Information avoidance in the age of COVID-19: A meta-analysis

Jinhui Li [a,b]

[a] School of Journalism and Communication, Jinan University, 601 Huangpu Ave West, Guangzhou, Guangdong, China 510632
[b] National Media Experimental Teaching Demonstration Center, Jinan University, 601 Huangpu Ave West, Guangzhou, Guangdong, China 510632

ARTICLE INFO

ABSTRACT

Guided by three major theoretical frameworks, this meta-analysis synthesizes 17 empirical studies (15 articles with 18,297 participants, 13 of them are from non-representative samples) and quantifies the effect sizes of a list of antecedents (e.g., cognitive, affective, and social factors) on information avoidance during the COVID-19 context. Findings indicated that information-related factors including channel belief ($r = -0.35$, $p < .01$) and information overload ($r = 0.23$, $p < .01$) are more important in determining individual's avoidance behaviors toward COVID-19 information. Factors from the psychosocial aspects, however, had low correlations with information avoidance. While informational subjective norms released a negative correlation ($r = -0.16$, $p < .1$) which was approaching significant, positive and negative risk responses were not associated with information avoidance. Moderator analysis further revealed that the impacts of several antecedents varied for people with different demographic characteristics (i.e., age, gender, region of origin), and under certain sampling methods. Theoretically, this meta-analysis may help determine the most dominant factors from a larger landscape, thus providing valuable directions to refine frameworks and approaches in health information behaviors. Findings from moderator analysis have also practically inspired certain audience segmentation strategies to tackle occurrence of information avoidance during the COVID-19 pandemic.

1. Introduction

The global spread of coronavirus disease 2019 (COVID-19) has caused major challenges in the healthcare, social and economic aspects (Osterrieder et al., 2021; Saladino, Algeri and Auriemma, 2020). As this rapidly-evolving pandemic continues, news and information regarding the COVID-19 have predominated the media agenda (Buneviciene, Bunevicius, Bagdonas and Bunevicius, 2021). Although effective dissemination of facts is essential to inform individuals about the changing conditions and encourage them to develop preventive behaviors, the excessive volume of relevant messages mixing with contradictory and incorrect information could also result in a situation called "Infodemic" (Naeem and Bhatti, 2020; Zarocostas, 2020) – which imposes extra uncertainties, triggers negative emotions (e.g., fear, distress) and subsequently impairs physical and mental well-being (Song, Yao and Wen, 2021; Soroya, Farooq, Mahmood, Isoaho and Zara, 2021). Under such condition, people may apply alternative coping strategies and start to avoid COVID-19 related information (Link, 2021; Soroya et al., 2021).

Indeed, information avoidance is a common communication phenomenon. According to Sweeny, Melnyk, Miller and Shepperd (2010, p. 341), information avoidance is defined as "*any behavior intended to prevent or delay the acquisition of available but potentially unwanted information*". With a theoretical basis on Uncertainty Management Theory (Brashers, 2001), information avoidance allows

people to limit the interaction to unnecessary or threatening information that could cause psychological discomfort. It thus serves as effective coping approaches in crisis management (Howell, Crosier and Shepperd, 2014; Link, 2021), particularly in the health context. For example, more than one-third of cancer patients reported avoiding information related to their illness (Emanuel et al., 2015; Loiselle, 2019). Other studies have further documented information avoidance in various health conditions and across different demographic groups (e.g., Buneviciene et al., 2021; Hightow et al., 2003; Orom, Schofield, Kiviniemi, Waters and Hay, 2020; Van der Meer et al., 2013). During a rapid global health crisis like the COVID-19, information avoidance, on one hand, can serve as a strategy to reduce negative emotions and maintain optimism (Barbour, Rintamaki, Ramsey and Brashers, 2012; Brashers, Goldsmith and Hsieh, 2002); On the other hand, it can also bias one's risk perception and result in stronger resistance to the adoption of preventive measures (Siebenhaar, Köther and Alpers, 2020). Such mixed results present a more critical need for health scholars and professionals to deeply understand information behavior – especially how and why people avoid information about COVID-19 – to identify the predictors and underlying conditions of this behavior.

Nevertheless, while a large number of review studies have synthesized and examined the antecedents predicting health information seeking (Chang and Huang, 2020; Marton and Choo, 2012; Ou and Ho, 2021; Wang, Shi and Kong, 2021), far less attention was paid to those associating with health information avoidance, despite its significant link to effective coping strategies and crisis management. Only one narrative review from Choo (2017) conceptualized and postulated the precursors of information avoidance in risk communication literatures that are highly relevant to the health context. As there is an increasing number of research focusing on health-related information avoidance during the COVID-19 pandemic, a meta-analysis in this field is urgently needed to integrate complex and even conflicting findings, identify the universal or dominant antecedents, and further offer insights into theory development and health practice. As a result, this study was conducted with three specific aims: a) to propose a comprehensive theoretical framework that incorporates cognitive, affective, situational and demographic determinants relating to information avoidance in the COVID-19 context; b) to quantify and compare the effects of these determinants through statistical assessment of existing evidences; and c) to examine the potential moderators that may explain the variations in the associations between these determinants and information avoidance.

2. Literature review

2.1. Developing theoretical frameworks to predict information avoidance

Information avoidance was extensively studied by researchers from diverse academic background such as communication, social psychology, information science and information system. Thus, a wide range of theories and frameworks have been applied into the research of information avoidance. For example, scholars in risk communication have started the primary work of information avoidance with the research on information seeking (Choo, 2017; Deline and Kahlor, 2019), given the fact that both of them are coping behaviors to risks and uncertainties. They sought to understand information avoidance by the cognitive models that explain what drives information seeking behavior (Yang and Kahlor, 2012; Zhou, Roberto and Lu, 2021). Meanwhile, others in environmental psychology proposed that sensory stimulus in the environment could affect individuals' internal state and subsequently lead to a behavioral response including information avoidance (Song et al., 2021; Soroya et al., 2021). This meta-analysis thus has identified three major theoretical frameworks with core and widely studied determinants that are mostly relevant to information avoidance in a health crisis like COVID-19.

2.1.1. Risk information seeking and processing (RISP) model

The RISP (Griffin, Dunwoody and Neuwirth, 1999) is one of the most widely used models to understand individuals' information seeking and processing behaviors across various environmental or health risks, such as air pollution (Kim and Kim, 2019), antibiotic use (Zhou, Acevedo Callejas and MacGeorge, 2020), and Zika virus (Hubner and Hovick, 2020). It postulates the importance of information insufficiency (the gap between perceived current knowledge and needed knowledge) on determining active seeking of risk information, while information insufficiency is further driven by a number of cognitive and sociopsychological motivators including perceived hazard characteristics, affective responses, relevant channel belief and informational subjective norms (Griffin, Dunwoody and Yang, 2013; Yang, Aloe and Feeley, 2014). Despite most RISP studies have focused on information seeking, this model can be also applied to explain and predict information avoidance in crisis contexts (Gutteling and de Vries, 2017; Kim, Ahn, Atkinson and Kahlor, 2020). Based the results of previous studies, the RISP was reported to have acceptable (or good) model fit and explain 7% to 39% variance in information avoidance under risks (Zhou et al., 2021). The RISP is further supplemented by its expanded iterations such as the *Planned Risk Information Seeking Model* (PRISM; Kahlor, 2010), and particularly, the *Planned Risk Information Avoidance* (PRIA; Deline and Kahlor, 2019) model, to specify its link to risk information avoiding behavior. There is an increasing recent research interest in examining the utility of the RISP in understanding why people avoid information about COVID-19 pandemic (Ahn, Kim, Kahlor, Atkinson and Noh, 2021; Hwang and Jeong, 2021; Link, 2021). However, the impacts of some RISP constructs were often inconsistent across these studies.

