Media Literacy and Its Potential Influence on Mpox-related Perceptions and Prevention Intentions in China During the 2022 Multi-country Outbreak of Mpox

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Abstract

Media literacy plays an increasingly important role in health communication during public health emergencies. The present study aimed to investigate the level of media literacy and its association with disease perceptions and behavioral intentions of receiving vaccination services among young men who have sex with men (YMSM) in China during the 2022 multi-country mpox outbreak. The data were from a large-scale cross-sectional survey conducted among 2,493 YMSM aged 18-29 years in six provincial regions in China in September 2022. A total of 2,079 YMSM who had obtained mpox information from social media platforms were included in this study. Correlation analysis and path analysis were conducted. The mean age of the sample was 24.7. After controlling for background variables, significant positive correlations were found in several pairs between media literacy, mpox-related perceptions (including perceived susceptibility to mpox, perceived severity of mpox, perceived benefits of mpox vaccination, and self-efficacy of receiving mpox vaccination), and the behavioral intention of receiving mpox vaccination. The mpox-related perceptions played a significant mediation role in the association between media literacy and intention of receiving mpox vaccination (indirect effect=0.165, $p<0.001$, effect size=82.1%). Media literacy is crucial for developing disease perceptions during public health emergencies and may further influence the adoption of preventive measures. As social media platforms have become the main battle field of health communication during disease outbreaks, improvement of media literacy is urgently warranted.

Keywords: mpox; media literacy; disease perceptions; vaccination; social media

1 Introduction

Mpox, a zoonotic disease, emerged as a global epidemic in 2022 (Wang et al., 2022). From 1 January 2022 through 20 November 2023, a cumulative number of 91,788 laboratory-confirmed cases of mpox, including 167 deaths, have been reported to World Health Organizations (WHO) from 116 countries/territories/areas (World Health Organization, 2023). Men who have sex with men (MSM) were considered to be at the highest risk of mpox, with 84.1% having self-identified as gay, bisexual, and other MSM (Chow et al., 2023). The multi-county outbreak was declared a public health emergency of international concern (PHEIC) by WHO in July 2022 (Mitjà et al., 2023). In mainland China, the first mpox infection was reported in September 2022 (Huang et al., 2022). By December 31, 2023, a cumulative total of 1,712 confirmed cases of mpox had been reported in 29 provincial-level administrative divisions of the mainland, with approximately 90% being MSM (Ren et al., 2024). The virus was still spreading in the country at the time of the study.

Nowadays, we are living in a highly media-saturated environment where information can be easily accessed through social media and other new technology. Social media has become the most popular platform for expressing opinions, perceptions, and attitudes (Edinger et al., 2023). It also has become a pivotal communication tool for governments and health organizations to disseminate crucial health information to the public (Edinger et al., 2023). During the 2022 mpox outbreak, social media became the main source for people obtaining related information and played an important role in informal and purposive health promotion in China (Garcia-Iglesias et al., 2023; May et al., 2023). However, social media always acts as a double-edged sword (Shi et al., 2023). As some of this information is unfiltered and unchecked, some of the claims can be part of

misinformation/disinformation, fake news, etc. For example, in China, information from social media platforms of health-related institutions and those of MSM organizations may be reliable, whereas that from dating apps and general public social media platforms could be less reliable, potentially disseminating misinformation. Misinformation may bring infodemic, resulting in severe problems such as erosion of trust in reliable sources, heightened public anxiety, and the potential for harmful behaviors based on inaccurate information (Rovetta & Castaldo, 2022). Furthermore, as technology becomes even more sophisticated so does people's potential to deceive social media users who are relying on these platforms to get information. As such, they may counter the effects of educational efforts from public policymakers, educators, and other practitioners. These consequences will pose huge threats to prevention and control during public health emergencies, highlighting the importance of media literacy (Su, Lee, & Xiao, 2022).

Media literacy is defined as an individual's ability to effectively access and utilize media information, which emphasizes critical assessment, understanding, and synthesis of the encountered information (McLean et al., 2016; Xin et al., 2023). Amid widespread misinformation on social media during disease outbreaks, media literacy enables individuals to identify reliable sources, seek and question information, and make informed decisions (Borah et al., 2022; Su, Lee, & Xiao, 2022). Therefore, media literacy in the era of social media use is crucial in health communication during public health emergencies. However, to the best of our knowledge, studies that investigated the level of media literacy and its association with mpox-related perceptions and behavioral intentions of receiving mpox vaccinations were sparse. To develop effective interventions to motivate MSM to

take preventive behaviors against mpox, it is warranted to explore the mechanism underlying the association between media literacy and the intentions of receiving mpox vaccination.

The present study aimed to investigate the level of media literacy and its association with disease perceptions and behavioral intentions of receiving vaccination services among young men who have sex with men (YMSM) aged 18-29 years in China during the 2022 multi-country mpox outbreak. We selected YMSM because they lacked the protection of smallpox vaccination and were more active in sexual activities (Wei, 2022).

1.1 *Influence of media literacy on mpox-related perceptions*

Media literacy may affect people's mpox-related perceptions. In this study, media literacy was measured by Austin's critical thinking scale. According to Austin (2016), media literacy includes two essential components: critical thinking about both information sources and messages. Austin and colleagues (2002) argued in the Message Interpretation Process (MIP) model that individuals' skepticism toward portrayals may influence their expectancies for the portrayed behaviors (Austin et al., 2015). During the 2022 mpox outbreak, social media platforms were the main battlefield for health communication (Edinger et al., 2023). Although official departments have declared the severity of this mpox outbreak and announced related health guidelines, misinformation downplaying the severity of mpox outbreaks was prevalent (Edinger et al., 2023; National Health Commission of the People's Republic of China, 2022). Such misinformation could bias people's decision-making processes (Austin et al., 2002). Individuals with greater media literacy tend to combat misinformation portrayed on social media and trust official announcements, and thus have

more optimal disease perceptions. Similar associations were found during the COVID-19 pandemic. Previous empirical studies found that media literacy was effective in combating misinformation and reducing COVID-19-related misperceptions (Borah et al., 2022; Su, Lee, & Xiao, 2022).

