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Beyond Health Beliefs: The Role of Social Media Perceptions and Digital Communicative Behaviours in Dengue Preventive Intentions

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ABSTRACT

Dengue fever remains a significant public health threat, particularly in densely populated urban areas where transmission risks are heightened. This study examines the impact of health-related beliefs, social media perceptions, and digital communicative behaviours on preventive behavioural intentions in dengue-affected communities. Data were collected during the Movement Control Order (MCO) imposed amid the COVID-19 pandemic, a period that intensified public engagement with digital health information. A cross-sectional online survey (N = 384) was analysed utilising partial least squares structural equation modelling (PLS-SEM). The results reveal that while health-related beliefs exert a modest direct influence on preventive intentions, they do not significantly predict digital communicative behaviours. In contrast, social media perceptions, comprising platform credibility, informational norms, and user efficacy, serve as the most significant factors, directly and indirectly driving preventive intentions through communicative engagement. The model explains 49.5 percent of the variance in preventive intentions and 28.5 percent in communicative behaviours, confirming strong predictive relevance. Theoretically, the study extends the Health Belief Model (HBM) by integrating cognitive determinants within the Situational Theory of Problem Solving (STOPS) framework, illustrating that communicative engagement and media perceptions are crucial mediators between belief and behaviour. This integration highlights a platform-first approach in health communication, emphasising the pivotal role of social media in influencing preventive behaviours. Practically, the findings underscore the need to build trust, reinforce informational norms, and strengthen digital efficacy in future public health campaigns.

Keywords: *Dengue prevention, health communication, social media perceptions, digital communicative behaviours, preventive behavioural intention.*

INTRODUCTION

Despite considerable research on psychological determinants and health behaviours, relatively few studies have explored how social media-related perceptions and digital communicative behaviours influence preventive health intentions. Traditional models such as the Health Belief Model (HBM) offer significant insights into how individuals' perceptions of susceptibility, severity, and self-efficacy influence preventive behaviours (Amin & Nazan, 2022; Johnson et al., 2025; Kim & Hawkins, 2020). Although widely used, the framework often prioritises individual cognition, neglecting the role of communicative engagement and digital environments in shaping behaviour. In today's digital landscape, individuals are not merely passive recipients of health information (Nguyen et al., 2023), but active participants who seek, share, and transmit content across multiple media platforms. This transition, therefore,

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demands a comprehensive theoretical framework that integrates belief systems, communication behaviours, and social media perceptions to elucidate modern health decision-making processes.

Recent evidence in health communication study highlighted that digital media play a vital role in determining behavioural responses to health risks (Carvajal et al., 2022; Ho et al., 2025; Shahid et al., 2020). The emergence of social media platforms has transformed the way health information is accessed and interpreted, reinventing the new ways the risk information being communicated to the community. Variables such as channel beliefs, informational subjective norms, and social media efficacy have significantly affected individuals' process, evaluate and act upon health information(Niu et al. 2021: Zhang et al., 2024). However, empirical evidence integrating these media perceptions with traditional health belief constructs remains limited (Alyafei & Easton-Carr, 2024; Zollo et al., 2024). Given the pervasive role of social media in shaping individuals health decision making, this omission is significant. Addressing this gap, the present study integrates health-related beliefs, communicative behaviours, and social media perceptions to examine their combined effects on preventive behavioural intentions.

This study, therefore, aims to advance understanding of how individuals living in dengue-affected localities in selected urban areas in Selangor communicate health information in digital environments. By integrating perspectives from the HBM, the Situational Theory of Problem Solving (STOPS), and social media perception concepts, it seeks to explain how psychological factors, communicative behaviours, and perceptions of digital platforms influence preventive behavioural intentions. Specifically, the study addresses the following research questions: RQ1: Are individuals living in dengue-affected areas influenced by health-related beliefs, social media-related perceptions, digital communicative behaviours, and preventive behavioural intentions? and RQ2: What is the relationship between health-related beliefs, social media-related perceptions, digital communicative behaviours, and preventive behavioural intentions among individuals living in dengue-affected areas?

PROBLEM STATEMENTS AND RESEARCH GAPS

The central concern of this study lies in the insufficient theoretical and empirical attention to the mediating role of communicative behaviours in shaping preventive health actions within the digital environment. While social media has become an essential tool for healthcare providers and practitioners to disseminate and exchange health information (Farsi, 2021), most dengue-related studies continue to rely on traditional frameworks such as the Knowledge, Attitude, and Practice (KAP) model or the Health Belief Model (HBM) (Arham et al., 2018; Guad et al., 2021). Although these models have advanced our understanding of individual cognition and behavioural outcomes, they often neglect how users actively engage in communication behaviours such as seeking, sharing, and transmitting health information when navigating complex digital environments. As a result, the relationships between social-psychological determinants, communicative behaviours, and preventive intentions remain theoretically underdeveloped.

