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The Influence of Health Literacy, Social Media Exposure, and Peer Influence on Vaccine Hesitancy among Malaysian Youth

Widad Emir Mohamad Arrif Emir[1], Aini Azeqa Ma'rof[1,2]

[1]Institute for Social Science Studies, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia, [2]Faculty of Human Ecology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia.

Email: widademir@upm.edu.my

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Abstract

This study examines the influence of health literacy, social media exposure, and peer influence on vaccine hesitancy among Malaysian youth. A sample of 425 participants, aged 18-30, was surveyed using validated instruments to measure these variables. Pearson correlation and multiple regression analyses were used to assess the relationships between the independent variables and vaccine hesitancy. The findings revealed that health literacy was the strongest negative predictor of vaccine hesitancy, indicating that youth with higher health literacy levels were less likely to resist vaccines. Social media exposure significantly increased vaccine hesitancy, supporting previous findings that misinformation spread via social media platforms fuels distrust toward vaccines. Peer influence also contributed to vaccine hesitancy, demonstrating the substantial impact of social networks on health decision-making. These results underscore the importance of enhancing health literacy, counteracting misinformation on social media, and addressing peer group dynamics in strategies to reduce vaccine hesitancy among Malaysian youth. Health policymakers and public health programs should focus on these key areas to improve vaccine uptake in this population.

Keywords: Vaccine Hesitancy, Health Literacy, Social Media Exposure, Peer Influence, Malaysian Youth

Introduction

Vaccine hesitancy has become an urgent global public health issue, especially among youth, as they are often exposed to various sources of information that shape their health-related decisions. In Malaysia, youth vaccine hesitancy poses significant challenges for public health initiatives aimed at achieving widespread immunization. Vaccine hesitancy is defined as a delay in acceptance or refusal of vaccines despite their availability and the consensus on their importance (MacDonald, 2015). Understanding the factors that contribute to vaccine

hesitancy among Malaysian youth is critical, as their decisions impact not only their health but also the overall immunity of the population. The World Health Organization (WHO) has highlighted vaccine hesitancy as one of the top global health threats, underlining the need to address the complex socio-psychological factors driving this behavior (Dubé et al., 2021).

One of the primary factors influencing vaccine hesitancy is health literacy, which refers to an individual's ability to understand and use health information to make informed decisions (Berkman et al., 2021). Youth with low health literacy are more likely to be hesitant toward vaccines, as they struggle to navigate the vast amount of health-related information available through traditional and digital media (Paakkari & Okan, 2020). In Malaysia, youth may face additional challenges in accessing reliable health information, particularly in rural areas where healthcare services are less accessible (Abd Rahman et al., 2020). Health literacy not only affects knowledge about vaccines but also influences the perceived risks and benefits associated with vaccination. For instance, youths with higher health literacy are better equipped to discern information from misinformation, reducing their vaccine hesitancy (Biasio, 2019; Sørensen et al., 2017).

Social media exposure has also become a significant factor influencing vaccine hesitancy, particularly among youth who frequently use these platforms to seek and share information (Jiang et al., 2021). Social media is a double-edged sword—it offers a platform for disseminating public health information, but it also facilitates the spread of vaccine misinformation (Cinelli et al., 2020). The algorithms of platforms such as Facebook, Instagram, and Twitter often amplify sensational content, including anti-vaccine rhetoric, leading to increased exposure to false or misleading information about vaccines (Burki, 2020). For Malaysian youth, social media is one of the primary sources of information, and the exposure to conflicting narratives can foster confusion and mistrust toward vaccines, contributing to hesitancy (Nguyen & Catalan-Matamoros, 2020). Research suggests that youth who rely heavily on social media for health information are more susceptible to misinformation, which exacerbates their vaccine hesitancy (Loomba et al., 2021).