Mpox-related perceptions, measured by the Health Belief Model (HBM), include perceived susceptibility and severity of mpox, as well as the benefits, self-efficacy, and barriers associated with mpox vaccination. To be specific, media literacy may be positively associated with perceived susceptibility, severity, benefits, and self-efficacy as individuals with greater media literacy tend to trust official announcements that emphasize the severity and susceptibility of mpox as well as the benefits of mpox vaccination during mpox outbreak (National Health Commission of the People's Republic of China, 2022). Similar associations were observed in prior empirical studies. A study conducted in Canada revealed that media literacy was positively associated with perceived susceptibility and severity of COVID-19 and the benefits of social distancing (Hita et al., 2023). Another study found that media literacy was positively associated with self-efficacy for influenza prevention behaviors (Austin et al., 2012). In contrast, media literacy may be negatively associated with perceived barriers. Individuals with greater media literacy are more likely to identify and dismiss misinformation about vaccination (e.g., exaggerated side effects), leading to fewer perceived obstacles to vaccination, which is supported by a previous study on COVID-19 vaccination (Ranjbaran et al., 2023; Skafle et al., 2022; Su, Lee, & Xiao, 2022). Therefore, we propose the following hypotheses.

H1(a)-(e): Media literacy is positively associated with (a) perceived susceptibility to mpox, (b) perceived severity of mpox, (c) perceived benefits of mpox vaccination, (d) self-efficacy of mpox vaccination, and negatively associated with (e) perceived barriers to mpox vaccination.

1.2 *Influence of mpox-related perceptions on mpox vaccination intentions*

It is highly plausible that mpox-related perceptions may influence mpox vaccination intentions. According to the HBM, individuals' decision to adopt a health behavior (e.g., vaccination) is the result of their perceived severity of a health threat, perceived susceptibility to the health threat, perceived benefits of health behavior, perceived barriers related to the behavior, and self-efficacy (Rosenstock, 1974). For instance, a meta-analysis identified perceived barriers and perceived benefits as the most common HBM constructs significantly associated with vaccine hesitancy (Nadarzynski et al., 2021).

Specifically, perceived susceptibility to mpox may be positively associated with mpox vaccination intentions, as individuals may vaccinate to prevent infection if they perceive a high likelihood of contracting mpox (Gilbert et al., 2023). Similarly, participants' intentions to accept mpox vaccination may be associated with more perceived severity of mpox, which is supported by a prior empirical study conducted in the UK (Smith et al., 2023). This may be because individuals regard vaccination as a safeguard against the severe outcomes associated with mpox. Additionally, perceived benefits of mpox vaccination may be positively associated with mpox vaccination intentions, as understanding the benefits (e.g., safety and efficacy) of vaccination may boost people's confidence in the vaccine and motivate them to receive the vaccination (Fu et al., 2023).

Furthermore, prior evidence also suggested that self-efficacy of mpox vaccination might also be positively associated with mpox vaccination intentions because confidence in one's ability empowers individuals to overcome obstacles and increases their likelihood of vaccination (Evers et al., 2023). Conversely, perceived barriers to mpox vaccination may be negatively associated with mpox vaccination intentions, as individuals may be deterred from vaccination due to perceived obstacles, which is supported by a previous empirical study on mpox vaccination (Owens & Hubach, 2024). Therefore, we propose the following hypotheses.

H2(a)-(e): (a) perceived susceptibility to mpox, (b) perceived severity of mpox, (c) perceived benefits of mpox vaccination, (d) self-efficacy of mpox vaccination are positively associated with intention of receiving mpox vaccination, and (e) perceived barriers to mpox vaccination are negatively associated with intention of receiving mpox vaccination.

1.3 *Influence of media literacy on mpox vaccination intentions via mpox-related perceptions*

Media literacy may influence mpox vaccination intentions. Based on the MIP model, individuals' behavior decisions may be influenced by skepticism toward portrayals (Austin et al., 2002, 2000, 2007; Pinkleton et al., 2012). Individuals with greater media literacy are more skeptical of misinformation on social media during the mpox outbreak (e.g., conspiracy theories about mpox vaccines), thereby more likely to take preventive measures. Similar results were found on COVID-19 vaccination. A U.S. study demonstrated that greater media literacy predicted a greater intention to receive the COVID-19 vaccine (Austin et al., 2023). Similarly, another study showed that media literacy positively affects individuals' COVID-19 vaccination intentions (Melki et al., 2023).

Moreover, the association between media literacy and mpox vaccination intentions may be mediated by mpox-realted perception. According to the MIP model, individuals' skepticism toward portrayals may affect expectancy for portrayed behaviors, which subsequently influences their behavior decisions (Austin et al., 2002, 2015). A higher level of media literacy may increase skepticism towards misinformation, leading to more comprehensive disease perceptions and, subsequently, promoting preventive behaviors. Austin and colleagues (2021) revealed that media literacy influenced COVID-19-related knowledge and expectancies for preventative behaviors (e.g., perceived benefits of vaccination), subsequently influencing COVID-19 preventive behaviors (e.g., wearing a mask). Similarly, prior empirical literature showed that health literacy, influenced by media literacy, affected perceived benefits, self-efficacy, and barriers of engaging in preventive behaviors, thus influencing COVID-19 preventive behaviors (Jiang et al., 2022; Niu et al., 2022; Parandeh Afshar et al., 2022). Therefore, we propose the following hypotheses.

