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Examining the Effect of Social Media Communication on COVID-19 Vaccination Intentions: The Mediating Role of Interpersonal Communication and Risk Perception

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Abstract. The emergence of COVID-19, originating from the novel coronavirus SARS-CoV-2, presented a global health crisis that had profound repercussions on societies worldwide. In response, the scientific community mobilized to swiftly develop effective vaccines in an unprecedented manner. Governments around the world launched extensive vaccination campaigns with the goal of attaining widespread immunity and ultimately bringing an end to the pandemic. The success of these endeavors to combat COVID-19 was partially contingent upon individuals' willingness to receive vaccinations. Thus, understanding the factors influencing people's vaccine intentions becomes crucial for future similar pandemic scenarios. The Indian government implemented numerous strategic social media campaigns to enhance acceptance of the COVID-19 vaccine among its populace. These campaigns, executed with careful planning, harnessed various online platforms to communicate accurate information, address concerns, and underscore the vaccine's significance in containing the virus's spread. This study delves into the impact of social media communication on COVID-19 vaccine intentions, considering the mediating roles of interpersonal communication and risk perception. Data collected from a cross-sectional survey of 391 participants were subjected to structural equation modeling for analysis. The results indicated that social media communication directly and indirectly influenced vaccine attitudes, mediated by risk perception and interpersonal communication. Consequently, attitudes toward the vaccine significantly affected intentions to receive the COVID-19 vaccination.

Keywords: COVID-19 vaccination intention, Interpersonal communication, Risk perception, Social media communication.

1. INTRODUCTION

The COVID-19 pandemic, a global crisis of unprecedented proportions, has forever altered the course of our world. Since its emergence in late 2019, the novel coronavirus, SARS-CoV-2, has swept across continents, challenging our understanding of public health, science, and societal resilience. With its rapid transmission and the severe health consequences it can inflict, this pandemic has prompted governments, healthcare systems, and individuals worldwide to adapt, innovate, and come together in an unparalleled effort to contain the virus's spread, treat the afflicted, and ultimately find a path toward recovery. Vaccination was considered a crucial tool in the fight against the COVID-19 pandemic. Rapid development has led to the availability of effective vaccines in most developed nations in 2021. Nevertheless, conquering the pandemic hinged not just on the accessibility of safe and effective vaccines but also on the willingness of individuals to receive them (Ahmad Rizal et al., 2022). While a significant portion of eligible populations in most developed countries had received the vaccine, acceptance rates for vaccination vary significantly, both among and within nations.

By the end of 2021, India had made significant strides in its COVID-19 vaccination campaign. The country embarked on one of the world's largest vaccination drives, administering vaccines to millions of its citizens. While the initial vaccine rollout in India encountered obstacles such as supply limitations and logistical challenges, India made impressive strides. Between January and December of 2021, crores of Indian population received at least one COVID-19 vaccine dose, improving the overall vaccination rate of India (Sharma et al., 2023). However, disparities in vaccination coverage between urban and rural areas, as well as disparities in the distribution of vaccines across regions turned out to be a big challenge for the success of Indian vaccination campaign. The task of vaccinating a population of more than 1.3 billion individuals in a densely inhabited and culturally varied country as India, posed an enormous challenge.

The vaccination campaign was further hampered by vaccine hesitancy among Indian people, driven by the spread of misinformation and a lack of trust, especially prevalent in the rural areas, where more than 65% of the population resides. Additionally, wrong concerns about vaccines affecting menstrual cycles and fertility further exacerbated these fears (Choudhary et al., 2021). The country also experienced a proliferation of misleading information tailored to specific religions. For instance, some within the Hindu community propagated false claims suggesting that cow meat is used in vaccine production, while within the Muslim community, there were baseless assertions about the presence of pork traces in the vaccine (Vaghela et al., 2021). To overcome these challenges, there has been a need for comprehensive public awareness initiatives and community involvement to tackle and reduce vaccine hesitancy. Misinformation propagated on social media, cultural beliefs, and concerns about vaccine safety contributed to hesitancy in many countries. The emergence of new variants and the interconnectedness of the world underscored the importance of achieving high vaccination rates to curb the spread of the virus. As the global community continued to grapple with the pandemic, addressing vaccine hesitancy remained a critical