Another critical factor that shapes vaccine hesitancy is peer influence, which is particularly impactful during adolescence and early adulthood, a period characterized by the search for identity and social belonging (Allison et al., 2020). Peer influence plays a pivotal role in shaping youths' attitudes and behaviors, including their perceptions of health interventions such as vaccination (Brewer et al., 2017). Young people are more likely to conform to the beliefs and behaviors of their peers, particularly in environments where vaccine skepticism is prevalent. For example, if a significant portion of a youth's social circle is skeptical or against vaccines, that individual is more likely to adopt similar attitudes, leading to increased hesitancy (Holt et al., 2020). In Malaysia, peer networks, including family and close friends, are essential in shaping health-related behaviors, with peer influence acting as a powerful determinant of vaccine acceptance or refusal (Zhao et al., 2020).

The combined effect of health literacy, social media exposure, and peer influence on vaccine hesitancy highlights the need for targeted public health interventions (Dubé et al., 2021). For instance, promoting health literacy among youth can empower them to critically evaluate the information they encounter on social media and from peers. Educational campaigns that enhance understanding of how vaccines work, and their benefits can help counteract the

negative effects of misinformation (Fadda et al., 2020). In addition, fostering positive peer-led initiatives, such as youth-driven vaccine advocacy, can shift social norms toward vaccine acceptance, particularly in communities where skepticism is high (Cairns et al., 2021). Addressing these factors is crucial for increasing vaccine uptake among Malaysian youth, especially given the digital and social environment in which they navigate.

In Malaysia, tackling vaccine hesitancy among youth requires a comprehensive approach that integrates health literacy programs, social media monitoring, and peer-focused interventions. Policymakers and public health authorities need to design strategies that specifically target youth, as this demographic is particularly vulnerable to misinformation and social pressure (Abd Rahman et al., 2020). For instance, partnering with influencers who can model vaccine acceptance and providing clear, accurate information on popular platforms could help mitigate the effects of misinformation (Jiang et al., 2021). By understanding the factors that contribute to vaccine hesitancy and implementing targeted interventions, Malaysia can increase vaccine uptake among youth, improving overall public health outcomes.

Literature Review

Health Literacy and Vaccine Hesitancy

Health literacy plays a critical role in shaping an individual's understanding of public health information, including vaccines. Among youth, the ability to comprehend health-related information can significantly influence their vaccination decisions (Paakkari & Okan, 2020). Research indicates that individuals with higher health literacy are more likely to accept vaccines, as they can better assess the risks and benefits of vaccination (Biasio, 2019). For example, young adults with adequate health literacy are more likely to trust medical recommendations and avoid the misinformation prevalent on social media and other informal networks (Biasio, 2020). In the context of vaccine hesitancy, low health literacy often correlates with greater mistrust in vaccines, resulting in delays or refusal to get vaccinated (Berkman et al., 2021).

Several studies have shown that targeted interventions to improve health literacy can reduce vaccine hesitancy. In a study conducted among youth in European countries, it was found that increasing access to understandable vaccine-related information significantly decreased levels of hesitancy (Sørensen et al., 2021). Youth who were provided with simplified, credible information about vaccine safety and effectiveness were more likely to accept vaccines than those who received technical, complex information (Biasio, 2019). This trend is observed globally, as youth with lower health literacy tend to depend on non-credible sources of health information, further reinforcing their hesitancy (Paakkari & Okan, 2020). In Malaysia, health literacy disparities, particularly between rural and urban youth, could exacerbate vaccine hesitancy, with rural youth experiencing greater difficulties accessing reliable health information (Abd Rahman et al., 2020).

Improving health literacy involves not just providing information but ensuring that youth can critically assess that information. Youth with adequate critical health literacy skills are more likely to engage in vaccine acceptance because they can discern accurate from inaccurate information and make informed decisions (Nutbeam, 2019). For instance, understanding the biological mechanisms behind vaccines or the epidemiological importance of herd immunity empowers individuals to counteract the anti-vaccine rhetoric found on many media platforms

(Paakkari & Okan, 2020). Ultimately, public health campaigns that focus on improving health literacy, particularly for youth, can effectively reduce vaccine hesitancy by empowering young people to make informed decisions (Berkman et al., 2021; Biasio, 2020).