H3: Media literacy is positively associated with mpox vaccination intentions.

H4: Mpox-related perceptions mediate the association between media literacy and mpox vaccination intentions.

In summary, the conceptual framework of this study is built by integrating the HBM and MIP models and the previous empirical evidence on the associations between media literacy, disease perceptions, and preventive behaviors. We proposed a novel path from media literacy to mpox vaccination intentions via mpox-related perceptions (shown in Figure 1). First, HBM (Rosenstock, 1974) provides a framework for understanding individuals' perceptions related to mpox (i.e.,

severity, susceptibility, benefits, barriers, and self-efficacy) and how these perceptions influence their mpox vaccination intentions (i.e., H2). Previous empirical literature has also demonstrated the associations between mpox-related perceptions and mpox vaccination intention (Luo et al., 2024; Riad et al., 2022, 2023). Second, the MIP model is used to explain how media literacy affects individuals' mpox-related perceptions (i.e., H1) and mpox vaccination intentions (i.e., H3), as well as the mediation role of mpox-related perceptions in the association between media literacy and vaccination intentions (i.e., H4). Prior empirical studies have utilized the MIP model to demonstrate the influence of media literacy on individuals' COVID-19 misperceptions and other health-related behaviors (e.g., alcohol use) (Austin et al., 2006, 2000, 2007; Borah et al., 2023).

2 Materials and methods

2.1 *Study design*

The data were from a large-scale cross-sectional survey conducted among 2,493 YMSM in six provincial regions in China from September 10 to 30, 2022. These regions were selected based on their geographical and economic representativeness, including Beijing (Capital of China, GDP per capita in 2020: 164,889 Chinese Yuan [CNY]), Zhejiang (East of China, 100,620 CNY), Guangdong (South of China, 88,521 CNY), Sichuan (West of China, 58,126 CNY), Shandong (North of China, 72,151 CNY), and Anhui (Central of China, 63,426 CNY) (Hu et al., 2020; National Bureau of Statistics of China, 2022). The study was approved by the Institution Review Board of Tsinghua University, China (Reference number: 20220140).

2.2 *Participant recruitment*

The inclusion criteria of the original survey were (a) being male, (b) 18-29 years old, (c) having anal or oral sex with men, and (d) being able to access and fill the electronic questionnaire. Participants who had psychiatric disorders based on recruiters' reports were excluded. The facility-based sampling method was used to enroll participants in the study, with support from local community-based organizations (CBOs) and the Centers for Disease Control and Prevention (CDCs). After receiving formal training, CBO staff members sent invitation messages to potentially eligible YMSM. Those MSM who expressed interest in the study were screened for eligibility and provided with detailed study information.

2.3 *Data collection*

Before data collection, each participant was required to provide informed consent. Individuals were then sent a QR code and a one-time password to access the self-administered online questionnaire using the Wenjuanxing survey platform (www.wjx.com). It took approximately 10-15 minutes to complete. Participants whose completed questionnaires passed a quality check were compensated with 15 CNY (approximately 2.2 USD) for their time and effort via the platform. The recruitment rate for the study was 67.2% (2,918 out of 4,342). Privacy concerns and lack of time were the main reasons for refusals to participate.

A total of 2,918 participants completed the questionnaire and 425 participants were subsequently excluded due to quality issues. Among the 2,493 surveyed YMSM, 2,306 (92.5%, 2,306/2,493) had

heard of mpox and 2,079 of them (90.2%, 2,079/2,306) had obtained mpox-related information from social media platforms. The 2,079 YMSM were then included in this study.

2.4 *Measures*

Behavioral intentions of receiving mpox vaccination (dependent variable)

The participants were required to rate their likelihood of receiving mpox vaccination under four scenarios, considering whether local cases were reported and whether the vaccine was available free of charge (response categories: "1 = very unlikely" to "5 = very likely"). A summative score was created, with a higher score indicating a higher level of intention to receive mpox vaccination (range: 4-20, Cronbach's alpha =0.90).

Social media use

Media literacy (independent variable)

Media literacy was measured by four items, which included two subscales: critical thinking about the source of the media message (e.g., "I think about the purpose behind messages I see"), and critical thinking about the content of the message (e.g., "I look for more information before I believe something I see in messages") (Austin et al., 2015). The Chinese version of this instrument has previously been utilized to examine the moderating role of media literacy on COVID-19 vaccination intentions (Xin et al., 2023). Participants were asked to rate on a 5-point Likert scale ("1 = strongly disagree" to "5 = strongly agree"). A summative score was computed, with a higher score implying a higher level of media literacy (range: 4-20, Cronbach's alpha=0.89).

Types of social media platforms

Participants were also asked to report the types of social media platforms used to obtain mpox-related information (e.g., social media platforms of health-related institutions), with the option to choose multiple platforms simultaneously.

Mpox-related perceptions (mediators)

The HBM included five key constructs that serve as significant predictors of the adoption of preventive behaviors (Janz & Becker, 1984). Perceived susceptibility to mpox was measured by three items (e.g., the likelihood of being infected with the mpox virus). The response categories were from "1 = very unlikely" to "5 = very likely". A total score was created by summing up the item scores, with a higher score implying a higher level of perceived susceptibility (range: 3-15, Cronbach's alpha=0.83). Perceived severity of mpox was measured by two items including the perceived negative impact of mpox infection on participants' health and life (response categories: "1 = very mild" to "5 = very strong"). A summative scale score was similarly formed, with a higher score indicating a higher level of perceived severity (range: 2-10, Cronbach's alpha=0.90).