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aspect of achieving herd immunity and ensuring public health. The literature extensively documents the connection between public health media campaigns and interpersonal communication (Duong et al., 2023). These campaigns trigger discussions and social exchanges among members of the target community, aiding them in comprehending associated risks and relevant health behaviors. According to the Integrative Model of Behavioral Prediction, interpersonal communication functions as an indirect factor that influences behavioral intentions through attitudes, perceived norms, and self-efficacy (Fishbein, 2009). While numerous studies have explored how interpersonal communication acts as a mediator for the effects of mass media health information, limited research has delved into its association with exposure to social media campaign messages and behavioral intentions in the context of an infectious outbreak such as COVID-19. Considering the growing utilization of social media for infectious disease prevention (Tsao et al., 2021), investigating the role of interpersonal communication in this setting offers deeper insights into the dynamics of social media exposure, interpersonal communication, and their combined impact on COVID-19 vaccine acceptance behaviors. This study seeks to investigate how social media communication influences interpersonal communication and risk perception related to attitudes about COVID-19 vaccination, ultimately influencing people's vaccination intentions. This research holds considerable importance for academics, healthcare practitioners, and policymakers alike. To begin with, it establishes a foundational framework for understanding the influence of diverse persuasive communication channels, particularly those found on social media, on individuals' choices regarding COVID-19 vaccination. This, in turn, offers a basis for expanding the existing body of literature concerning the impact of communication on vaccine acceptance.

2. LITERATURE REVIEW

Over the past decade, the landscape of communication has undergone a significant transformation. We've transitioned away from a heavy reliance on conventional mass communication avenues like newspapers, television, and radio, and moved towards the utilization of social media platforms such as Facebook, Twitter, and YouTube (Ahmad Rizal et al., 2022). In stark contrast to traditional mass media, where information typically emanated from well-established news agencies, social media possess unique features that empower the general public and individual users to serve as sources of information themselves. Furthermore, owing to the technological capabilities and social networking aspects of social media, this information can be easily disseminated through users' interconnected networks. In the realm of traditional media, any new information typically goes through multiple editorial filters before reaching the public, ensuring its accuracy and reliability. In contrast, users of social media are able to freely share information without being bound by the obligation to verify its authenticity (First et al., 2021). This situation, coupled with the rapid growth in the number of internet users, has transformed social media into a "two-sided coin" capable of disseminating both crucial and misleading information to a wide audience. In the realm of vaccines, researchers contend that a fresh messaging strategy is imperative to combat misinformation and vaccine hesitancy prevalent on social media platforms. Among the top three platforms for sharing and accessing information on social media—Facebook, YouTube, and Twitter—Twitter is particularly susceptible to the dissemination of false information and the propagation of hesitancy, despite Facebook boasting a larger user base (Nazione et al., 2021). Hence, there is a compelling need to undertake this study within the context of these three popular social media platforms as vehicles for conveying information regarding the COVID-19 vaccine.

2.1. Social Media Communication and Interpersonal Communication

Research focused on media campaigns consistently demonstrates that exposure to campaign messages initiates discussions among individuals on the topic (First et al., 2021; Nazione et al., 2021). In situations where health is threatened, people are driven to engage in conversations with others in order to seek information, reduce uncertainty, and gain insights into preventive measures (Southwell & Yzer, 2007). Conversations among individuals serve not only as a means to repeat and spread media messages but also as relational and socially significant interactions that occur in various contexts. Scholars highlight that in the era of the Internet and social media, interpersonal communication extends beyond face-to-face interactions to encompass mediated social exchanges, such as those occurring on social media platforms (Hendriks et al., 2016; Southwell & Yzer, 2007). In this study, we define interpersonal communication as the dialogues individuals engage in through both face-to-face interactions and mediated platforms. During the phase of the COVID-19 outbreak, marked by heightened uncertainty and fear due to limited knowledge about the novel coronavirus and vaccine efficacy, these emotions likely spurred interpersonal communication aimed at seeking reassurance and filling information gaps regarding the outbreak. Indeed, previous research has established that during large-scale disease outbreaks, individuals experience increased fear and perceive higher levels of risk, motivating them to discuss health risks (Paek et al., 2016). Studies also indicate that when confronted with health risks, people tend to share information about these risks with others, utilizing both face-to-face conversations and social media (Duong et al., 2023). Thus, we propose the following hypothesis:

H_1: Social media messages will positively influence interpersonal communication regarding COVID-19 vaccines.