Earlier theories, such as the Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), and Social Cognitive Theory (SCT), have contributed valuable insights into attitudes, norms, and efficacy as predictors of health behaviour. However, these approaches generally prioritise what happens to individuals rather than what individuals do as

communicators in digital contexts. As Collins et al. (2011) argue, traditional models struggle to account for users' expanded roles in producing, distributing, and interpreting content online. The Situational Theory of Problem Solving (STOPS) addresses this limitation by conceptualising communicative behaviour as a core mechanism through which people respond to perceived health risks (Kim & Grunig, 2011). Despite its relevance, STOPS has not been applied to dengue prevention research, leaving a gap in understanding how communicative engagement on social media shapes preventive behavioural intentions.

Globally, research has increasingly documented the role of digital communication in influencing health outcomes, with evidence spanning contexts such as nutrition (Chau et al., 2018), vaccination (Cascini et al., 2022), breast cancer screening (Todor et al., 2024), and infectious disease outbreaks (Xu et al., 2021). However, in Malaysia, empirical studies on communicative behaviour remain scarce and fragmented, with prior work concentrated on fields such as public relations, agriculture, and ethnic relations (Hashim et al., 2014; Ismail et al., 2017; Azlan, 2019). Little attention has been given to infectious diseases, despite the persistent public health threat posed by dengue and the proliferation of dengue-related information on social media. This study addresses this gap by proposing a conceptual model that integrates social-psychological determinants, communicative behaviours, and preventive intentions, thereby contributing empirical evidence to advance both theory and practice in health communication research.

LITERATURE REVIEW

For decades, scholars in the field of health communication have recognised the significant roles of media in influencing public health behavioural changes through various health campaigns (Jackson et al., 2023; Schliemann et al., 2020; Van Asbroeck et al., 2021). They pointed out that these campaigns not only emphasise the prevention of chronic diseases such as dementia, but also aim to educate the audience about harmful lifestyle practises such as tobacco use, alcohol and illicit drug usage, and other health-related issues. Traditional campaigns have typically used broad-reaching media platforms such as television, radio, out-of-home (i.e., brochures), and print media (i.e., magazines and newspapers) (Hwang & Jeong, 2020; Kanchan & Gaidhane, 2024). As a result of normal media consumption, these messages are typically seen passively. The emergence of new technologies, however, has changed the campaign's approaches. Health messages are no longer traditionally presented but have been integrated and broadcast through various digital platforms, such as Facebook, Twitter, WhatsApp, Telegram, and many other media applications that can easily be installed on and accessed through mobile phones (Purnama et al., 2022).

In parallel with the growing prominence of social media as a primary source of health communication, public engagement with dengue awareness efforts has increasingly migrated to digital platforms. A significant segment of the population seeks dengue-related information on platforms like Facebook, drawn by its immediacy, accessibility, and integration into daily communication practices (Ho et al., 2025). Likewise, real-time platforms such as Twitter have enabled interactive dialogues concerning dengue outbreaks, allowing users to actively seek, discuss, and disseminate information relevant to dengue during epidemics. Among the frequently sought information these tweets are dengue incidence rates, hospitalisation cases, diagnostic and treatment aspects of dengue, its transmission dynamics, preventive measures, and even blood donation drives (Shahid et al., 2020). This implies that the accessibility of

media channels and the usage patterns of target audiences are important determinants in the selection of communication channels for health promotion activities.

In Malaysia, 78.9 percent of the surveyed social media users communicated using social media platforms, with the majority of them doing so daily (Malaysian Communications and Multimedia Commission, 2021). Furthermore, a survey of 2,402 participants discovered that around 77.2 percent of participants used social media to seek health-related information. Among the common information sought were symptoms and diseases (91.4 percent), healthcare tips (89.8 percent), and treatment methods (83.5 percent) (Malaysian Communications and Multimedia Commission, 2017). This indicates that social media is progressively establishing itself as a primary source of information for health-related matters within the community of social media users in the country. Hence, within the Malaysian context, characterised by a rapid surge in social media usage and a steady annual rise in dengue infection rates, social media has the potential to effectively engage a broad spectrum of demographics through a campaign aimed at addressing the disease prevention and control.

THEORETICAL FRAMEWORK

Figure 1 presents the theoretical framework of this study, illustrating the proposed relationships among health-related beliefs, social media perceptions, digital communicative behaviours, and preventive behavioural intentions. The framework is grounded in an integrative review of prior scholarship, which is elaborated in the following sections. Based on this synthesis, five hypotheses were developed to examine the interrelations between these variables. It should be noted that the present study adopts a correlational perspective, aiming to identify correlation rather than causation.