2.1.2. Comprehensive model of information seeking (CMIS)

Introduced by Johnson and Meischke (1993), the CMIS is another widely cited theoretical framework in information behavior literature with a particular attempt to model the health-related information seeking – or avoidance. The key proposition of the CMIS is that the extent to which an individual seeks or avoids information is influenced by his/her health-related factors (i.e., demographics, direct health experience, perceived salience, efficacy beliefs) and information characteristics (e.g., perceived credibility), and the

relations are further mediated by information utility (i.e., perceived usefulness of information channels) (Johnson, Donohue, Atkin and Johnson, 1995). Applicability of the CMIS has been examined across many health fields. For example, several cancer studies have highlighted the direct and indirect impacts of information carrier factors, demonstrating their strong association with cancer information seeking and avoiding (Johnson and Meischke, 1993; Ruppel, 2016). Meanwhile, other studies have extended the model through adding antecedent factors such as interest in exchanging health information online (Van Stee and Yang, 2018), or length and frequency of the Internet use (Basnyat, Nekmat, Jiang and Lin, 2018). Particularly, research from Addison (2017) further expanded the CMIS to better predict health information avoidance, by including the belief or lack of belief in health information seeking as a social responsibility.

2.1.3. Stimulus-Organism-Response (S-O-R) framework

The classical framework of S-O-R (Mehrabian and Russell, 1974) has its origin in environmental psychology, mainly describing a set of environmental cues that influence an individual's internal states (e.g., perception, feelings, and thinking) and subsequently trigger behavioral responses. Specifically, it explicates how stimuli in outer surroundings can affect the cognitive and affective aspects of decision-making process, which could induce an individual approach or avoid the environment. This framework has been extensively studied in the domain of consumer behaviors (e.g., Liu and Zheng, 2019), online learning (e.g., Zhai, Wang and Ghani, 2020) and health information management (e.g., Yang et al., 2021). Recent studies have successfully applied the S-O-R to understand public's behavior changes during the COVID-19 pandemic, particularly the avoidance behaviors toward relevant information (Song et al., 2021; Soroya et al., 2021). Guided by the paradigm, their findings suggested that under the external stimulus of threat and uncertainty, people are likely to avoid COVID-19 information arousing unpleasant feelings of sadness, anxiety, as well as cognitive dissonance and overload.

2.2. Identifying influencing factors for meta-analysis

To construct a comprehensive framework to study information avoidance toward COVID-19 pandemic, this study has identified major antecedents proposed by the above three theoretical frameworks. These antecedents were then categorized into four aspects: cognitive factors, affective factors, situational factors, and demographic factors. Fig. 1 illustrates the proposed framework incorporating major antecedents for meta-analysis.

2.2.1. Cognitive factors

Previous studies often highlighted the critical role of cognitive processing in driving health information avoidance (Deline and Kahlor, 2019). When studying risk-related information behaviors, cognitive factors can be further divided into two dimensions (Zhao and Liu, 2021): information-oriented and risk-oriented. Information-oriented factors emphasize individual's cognitive need and evaluation of relevant information to react under risks. Variables such as *Information Insufficiency* and *Channel Belief* in the RISP, and *Information Overload* in the S-O-R represent this dimension, demonstrating that perceptions and attitudes toward information account for people's decision on information behavior strategies under risk scenarios. For example, existing risk communication studies indicated that individuals tend to avoid information if they perceive low information insufficiency (Yang and Kahlor, 2012; Zhao and
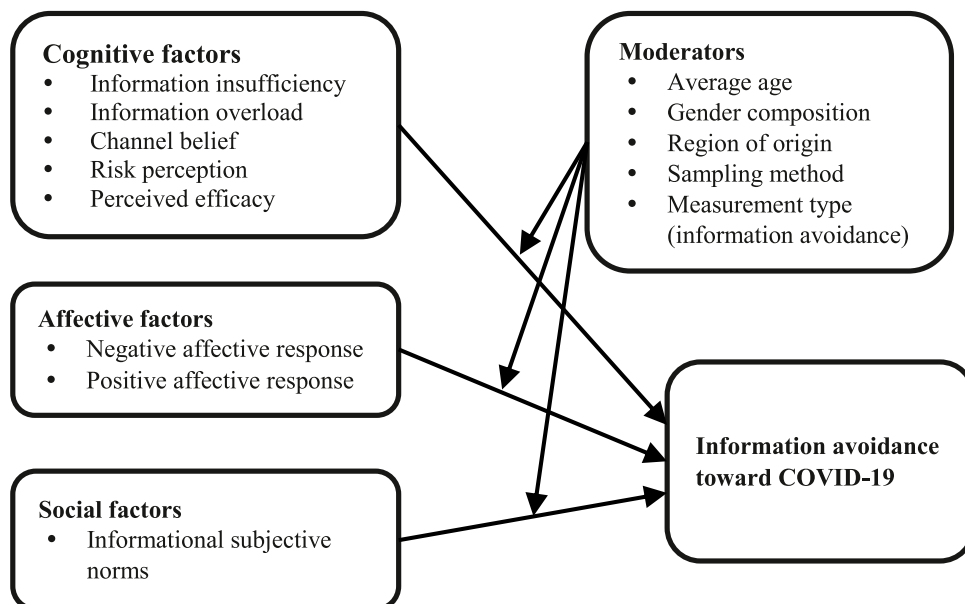

Fig. 1. Theoretical framework proposed for meta-analysis.