Perceived benefits of mpox vaccination were measured by four items (e.g., "It can protect me from mpox infection"), with response categories ranging from "1 = strongly disagree" to "5 = strongly agree". A total score was constructed by summing up the item scores, with a higher score implying more perceived benefits (range: 4-20, Cronbach's alpha=0.90). Perceived barriers to mpox vaccination were measured by four items relating to cost, convenience, privacy disclosure, and side effects. The response categories were from "1 = strongly disagree" to "5 = strongly agree". A

composite score was created by summing the item scores, with a higher score indicating more perceived barriers (range: 4-20, Cronbach's alpha=0.81). Self-efficacy of mpox vaccination was measured by two items (e.g., "I am confident in taking mpox vaccination"). For each item, respondents rated on a 5-point Likert scale (from "1 = strongly disagree" to "5 = strongly agree"). A summative score was formed, with a higher score indicating stronger self-efficacy (range: 2-10, Cronbach's alpha=0.82).

Background information

Background information, including age, sex, marital status, education level, occupational status, and monthly income were collected.

2.5 ***Statistical analysis***

First, the distributions of all the studied variables were described by means and standard deviations (SD) for continuous variables or frequencies and proportions for categorical variables. Second, univariate regressions were performed to examine the crude association between media literacy and background variables. The point estimate (b_c) and 95% confidence interval (CI) were reported. Third, partial correlations were conducted to assess the adjusted associations between the main studied variables after controlling for all background variables. Fourth, path analysis with maximum likelihood estimation was conducted to test the hypothesized mediation model after controlling for all background variables. The 95% bias-corrected confidence intervals (CI) of the indirect effects were estimated based on 5,000 bootstrapped samples. Standardized coefficients and the bootstrapped

95% confidence interval (CI) were reported. The analyses were conducted by the SPSS 26.0 (New York, USA) and MPlus 8.3 software (Muthén & Muthén, CA, USA).

3 Results

3.1 *Background information, mpox-related perceptions, and vaccination intention*

Out of the participants, the mean age of the sample was 24.7 (SD=2.9). The majority of participants were Han Chinese (n=1,998, 96.1%), employed (n=1,472, 70.8%), unmarried/divorced/separated/widowed (n=1,982, 95.3%), having a college degree or higher (n=1,770, 85.1%), and reporting a monthly income below 6,000 CNY (n=1,258, 60.5%).

The mean score of perceived susceptibility to mpox, perceived severity of mpox, perceived benefits of mpox vaccination, perceived barriers to mpox vaccination, and self-efficacy of mpox vaccination were 6.1 (SD=2.3), 8.5 (SD=1.7), 16.7 (SD=2.8), 13.8 (SD=3.4), and 7.6 (SD=1.5), respectively. The mean score of intentions of receiving mpox vaccination was 17.0 (SD=3.5) (Table 1).

3.2 *Social media use*

Overall, 58.1% of participants obtained mpox-related information from health-related institutions' social media, 28.3% from MSM organizations' social media, 20.9% from MSM dating apps, and 74.9% from general public social media. The mean score of media literacy was 15.0 (SD=3.4). Regarding critical thinking about the source of the media message in the study, 73.6% (n=1,531), and 58.3% (n=1,213) of participants reported they would question the truthfulness of the messages

and consider the purpose behind, respectively. Concerning respondents' critical thinking about media content, 72.5% (n=1,506), and 56.3% (n=1,169) of respondents stressed thoughtful consideration and sought additional information, respectively (Table 1, Figure 2).

3.3 *Univariate analysis and correlations*

Univariate analysis further showed that media literacy was associated with marital status (b_c= -0.717 [-1.406, -0.029]), and education level (b_c= -0.547 [-0.955, -0.139]) (Table 2).

As shown in Table 3, after controlling for background variables, media literacy was positively associated with higher levels of perceived susceptibility to mpox (r=0.054, p=0.014), perceived severity of mpox (r=0.135, p<0.001), perceived benefits of mpox vaccination (r=0.246, p<0.001), self-efficacy of mpox vaccination (r=0.193, p<0.001), and the intentions of receiving mpox vaccination (r=0.200, p<0.001). The correlation between media literacy and perceived barriers to mpox vaccination was not significant.

3.4 *Mediations between media literacy and intention to receive mpox vaccination*

Given that background variables were potential factors influencing the intentions of receiving mpox vaccination, all background variables were controlled in the path analysis. In the path analysis, statistical significance was detected in the total effect (standardized coefficient=0.201 [0.154, 0.247], p<0.001), and overall indirect effect (standardized coefficient=0.165 [0.133, 0.199], p<0.001) between media literacy and intentions of receiving mpox vaccination. The overall indirect effect

accounted for 82.1% of the total effect. It is noteworthy that the direct effect was not significant (Table 4).

A total of four significant indirect paths were identified. Mpox-related perceptions (including perceived susceptibility and severity of mpox, as well as perceived benefits and self-efficacy of mpox vaccination) played a significant mediation role in the association between media literacy and intention of receiving mpox vaccination. Participants reported a higher level of media literacy, which was in turn associated with more perceived susceptibility and ultimately led to a higher level of intentions of receiving mpox vaccination (standardized coefficient=0.006 [0.001, 0.012], p=0.023, the proportion of the mediation effect=3.0%). Respondents reported a higher level of media literacy, which was subsequently associated with more perceived severity and ultimately contributed to a higher level of intentions of receiving mpox vaccination (standardized coefficient=0.013 [0.006, 0.023], p=0.002, mediation effect=6.5%). Participants reported a higher level of media literacy, which was in turn associated with more perceived benefits and ultimately led to a higher level of intentions of receiving mpox vaccination (standardized coefficient=0.092 [0.069, 0.118], p<0.001, mediation effect=45.8%). Participants reported a higher level of media literacy, which was subsequently associated with more self-efficacy and ultimately resulted in a higher level of intentions of receiving mpox vaccination (standardized coefficient=0.054 [0.038, 0.073], p<0.001, mediation effect=26.9%) (Figure 3, Table 4).