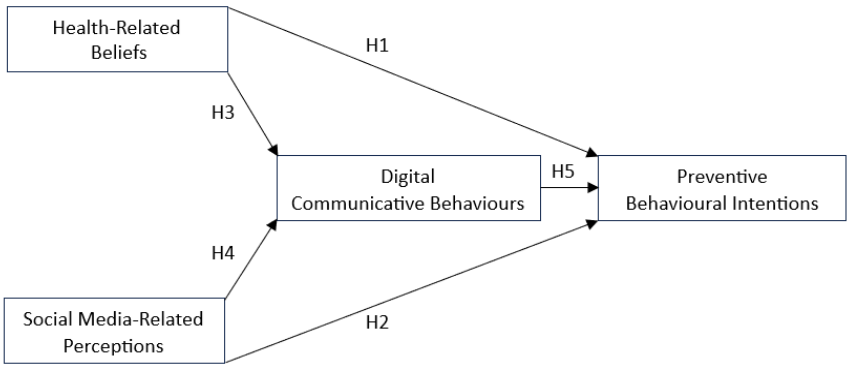

Figure 1: Theoretical framework

a. Health-Related Beliefs

Health-related beliefs represent the most extensively studied and frequently cited determinants of health behavioural intention (HBI) across the reviewed literature. This theme encompasses cognitive and affective constructs that shape how individuals assess health risks and decide whether to adopt protective behaviours (Janz & Becker, 1984). The prominence of these determinants can be attributed mainly to theoretical models such as the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB), both of which have consistently informed empirical studies on health behaviour. Seven sub-themes were identified within this category: *perceived susceptibility*, *perceived severity*, *perceived risk*, *perceived benefits*,

perceived barriers, *self-efficacy, and attitude*. Among these, perceived susceptibility and perceived risk appeared with the highest frequency (9 studies each), followed closely by perceived severity**,** perceived benefits, and self-efficacy.

Perceived susceptibility refers to an individual's subjective evaluation of their likelihood of contracting an illness or experiencing a health threat. When individuals perceive themselves as vulnerable to a particular health risk, they are more likely to take preventive actions. This relationship is well illustrated in the study by Xu et al. (2021), which explored the intention to take up HPV vaccination use as a preventive behaviour against human papillomavirus (HPV). The study found that individuals who believed they were at risk of infection were significantly more likely to engage in preventive measures. Interestingly, this study also suggested that perceived susceptibility indirectly affected communicative behaviours variables.

While often paired with susceptibility in HBM-based frameworks, *perceived severity* focuses on the seriousness of the potential health condition and its consequences. When individuals consider an illness potentially life-threatening or fatal, they are more inclined to form strong intentions toward prevention or early detection. This was demonstrated in Shmueli (2021), where perceived severity significantly predicted the intention to receive the Covid-19 vaccine among the general populations. A study in China showed that perceived risk predicts reproductive cancer information seeking through mobile platform among young and middle age women (Zhang et al., 2019). These constructs, however, have been used interchangeably or without clear differentiation in many studies, which presents a conceptual challenge for consistent measurement and interpretation.

The *self-efficacy* construct further refines our understanding of how personal agency influences HBI. Self-efficacy, derived from Bandura's Social Cognitive Theory, is one's ability to perform a health-related task. This was evidenced in Choi et al. (2019)**,** where participants with higher self-efficacy reported stronger intentions to practice dementia preventive measures. Similarly, Niu et al. (2021) found self-efficacy was significantly associated with intention to seek health information on social media among those who have prior positive experience with health retrieved from the platform. These empirical findings provided compelling evidence: health-related beliefs (perceived susceptibility, perceived severity, and health self-efficacy) significantly correlated with preventive behavioural intentions among individuals. Building upon these studies, the present research hypothesises:

H1: There is a relationship between health-related beliefs and preventive behavioural intention.

H2: There is a relationship between health-related beliefs and digital communicative behaviour.

b. Social Media-Related Perceptions

The theme '*social media-related perceptions'* encompasses beliefs and evaluations individuals hold towards the credibility, relevance, and personal impact of health information conveyed through various social media channels. This theme captures the interaction between audience psychology and social media content, highlighting how exposure to social media and institutional campaigns can influence health behavioural intention. Four sub-themes were identified within this category: *subjective norms, informational subjective norms, relevant channel beliefs, and social media efficacy*. Among these factors, *subjective norms* were mentioned the most as predicting the health behaviour intention (Andarge et al., 2020;

Greyson et al., 2021; Manika et al., 2021; Xia et al., 2017; Zhu, 2017). These factors mostly refer to the perception that particular health behaviours are socially approved or expected, as shaped by representations in the media. This includes influence from peer comments, social media users, and important others. In a survey study, Xia et al. (2017) found that subjective norm was a significant predictor of students intention to seek health information online while they are in urgent and severity problematic situation. Similarly, Andarge et al. (2020) found that this normative pressure strengthen the intention of adult with chronic conditions to perform health personal preventive measures. Additionally, subjective norms were identified as determinant for influence vaccination uptake intention among pregnant women (Greyson et al., 2021).