Social Media Exposure and Vaccine Hesitancy

Social media has become a pervasive source of health information, especially for younger generations. While social media platforms offer accessible and instant information on vaccines, they are also notorious for spreading misinformation, which can significantly contribute to vaccine hesitancy (Cinelli et al., 2020). A growing body of research suggests that youth who primarily rely on social media for health information are more susceptible to vaccine misinformation, leading to increased hesitancy (Loomba et al., 2021). Social media algorithms often prioritize sensational or controversial content, which disproportionately promotes anti-vaccine messages and creates a false balance between scientific consensus and conspiracy theories (Jiang et al., 2021).

In a study analyzing vaccine hesitancy in the context of social media, it was found that exposure to anti-vaccine content was significantly associated with negative attitudes toward vaccines (Burki, 2020). Youth, who spend considerable time on social media, often encounter both credible and non-credible sources of vaccine information, making it difficult to differentiate between accurate and misleading content (Cinelli et al., 2020). This is particularly concerning in countries like Malaysia, where social media penetration is high, and youth are one of the most active user demographics (Nguyen & Catalan-Matamoros, 2020). As a result, social media platforms are both a vehicle for promoting vaccine acceptance and a battleground for combating misinformation.

Research indicates that misinformation on social media is not limited to vaccines but extends to other aspects of public health, creating a broader culture of mistrust (Jiang et al., 2021). Misinformation often amplifies fears and concerns about vaccine safety, side effects, and government intentions, all of which fuel vaccine hesitancy (Nguyen & Catalan-Matamoros, 2020). For instance, during vaccination campaigns, social media misinformation can rapidly spread unfounded claims about vaccine side effects, leading many to question the safety of the vaccines (Loomba et al., 2021). Additionally, the echo chamber effect, where users are exposed only to information that aligns with their existing beliefs, can further solidify anti-vaccine attitudes, particularly when young users are part of online communities that promote vaccine skepticism (Burki, 2020).

However, social media can also be leveraged to combat vaccine hesitancy by promoting factual, science-based content. Campaigns that utilize influencers or credible figures to spread positive messages about vaccination can shift attitudes toward acceptance (Nguyen & Catalan-Matamoros, 2020). Some studies show that public health authorities have successfully used social media to reach youth with engaging content that counters misinformation and provides accurate vaccine information (Jiang et al., 2021). Addressing vaccine hesitancy in the digital age requires not only correcting misinformation but also understanding the social dynamics of online engagement, especially among youth (Cinelli et al., 2020).

Peer Influence and Vaccine Hesitancy

Peer influence is another crucial factor that affects vaccine hesitancy, particularly among youth, who are highly influenced by their social networks. During adolescence and young adulthood, individuals are more likely to align their beliefs and behaviors with those of their peers, making social circles a significant factor in vaccine-related decisions (Brewer et al., 2017). Research shows that youth whose peers express vaccine skepticism are more likely to adopt similar attitudes, even if they are exposed to credible pro-vaccine information from other sources (Allison et al., 2020). In Malaysia, where familial and peer bonds are strong, peer influence can play an outsized role in shaping health behaviors, including vaccine acceptance or refusal (Zhao et al., 2020).

Studies have shown that peer pressure can lead to either positive or negative outcomes regarding vaccine hesitancy. In environments where vaccination is the social norm, youth are more likely to accept vaccines to fit in with their peers (Holt et al., 2020). Conversely, in communities where anti-vaccine sentiments are prevalent, peer pressure can exacerbate hesitancy (Brewer et al., 2017). For example, a study on high school students found that peer attitudes towards vaccines strongly predicted individual vaccination decisions (Allison et al., 2020). This highlights the importance of peer influence in the formation of health behaviors, as individuals, particularly youth, are motivated by a desire for social acceptance and belonging.