Liu, 2021) or experience high information overload (de Bruin, de Haan, Vliegenthart, Kruikemeier and Boukes, 2021; Song et al., 2021). At the same time, people's perceived trustworthiness and usefulness of information channels, or known as channel belief, is also a negative predictor of information avoidance behavior (Zhou et al., 2021). Instead, risk-oriented factors reflect the cognitive judgements induced by a risk, in which people assess the severity and susceptibility of the risk, as well as their coping ability against it. Despite using different terms, three theoretical frameworks indeed proposed relevant variables with similar conceptualization. For instance, perceived salience in the CMIS has a commonality in the conceptualization of risk perception in the RISP (Wang et al., 2021), which both indicate people's evaluation of the risk. Furthermore, variables such as perceived information gathering capacity in the RISP, efficacy belief in the CMIS, and perceived self-efficacy in information seeking literature are all referred to the perceived ability and control to perform information behaviors under salient threats. Substantial studies have indicated the negative impacts of these variables on health information avoidance, including the COVID-19 context (Hwang and Jeong, 2021; Zhao and Liu, 2021). Therefore, inspired by previous reviews (Ou and Ho, 2021; Wang et al., 2021), this meta-analysis applied the umbrella concepts of *Risk Perception* and *Perceived Efficacy* to represent the risk-oriented cognitive factors that predict COVID-19 information avoidance. Based on relevant theories and research regarding the association between these cognitive factors and information avoidance, this meta-analysis therefore proposes the following hypotheses in the COVID-19 context:

Hypothesis 1. *Information insufficiency is negatively associated with information avoidance toward COVID-19.*

Hypothesis 2. *Information overload is positively associated with information avoidance toward COVID-19.*

Hypothesis 3. *Channel belief is negatively associated with information avoidance toward COVID-19.*

Hypothesis 4. *Risk perception is negatively associated with information avoidance toward COVID-19.*

Hypothesis 5. *Perceived efficacy is negatively associated with information avoidance toward COVID-19.*

2.2.2. Affective factors

Unlike cognitive factors, the importance of affective factors has always lurked predominantly in the field of information behavior (Fisher and Landry, 2007). The emotions triggered by threat and uncertainty, however, also largely determine people's information behaviors in risky situations. Theoretical frameworks of the RISP and the S-O-R have incorporated emotional responses as a lens to understand risk information seeking behavior (Hwang and Jeong, 2021; Kim and Kim, 2019; Song et al., 2021). Although perceived risk is likely to produce negative responses such as fear and anxiety, it can also produce positive feelings of hope, optimism, and excitement toward the risk (Griffin et al., 2008). Both negative and positive affect could motivate information seeking and avoidance (Deline and Kahlor, 2019; Griffin et al., 2013), especially in a high-risk context such as COVID-19 (Zhao and Liu, 2021). Nevertheless, previous findings of the relationship between affective factors and COVID-19 information avoidance are rather fragmented and inconsistent. While some studies investigated affective responses as a whole (Hwang and Jeong, 2021; Liu, Chen, Shi and Yan, 2021), others focused on specific feelings such as sadness, anxiety (Ahn et al., 2021) or worry (Nolte, Deng and Löckenhoff, 2021; Pahayahay and Khalili-Mahani, 2020). Additionally, most of studies indicated that negative responses decrease the intention to avoid information, while positive emotions lead to information avoidance (Brashers, 2001; Yang and Kahlor, 2012). But reverse conclusion was also reported (Siebenhaar et al., 2020), since the action tendency of fear and anxiety is avoidance – individuals would choose to ignore the distressing information in order to alleviate the negative emotions. Given the inconsistent results, this meta-analysis seeks to estimate the overall impacts of both *Negative Affective Response* and *Positive Affective Response* on information avoidance during COVID-19 pandemic. This study posits:

Hypothesis 6. *Negative affective response is negatively associated with information avoidance toward COVID-19.*

Hypothesis 7. *Positive affective response is positively associated with information avoidance toward COVID-19.*

2.2.3. Social factors

The effect of social factors lies on the assumption that individual's social environment network (e.g., perceived pressure or expectations from peers or relatives) would influence their assessment of information needed for the risk, and thus the corresponding information behavior (Choo, 2017; Griffin et al., 1999). Different from other antecedents, social factors are highlighted in the RISP only, not in the other two models. They are conceptualized as information subjective norms in the RISP, and positioned as a key motive behind information seeking and processing under a risk (Yang et al., 2014). Many empirical studies have supported that greater informational subjective norms result in less information avoidance (Griffin et al., 2013; Yang and Kahlor, 2012). This association was further examined in the context of COVID-19 pandemic (Ahn et al., 2021; Liu et al., 2021). Therefore, this meta-analysis includes *Information Subjective Norms* as a social factor in the current theoretical framework predicting the COVID-19 information avoidance, and posits the following hypothesis:

Hypothesis 8. *Information subjective norms are negatively associated with information avoidance toward COVID-19.*

2.2.4. Potential moderators

It is worthwhile to further examine the potential factors that moderate the impacts of proposed antecedents on information

avoidance. First, information behaviors may vary across different demographic conditions. For instance, meta-analytic evidence indicated that older adults perform less information search than younger adults before decision-making (Mata and Nunes, 2010). Age is also associated with cognitive perceptions toward online health information seeking (Sheng and Simpson, 2015). Hence, age could serve as a moderator on the relationships between certain antecedents and information avoidance. With respect to gender, previous studies suggested that men often tend to be unwilling and lack the motivation to engage with health-related information, due to gender role strains and conventional masculine norms (Ek, 2013; Manierre, 2015). The gender gap existing in health information behaviors may also lead to similar moderation effect on information avoidance. In addition, cultural differences associated with regions are able to influence the strength of the relationship between perceived information characteristics and information seeking and processing, thus moderating information avoidance (Kim et al., 2020; Yi, Stvilia and Mon, 2012). Beyond the demographic moderators, this meta-analysis also included methodological moderators to investigate generalizability of the associations between antecedents and COVID-19 information avoidance. A common methodological moderator highlighted in previous meta-analytic studies (Ou and Ho, 2021; Yang et al., 2014) is sampling method, as findings from non-representative samples would exaggerate the correlations between variables. Meanwhile, because single-item measures are considered to be more vulnerable to random measurement errors and have less predictive validity than multiple-item measures (Diamantopoulos, Sarstedt, Fuchs, Wilczynski and Kaiser, 2012), the outcome measurement of information avoidance may act as another methodological moderator for the proposed relations. Taking together, this study examined the moderating effects of *age, gender, region of origin, sampling method*, and *measurement type of information avoidance* in the proposed theoretical framework predicting COVID-19 information avoidance. Thus, this meta-analysis raises the following question:

RQ1: *Do the associations between proposed antecedents and COVID-19 information avoidance vary by (a) average age of the sample, (b) gender composition of the sample, (c) region of origin, (d) sampling method and (e) measurement type of information avoidance?*
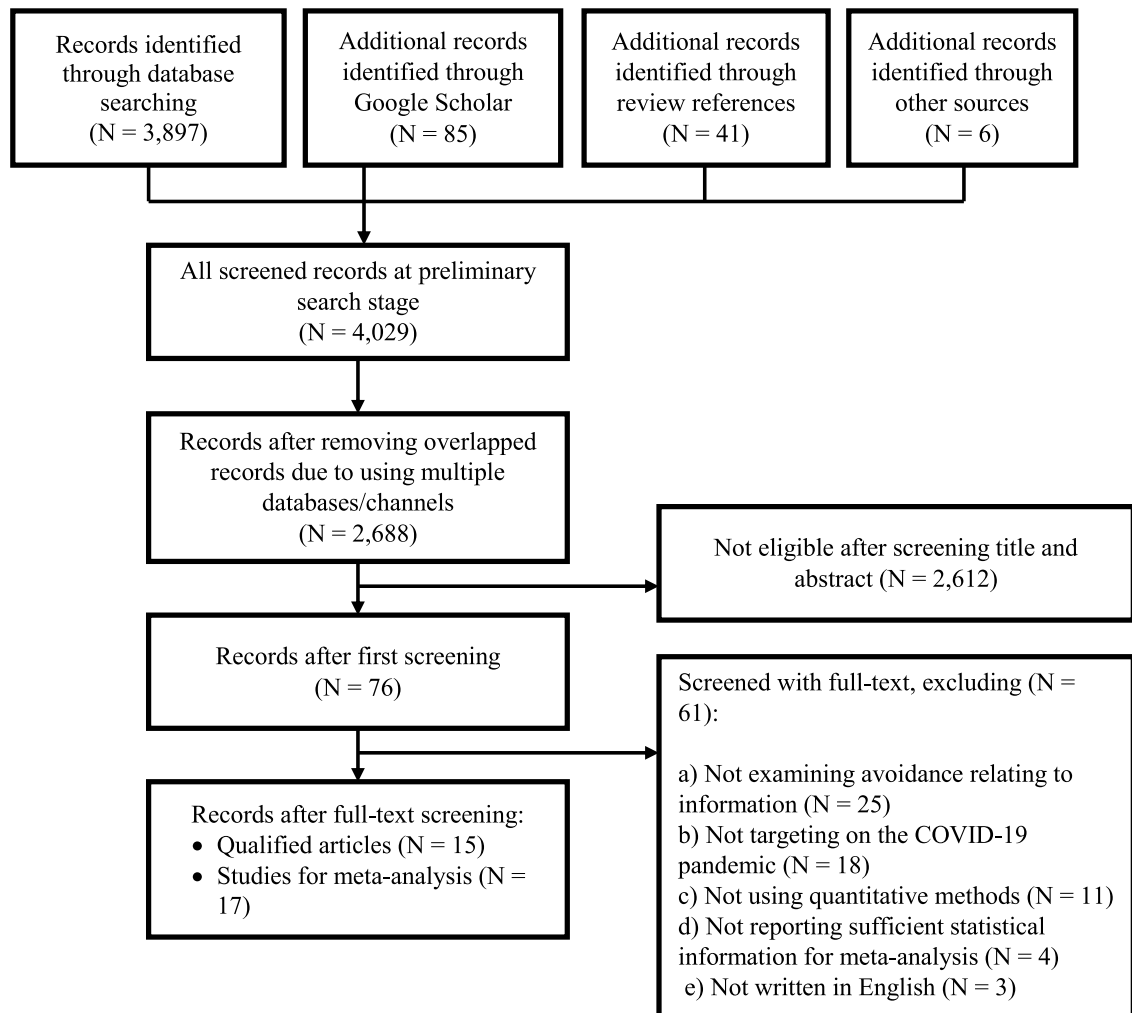

Fig. 2. The selection process of studies included in the meta-analysis.

3. Methods

3.1. Search process and selection criteria

This meta-analysis was conducted based on the guidelines from Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher, Liberati, Tetzlaff, Altman and The, 2009). A thorough literature search was performed in February 2022, among major databases involving PubMed®, Web of Science®, EBSCO®, and ScienceDirect®. Google Scholar® search engine was also applied to maximize the search scope. Given the main purpose, this study has developed a combination of search terms to retrieve English-written articles: "Information OR news OR media" AND "corona* OR sars cov OR covid*" AND "avoid* OR ignor* OR

Table 1
Conceptualization of all the antecedents and outcome.

Category	Construct	Definition	Included conceptualization	Source
Cognitive factors	Information insufficiency	Individuals' perceptions of the gaps between what they already knew and what they need to know regarding the COVID-19 pandemic	(Perceived) Information insufficiency	Link (2021), Ahn et al. (2021); Zhou et al. (2021)
			Perceived knowledge insufficiency	Liu et al. (2021)
			Sufficiency threshold	Hwang and Jeong (2021)
	Information overload	A state in which individuals have received too much information on the COVID-19 pandemic	Overloaded	de Bruin et al. (2021)
			(Perceived) Information overload	Link (2021), Song et al. (2021)
	Channel belief	Individuals' perceived trustworthiness and usefulness of information channels regarding the COVID-19 pandemic	Media trust	de Bruin et al. (2021)
			Trust in information sources	Siebenhaar et al. (2020)
			Relevant channel belief	Zhou et al. (2021)
	Risk perception	Individuals' perceived susceptibility and severity of the COVID-19 pandemic	Risk perception	e.g., Liu et al. (2021); Link (2021); Kim et al. (2020)
			Perceived threat	Song et al. (2021)
			Perceived severity	Zhao and Liu (2021)
			Perceived susceptibility	Zhao and Liu (2021)
			Perceived risk	Chen et al. (2022)
			Risk judgement	Hwang and Jeong (2021)
	Perceived efficacy	Individual's evaluation of effectiveness, feasibility, and convenience in the face of threats relating to COVID-19 pandemic	Efficacy (high and low)	de Bruin et al. (2021)
			Perceived seeking control	Liu et al. (2021)
			Self-efficacy	Zhao and Liu (2021)
			Perceived information gathering capacity	Hwang and Jeong (2021)
Affective factors	Negative affective response	Negative emotions or feelings triggered by the COVID-19 pandemic	Negative affective risk response	Link (2021)
			Affective responses (consisting of negative emotions, e.g., concerned, worried, anxious)	Hwang and Jeong (2021), Zhou et al. (2021)
			Worry of health (mental and physical risk)	Pahayahay and Khalili-Mahani (2020), Nolte et al. (2021)
			Fear	Buneviciene et al. (2021), Ahn et al. (2021)
			Anxiety	e.g., Buneviciene et al. (2021); Song et al. (2021); Siebenhaar et al. (2020)
			Anger	Zhao and Liu (2021), Ahn et al. (2021)
			Sadness	Ahn et al. (2021), Song et al. (2021)
			Concerned	Zhao and Liu (2021)
			Depression	Buneviciene et al. (2021)
			Distress by information	Siebenhaar et al. (2020)
	Positive affective response	Positive emotions or feelings triggered by the COVID-19 pandemic	Hope (hopeful)	Zhao and Liu (2021), Ahn et al. (2021)
			Excited	Zhao and Liu (2021)
			Encouraged	Zhao and Liu (2021)
Social factors	Informational subjective norms	individual's tendency to respond to social expectations that they should obtain adequate information to cope with the COVID-19 pandemic	Informational subjective norms	e.g., Liu et al. (2021); Kim et al. (2020); Hwang and Jeong (2021)
Outcome	Information avoidance	Individuals' intention or action to prevent or delay access to information about the COVID-19 pandemic	Information avoidance	e.g., Link (2021); Ahn et al. (2021); Buneviciene et al. (2021)
			News avoidance	de Bruin et al. (2021)
			Ignore	Pahayahay and Khalili-Mahani (2020)
			Self-reported media avoidance	Nolte et al. (2021)
			Behavioral media avoidance	Nolte et al. (2021)

selective exposure." Snowballing technique (Wohlin, 2014) was further performed on the identified articles and relevant reviews to supplement the search results. Besides seeking for journal articles and conference papers, relevant book chapters and dissertations (e. g., Brown, 2021) were also screened to avoid potential bias. It resulted in a total of 4029 articles at the preliminary search stage.