2.2. Social Media Communication and Risk Perception

Prior studies have observed that social media communication significantly influences the perception of COVID-19 vaccine risks, as it serves as a primary information source for acquiring information about COVID-19 (Ahorsu et al., 2022). Exposure to information and discussions on social media platforms such as Facebook, Twitter and YouTube can significantly influence how individuals perceive the risks associated with vaccination. During COVID-19 pandemic, people had limited physical contact so social media became an important platform for dissemination of vaccine-related information. In extant literature, researchers have pointed out its role in propagating both positive and negative sentiments towards vaccination (Betsch et al., 2012). Many scholars have found out that wrong information on social media lead to higher vaccine hesitancy among people and responsible for forming incorrect perception regarding vaccination (Pennycook et al., 2020) Therefore, it is evident that social media communication is a powerful driver of risk perception regarding COVID-19 vaccines, and understanding the dynamics of this influence is crucial for public health efforts to address vaccine hesitancy and promote vaccination uptake. As individuals engage in discussions, share articles, and exchange personal experiences on platforms like Facebook, Twitter, and YouTube, they contribute to the collective perception of vaccine safety and efficacy. Research by Eysenbach (2008) and Betsch et al. (2012) underscores the influential role of social media in information dissemination and its potential to impact vaccine hesitancy. The rapid spread of both accurate information and misinformation on these platforms has heightened public awareness and concerns about vaccine side effects, efficacy, and the overall risks associated with vaccination. Consequently, individuals' risk perceptions are molded not only by official health agencies but also by the multifaceted and dynamic conversations taking place on social media. This dynamic interaction between social media communication and risk perception underscores the importance of understanding the interplay between digital discourse and public attitudes toward COVID-19 vaccines. Therefore, following hypothesis is proposed:

H_2 Social media messages will significantly influence risk perception regarding COVID-19 vaccines.

2.3. Social Media Communication and Attitude

During COVID-19 pandemic, social media platforms, including Facebook, Twitter, and YouTube, became primary sources of information for majority of people in India. These platforms served as vehicles for real-time sharing of news, personal experiences, and opinions regarding vaccines. Previous researchers have observed that mass media messages and campaigns have either direct or indirect impact on attitude related to health issues (Bekalu & Eggermont, 2015; Duong et al., 2023; Southwell & Yzer, 2007). A study by Oh et al. (2021) indicated that social support provided through social networking websites affected intention through attitude. Social networking websites have been found to impact attitude related to health issues such as improved HIV testing or reduced tobacco usage (Yang & Wu, 2021). As a result, social media plays a crucial role in amplifying both accurate information and misinformation from health authorities, and also spreading it at an alarming rate. The dynamic and multifaceted nature of discussions on social media has contributed to the formation of diverse attitudes towards COVID-19 vaccines. While official health agencies have consistently advocated for vaccination as a critical tool in combating the pandemic, social media has become a space where individuals express a wide range of views, from vaccine enthusiasm to skepticism. Studies such as the one conducted by Ahmed et al. (2020) have highlighted the polarizing effect of social media on vaccine-related attitudes. Positive narratives about vaccine experiences, shared by those who have received the vaccine, can boost vaccine confidence. Conversely, the rapid spread of vaccine-related misinformation and conspiracy theories has fueled vaccine hesitancy among certain groups (Pennycook et al., 2020). Thus, following hypothesis is posited:

H_3 Social media messages will significantly influence attitude towards COVID-19 vaccines.

2.4. Interpersonal Communication and Attitude

The Integrative Model of Behavioral Prediction (IM) framework asserts that the most accurate predictor of behavior is individuals' behavioral intentions, which are influenced by their attitudes, perceptions of societal norms, and self-efficacy (Fishbein, 2009). Attitudes represent one's convictions regarding the consequences, whether positive or negative, of engaging in a particular behavior. Interpersonal communication plays a pivotal role in shaping attitudes towards COVID-19 vaccines. Conversations and discussions among individuals serve as a dynamic platform for the exchange of information, opinions, and experiences related to vaccination. This interpersonal dialogue not only fosters a sense of community but also significantly influences individuals' perceptions of vaccine safety and efficacy. Research by Hornik et al. (2021) underscores the influential role of interpersonal communication in vaccine decision-making processes, emphasizing the impact of discussions with trusted sources on vaccine acceptance. These conversations can either bolster confidence in vaccines or contribute to vaccine hesitancy, depending on the information shared and the persuasiveness of the interlocutors. Furthermore, social media discussions, campaigns and messages make more sense in the company of individual's conversation with family and friends that eventually helps in shaping one's attitude towards any health issue (Duong et al., 2023). Therefore, in the context of vaccination campaigns, understanding the dynamics of interpersonal communication and its impact on attitudes towards COVID-19 vaccines remains crucial in promoting widespread vaccine acceptance and achieving herd immunity. In light of above arguments, the fourth