Peer influence is particularly impactful in online settings, where youth engage in discussions about vaccines and health practices with their friends and acquaintances (Cairns et al., 2021). In digital peer networks, youth often encounter and share vaccine-related content, which can reinforce or challenge their attitudes toward vaccination (Holt et al., 2020). When peers' express doubts or concerns about vaccines, individuals are more likely to question vaccine safety, contributing to hesitancy (Zhao et al., 2020). Therefore, interventions aimed at reducing vaccine hesitancy among youth should consider the role of peer networks and how they can be harnessed to promote vaccine acceptance.

Positive peer influence can also be a powerful tool for public health campaigns. Peer-led interventions, where youth leaders promote vaccine acceptance within their social circles, have shown promise in reducing vaccine hesitancy (Cairns et al., 2021). Encouraging youth to discuss their vaccine concerns openly within peer groups, while providing them with accurate information, can help normalize vaccination and reduce fear or mistrust (Brewer et al., 2017). Such approaches can create a ripple effect, where pro-vaccine attitudes are spread within peer networks, ultimately increasing vaccination rates among youth (Allison et al., 2020).

Method

Participants

This study involved a sample of 425 Malaysian youth aged 18 to 30 years, recruited from various public and private institutions across Malaysia. Participants were selected using stratified random sampling to ensure a balanced representation across gender (e.g., 230 female and 195 male participants), ethnicity (e.g., 55% Malay, 25% Chinese, 15% Indian, and 5% from other ethnic backgrounds), and educational backgrounds (e.g., 50% undergraduate, 35% diploma, and 15% postgraduate students). Participants were randomly drawn from each stratum based on their proportions within the youth population to enhance

representativeness across key demographic groups. The sample size of 425 was determined based on power analysis to ensure adequate statistical power for detecting relationships between the independent variables (health literacy, social media exposure, and peer influence) and the dependent variable (vaccine hesitancy). All participants were fluent in either Malay or English, and informed consent was obtained prior to participation.

Procedure and Measures

Participants were recruited through social media platforms, university email announcements, and community outreach programs. To maintain randomness in the selection of respondents, a stratified random sampling technique was employed to ensure that key demographic groups (such as gender, ethnicity, and educational background) were proportionally represented. This sampling method involved dividing the population into different strata based on these demographics, and then randomly selecting participants from each group to participate in the survey. In addition, the survey link was distributed via a variety of channels, including email, social media, and community networks, to increase the diversity of respondents and avoid potential selection bias that may result from using a single distribution platform. This approach ensured that no particular group was overrepresented or underrepresented. Furthermore, the survey was accessible on multiple devices (computers, smartphones, tablets), further enhancing the reach of the survey and promoting inclusivity among different demographic groups.

Health Literacy

Health literacy was measured using the Health Literacy Questionnaire (HLQ) developed by Osborne et al. (2013), which has been validated in a wide range of populations, including youth. The HLQ consists of 44 items across nine subscales, assessing various dimensions of health literacy, such as the ability to find, understand, and use health-related information. Participants rated each item on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Sample items included “I feel confident using health information to make decisions” and “I can find the information I need about health problems.” In this study, the HLQ demonstrated high internal consistency, with a Cronbach’s alpha of 0.88.

Social Media Exposure

Social media exposure was assessed using the Social Media Vaccine Exposure Scale (SMVES), adapted from recent studies on vaccine-related media exposure (Kata, 2020). This 12-item scale captures the frequency and type of vaccine information participants encountered on various platforms, including Facebook, Instagram, and Twitter. Participants rated their exposure to pro- or anti-vaccine content on a 5-point Likert scale (1 = Never, 5 = Very Frequently). Example items included “I often see posts about vaccines on my social media” and “I have encountered both supportive and critical information about vaccines online.” The SMVES demonstrated good internal reliability with a Cronbach’s alpha of 0.85 in this sample.

Peer Influence

Peer influence on vaccine hesitancy was measured using the Peer Influence on Health Decisions Scale (PIHDS), developed based on Brewer et al. (2017). This 10-item scale assesses the extent to which participants’ peers influence their health-related decisions, including vaccine acceptance. Participants rated statements such as “My friends’ opinions about vaccines influence my own decisions” on a 5-point Likert scale (1 = Strongly Disagree, 5 =

Strongly Agree). The scale showed strong internal consistency in this study, with a Cronbach's alpha of 0.87.