The titles and abstracts of all retrieved articles were first screened after removing the duplicated ones due to using multiple databases and channels. To be included in the final meta-analysis, the eligible study should meet the following criteria:

a) The impacts of antecedents on information avoidance behaviors or intention were examined. As such, studies that examined avoidance not relating to information – such as avoidance of healthcare utilization (e.g., Wartelle et al., 2021) or avoidance of contracting COVID-19 (e.g., Leotti, Pochinki, Reis, Bonawitz and LoBue, 2021) – were excluded.

b) Study was conducted within the context of COVID-19 pandemic. Those examining information avoidance in the general or other specific health contexts (e.g., Howell and Shepperd, 2013; Hua and Howell, 2020) were excluded.

c) Quantitative methods were used with essential statistical information for meta-analysis. Qualitative studies or commentaries were excluded. Furthermore, one identified study (Lee, 2021) did not report sufficient information (e.g., correlation, β coefficient, or odds ratio) to calculate the effect size. The research team have tried to contact the author, but no response was received. Therefore, it was eventually excluded from the meta-analysis.

3.2. Coding and analysis procedure

This meta-analysis ultimately included 15 qualified articles predicting COVID-19 information avoidance. The article selection process is presented in Fig. 2. Most of the articles involved a cross-sectional study (14 articles) and focused on general adult populations (14 articles). The regional characteristics of selected samples may differ but they represent a subpopulation of interest who avoid information about COVID-19. Meanwhile, the included research have been conducted in a reasonably similar time period (Year 2020–2022) so results are not greatly affected by time. They shared high similarity in study design and sampling frames, and thus had the basis for meta-analysis. One article (Zhou et al., 2021) involved three independent samples collected at different time points, its findings were then coded for multiple coefficients. Furthermore, considering the different ways of conceptualizing certain antecedents among these articles, they are also categorized and coded for multiple coefficients. Suggested by previous literature and meta-analyses

Table 2
Studies included in the meta-analysis.

Study	Sample size	Country	Average age	Gender composition	Region of origin	Sampling method	Measurement of information avoidance
Ahn et al. (2021)	2942	Multiple	Over 40 years	Majority male	Majority Asia	Non-representative	Multiple-item
Buneviciene et al. (2021)	1036	Lithuania	Below 40 years	Majority female	Majority Europe/ North America	Non-representative	Single-item
Chen et al. (2022)	561	United States	Below 40 years	Majority female	Majority Europe/ North America	Representative	Multiple-item
de Bruin et al. (2021)	2593	Netherlands	Over 40 years	Majority female	Majority Europe/ North America	Non-representative	Multiple-item
Hwang and Jeong (2021)	346	South Korea	Over 40 years	Majority female	Majority Asia	Non-representative	Multiple-item
Kim et al. (2020)	2942	Multiple	Over 40 years	Majority male	Majority Asia	Non-representative	Multiple-item
Link (2021)	1000	Germany	Over 40 years	Equal	Majority Europe/ North America	Representative	Multiple-item
Liu et al. (2021)	822	China	Below 40 years	Majority female	Majority Asia	Non-representative	Multiple-item
Nolte et al. (2021)	500	United States	Over 40 years	Majority female	Majority Europe/ North America	Representative	Multiple-item
Pahayahay and Khalili-Mahani (2020)	685	Multiple	Over 40 years	Majority female	Majority Europe/ North America	Non-representative	Single-item
Siebenhaar et al. (2020)	1059	Germany	Below 40 years	Majority female	Majority Europe/ North America	Non-representative	Multiple-item
Song et al. (2021)	721	China	Below 40 years	Majority female	Majority Asia	Representative	Multiple-item
Soroya et al. (2021)	321	Finland	Below 40 years	Majority female	Majority Europe/ North America	Non-representative	Multiple-item
Zhao and Liu (2021)	1946	China	Below 40 years	Majority male	Majority Asia	Non-representative	Multiple-item
Zhou et al. (2021)a	263	United States	Below 40 years	Majority male	Majority Europe/ North America	Non-representative	Multiple-item
Zhou et al. (2021)b	280	United States	Below 40 years	Majority male	Majority Europe/ North America	Non-representative	Multiple-item
Zhou et al. (2021)c	280	United States	Below 40 years	Majority male	Majority Europe/ North America	Non-representative	Multiple-item

(e.g., Chang and Huang, 2020; Link, 2021; Ou and Ho, 2021), this study has provided a clear definition for each of the antecedents and outcome, as well as a mapping of various conceptualizations onto these definitions. For instance, some studies examined efficacy-related factors toward the COVID-19 information, such as *Perceived seeking control* (Liu et al., 2021), *Self-efficacy* (Zhao and Liu, 2021) and *Perceived information gathering capacity* (Hwang and Jeong, 2021). In the coding process, these various conceptualizations were merged into the umbrella concept of *Perceived efficacy*. Table 1 provides the detailed definition and conceptualization of all the antecedents and outcome.