hypothesis is proposed below:

H_4 Interpersonal communication will positively influence attitude towards COVID-19 vaccines.

2.5. Risk Perception and Attitude

Understanding the complex interplay between risk perception and vaccine attitudes is essential for public health campaigns and communication strategies aimed at promoting vaccine acceptance during the COVID-19 pandemic. The perception of risk associated with the vaccines plays a crucial role in shaping individuals' attitudes and decision-making regarding vaccination. Previous researchers have also noted that the risk-benefit trade-off of vaccines plays an important role on the minds of people. If individuals are convinced regarding the perceived benefits of immunity and protection from COVID-19, this impacts their attitude towards vaccination in a positive manner (Dryhurst et al., 2020). Moreover, a meta-analysis study by Brewer et al. (2007) emphasized that risk communication and the framing of vaccine-related information influences the risk perceptions of people and, consequently, affect their attitudes towards vaccination. Therefore, it becomes an essential investigation to understand the interplay between risk perception and vaccine attitudes for addressing public concerns and promote vaccine confidence. Thus, the fifth hypothesis is proposed below:

H_5 Risk perception will negatively influence attitude towards COVID-19 vaccines.

2.6. Attitude and Intention

In many health and environmental studies, empirical evidences have underscored the predictive effect of attitudes in shaping individuals' behavioral intentions (Yang & Wu, 2021). Fishbein (2009) defined attitude as "beliefs about performing a behavior that will lead to favorable or unfavorable outcomes." Ajzen (1991) observed that when predicting behavioral intentions, attitude can play a pivotal role, as a more positive attitude toward a particular behavior (such as receiving a vaccine) tends to bolster one's intention to carrying out that behavior. In extant literature, studies have demonstrated that individuals with more positive attitudes towards these vaccines are more likely to possess an intention to get vaccinated (Fisher et al., 2020). These attitudes are impacted by various factors, such as perceptions of vaccine safety and efficacy, as well as concerns about the severity of the disease (Karlsson et al., 2021). For governments and health ministries around the globe, one critical challenge for any successful vaccination campaign is vaccine hesitancy. Vaccine hesitancy encompasses a spectrum of issues, ranging from complete rejection of vaccines by majority of population to a more tentative "wait-and-see" stance (Larson et al., 2015). The origins of vaccine hesitancy are complex and may encompass various factors such as apprehensions regarding vaccine safety, the influence of misinformation, distrust in governmental or pharmaceutical entities, and perceptions of limited susceptibility to the disease (Dubé et al., 2014). Comprehending and actively dealing with these reservations hold great significance for public health initiatives. The implementation of effective communication approaches is vital in tackling vaccine hesitancy and nurturing favorable sentiments regarding COVID-19 vaccines. Furthermore, emphasizing the potential advantages of vaccination, such as the restoration of a more typical way of life and safeguarding vulnerable communities, can serve to further enhance positive attitudes and the inclination to receive vaccination (Karlsson et al., 2021). On the basis of above arguments, the sixth hypothesis is proposed below:

H_6 Attitude towards COVID-19 vaccine will positively influence intention to get COVID-19 vaccine.