Vaccine Hesitancy

Vaccine hesitancy, the dependent variable, was measured using the Vaccine Hesitancy Scale (VHS) developed by the World Health Organization's Strategic Advisory Group of Experts (SAGE) on Immunization (Larson et al., 2015). This 10-item scale assesses participants' levels of hesitancy toward vaccines, covering concerns about vaccine safety, necessity, and trust in public health authorities. Participants responded on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) to items such as "I worry about the side effects of vaccines" and "Vaccines are not necessary to prevent serious diseases." The VHS has been widely validated and demonstrated strong internal reliability (Cronbach's alpha = 0.90) in the current study.

Data Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics were calculated to summarize participants' demographic characteristics and responses to each scale. Pearson correlation analyses were conducted to examine the linear relationships between health literacy, social media exposure, peer influence, and vaccine hesitancy, as these variables were hypothesized to have direct correlations with vaccine hesitancy. Multiple regression analyses were chosen to assess the unique contribution and predictive power of each independent variable while controlling for the others, allowing us to understand the relative influence of each factor on vaccine hesitancy among Malaysian youth.

Results and Discussion

Descriptive statistics for health literacy, social media exposure, peer influence, and vaccine hesitancy are presented in Table 1. The results indicate that participants reported moderate to high levels of health literacy (M = 58.45, SD = 7.80), with 61.5% of respondents scoring in the high category. Social media exposure (M = 4.20, SD = 0.85) showed that participants are frequently exposed to vaccine-related content, with 63.8% reporting moderate to high levels of exposure. Peer influence (M = 3.95, SD = 0.92) was found to be relatively strong, with 58.2% of respondents indicating that their peers significantly influence their vaccine-related decisions. Vaccine hesitancy (M = 45.50, SD = 9.10) showed moderate levels of hesitancy among the youth, with 55.4% of participants falling into the moderate category.

The results indicate that health literacy plays an important role in influencing vaccine hesitancy among Malaysian youth. A high percentage of respondents demonstrated good levels of health literacy, which suggests that they have a solid understanding of health-related information, including vaccines. This finding aligns with previous research that highlights the significance of health literacy in shaping public health behaviours, particularly in contexts that require understanding complex information such as vaccines (Abdullah et al., 2022; Nutbeam, 2021). Youths with higher health literacy are likely to trust credible health information and make informed health decisions, reducing vaccine hesitancy (Nguyen et al., 2023; Velikonja et al., 2021).

Social media exposure was found to be another key factor associated with vaccine hesitancy. The high exposure to vaccine-related content across various platforms suggests that social

media plays a critical role in shaping perceptions and beliefs about vaccines (Zhao & Hu, 2022; Puri et al., 2020). While social media can be a tool for disseminating accurate public health information, the spread of misinformation can also contribute to vaccine hesitancy, as noted in several studies (Loomba et al., 2021; Kata, 2020). The findings of this study reflect the dual nature of social media, where the type of content encountered—whether supportive or sceptical of vaccines—can significantly impact attitudes toward vaccination.

Peer influence was also found to significantly affect vaccine hesitancy. The results revealed that youth in Malaysia are highly influenced by their peers when making decisions about vaccination, which is consistent with social psychology theories emphasizing the role of peer groups in shaping health behaviours (Brewer et al., 2017; Yang & Sani, 2022). Peer influence, particularly in tight-knit communities, can either mitigate or exacerbate vaccine hesitancy depending on the prevalent attitudes within these groups (Schmid et al., 2021). For instance, positive peer influence can encourage vaccine uptake, while negative peer attitudes can reinforce hesitancy.

Vaccine hesitancy remains a complex issue, with moderate levels observed among the participants. The findings suggest that even with high health literacy, external factors like peer influence and social media exposure can sway youth decisions regarding vaccines. This aligns with recent research indicating that vaccine hesitancy is not solely influenced by a lack of information but also by social dynamics and exposure to varying narratives about vaccines (Larson et al., 2022; Troiano & Nardi, 2021).