Comparable to subjective norms, Lu et al. (2020) identified *informational subjective norms* as a proximal predictor of individuals' intentions to seek information about the influenza vaccine. This finding emerged from a large-scale study involving 2,091 adults in the United States. Notably, among the various antecedents examined, informational subjective norms consistently emerged as the most robust predictor of information-seeking intentions. In a similar vein, Liu et al. (2021) reported that informational influence was the strongest predictor not only for information seeking but also for information avoidance. Their findings suggest that an individual's social environment plays a critical role in shaping how the public engages with health-related information, particularly in the context of disease communication.

The term *Channel Beliefs* refers individuals' perceptions that a specific information channel provides content that is relevant, impartial, and credible. A study conducted in the United States by Yang et al. (2021) on COVID-19 information-seeking behaviour found that individuals are more likely to engage with a particular information channel when the information presented is perceived as trusted, credible, and accurate. Notably, the study emphasised that the level of trust in an information source exerted a direct influence on individuals' information-seeking behaviour, particularly in the context of a public health emergency. Drawing from this rich body of empirical evidence, the present study posits the hypothesis that:

H3: There is a relationship between social media-related perceptions and dengue preventive behavioural intentions.

H4: There is a relationship between social media-related perceptions and digital communicative behaviours.

c. Digital Communicative Behaviours

The emergence of new communication mediums such as social media transformed the way information is disseminated. With a significant capacity to connect audiences through virtual spaces, social media has become the most popular means of communication among people with similar interests, communicate with and share a wide range of issues, including education, health and well-being (Lee et al., 2020; McKeever et al., 2016). Because strong social media engagement can build a credible online presence, individuals and organisations have utilised this technology to interact with their colleagues, clients, consumers, and even their society. In the context of health communication, health professionals adopted social media while conducting health promotion or behaviour change intervention activities (De Vleminck et al., 2015; Plackett et al., 2020). As for individuals, social media allows them to be more participative and interactive while seeking health information (Carvajal et al., 2022; Cho

et al., 2018). This situation has piqued the interest of communication scholars investigating the potential of social media as an effective health communication medium.

Despite extensive research on the influence of health-related beliefs, attitudes, and behaviors on health behaviors, prior studies revealed that there has been a notable gap in understanding the role of the public's digital communicative behaviors during health campaigns (Rimal et al., 1999; Rimal & Lapinski, 2009; Rimal & Real, 2003). The existing literature has primarily focused on traditional determinants, neglecting the potential impact of digital communicative behaviour on health-related outcomes. This presents an unexplored avenue for research, highlighting the need to incorporate digital communication into the broader framework of health behavior studies. Therefore, examining the relationship between digital communicative behaviours and health-related beliefs, attitudes, and behaviours, offering a comprehensive understanding of the dynamics influencing public responses to health campaigns messages. Prominent scholars like Griffin et al. (1999) and Kahlor (2010) argue that most studies related to these antecedents tend to investigate the information-seeking behaviours in different settings, such as risk information-seeking. Thus, understanding the role of communicative behaviour in the context of digital media landscape and preventive behavioural intentions is critical, as it is expected to strengthen the campaign's effectiveness through new strategies.

Recent studies on various public health issues have generally suggested a positive relationship between digital communicative behaviours and preventive behavioural intention. For example, a study conducted by Handayani et al. (2023) found that during the COVID-19 pandemic in Indonesia, the increase in social media digital engagement correspond with strong adoption recommended health protective actions. Furthermore, Goodyear et al. (2021) revealed significant relationship between social media usage and health behavioural changes such as physical activity, dietary behaviors, and quality of life during the pandemic. Similarly, Yoo et al. (2023) demonstrated that interpersonal communication and social media expression mediates the effect of social media exposure on preventive behavioral intention, highlighting the communication behaviours that translate digital exposure into action. The following hypotheses are thus posed:

H5: There is a relationship between digital communicative behaviours and preventive behavioural intentions.

RESEARCH METHOD

Procedure and Participants

This study employed the quantitative research design to examine the determinants of dengue preventive behavioural intention among urban populations in Selangor, Malaysia, its relationship with dengue prevention messages carried out by the campaign run across social media platforms. The campaign informed people of the risks of, susceptibility to, and prevention of the disease. The participants of this research encompasses individuals living in selected dengue hotspot localities in Selangor. As the study was conducted during the movement control order (MCO) due to Covid-19 outbreak, a convenience sampling, a non-probability sampling method was employed for participant selection. The selection was based on participant's knowledge and willingness to allign with study's objective. The survey consisted of five sections: section A to section D delve into the constructs – preventive behavioural intentions, health-related beliefs, social media-related perceptions, and digital communicative behaviours. Section E collected demographic data including gender, age,

education, income, and race. Online survey and self administered questionnaires distributed through Google Forms via WhatsApp group of selected communities. Data collection transpired between Mac 2022 and May 2022. The study adopted a seven Likert-scale to gauged respondent's opinion towards the construct. A number of 415 valid responses analysed, in which questionnaires tailored from previous studies. The questionnaires were in Malay and English, reflecting the diversity of the respondents. The study employed Harman's Single factor test using SPSS version 26 to address potential common method bias. The results showed that the single factor explained only 27.6 percent, less than the benchmark value of 50 percent of the total variance, suggesting that common method biasness was not a likely influence the results of this study.