As a result, a total of 17 studies were identified for meta-analysis, yielding an overall sample size of 18,297 participants and 64 relevant correlations. An adequate statistical power can be assumed in most of these studies, since the average sample size excesses 1000 participants. Besides statistical information, basic study characteristics regarding the potential moderators – average age, gender composition, region or origin, sampling method, and measurement type of information avoidance – were also extracted and further
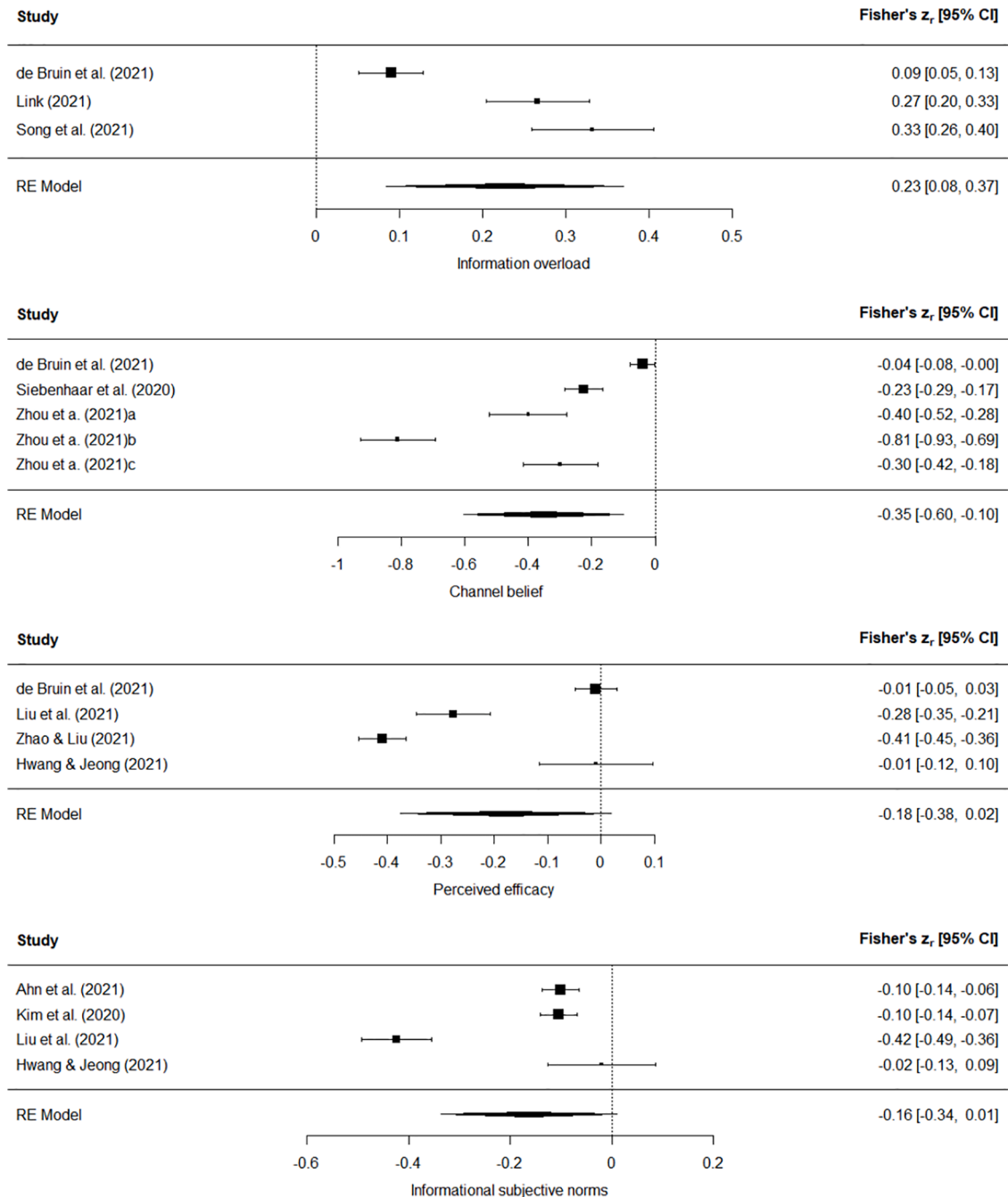

Fig. 3. Forest plots for the effect sizes of information overload, channel belief, perceived efficacy, and informational subjective norms.

coded for analysis. In the coding process of average age, studies which did not explicitly report the mean age were coded (either below or over 40 years) based on the age proportions. Two coders with expertise in information and communication (author of this study and one of his master students) performed the coding process independently and then resolved the disagreements through discussion. Table 2 presented the descriptive information of the studies included in this meta-analysis. Following the guidelines from Rao et al. (2008), this research has further developed critical criteria to assess the survey quality of these studies. Specifically, the quality criteria involve response rates, sample representativeness, questionnaire pre-testing, and non-response follow-up. Studies were deemed of poor quality if they do not obtain (or fail to report) high coverage of target population and take measures to reduce non-response bias. The results of quality assessment were illustrated in Supplemental Appendix Table S1. Sensitivity analyses was performed to evaluate the robustness of the main findings by removing poor quality studies. Supplemental Appendix Table S2 indicates the results of sensitivity analyses.

Consistent with previous meta-analysis in health information behaviors (Kuang and Wilson, 2017; Wang et al., 2021), this study has applied the Pearson correlation coefficient r as the primary metric to estimate effect size. For studies reporting other index of relationships (i.e., β coefficients, odds ratio, F statistics), this meta-analysis converted the corresponding values to Pearson's r based on the methods introduced by Peterson and Brown (2005) and Rosenthal and DiMatteo (2001). The effect sizes of all included studies were primarily weighted based on sample sizes and computed into an overall effect size through the random-effects model. Different from fixed-effect model, random-effects model assumes that both within-study (sampling error) and between-study variability contribute to the difference across study effect sizes (Hunter and Schmidt, 1990). Recognizing the publication bias toward positive findings in the research community (Kraemer and Andrews, 1982), the fail-safe N test (Rosenthal, 1979) was applied to estimate the minimum number of additional "negative" studies (in which effect size is non-significant) that would be needed to change the standing conclusion in the meta-analysis. Moderator analysis was further examined to determine whether the five potential moderators explained observed variances in effect sizes. This study first used Q statistic and index I^2 to assess the homogeneity of variance in the effect sizes. A significant Q value and I^2 value exceeding 75% suggested a high heterogeneity and thus the need to perform moderator analysis (Huedo-Medina, Sánchez-Meca, Marín-Martínez and Botella, 2006). Weighted least squares regression analysis was then applied to test the significance of moderators when all of them were entered simultaneously into the model. All analyses in this study were conducted in R using the *metafor* package.

4. Results

Over half of the studies were conducted in the Western context, while three studies (Ahn et al., 2021; Kim et al., 2020; Pahayahay and Khalili-Mahani, 2020) involved participants from multiple nations. No major preference was shown in age and gender composition among these studies. However, most of the studies employed non-representative sampling methods (13 out of 17) and multiple-item scales (15 out of 17) to measure information avoidance. Among them, only two studies (Buneviciene et al., 2021; Link, 2021) have reported the prevalent rate of avoidance toward COVID-19-related information, ranging from 32 to 34.1%.

4.1. Effect size of antecedents

Significant overall effect sizes were observed in several cognitive and social factors. Among them, channel belief is the most crucial antecedent associated with information avoidance toward COVID-19, with a negative and moderate weighted effect size ($r = -0.35$, $p < .01$), thus supporting H1c. Fail-safe N test results suggested that 430 undetected studies with non-significant effect size would have to exist to bring the significance level above 0.05. Information overload also played significant role in explaining individuals' information avoidance, leading to a positive overall effect size of $r = 0.23$, $p < .01$, thus supporting H1b. Meanwhile, perceived efficacy

Table 3
Summary of overall effect sizes on the COVID-19 information avoidance.

Antecedents	k	N	Effect size estimation			Homogeneity		Publication bias
			r	SE	*95% CI*	Q	I^2	Fail-safe N
Cognitive factors								
Information insufficiency	9	10,821	−0.07	0.05	[−0.18, 0.03]	244.34***	96.21%	154
Information overload	3	4314	0.23**	0.07	[−0.08, 0.37]	44.44***	94.73%	174
Channel belief	5	4475	−0.35**	0.13	[−0.60, −0.10]	179.10***	98.15%	430
Risk perception	9	13,226	−0.12	0.16	[−0.44, 0.20]	1345.68***	99.70%	160
Perceived efficacy	4	5707	−0.18$^{\xi}$	0.10	[−0.38, 0.02]	194.61***	97.97%	259
Affective factors								
Negative affective response	26	32,898	0.04	0.04	[−0.03, 0.12]	655.49***	97.64%	381
Positive affective response	4	8780	0.09	0.09	[−0.09, 0.27]	200.55***	98.65%	98
Social factors								
Informational subjective norms	4	7052	−0.16 $^{\xi}$	0.09	[−0.34, 0.01]	79.06***	97.82%	202

Note. k, number of relationships; *N,* aggregated sample size; *r,* weighted mean observed correlation; *CI,* confidence intervals.