4 Discussion

As social media platforms have become the main source of receiving and searching health information, media literacy plays an increasingly important role in health communication during public health emergencies (Austin et al., 2023; Borah et al., 2023). This study investigated the level of media literacy among YMSM aged 18-29 years in China during the 2022 multi-country mpox outbreak and examined its association with mpox perceptions and behavioral intentions of receiving mpox vaccination. By integrating the HBM and MIP models, this study constructs a conceptual framework to enhance our understanding of how media literacy influences protective behaviors in the context of disease outbreaks and the mass use of social media platforms, adding novelty to the mechanism leading to health-related behaviors and making theoretical contributions to health communication studies. The findings contribute to the existing literature on media literacy in the era of social media use and provide insightful implications for responding to misinformation and preparing for future public emergencies.

The level of media literacy in this study was moderate (mean score=15.0 out of 20) and was similar to that of a previous study conducted among Chinese university students during the COVID-19 pandemic which used the same scale (mean score=14.6) (Xin et al., 2023). The similar age group and measurement tool may be the main reason for the similarity. The study finding implies that there is still a large room for improvement in YMSM's media literacy, as a significant proportion of them might not question the truthfulness of the messages they saw, consider the purpose behind the message, think about the message for twice, nor seek additional information. Previous literature demonstrated that people might encounter a substantial amount of information on social media, making it challenging to consider its authenticity and purpose thoroughly while concerns about waste

of time and efficiency in information retrieval might be another reason for the suboptimal media literacy (Jones-Jang et al., 2021; Khaleel et al., 2020). Additionally, this study found that people obtain information from various types of social media platforms. Some of these platforms, such as dating apps and general public social media platforms, are potentially unreliable and may contain misinformation. During public health emergencies, both correct information and misinformation can spread rapidly on social media platforms. Therefore, it is vital to enhance people's media literacy and equip the public with useful skillsets in effectively processing information and identifying misinformation in the era of social media use.

Media literacy is crucial for developing disease perceptions, supported by the study findings. After adjusting for background variables, media literacy was positively associated with higher levels of perceived susceptibility to mpox, perceived severity of mpox, perceived benefits of mpox vaccination, and self-efficacy of mpox vaccination. It implies that among the most-affected community during the 2022 multi-country outbreak of mpox, those who possess better media literacy may have a deeper understanding of the disease, perceive more risk, and hold more positive attitudes toward preventive measures. The finding was consistent with previous studies which found a higher level of media literacy was associated with fewer misperceptions about the disease (e.g., COVID-19) (Borah et al., 2023; Su, Borah, & Xiao, 2022). It is understandable because individuals with a higher level of media literacy may demonstrate more critical thinking skills, which allows them to identify misperceptions and achieve a more comprehensive understanding of the subject (Xiao et al., 2021).

Moreover, the positive influence of media literacy on disease perceptions may in turn promote the behavioral intention of receiving mpox vaccination, as shown by the mediation analysis in the

study. The present study, for the first time, provided empirical evidence that mpox-related perceptions played a significant mediation role in the association between media literacy and intention to receive mpox vaccination. According to the HBM, disease perceptions are essential determinants of health behaviors (Riad et al., 2023). It is plausible that individuals with a higher level of media literacy can better discern and evaluate information related to diseases on social media platforms and generate more comprehensive understandings of the newly emerging disease and related preventive measures, which further motivate them to adopt preventive behaviors such as receiving vaccination (Edinger et al., 2023).

The total indirect effect of mpox-related perceptions accounted for over 80% of the total effect of media literacy on the intention of receiving mpox vaccination. It indicates that disease perceptions are the most key mediation mechanism underlying the association between media literacy and mpox vaccination intentions. The direct effect was statistically nonsignificant, which may be due to that the positive effects caused by other potential mediators (e.g. social norm of taking mpox preventions) may be offset by the negative effects caused by some possible suppressors (e.g. fear of stigma and social rejection due to mpox) (Curtis et al., 2023; Zheng et al., 2023). Such potential mechanisms require testing in future research. It is noteworthy that perceived barriers to receiving mpox vaccination were not a significant mediator in the study, which should be further examined.

It is interesting that YMSM with a high school or below education background scored significantly higher in media literacy than those with a college or above education level. One possible reason is that individuals with a lower educational level might be more susceptible to conspiracy theories and tend to be skeptical of all the information from social media, no matter from

governmental/professional resources or not (Tam & Lee, 2024). During public health emergencies, social media accounts operated by governments, NGOs, and health professionals are very important venues for disseminating correct health information (Garcia-Iglesias et al., 2023). Untrust of this professional information may lead to huge health risks (e.g., vaccine hesitancy) (Alnasser et al., 2021). It reminds us that it is both very important to improve people's media literacy and to build their trust in professional information resources. Future media literacy campaigns should guide the public in identifying misinformation and trusting professional information. Additionally, YMSM who were living with a partner showed a significantly higher level of media literacy compared to those who were single. One possible explanation could be that the proportion of individuals who were married or living with a partner was relatively small (4.7%), potentially resulting in statistical significance without practical relevance (Thompson, 2002).

The study had some limitations. First, social desirability bias and recall bias might influence the measurement of media literacy, disease perceptions, and behavioral intentions. The extent of the bias was difficult to gauge. We used the self-administered questionnaire, rather than the face-to-face interview, to minimize the social desirability bias. Second, this study used the facility-based sampling method to recruit the participants, which may lead to selection bias. The levels of disease perceptions and behavioral intention of receiving mpox vaccination might be overestimated, as YMSM who were more familiar with MSM-associated health services might be more likely to participate in the study. Third, causality could not be fully established in this study due to the cross-sectional design. Longitudinal studies are needed in the future. Last but not least, media literacy in this study mainly refers to media literacy for the use of social media and may not fully encompass

social media literacy, as social media literacy has unique features compared to media literacy such as communication and interaction. Given the increasing importance of social media literacy, further studies are needed to explore the influence of social media literacy and apply it to health communication studies.