Sampling Limitations and Ethical Considerations

This study employed a convenience sampling approach using an online, self-administered questionnaire distributed during the Movement Control Order (MCO). While this method enabled safe and efficient data collection, it may have limited participation among individuals with restricted internet access or lower digital literacy, potentially affecting representativeness. Although formal ethics committee approval was not required for minimal-risk, non-clinical research at Universiti Sains Malaysia, all procedures adhered to institutional ethical guidelines. Participants were provided with a clear study overview and gave informed consent before responding. These measures ensured voluntary participation, anonymity, and confidentiality throughout the research process.

Measures

Given that SmartPLS does not require data to follow the assumption of normal distribution, the current dataset was analysed without relying on parametric distributional techniques. Partial least squares structural equation modelling (PLS-SEM) was applied as the principal statistical method to evaluate the model's measurement and structural components. The survey instrument comprised established measures: health-related beliefs (12 items adapted from Isa et al., 2013); Yoo et al. 2016); social media perceptions (13 items by Eastin & LaRose, 2000; Griffin et al., 2002; Kahlor, 2007); digital communicative behaviours (11 items from Kim & Grunig, 2011); and preventive behavioural intention (11 items adapted from Isa et al., 2013; Yoo et al., 2016). A two-stage validation process was employed to ensure these measures' robustness. First, two senior academics (associate professors) reviewed the items for content accuracy and conceptual alignment. Subsequently, a pilot study was administered to 40 randomly selected residents from dengue-prone areas to test reliability. Data from this pilot were analysed using SPSS, and Cronbach's alpha values exceeded the recommended threshold of 0.7 for all constructs, confirming satisfactory internal consistency for subsequent analyses.

Data Analysis

Descriptive statistics for the demographic variables and the four central constructs were first generated using SPSS version 24.0. While exploratory and confirmatory analyses can be conducted through various statistical techniques (Benitez et al., 2020), this study applied SmartPLS version 3.2.9, adopting the PLS-SEM procedure to evaluate both the measurement and structural models as well as to test the proposed hypotheses (Ringle et al., 2020). The choice of PLS-SEM is consistent with scholarly recommendations for analysing datasets that

are composite-based and commonly encountered in social and behavioural sciences (Ringle et al., 2020). Sample size was determined using Raosoft's online calculator, which suggested a minimum of 378 participants. The final dataset, comprising 415 valid responses, thus exceeded this threshold and provided a robust basis for the subsequent analyses.

RESULTS

Demographic Profiles

Among the 415 survey participants, gender was almost evenly distributed, with females accounting for 209 (50.4 percent) and males for 206 (49.6 percent). The age profile revealed that the largest proportion of respondents were between 40 and 49 years (34.9 percent), followed by those aged 30-39 (21.9 percent) and 50-59 (21.4 percent), while younger adults (18-29 years) and older adults (60 years and above) represented smaller groups at 12 percent and 9.6 percent, respectively. In terms of ethnicity, the sample was predominantly Malay with 347 (83.6 percent), followed by Chinese, 29 (7 percent), Indian, 24 (5.8 percent), and other ethnic groups, 15 (3.6 percent). Educational attainment varied considerably: 165 (39.8 percent) reported secondary-level qualifications (PMR, SPM) or equivalent, while 121 (29.2 percent) held higher education degrees (bachelor's, master's, or doctorate). Another 111 (26.7 percent) had completed pre-univeristy, matriculation or diploma-level studies, and a 18 (4.3 percent) have other qualifications. With respect to prior health experience, most respondents (80.7 percent) reported no history of dengue infection, whereas 19.3 percent indicated having contracted the disease previously. Housing characteristics also reflected a mix of ownership status. About 281 or 67.7 percent respondents living in their own house and 134 (32.3 percent) residing as tenants. Geographically, participants were concentrated across three major urban municipalities, with the highest proportion drawn from Shah Alam City Council with 180 (43.4 percent), followed by Subang Jaya City Council (129 or 31.1 percent) and Petaling Jaya City Council (106 or 25.5 percent), respectively.