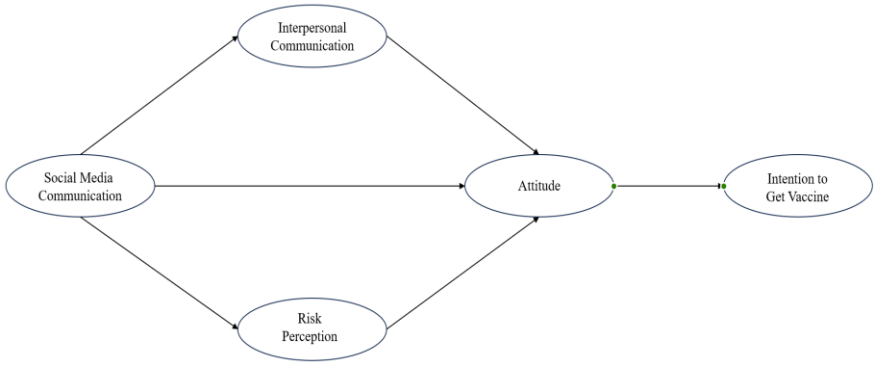


Figure 1: Proposed research model.

3. RESEARCH METHODOLOGY

3.1. Data Collection

In this study, we employed a cross-sectional research design to gather data, utilizing a self-reported online survey as our primary data collection method. The survey was administered in four Indian cities: Delhi, Lucknow, Gwalior, and Indore. To recruit participants, we employed convenience and snowball sampling techniques during the month of January 2022. In total, 945 individuals responded to the online questionnaire within the stipulated survey period. Subsequently, we subjected the collected data to a screening process, and 768 of these responses were deemed suitable for further data analysis. Some respondents either left numerous questions unanswered or

abandoned the survey after providing only partial responses. Notably, the survey included a statement affirming that participation was voluntary, and respondents' contributions would remain anonymous.

The gender distribution among the participants showed a slight predominance of females (52.6%) over males (47.4%). Additionally, a larger proportion of participants identified as single (64.2%) compared to those who were married (35.8%). The age distribution of our respondents spanned a wide range, with 18 to 24-year-olds comprising 29.2% (n = 224) of the sample, 25 to 39-year-olds making up 37.2% (n = 286), 40 to 54-year-olds accounting for 23% (n = 177), and 55 to 75-year-olds constituting 10.5% (n = 81) of the total. Furthermore, it is noteworthy that a substantial majority of the participants (59.1%, n = 454) possessed a bachelor's degree or a higher level of educational attainment.

3.2. Measures

All the constructs in the questionnaire were measured using several reflective indicators on a Likert scale of 1 to 5. The 'social media communication' construct was evaluated using six questions developed on the work of Rizal et al. (2022). One of the questions was "Social media posts provides timely information about COVID-19 vaccines." Likewise, the 'interpersonal communication' construct, drawn from First et al. (2021), was composed of three measurement items. One of the measuring items was "How often have you had conversations with your family or friends about COVID-19 vaccines?" To gauge 'risk perception', four questions were formulated based on the research by Oh et al. (2021). Among these questions, one was "I believe that COVID-19 vaccines are safe." The constructs of 'Attitude' and 'Intention to get COVID-19 vaccine' were adapted from the work of Seddig et al. (2022). 'Attitude' was measured with the help of four questions and 'Intention to get COVID-19 vaccine' was measured using three questions. One of the questions concerning 'Attitude' was "For me, vaccination against the coronavirus is good". Similarly, one of the measuring items assessing 'Intention to get COVID-19 vaccine' was "How likely are you to get vaccinated against the coronavirus?"

3.3. Data Analysis and Results

We initiated our data analysis with preliminary steps, which encompassed an examination of descriptive data, detection of outliers, handling of missing data, and checking for non-normality using SPSS v21. As part of this process, covariates such as age, gender, marital status, and educational levels were included. Given that all the constructs under investigation were either adapted or modified from previous research, we proceeded to employ structural equation modeling (SEM) on the collected dataset. Following the guidelines of Kline (2010), we adhered to a two-step approach. In the initial step, we assessed a measurement model to ensure that the latent variables (e.g., social media communication, interpersonal communication, risk perception, attitude, and intention) were adequately explained by their respective indicators through confirmatory factor analysis. Once the measurement model was established, we proceeded to estimate the structural relationships between these latent variables.

3.4. Confirmatory Factor Analysis

In performing CFA, first measurement model was defined by specifying the connections between the five latent constructs and their observed indicators. This involves deciding which observed variables (items) load on which latent factors. For assessing the fit of model to the gathered data, model-fit indices were computed for the measurement model. Table 1 presents the overall model-fit, and the results indicate that the model indices meet the acceptable levels. The CMIN/DF value is below the preferred score of 5, and the CFI, SRMR and RMSEA scores are within their thresholds, suggesting a good model fit (Hu & Bentler, 1999). Additionally, all items have high loadings (>0.5) on their respective latent constructs (Figure 2). Based on the model-fit indices, it can be inferred that the suggested model demonstrated a satisfactory alignment with the data.