In conclusion, social media platforms have become the main battlefield of health communication during disease outbreaks. It is urgently warranted to enhance the media literacy of people, including those at high risk of the disease as well as the general population, and build their trust in professional information resources, so as to mitigate the spread of misinformation, foster better understandings of the disease, and ultimately promote prevention and control measures.

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Authorship Contribution Statement

SL, MX, WL, and FC conceptualized the study and contributed to the methodology. SL supervised the study. SH, JZ, YZ, YX, KJ, YL, YX, WM, LH, XR, ZD, JS, and QL contributed to the questionnaire design and data collection. SH did the formal analysis. SH contributed to the original draft of the manuscript. SL revised and finalized the manuscript. All authors were responsible for the decision to submit the manuscript for publication. SL had full access to all the data in the study and had final responsibility for the decision to submit for publication.

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Tables with captions

Table 1 Distributions of all variables among young MSM who had obtained mpox information from social media platforms in China (N=2,079)

Variables	n (%) / Mean±SD
Background Characteristics	
Age (years), Mean ± SD	24.7±2.9
Ethnicity	
Han	1998 (96.1)
Others	81 (3.9)
Employment status	
Students	503 (24.2)
Unemployed	104 (5.0)
Employed	1472 (70.8)
Marital status	
Married or living with a partner	97 (4.7)
Unmarried/divorced/separated/widowed	1982 (95.3)
Education level	
High school or below	309 (14.9)
College and above	1770 (85.1)
Monthly income (CNY)	
≤2000	404 (19.4)
2001-6000	854 (41.1)
6001-10000	549 (26.4)
>10000	272 (13.1)
Mpox-related perceptions (Mean ± SD)	

Perceived susceptibility of mpox (range: 3-15)	6.1±2.3
Perceived severity of mpox (range: 2-10)	8.5±1.7
Perceived benefits of mpox vaccination (range: 4-20)	16.7±2.8
Perceived barriers to mpox vaccination (range: 4-20)	13.8±3.4
Self-efficacy of receiving mpox vaccination (range: 2-10)	7.6±1.5
Intentions of receiving mpox vaccination (score range: 4-20), Mean ± SD	17.0±3.5
Social media use	
Types of social media platforms [a]	
Social media platforms of health-related institutions	1207 (58.1)
Social media platforms of MSM organizations	588 (28.3)
Dating apps of MSM	434 (20.9)
General public social media platforms	1558 (74.9)
Media literacy (mean ± SD) (score range: 4-20), Mean ± SD	15.0±3.4
I think about the truthfulness of messages before I accept them as believable [b]	1531 (73.6)
I think about the purpose behind messages I see [b]	1213 (58.3)
It is important to think twice about what messages say [b]	1506 (72.5)
I look for more information before I believe something I see in messages [b]	1169 (56.3)

Note: SD, standard deviation.

[a] Participants can choose multiple choices simultaneously.

[b] Frequency (%) of participants who choose “agree” and “strongly agree”.

Table 2 Univariate regressions on the media literacy among young MSM who had obtained mpox information from social media platforms in China (N=2,079)

Background variables	Media literacy	
	b (95%CI)	*P*
Age (years)	0.004 (-0.047, 0.055)	.873
Ethnicity		
Han	ref	-
Others	0.378 (-0.373, 1.129)	.323
Employment status		
Students or unemployed	ref	-
Employed	0.121 (-0.198, 0.441)	.457
Marital status		
Married or living with a partner	ref	-
Unmarried/divorced/separated/widowed	-0.717 (-1.406, -0.029)	.041
Education level		
High school or below	ref	-
College and above	-0.547 (-0.955, -0.139)	.009
Monthly income (CNY)		
≤6000	ref	-
>6000	-0.218 (-0.516, 0.079)	.150

Table 3 Partial correlations among the main studied variables among young MSM who had obtained mpox information from social media platforms in China (N=2,079)

Variables	1	2	3	4	5	6	7
1. Intention of receiving mpox vaccination	-						
2. Media literacy	**0.200** ***	-					
3. Perceived susceptibility to mpox	**0.121** ***	**0.054** *	-				
4. Perceived severity of mpox	**0.203** ***	**0.135** ***	**0.091** ***	-			
5. Perceived benefits of mpox vaccination	**0.501** ***	**0.246** ***	-0.036	**0.176** ***	-		
6. Perceived barriers to mpox vaccination	0.028	0.000	**0.131** ***	**0.182** ***	**0.067** **	-	
7. Self-efficacy of receiving mpox vaccination	**0.445** ***	**0.193** ***	**0.067** **	**0.121** ***	**0.392** ***	**0.084** ***	-

***Note*:** *p<0.05, **p<0.01, ***p<0.001.

Table 4 Path analysis of the mediation effect of mpox-related perceptions on the association between media literacy and intentions of receiving mpox vaccination among young MSM who had obtained mpox information from social media platforms in China (N= 2,079)