Descriptive Analysis

Table 1 presents the descriptive statistics for the key constructs examined in this study. Participants evaluated items relating to health beliefs, social media-related perceptions, digital communicative behaviours, and preventive behavioural intentions on a seven-point scale. The seven-point Likert scale ranged from "Strongly Disagree (1)" to "Strongly Agree (7)", capturing the degree of participants' agreement with each statement across all constructs.Among these, health-related beliefs yielded the highest mean score (M = 6.02, SD = 0.81), reflecting strong agreement that dengue constitutes a serious health risk, that respondents considered themselves vulnerable, and that they were confident in their ability to undertake preventive practices. Social media-related perceptions (M = 5.37, SD = 0.79) and digital communication behaviours (M = 4.71, SD = 0.94) followed, indicating that while participants generally regarded social media as a credible, accessible, and valuable channel for health-related engagement, their actual communicative activities such as actively seeking, sharing, or disseminating health information were less frequent and somewhat inconsistent. In terms of preventive behavioural intention (M = 5.64, SD = 1.03), the results suggest relatively strong intentions overall, though the wider standard deviation points to variation among respondents, with some demonstrating a particularly high willingness to adopt dengue prevention behaviours and others showing more moderate commitment.

Table 1: Descriptive analysis of construct

Construct	Mean	Std Deviation
Health-related beliefs	6.02	0.81
Social media-related perceptions	5.37	0.79
Digital communicative behaviours	4.71	0.94
Preventive behavioural intentions	5.64	1.03

Measurement Model Assessment

The assessment of the measurement model is encapsulated in Table 2. Consistent with established guidelines, the assessment considered three primary indicators of construct validity, namely factor loadings, composite reliability (CR), and average variance extracted (AVE). Indicator reliability was examined according to the widely accepted threshold of 0.708 or higher (Sarstedt et al., 2022). Although earlier scholarship has acknowledged that items with loadings above 0.7, and in some cases as low as 0.6, 0.5, or 0.4, may still be retained if theoretically justified and supported by stronger items within the construct, such inclusions require careful attention to ensure that the AVE and CR values remain robust (Cheung et al., 2024). In this analysis, the recommended benchmarks of 0.7 for CR and 0.5 for AVE were achieved across all constructs, implying that the measurement model demonstrates convergent validity. Figure 2 depicted the measurement model assessment, which indicates the SmartPLS output.

Subsequently, the Heterotrait-Monotrait ratio of correlations (HTMT) was used to assess the discriminant validity of the model, as suggested by Sarstedt et al. (2022). The results indicated that all HTMT values remained below the specified threshold of 0.85 (Kline, 2015) and 0.90 (Soares et al., 2023). These results presented in Table 3, provide strong evidence that the constructs are empirically distinct, thereby supporting the discriminant validity of the measurement model.

Table 2: Factor loading, composite reliability, and average variance extracted

Item	Item Code	Loadings	CR	AVE
Preventive Behavioural Intentions (PBI)	PBI-1	0.754	0.912	0.517
	PBI-2	0.497		
	PBI-3	0.584		
	PBI-4	0.890		
	PBI-5	0.582		
	PBI-6	0.637		
	PBI-7	0.675		
	PBI-8	0.905		
	PBI-9	0.694		
	PBI-10	0.851		
Digital Communicative Behaviours (DCB)	IS-2	0.922	0.894	0.546
	IS-4	0.980		
	IT-1	0.826		
	IT-2	0.923		
	IT-3	0.909		
	IA-1	0.936		
	IA-2	0.930		
	IA-3	0.936		
	IA-4	0.904		

Health-Related Beliefs (HRB)	PR-1	0.542	0.898	0.501
	PR-2	0.890		
	PR-3	0.919		
	PR-4	0.921		
	PR-5	0.899		
	PR-6	0.814		
	HSE-2	0.846		
	HSE-4	0.902		
	HSE-5	0.868		
Social Media-Related Perceptions (SMRP)	ISN-2	0.895	0.910	0.505
	ISN-3	0.868		
	ISN-4	0.866		
	RCB-1	0.782		
	RCB-4	0.855		
	SME-1	0.787		
	SME-2	0.836		
	SME-3	0.887		
	SME-4	0.850		
	SME-5	0.860		

Table 3: HTMT assessment of discriminant validity

	Digital communicative behaviours	Health-related beliefs	Preventive behavioural intentions	Social media-related perceptions
Digital communicative behaviours				
Health-related beliefs	0.382			
Preventive behavioural intentions	0.556	0.387		
Social media-related perceptions	0.763	0.452	0.502	