Table 1: Model-fit indices – Measurement model.

Measure	Estimate	Threshold	Interpretation
CMIN	342.984	--	--
DF	160	--	--
CMIN/DF	2.144	Between 1 and 3	Excellent
CFI	0.976	>0.95	Excellent
SRMR	0.035	<0.08	Excellent
RMSEA	0.041	<0.06	Excellent
PClose	0.995	>0.05	Excellent

To assess the construct reliability and validity, confirmatory factor analysis (CFA) was conducted. Composite reliability (CR) was computed to assess the reliability of the five latent constructs. The findings indicate that they satisfy the established threshold of 0.7 as reported in Table 2. Subsequently, the validity of the constructs was

assessed using three criteria: convergent validity, discriminant validity, and factor loadings for individual items.

The evaluation of convergent validity involved analyzing the average variance extracted (AVE), a metric that gauges the shared variance between the latent variable and its corresponding indicators. To establish convergent validity, it is generally recommended that AVE scores for the latent variables surpass 0.5. The outcomes displayed in Table 2 disclosed AVE scores spanning from 0.582 to 0.68, thereby endorsing the constructs' validity. Additionally, the study assessed validity by scrutinizing the factor loadings of the measurement items. The findings demonstrated that the factor loadings for each item surpassed 0.5 (depicted in Figure 2), providing further affirmation of the convergent validity of the constructs.

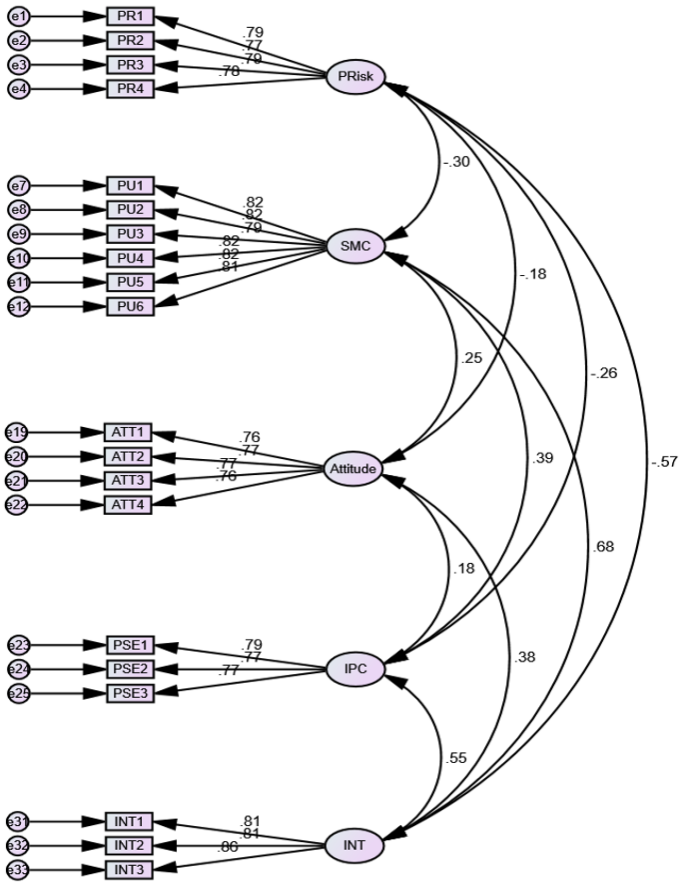


Figure 2: Measurement model.

Discriminant validity was assessed by comparing the AVE scores for each latent variable with the multiple correlations with other latent variables (Hair et al., 2010). The results demonstrated that the AVE for each variable was greater than its multiple correlations with the rest of the variables (Table 2). Consequently, the diagonal elements had higher values than the off-diagonal elements, providing support for the discriminant validity of the variables as well (Fornell & Larcker, 1981).

Table 2: Convergent and Discriminant Validity.

