia.

Data from Vietnam during the same period suggests a link between COVID-19 vaccine hesitancy and social media. One study of health science students found that vaccine hesitancy was 40.4% and suggested that mass media appreciation of vaccine safety and effectiveness could help reduce hesitancy [18]]. Another study found that COVID-19 risk had a positive effect on both hesitancy and vaccination perception, while vaccination perception had a negative impact on hesitancy, illustrating the detrimental effect of social media on immunity [19].

A relationship was found between students and unemployed individuals and COVID-19 vaccine hesitancy. This result may be due to these two groups having the most access to social media and information about the COVID-19 vaccine compared to other occupational groups. Previous studies have shown that trust in information is an important determinant of vaccination [20]. Research by a Pakistani team also showed an inverse relationship between the rate of trust in the information received and the increased rate of vaccine hesitancy [21,22]. Their opinions on the safety of the COVID-19 vaccine were influenced by their reliance on social media as a primary source of information and their distrust of vaccine manufacturers (pharmaceutical companies) [23].

An interesting finding in this study was the relationship between the frequency of social media use and the degree of trust in the information obtained from these platforms that influenced people's psychological reluctance to vaccinate in Vietnam. These findings add to the literature on the role of social media in shaping attitudes towards vaccines [3].

Although some studies have considered social media to have a positive impact on COVID-19 vaccine hesitancy, disinformation disseminated through these platforms has led to negative beliefs about the vaccine. This problem has been exacerbated by the spread of false material designed to reduce vaccination uptake or increase vaccine reluctance [21]. This was demonstrated in a study in Vietnam regarding side effects in national immunization programs, which showed an increased likelihood of vaccine refusal after reading about adverse effects of immunizations (AEFIs) in the media [24]. A study conducted in the US suggests that while social media can be used to educate vaccine-hesitant individuals, traditional media should prioritize promoting reliable, fact-based vaccine content to their audiences [25]. These points are consistent with recent evidence in the UK on public health communication during the pandemic. The study recommended providing informative social media campaigns to share good resources and encourage browsing on reliable sources, and for social media companies to intensify their removal of vaccine disinformation and anti-vax accounts with independent monitoring [26].

It is noted that this study was conducted during a period of vaccine shortage, which may be associated with increased hesitancy. Vaccine shortages can lead to increased anxiety and distrust because people question the safety and effectiveness of existing vaccines. This highlights the importance of ensuring a stable and reliable supply of vaccines, as well as effective communication strategies to address any concerns or misconceptions about vaccines at this time [27-28].

Based on the findings of this study, policymakers and health authorities need to weigh the factors associated with public reluctance and promote wider use of vaccine access strategies in accordance with highly reliable scientific evidence and transparency. Targeted and emergency risk communication strategies, such as reaching out to influencers and high-level public figures to communicate the benefits of vaccination and promote it, are also effective strategies to reverse the rate of vaccine hesitancy in the community [29].

Although the first study was conducted in the context of a pandemic through an online platform and relied on self-reporting, it also has some limitations. Since it was conducted online using the snowball approach, the collected information may be misleading because individuals know each other, and it may not reflect those who did not participate. Therefore, it is important to bear in mind the possible bias in these responses. Second, a sample size of 702 people is small compared to the general population of Vietnam (79.47 million in 2021 and 100 million people in 2024), so the results may not be generalizable to all people and other countries. However, the evidence found in this study may be applicable to countries and regions with similar contexts. Third, it is difficult to conclude a causal relationship between the relationships explored in this study because it is only a cross-sectional survey.

Despite these limitations, the study has some strengths that must be emphasized. The study used a validated scale to assess vaccine hesitancy and investigated numerous pieces of information related to demographics, health, and possible social networks that contribute to vaccine hesitancy. The findings have important implications for public health efforts to increase vaccine uptake and combat COVID-19 vaccine misinformation and infodemics. For future studies, a larger sample size and time-series survey design should be taken into account resulting in a more accurate assessment of this relationship and facilitating more informed policymaking. In future investigations, it might be possible to examine the readiness of health-specific topics, media, and service providers, as well as the barrier to accessing vaccines due to vaccine hesitancy. While rural population and level of education were not found to be significant in this study, these factors may have different effects in other contexts. Therefore, it would be useful to include them in future research at some stage.

CONCLUSION

The main findings of the study show that a significant proportion of the Vietnamese population is hesitant to get the COVID-19 vaccine and that there is a link between social media use and vaccine hesitancy. The frequency of social media use and confidence in information obtained from these platforms are major factors influencing vaccine hesitancy. Interventions to increase the accuracy and reliability of COVID-19 vaccine information on social media platforms can help address hesitancy and promote vaccine adoption. More research is needed to better understand the dynamics of vaccine hesitancy and the effectiveness of interventions to reduce it.

DECLARATIONS:

Consent for publication: Not applicable.

COMPETING INTEREST:

The authors declare they have no competing interests.

AVAILABILITY OF DATA AND MATERIALS

All data supporting our findings will be shared upon request.

FUNDING:

None

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