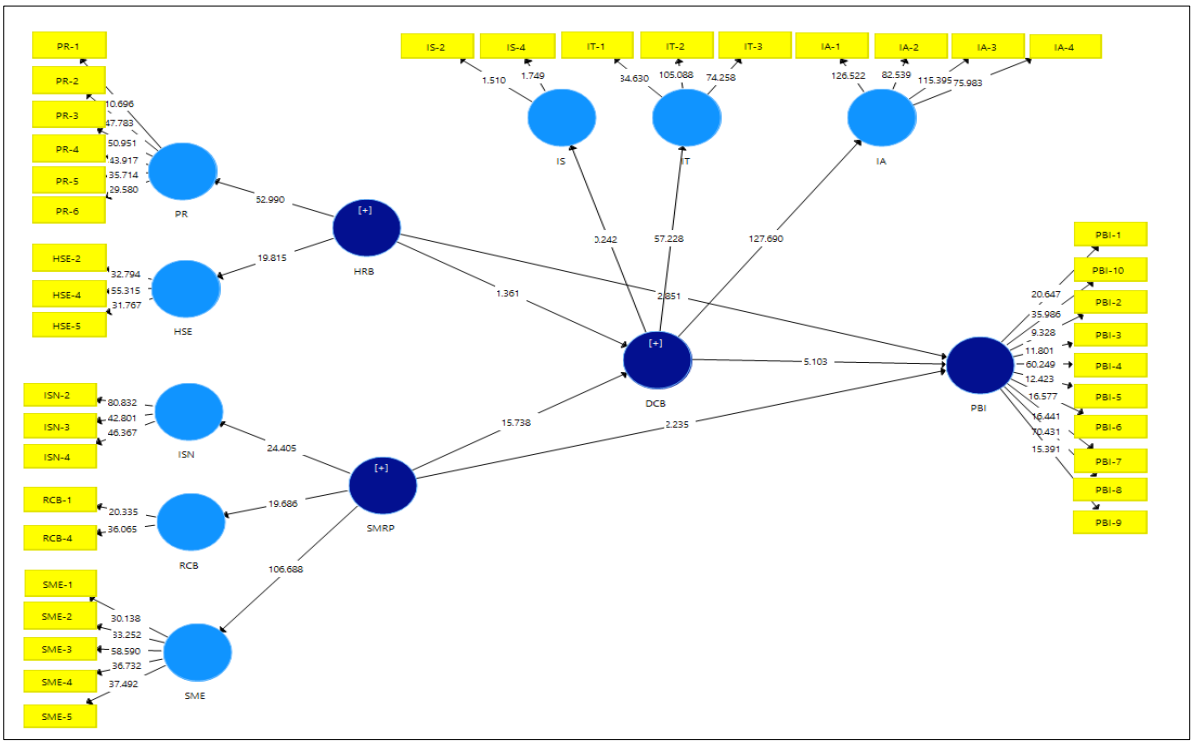

Figure 2: SmartPLS output of the measurement model

Structural Model Assessment

Table 4 summarises the outcomes of the path analysis together with the diagnostic indicators used to evaluate the model, namely VIF, f^2, R^2, and Q^2, across the constructs of health-related beliefs, social media perceptions, digital communicative behaviours, and preventive behavioural intentions. The first step involved testing for multicollinearity using the variance inflation factor (VIF). Established guidelines recommend threshold values of less than 5.0, with more stringent criteria suggesting values below 3.3. The results showed that all VIF scores fell well within acceptable limits, confirming that collinearity was not an issue and that the model estimates are stable. The significance of the structural relationships was then assessed. Based on conventional decision rules ($p < .05$, $t > 1.96$; $p < .01$, $t > 2.58$), most hypothesised relationships were statistically supported, providing evidence of the robustness of the proposed relationships. To evaluate the model's explanatory power, R^2 values were considered. Prior research by Lakens (2022) suggested that values of 0.26, 0.13, and 0.02 can be interpreted as substantial, moderate, and weak, respectively. In this study, preventive behavioural intentions recorded an R^2 of 0.495, indicating a substantial level of variance explained, while digital communicative behaviours achieved an R^2 of 0.285 (moderate). These findings confirm that the model demonstrates strong explanatory relevance.

Beyond explanatory capacity, predictive validity was tested using the blindfolding procedure with an omission distance of seven. The resulting Q^2 values were 0.264 for preventive behavioural intentions and 0.140 for digital communicative behaviours. Since both values exceeded zero, the model can be regarded as having satisfactory predictive accuracy for its endogenous constructs, further strengthening its reliability. The analysis also included an examination of effect sizes (f^2) to determine the extent to which exogenous constructs influenced their endogenous counterparts. Following Cohen's guidelines (Cohen, 1988) as recommended by Sarstedt et al. (2022), (f^2) values of 0.35 representing a large effect, 0.15 a medium effect, and 0.02 a small effect. The results revealed a mix of strong, moderate, and weak influences across the tested pathways. This distribution suggests that while some predictors exert considerable influence on behavioural outcomes, others contribute more modestly, yet still meaningfully, to the overall model.

Taken together, these results confirm that the measurement and structural models meet the key standards of validity and reliability, with strong explanatory and predictive performance. The nuanced variation in effect sizes also highlights which relationships carry the most weight in shaping preventive behavioural intentions, thereby offering important guidance for both theoretical refinement and the design of future health communication strategies.