	CR	AVE	PRisk	SMC	Attitude	IPC	INT
PRisk	0.863	0.611	**0.782**				
SMC	0.922	0.662	-0.303***	**0.814**			
Attitude	0.848	0.582	-0.180***	0.246***	**0.763**		
IPC	0.818	0.599	-0.260***	0.392***	0.181***	**0.774**	
INT	0.864	0.68	-0.568***	0.685***	0.383***	0.553***	**0.825**

3.5. Structural Analysis

In the second step, to test the hypotheses a structural model was developed as shown in Figure 3, based on the proposed model. The structural model's findings indicated a $\chi 2$ of 418.406 (df = 164; p < .001), with acceptable fit indices: CFI = 0.915, SRMR = 0.049, and RMSEA = 0.016. The overall model demonstrated satisfactory compatibility with the data (Table 3).

H1 examined whether social media communication would be positively associated with interpersonal

communication regarding COVID-19 vaccines. The results showed that social media communication was positively related to interpersonal communication ($\beta = 0.67$, $p < .001$), supporting H1. H2 anticipated that increased exposure to social media communication would have a notable impact on individuals' perception of risk associated with COVID-19 vaccines. Results found that social media communication negatively influenced risk perception regarding COVID-19 vaccines ($\beta = -0.45$, $p < .001$). This suggests that social media campaigns and posts served to alleviate people's concerns about the risks associated with COVID-19 vaccines. Nonetheless, social media communication did not seem to directly affect attitude towards COVID-19 vaccines ($\beta = 0.06$, $p > .45$), rejecting H3. H4 explored the relationships between interpersonal communication and attitude towards COVID-19 vaccines. The results demonstrated that positive association exists between interpersonal communication and attitude ($\beta = 0.54$, $p < .001$). H5 posited a significant relationship between risk perception and attitude. The results revealed a negative relationship between risk perception and attitude towards COVID-19 vaccines ($\beta = -0.45$, $p < .001$). This implies that social media communication does not directly influence the attitude, but indirectly impacts attitude through risk perception and interpersonal communication. H6 investigated whether attitude towards COVID-19 vaccines would be positively linked to intention to get the COVID-19 vaccine. The findings indeed confirmed a positive relationship between attitude and intention to get COVID-19 vaccines ($\beta = 0.73$, $p < .001$). The results are displayed in Figure 3.

Table 3: Model-fit indices – Structural model.

Measure	Estimate	Threshold	Interpretation
CMIN	418.406	--	--
DF	164	--	--
CMIN/DF	2.551	Between 1 and 3	Excellent
CFI	0.962	>0.95	Excellent
SRMR	0.046	<0.08	Excellent
RMSEA	0.037	<0.06	Excellent
PClose	0.995	>0.05	Excellent

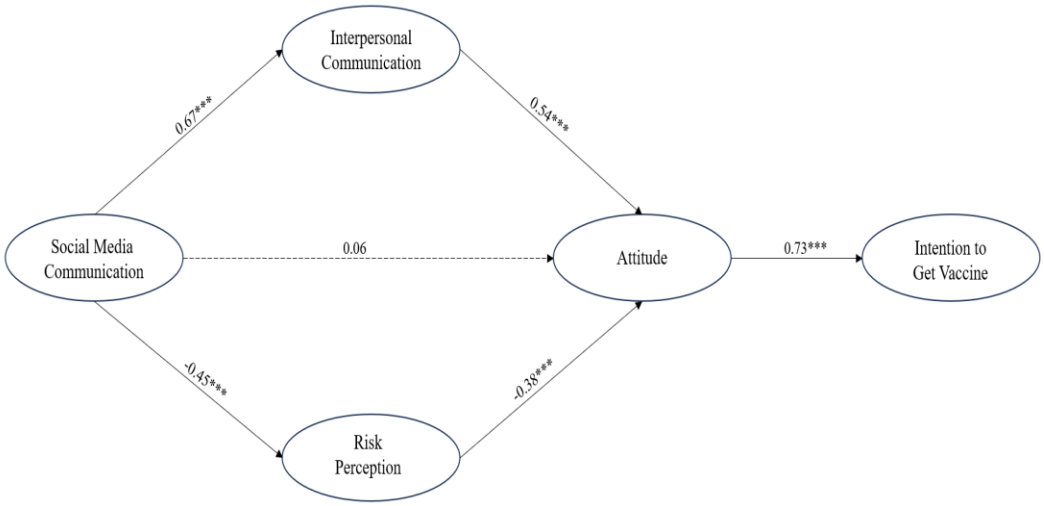


Figure 3: Structural model.