$^{\xi}$ $p < 0.1$.
*$p < .05$.
** $p < .01$.
*** $p < .001$.

has a negative effect size which was approaching significance level ($r = 0.18, p < .1$). Similarly, from the social perspective, a small and negative correlation was observed between informational subjective norms and information avoidance ($r = -0.16, p < .1$), which was also close to statistical significance. Therefore, both H1e and H3 were considered to be supported in this meta-analysis. The fail-safe N of the above three antecedents ranged from 174 to 259, suggesting that the conclusions of the meta-analysis are unlikely susceptible to publication bias. Fig. 3 illustrates the forest plots for the effect sizes of significant (or approaching significant) antecedents. Different from expectation, COVID-19 information avoidance was not affected by risk perception, information insufficiency, as well as affective factors including positive and negative risk responses. These non-significant results did not support H1a, H1d, H2a, and H2b. Table 3 summarizes the results of the weighted mean effective sizes between all the antecedents and information avoidance toward COVID-19. Further examination in sensitivity analyses (Supplemental Appendix Table S2) had supported the robustness of the main findings, with most of conclusions remained the same after removing poor quality studies.

4.2. Moderator analysis

Findings of the heterogeneity test (Q and I^2 values) indicated that impacts of antecedents on COVID-19 information avoidance would be moderated by demographic and methodological factors (see Table 4). Specifically, average age moderated the relationship between perceived efficacy and information avoidance ($Z = 4.80, p < .001$), such that the effect would be stronger for young adults aged below 40 years ($r = -0.35, p < .001, k = 2$) than it would be for older adults aged over 40 years ($r = -0.01, p = .69, k = 2$). Gender composition also functioned as a significant moderator in the association between channel belief and information avoidance ($Z = -1.77, p < .001$). While studies with a majority of male participants tended to reveal significant negative associations between channel belief and information avoidance ($r = -0.50, p < .01, k = 3$), studies with a majority of female participants did not show such tendency ($r = -0.13, p = .16, k = 2$). In addition, the effect of risk perception on information avoidance varied depending on the region of origin ($Z = 2.00, p < .05$): it appeared to be stronger for studies focused on mainly Western population ($r = -0.65, p = .37, k = 2$) than for studies mainly focused on mainly Asian population ($r = 0.03, p = .67, k = 7$). Last, sampling method moderated the relationships between risk perception and information avoidance ($Z = -1.93, p < .05$), as well as between information overload and information avoidance ($Z = 4.20\ p < .001$). As such, the above correlations were stronger for studies involving representative samples, in comparison to studies involving non-representative samples. No moderation effects were found for measurement type on the relationships between proposed antecedents and COVID-19 information avoidance.

5. Discussion

As the COVID-19 pandemic continues, this global health crisis now is also conceived as a global information crisis and much attention are paid to human information behaviors observed under this critical situation (Montesi, 2021). This meta-analysis represents one of the first to provide a comprehensive synthesis of empirical findings predicting information avoidance relating to the COVID-19 pandemic. It particularly summarizes and examines multiple categories of antecedents and potential moderators, through a proposed theoretical framework that combines theories most relevant to information avoidance. Despite focusing on a specific health risk, findings of this research do not restrict to the COVID-19 context; Instead, they make theoretical and practical contributions to a more general domain involving health communication and crisis management.

5.1. Principal findings

First, channel belief and information overload were found to be the strongest among all antecedents, revealing consistent impacts on information avoidance toward COVID-19. Together with the conclusions of recent meta-analyses in health information seeking (Ou and Ho, 2021; Wang et al., 2021), this meta-analysis further suggested that information-related factors, rather than other factors, are

Table 4
Summary of results in moderator analysis.

Pairwise relationship	Moderator	Z-score	Level	k	R
Perceived efficacy – Information avoidance	Age	4.80***	Below 40 years	2	−0.35***
			Over 40 years	2	−0.01
Channel belief – Information avoidance	Gender	−1.77*	Majority female	2	−0.13
			Majority male	3	−0.50**
Risk perception – Information avoidance	Region of origin	2.00*	Majority Europe/North America	2	−0.65
			Majority Asian	7	0.03
Risk perception – Information avoidance	Sampling method	−1.93*	Non-representative	6	0.06
			Representative	3	−0.50*
Information overload – Information avoidance	Sampling method	4.20***	Non-representative	1	0.09***
			Representative	2	0.30***

Note. k, number of relationships; *N,* aggregated sample size; *r,* weighted mean observed correlation.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

more important in determining individual's health information behaviors of both seeking and avoiding. Factors from the psychosocial aspects, however, had low correlations with information avoidance.

Although the overall effects of perceived efficacy and informational subjective norms were small and approaching significant in our study, they still demonstrated negative effects in explaining information avoidance behaviors. After all, these two antecedents accounted for significant variations of information avoidance in major models such as RISP and PRISM (Liu et al., 2021; Zhao and Liu, 2021). Nevertheless, the impacts of other essential constructs in these models, such as risk perception, information insufficiency, and affective response, were not supported in this meta-analysis. It cannot be simply concluded that these antecedents are meaningless in explaining information avoidance under the COVID-19 context. In fact, one possible explanation is the variety of conceptualizations within these antecedents. For instance, previous risk communication literature (Deline and Kahlor, 2019) argued that emotions such as anxiety and fright are more likely to lead to information avoidance than other such as sadness. Such differentiation among the effects of these discrete emotions might account for nonsignificant overall effect size in the general concept of negative affective response in this meta-analysis.

Second, moderator analysis further revealed that the impacts of several antecedents on COVID-19 information avoidance varied for different people and under some circumstances. Specifically, both demographic and methodological factors served as important moderators for certain relationships. In terms of demographic moderators, this research found that perceived efficacy exerted a larger impact on information avoidance among young adults rather than older adults. Previous experiences serve as a most influential basis for efficacy beliefs (Bandura, 1986). As people get older, they develop more stable efficacy beliefs as direct life experiences accumulated (Schwoerer and May, 1996). In contrast, these beliefs and attitudes among young adults are often impressionable and easily changed (Alwin and Krosnick, 1991), thus may lead to stronger respond such as avoiding relevant risk information. Besides, the gender and regional composition of samples significantly moderated the effects of channel belief and risk perception, respectively. For example, the relation between channel belief and information avoidance were more salient in studies with mainly male participants. The different attention paid to information sources between males and females could possibly explain such findings, as male may be more calculative and deliberate when seeking critical information about the COVID-19 pandemic. Nevertheless, since gender's possible effect on channel belief has been largely ignored in previous literature, future empirical studies are needed to investigate the underlying mechanism of gender differences within the relationship between channel belief and information avoidance. Regional differences were further observed in the effect of risk perception on information avoidance, such that the effect was stronger in studies mainly consisting of Western participants. As most of the included studies were conducted between 2020 and 2021 when countries from Europe and North America were less effective than those from East Asia in controlling the COVID-19 pandemic (Navarro, 2021), risk judgement may be more influential for Western population in developing their information management behaviors.