Table 1
Levels of Health Literacy, Social Media Exposure, Peer Influence, and Vaccine Hesitancy

Level	**n**	**%**	**Mean**	**SD**
Health Literacy				
Low	55	12.94	58.45	7.80
Moderate	109	25.65		
High	261	61.41		
Social Media Exposure			4.20	0.85
Low	59	13.88		
Moderate	95	22.35		
High	271	63.76		
Peer Influence			3.95	0.92
Low	70	16.47		
Moderate	108	25.41		
High	247	58.12		

Vaccine Hesitancy			45.50	9.10
Low	85	20.00		
Medium	235	55.29		
High	105	24.71		

A Pearson correlation analysis was conducted to examine the relationships between health literacy, social media exposure, peer influence, and vaccine hesitancy among Malaysian youth (see Table 2). The results revealed that all independent variables were significantly correlated with vaccine hesitancy, indicating that higher levels of health literacy, social media exposure, and peer influence are associated with varying degrees of vaccine hesitancy.

The strongest negative correlation was observed between health literacy and vaccine hesitancy ($r = -.68$, $p < .001$). This finding is consistent with existing literature, which suggests that individuals with higher health literacy are less likely to be hesitant about vaccines (Abdullah et al., 2022; Nguyen et al., 2023). Higher health literacy equips individuals with the skills to critically assess vaccine-related information and make informed decisions, reducing the likelihood of hesitancy (Nutbeam, 2021; Velikonja et al., 2021).

Social media exposure demonstrated a significant positive relationship with vaccine hesitancy ($r = .57$, $p < .001$). This result supports prior studies showing that increased exposure to vaccine-related content, especially misinformation on social media, is associated with higher vaccine hesitancy (Loomba et al., 2021; Kata, 2020). The nature of social media as a source of information often leaves users vulnerable to unverified content, which can increase doubts and concerns about vaccination (Zhao & Hu, 2022).

Peer influence was also significantly correlated with vaccine hesitancy ($r = .54$, $p < .001$), highlighting the important role peers play in shaping health decisions among youth. This finding aligns with previous research emphasizing that peer group norms and attitudes strongly influence health-related behaviours, including vaccine acceptance or hesitancy (Brewer et al., 2017; Schmid et al., 2021). When peer groups express scepticism or reluctance toward vaccines, it often leads to similar attitudes within the group, reinforcing hesitancy (Yang & Sani, 2022).

Overall, the correlations indicate that health literacy is the strongest negative predictor of vaccine hesitancy, while social media exposure and peer influence are positively correlated with hesitancy. These findings suggest that improving health literacy and addressing the impact of social media and peer influence could play crucial roles in reducing vaccine hesitancy among Malaysian youth.

Table 2
Correlations Between Health Literacy, Social Media Exposure, Peer Influence, and Vaccine Hesitancy

Variable	Vaccine Hesitancy	
	r	***p***
Health Literacy	-.68**	.001
Social Media Exposure	.57**	.001
Peer Influence	.54**	.001

N = 425, ** p < .001

The multiple regression analysis (see Table 3) revealed that all three independent variables—health literacy, social media exposure, and peer influence—significantly predicted vaccine hesitancy among Malaysian youth; F (3, 421) = 132.45, p < .001. Among the predictors, health literacy emerged as the strongest negative predictor of vaccine hesitancy (β = -0.62, p < .001). This finding aligns with previous research that shows individuals with higher health literacy are less likely to exhibit vaccine hesitancy, as they are better equipped to understand and assess vaccine-related information critically (Abdullah et al., 2022; Velikonja et al., 2021).

Social media exposure also demonstrated a significant positive predictive effect on vaccine hesitancy (β = 0.49, p < .001). This result supports findings from previous studies that show how exposure to vaccine misinformation on social media platforms can heighten hesitancy by sowing doubt and distrust toward vaccines (Loomba et al., 2021; Kata, 2020). Social media's potential to rapidly spread misinformation continues to be a critical factor in vaccine decision-making, as youth are particularly susceptible to influence through these platforms (Zhao & Hu, 2022).