4. DISCUSSION AND CONCLUSION

This study examined the relationships of social media communication, interpersonal communication and risk perception on attitude and intention towards COVID-19 vaccines. Our study yielded several key findings. Firstly, we empirically confirmed that social media communication exerts a substantial impact on individuals' interpersonal communication and their perceptions of risk related to COVID-19 vaccines. Secondly, while social media communication doesn't directly shape attitudes, it does indirectly influence people's attitudes toward COVID-19 vaccines by way of its effects on risk perception and interpersonal communication. Thirdly, we established that a favorable attitude toward COVID-19 vaccines positively correlates with the intention to receive them.

Our study findings are in sync with previous research such as Ahmed et al. (2020) who highlighted that positive narratives about vaccine experiences, shared by those who have received the vaccine, can boost vaccine confidence. Chou et al. (2020) also advocated that well-crafted and targeted social media campaigns can indeed have a positive impact on vaccine acceptance. Research by Pennycook et al. (2020) found that social media

platforms can disseminate accurate information about vaccines, which can counteract the spread of misinformation and mitigate vaccine hesitancy. Platforms like Twitter and Facebook have been used to share factual information, highlight success stories, and amplify endorsements from trusted sources such as healthcare professionals and public health agencies (Nazione et al., 2021). Studies such as those conducted by Ahmed and Zviedrite (2016) emphasize the importance of peer-to-peer communication in shaping individuals' health beliefs and behaviors. On social media platforms, when individuals engage in conversations, share personal experiences, and seek advice from their peers, it creates an environment for interpersonal exchange of information and opinions regarding vaccines (Betsch et al., 2012). This interpersonal communication, then, act as real-life testimonials for people and coupled with the feedback of people who have already received the vaccine, potentially reduces vaccine hesitancy among other people (Nowak et al., 2015).

Prior research in communication has consistently demonstrated the persuasive impact social media platforms have on molding human attitudes regarding health issues. In this regard, the outcomes of our study align with existing literature in the field of health communication. For example, a study conducted in the USA by Bolsen et al. (2020) illustrates how individual attitudes and willingness to accept vaccination can be influenced by how the media frames vaccine-related messages. Similar to our research, several other studies concerning the COVID-19 pandemic have underscored the central role of attitudes in determining vaccine acceptance. Furthermore, our study has revealed that an individual's attitude is indirectly influenced by their consumption of social media content. The content found on social media platforms can mold users' attitudes, either through interpersonal interactions or by reducing their perception of vaccination risks. This underscores the vital role played by social media in shaping individuals' motivation to receive the COVID-19 vaccine. Additionally, our findings support the notion that promoting vaccination isn't solely reliant on presenting scientific facts; compelling storytelling and prosocial messages also possess the capacity to influence individuals' attitudes toward COVID-19 vaccines.

Our research findings have several insights for academicians, health professionals and policy makers. First and foremost, it lays the groundwork for comprehending how a variety of persuasive communication channels, notably those within the realm of social media, affect people's decisions regarding COVID-19 vaccination. Consequently, this serves as a foundation for broadening the current body of research on how communication influences vaccine acceptance. Additionally, healthcare experts and policymakers can use the knowledge acquired from our study as a model for crafting and improving communication strategies designed to address vaccine hesitancy in other vaccination contexts, offering invaluable guidance for public health campaigns.

4.1. Limitations and Directions for Future Work

We acknowledge that our study has certain limitations, which could benefit from further investigation in future research. Firstly, the cross-sectional nature of our data imposes constraints on our ability to establish a definitive causal relationship. Future inquiries, employing either experimental or longitudinal designs, would offer a more robust basis for elucidating the causal pathways posited in our study. Secondly, while our sample size suffices for conducting Structural Equation Modeling (SEM) analysis and validating our findings, it's worth noting that our data was collected from just four cities using non-probability sampling methods. To enhance the generalizability of our results, future research should aim for larger and more diverse samples drawn from various regions. Lastly, our variable 'social media communication' primarily gauges the informativeness of social media posts and campaigns. Future investigations could consider incorporating metrics such as the frequency of visits to social media platforms to gain deeper insights into the impact of social media communication on vaccine acceptance.

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