Table 4: Results of path analysis, VIF, f2, R2, and Q2

	Original Sample (O)	**Sample Mean (M)**	**Std Dev (STDEV)**	**T Values**	**P Values**	**VIF**	**f^2**	**R^2**	**Q^2**
Digital Communicative Behaviours -> Preventive Behavioural Intentions	0.332	0.332	0.068	4.869	0.000	1.979	0.078	0.495	0.264
Health-Related Beliefs -> Digital Communicative Behaviours	0.061	0.063	0.044	1.361	0.174	1.188	0.006	0.285	0.14
Health-Related Beliefs -> Preventive Behavioural Intentions	0.16	0.16	0.057	2.827	0.005	1.195	0.03		

Social Media-Related Perceptions -> Digital Communicative Behaviours	0.677	0.677	0.041	16.66	0.000	1.188	0.764
Social Media-Related Perceptions -> Preventive Behavioural Intentions	0.153	0.156	0.067	2.296	0.022	2.095	0.016

DISCUSSION

Our findings affirm that these constructs influence individuals residing in dengue-prone regions—but with marked variation in influence strength. Health-related beliefs such as risk perception and self-efficacy contributed modestly to preventive behavioural intention (PBI), aligning with prior applications of the Health Belief Model in pandemic contexts (e.g., Alsulaiman, 2023), where these beliefs predicted adherence to protective behaviours (Alsulaiman, 2023). However, our results diverge by showing that these beliefs had a negligible connection with digital communicative behaviours, suggesting external factors may override internal motivations under crisis conditions. By contrast, social media-related perceptions emerged as significantly more influential. Trust in digital platforms and perceived social norms surrounding their use played a decisive role in shaping preventive intentions—a pattern also observed in studies of COVID-19 protective behaviour, where platform trust predicted both online engagement and subsequent protective actions (Choi & Noh, 2023; Handayani et al., 2023). This trend demonstrates the amplified importance of the media environment in enabling behavioural change when health concerns compete for attention.

Our structural model highlights a platform-first mechanism: social media perceptions had the strongest effect, directly influencing PBI and exerting a substantial indirect impact through DCB. This finding resonates with crisis communication literature emphasising media credibility and institutional trust as central in public engagement during epidemics (Alanazi et al., 2025; Elfattah, 2024). In Singapore, for example, adaptive dengue messaging on Facebook during the dual crises of dengue and COVID-19 exemplified how agile, trusted digital communication can sustain public vigilance (Ho et al., 2025). In contrast, health-related beliefs showed only a small direct influence on intention and no relationship with communicative behaviours—counter to conventional HBM-focused models. This discrepancy may reflect issue competition: COVID-19 overshadowed dengue in public consciousness during the MCO, muting the activation effect of dengue-specific risk appraisal. Studies in similar contexts found that risk perception effects can be moderated by platform trust and crisis salience (Garrett et al., 2024; Wang et al., 2024).

Taken together, the relationships observed in this study point to a platform-first mechanism: social media perceptions shape communicative behaviours, which then reinforce preventive behavioural intentions. Health beliefs retain importance for intention but do not drive information behaviours similarly under crisis conditions. This highlights the context sensitivity of health communication models and underscores the importance of tailoring campaign strategies to risk salience and media environments.

CONCLUSION

This study examined how health-related beliefs, social media perceptions, and digital communicative behaviours interact to shape preventive behavioural intentions in dengue-affected areas, with data collected during the Movement Control Order (MCO). The findings

highlight a distinctive pattern: while traditional health beliefs continued to moderately influence preventive intentions, they did not significantly drive communicative engagement. Instead, perceptions of digital platforms – specifically their credibility, usability, and associated social norms – emerged as the most powerful determinants of online engagement and subsequent behavioural intentions. These results underscore a shift from belief-driven to platform-driven mechanisms of preventive health communication under crisis conditions. The dominance of social media perceptions during the MCO suggests that when public attention is fragmented across multiple health threats, communicative actions are more strongly guided by digital channels' perceived reliability and social value than risk assessments alone. This insight refines existing health communication models by demonstrating the central role of media environments in facilitating or constraining preventive behaviours.

From a practical standpoint, the study points to the importance of designing public health campaigns that communicate risk and strengthen the communicative infrastructure around it. Enhancing platform trust, making preventive content more accessible and shareable, and leveraging visible social norms can amplify engagement and sustain preventive practices. Future research should extend this framework by testing it in non-crisis contexts and across different health issues. It should also examine how misinformation and algorithmic exposure may further mediate the link between perceptions, communication, and behaviour. Overall, this study contributes to theory and practice by demonstrating that effective health communication in digital societies requires more than addressing risk beliefs, as it requires building communication ecosystems that enable, motivate, and normalise preventive engagement.

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