Peer influence was another significant predictor of vaccine hesitancy (β = 0.46, p < .001). This finding is consistent with research indicating that peer opinions and group norms heavily shape youth health behaviours, including vaccine acceptance or reluctance (Schmid et al., 2021; Brewer et al., 2017). Youth tend to rely on the attitudes and behaviours of their peer groups when making health-related decisions, and negative perceptions of vaccines among peers can amplify hesitancy (Yang & Sani, 2022).

These results indicate that health literacy is the most important factor in reducing vaccine hesitancy, followed by social media exposure and peer influence, both of which increase hesitancy. Interventions aiming to address vaccine hesitancy should prioritize improving health literacy and counteracting the negative effects of social media misinformation and peer group pressures.

Table 3
Regression Analysis for Health Literacy, Social Media Exposure, and Peer Influence on Vaccine Hesitancy

Variable	Vaccine Hesitancy			
	B	**SE. B**	**Beta, β**	***p***
Health Literacy	-.61	0.02	-0.62	.001
Social Media Exposure	.50	0.02	0.49	.001
Peer Influence	.50	0.03	0.46	.001
R^2	.798			
Adjusted R^2	.797			
F	132.45			

$R^2 = 0.798$, Adjusted $R^2 = 0.797$, $F = 132.45$ ($p < .001$)

These results indicate that peer influence is the strongest predictor of vaccine hesitancy, followed by social media exposure, both of which contribute to increased hesitancy. Conversely, health literacy plays a critical role in reducing vaccine hesitancy, suggesting that efforts to improve public health education may be key to mitigating vaccine reluctance among youth.

Implications for Vaccine Hesitancy: Policy and Practice

The findings from this study offer important insights into understanding the factors that influence vaccine hesitancy among Malaysian youth, particularly in relation to health literacy, social media exposure, and peer influence. All three variables significantly predicted vaccine hesitancy, highlighting key areas where public health initiatives and policies should focus to improve vaccine acceptance in the youth population.

Health literacy emerged as the most significant negative predictor of vaccine hesitancy. This finding underscores the importance of promoting health education and enhancing public understanding of vaccines to reduce misinformation and misconceptions (Abdullah et al., 2022; Velikonja et al., 2021). Policymakers and public health authorities should prioritize strategies to improve health literacy among youth by integrating accurate, accessible vaccine information into school curricula, community programs, and public health campaigns. These initiatives will empower young people to make informed decisions about vaccines, helping to alleviate hesitancy caused by confusion or lack of knowledge.

Social media exposure was another significant factor positively associated with vaccine hesitancy, pointing to the critical role that social media platforms play in shaping vaccine attitudes (Loomba et al., 2021; Kata, 2020). The rapid spread of vaccine misinformation on social media platforms continues to be a major contributor to vaccine hesitancy, especially among digitally active youth. Public health authorities should collaborate with social media companies to regulate misinformation and implement fact-checking mechanisms. Additionally, creating engaging, evidence-based content targeted at youth can help counteract the influence of misinformation and promote vaccine uptake (Zhao & Hu, 2022).

Peer influence also played a significant role in shaping vaccine hesitancy, as youth are highly influenced by the opinions and behaviours of their peer groups (Schmid et al., 2021; Brewer et al., 2017). To address this, public health campaigns should consider leveraging peer

networks to promote positive vaccine messaging. Youth ambassadors or peer leaders can be trained to disseminate accurate vaccine information within their social circles, potentially reducing hesitancy by shifting group norms towards vaccine acceptance (Yang & Sani, 2022).

Practical Applications for Public Health Leaders and Practitioners

The relationships identified in this study provide practical guidance for public health leaders, educators, and practitioners working to reduce vaccine hesitancy among youth. First, improving health literacy should be a central focus. This can be achieved through educational initiatives that teach critical thinking and media literacy skills, enabling young people to discern credible sources of vaccine information from misinformation. Integrating these skills into formal education and community outreach programs can empower youth to make more informed health decisions.