Paths	Standardize path coefficient	95%CI	*P* [a]	% of the total effect
Total effect	0.201	(0.154, 0.247)	<0.001	\
Total indirect effect	0.165	(0.133, 0.199)	<0.001	82.1%
Direct effect				
Media literacy→intentions of receiving mpox vaccination	0.036	(-0.005, 0.077)	0.085	17.9%
Perceived susceptibility to mpox→intentions of receiving mpox vaccination	0.111	(0.080, 0.143)	<0.001	\
Perceived severity of mpox→intentions of receiving mpox vaccination	0.097	(0.055, 0.142)	<0.001	\
Perceived benefits of mpox vaccination→intentions of receiving mpox vaccination	0.374	(0.319, 0.424)	<0.001	\
Perceived barriers to mpox vaccination→intentions of receiving mpox vaccination	-0.052	(-0.091, -0.013)	0.007	\
Self-efficacy of mpox vaccination→intentions of receiving mpox vaccination	0.277	(0.233, 0.325)	<0.001	\
Media literacy→perceived susceptibility to mpox	0.055	(0.010, 0.100)	0.016	\

Media literacy→perceived severity of mpox	0.133	(0.083, 0.180)	<0.001	\
Media literacy→perceived benefits of mpox vaccination	0.246	(0.195, 0.296)	<0.001	\
Media literacy→perceived barriers to mpox vaccination	-0.003	(-0.055, 0.048)	0.917	\
Media literacy→self-efficacy of mpox vaccination	0.194	(0.141, 0.246)	<0.001	\
Specific indirect effect				
Media literacy→intentions of receiving mpox vaccination via perceived susceptibility to mpox	0.006	(0.001, 0.012)	0.023	3.0%
Media literacy→intentions of receiving mpox vaccination via perceived severity of mpox	0.013	(0.006, 0.023)	0.002	6.5%
Media literacy→intentions of receiving mpox vaccination via perceived benefits of mpox vaccination	0.092	(0.069, 0.118)	<0.001	45.8%
Media literacy→intentions of receiving mpox vaccination via perceived barriers to mpox vaccination	0.000	(-0.003, 0.003)	0.923	0.0%
Media literacy→intentions of receiving mpox vaccination via self-efficacy of mpox vaccination	0.054	(0.038, 0.073)	<0.001	26.9%

***Note*:** [a] Path analysis with maximum likelihood estimation was conducted based on 5,000 bootstrapped samples; CI, confidence interval.

Figures

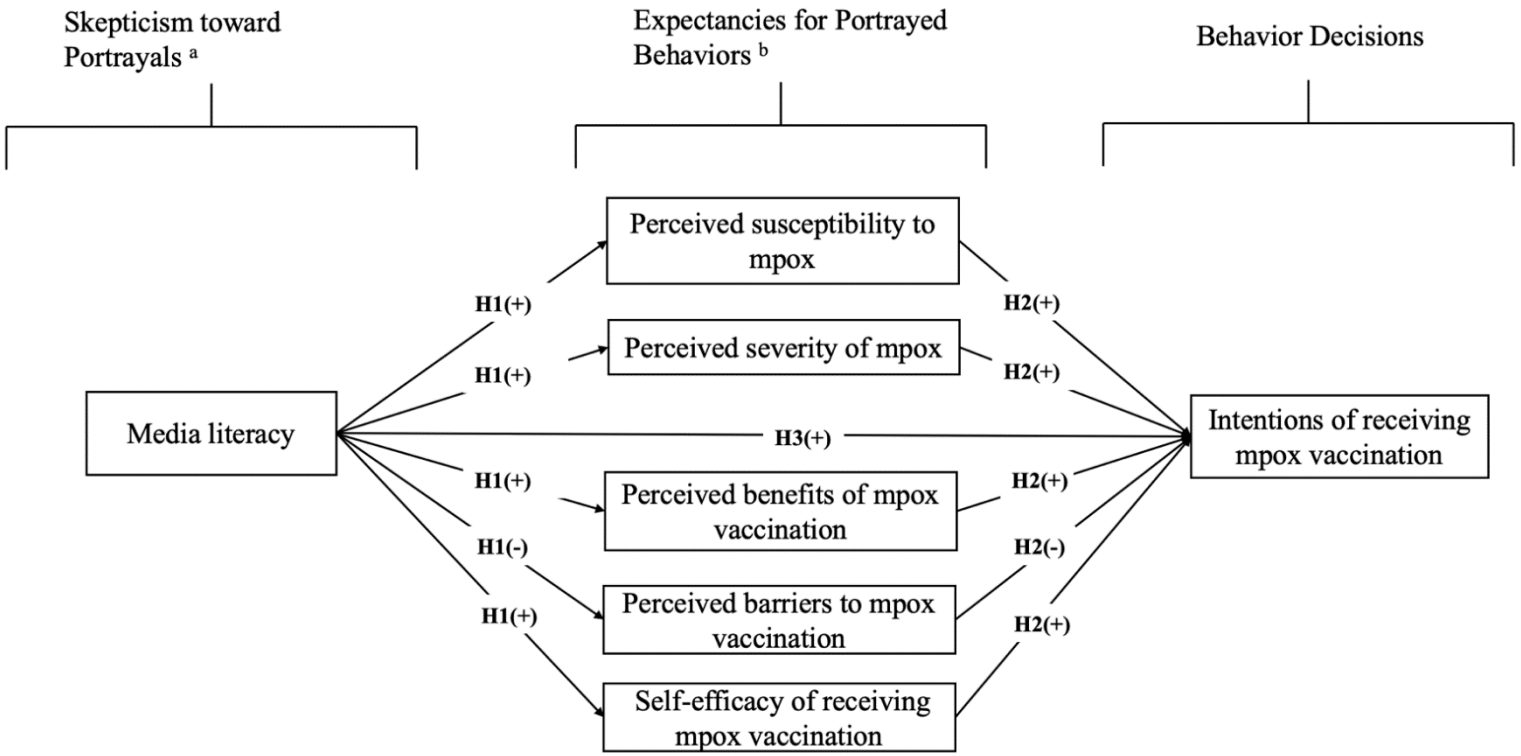

Figure 1 Conceptual framework based on HBM and MIP model

***Note*:** [a] A cognitive state of incredulity that encourages the active consideration of a message's veracity through more thoughtful processing and additional information-seeking; [b] Beliefs about the results of portrayed behaviors.