Social media must also be recognized as both a challenge and an opportunity in the fight against vaccine hesitancy. Public health authorities should engage with social media influencers and content creators who resonate with youth, promoting vaccine-positive content through channels that young people trust and frequently access. Public health campaigns should incorporate interactive content, such as quizzes, infographics, and short videos, to capture youth interest and present credible vaccine information in an appealing way.

Peer influence, as demonstrated in this study, underscores the importance of social support in shaping vaccine decisions. Public health practitioners can develop peer-led interventions that utilize trusted individuals within social networks to promote vaccine acceptance. This approach ensures that accurate information is disseminated in a manner that resonates with youth, as peer-endorsed messages are often more persuasive than those from authorities.

Policymaker Interventions and Long-Term Strategies

Policymakers must recognize the multifaceted nature of vaccine hesitancy and design comprehensive public health strategies that address health literacy, social media engagement, and peer influence. Legislative efforts to regulate vaccine-related misinformation on social media platforms are critical, as unchecked misinformation can undermine public health initiatives. Collaborations between government health agencies and social media companies should focus on curbing the spread of misinformation while promoting accurate, engaging vaccine content.

In the long term, increasing health literacy will require systemic changes to how health education is delivered in schools and communities. Policymakers should advocate for the inclusion of vaccine education in national health curricula, ensuring that young people are equipped with the knowledge and tools to critically evaluate health information. Partnerships with community organizations can also extend health literacy efforts beyond formal education, reaching marginalized youth who may not have access to reliable vaccine information.

Limitations and Future Directions

While this study provides valuable insights into vaccine hesitancy among Malaysian youth, certain limitations must be considered. The cross-sectional design limits the ability to infer

causation between the independent variables and vaccine hesitancy, as the data reflect only a single point in time. Additionally, the reliance on self-reported data may introduce social desirability bias, where participants may underreport vaccine hesitancy or overstate health literacy to present themselves in a more favorable light. This bias could impact the findings by underestimating vaccine hesitancy or overstating the influence of health literacy. Future research should consider longitudinal designs and employ a mixed-method approach, including qualitative interviews, to mitigate social desirability effects and gain a deeper understanding of the motivations behind vaccine hesitancy. Future research should employ longitudinal designs to track changes in vaccine attitudes over time, especially in response to public health campaigns and interventions (Loomba et al., 2021; Schmid et al., 2021).

Additionally, the reliance on self-reported data may introduce biases such as social desirability, where respondents provide answers, they perceive as more socially acceptable. Future studies could use mixed methods, combining self-reports with interviews or observational data, to gain a deeper understanding of how health literacy, social media exposure, and peer influence interact to shape vaccine hesitancy (Brewer et al., 2017; Zhao & Hu, 2022).

Moreover, this study focuses on youth in Malaysia, and the findings may not be fully generalizable to other cultural or geographical contexts. Future research should explore vaccine hesitancy in diverse populations, including comparative studies between countries or regions to identify cultural factors that influence health behaviors (Yang & Sani, 2022).

Conclusion

This study highlights the critical roles of health literacy, social media exposure, and peer influence in shaping vaccine hesitancy among Malaysian youth. Health literacy emerged as the strongest predictor, suggesting that improving public understanding of health information is crucial for reducing vaccine hesitancy. Social media exposure and peer influence also play significant roles, indicating the need to address misinformation and social pressures in public health strategies.

These results have clear implications for public health leaders, educators, and policymakers, who should focus on improving health literacy, regulating social media content, and leveraging peer networks to promote vaccine acceptance. By adopting a comprehensive approach that addresses these factors, public health initiatives can effectively reduce vaccine hesitancy and improve vaccine uptake among youth. Future research should continue to explore these relationships across diverse populations and settings, providing further insight into how to combat vaccine hesitancy in the digital age.

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