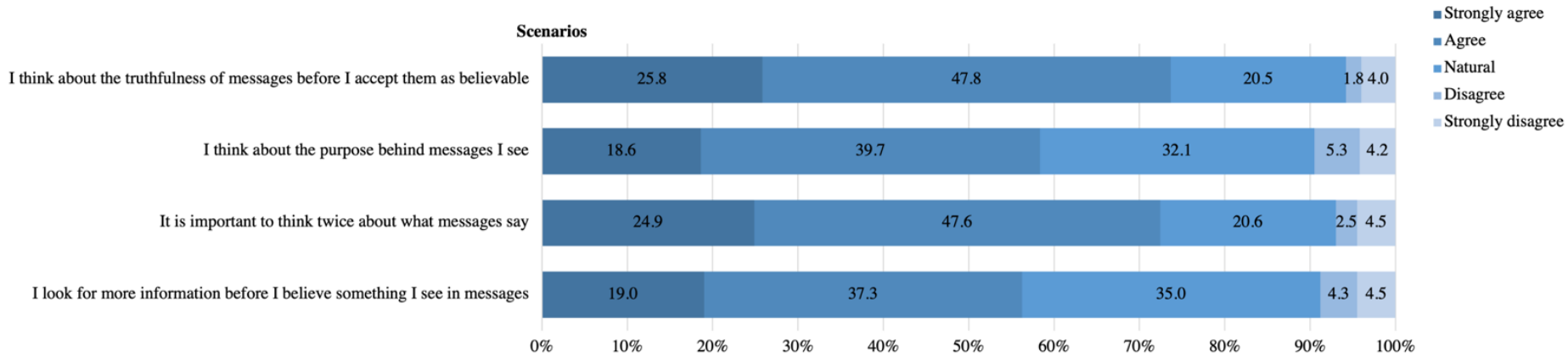

Figure 2 Media literacy among young MSM who had obtained mpox information from social media platforms in China (N=2,079)

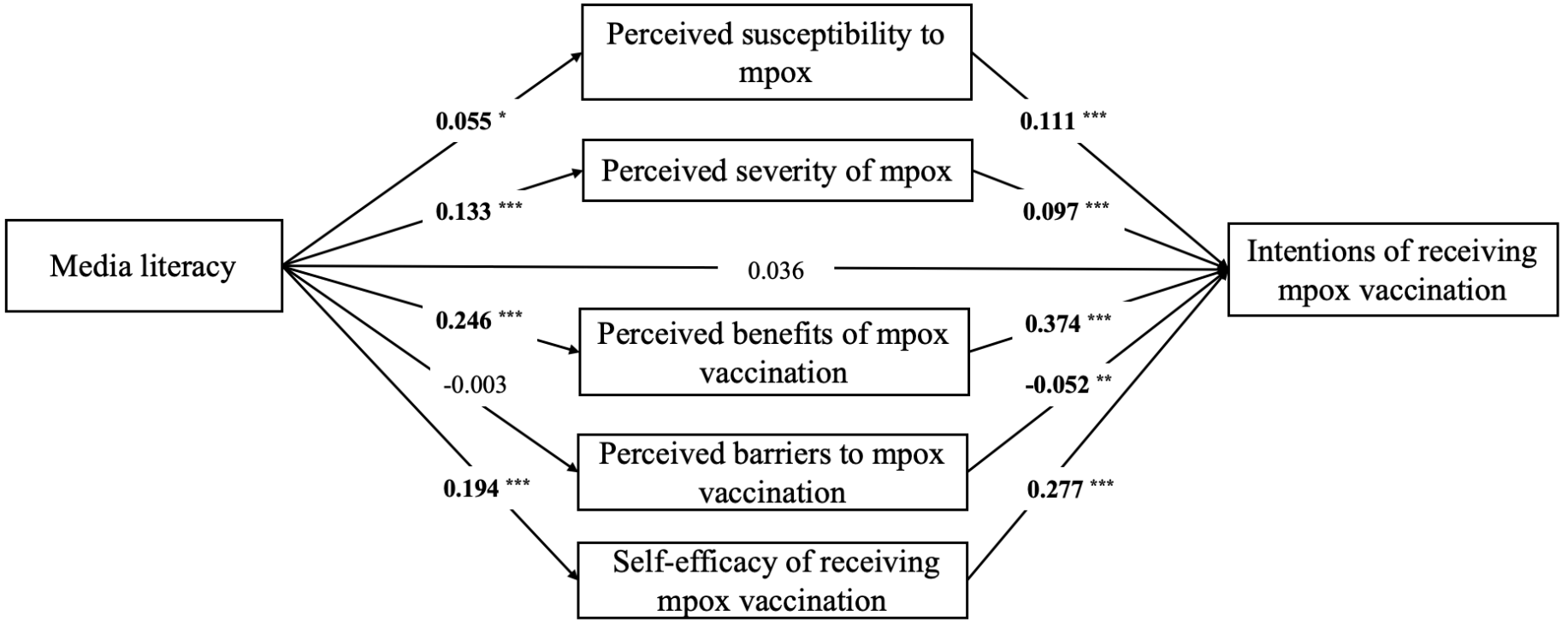

Figure 3 The proposed mediation model with standard coefficients for the behavioral intentions of receiving mpox vaccination (N= 2,079)

***Note*:** $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$.

Figure captions (as a list).

Figure 1 Conceptual framework based on HBM and MIP model

Figure 2 Media literacy among young MSM who had obtained mpox information from social media platforms in China (N=2,079)

Figure 3 The proposed mediation model with standard coefficients for the behavioral intentions of receiving mpox vaccination (N= 2,079)