The heterogeneous association between antecedents and information avoidance could also be a result of methodological variations. The findings from the meta-analysis suggested that sampling method significantly moderated the effect of both risk perception and information overload on COVID-19 information avoidance. Studies that employed representative sampling methods reported stronger negative effects of risk perception, as well as stronger positive effects of information overload, than studies employing non-representative methods. As non-representative studies have limited generalizability due to the high estimation errors, findings from representative studies are more accurate in reflecting the true relationship estimation. Interestingly, despite the high heterogeneity identified among antecedents such as information insufficiency, affective responses and informational subjective norms, the moderators in this meta-analysis did not play a role in the impacts of these antecedents. This could be attributed to the substantial imbalances in the number of studies conducted with different demographic and methodological contexts. Additionally, perhaps future investigations on other moderators may help better understanding the complicated relationships between these factors and information avoidance during a global health risk like the COVID-19 pandemic.

5.2. Theoretical implications

This study has important theoretical implications for health-related information behaviors research, as well as broader fields such as health communication and risk communication. The findings yield a comprehensive approach integrating the cognitive, affective, and social predictors of information avoidance toward the COVID-19 pandemic. As the existing theories are often limited to specific set (s) of variables, this meta-analysis may help determine the most dominant factors from a larger landscape, thus providing valuable directions to refine frameworks and approaches in health information behaviors, particularly under the context of a global health crisis. Specifically, our results show that information-related factors emphasizing individual's cognitive evaluation of risk information demonstrate the strongest associations with information avoidance. As vast amount of information mixing scientific evidences and misinformation differentiated during the COVID-19 crisis (Bridgman et al., 2020; Gisondi et al., 2022; Wang and Zhou, 2022), the quantity and quality of information can play a central role in shaping their decision on seeking or ignoring the information, in order to cope with the pandemic. Future theory development in this field should acknowledge the large impact of these factors.

Next, only information overload, channel belief, perceived efficacy, and informational subjective norms share consistent associations with information avoidance toward COVID-19. The overall effects of other antecedents emphasized in the three theoretical frameworks were not supported in the specific COVID-19 context. Such results indicated that no single model of RISP, CMIS, or S-O-R could completely and effectively explain individuals' information avoidance intention or behaviors under a global public health crisis. It also implied the need to explore additional predictors of information avoidance outside the spectrum of these theories. For example, one recent meta-analysis (Kuang and Wilson, 2017) indicated the impacts of uncertainty on information avoidance within various illness contexts. During the COVID-19 outbreak, the uncertainty people perceive relating to the rapidly changing situation could be influential in their adoption of different information management strategies. Individual-level factors such as health literacy or

self-affirmation are also highlighted in previous information avoidance literature (e.g., Chen, Li and Kreps, 2022; Howell and Shepperd, 2012). Incorporating these factors could also be a possible way to refine the proposed theoretical framework for better prediction of information avoidance.

Last, this meta-analysis further identified the research gaps where existing information avoidance studies have not generated adequate investigations under a health crisis inundated with uncertainties and risks. There is a large number of studies examined the impacts of affective factors, particularly a predominant emphasis on affective response. The influence of cognitive and social factors, such as information overload and informational subjective norms, were not well examined with enough studies (Table 3). Other relevant antecedents including e-Health literacy and attitude toward information seeking were not included in this meta-analysis because they have been only investigated in a single study. More research is needed to establish the robust understanding of how cognitive and social factors influence information avoidance in the on-going COVID-19 context.

5.3. Practical implications

Our findings also suggest several practical implications for healthcare providers and practitioners. To prevent individuals from avoiding COVID-19-related information, it is vital to offer high-quality health information channels and to improve the general public's trust in these sources. Designing health campaigns to encourage pressure or expectations from social networks (e.g., relatives or friends) can also benefit from reducing people's selective exposure to the COVID-19 information. In addition, findings from moderator analysis have inspired certain audience segmentation strategies to tackle occurrence of information avoidance during the COVID-19 pandemic. For example, influence of perceived efficacy on information avoidance are more substantial for the young generation, and the effect of channel belief on information avoidance are more significant for males. Therefore, to avoid passive information management behaviors under the COVID-19 crisis, more attention should be paid to promote male's favorable beliefs in information sources as well as increase young adults' efficacy in seeking information. These results can be applied to other novel and worldwide health crisis, such as Zika, Ebola, or future infectious diseases where the risk is still unfolding (Hubner and Hovick, 2020).

5.4. Limitations

Several limitations should be considered in this study. The first limitation is the small number of studies included in the subgroups of moderator analysis, in which results need to be interpreted with caution. Another limitation is that the moderators were restricted to the universal variables reported in the original studies. Other potential moderators such as perceived health status and information channels (e.g., newspaper, websites, social media) may alter some of the associations. Perhaps an updated meta-analysis should be conducted as more on-going COVID-19 studies published in this field. Furthermore, the causal inference between antecedents and information avoidance were not fully supported since most of the included studies employed a cross-sectional design. Experimental or longitudinal data are needed to draw rigorous conclusions. Lastly, this meta-analysis only includes articles written in English, while most of them were from non-representative samples. The validation of these findings can be improved in future reviews by involving more studies published in other languages, and with representative sampling methods.

Declaration of Competing Interest

There is no conflict of interest in the paper.

Data availability

Data will be made available on request.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ipm.2022.103163.

References

Addison, C. V. (2017). *The issue of avoidance: Information avoidance in the context of personal health concerns*. Vancouver: The University of British Columbia (Doctor of Philosophy)Retrieved from http://hdl.handle.net/2429/62612.

Ahn, J., Kim, H. K., Kahlor, L. A., Atkinson, L., & Noh, G.-. Y. (2021). The Impact of Emotion and Government Trust on Individuals' Risk Information Seeking and Avoidance during the COVID-19 Pandemic: A Cross-country Comparison. *Journal of Health Communication, 26*(10), 728–741.

Alwin, D. F., & Krosnick, J. A. (1991). Aging, Cohorts, and the Stability of Sociopolitical Orientations Over the Life Span. *American Journal of Sociology, 97*(1), 169–195.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ, US: Prentice-Hall, Inc.

Barbour, J. B., Rintamaki, L. S., Ramsey, J. A., & Brashers, D. E. (2012). Avoiding health information. *Journal of Health Communication, 17*(2), 212–229.

Basnyat, I., Nekmat, E., Jiang, S., & Lin, J. (2018). Applying the Modified Comprehensive Model of Information Seeking to Online Health Information Seeking in the Context of India. *Journal of Health Communication, 23*(6), 563–572.

Brashers, D. E. (2001). Communication and uncertainty management. *Journal of Communication, 51*(3), 477–497.

Brashers, D. E., Goldsmith, D. J., & Hsieh, E. (2002). Information Seeking and Avoiding in Health Contexts. *Human Communication Research, 28*(2), 258–271.

Bridgman, A., Merkley, E., Loewen, P. J., Owen, T., Ruths, D., Teichmann, L., et al. (2020). The causes and consequences of COVID-19 misperceptions: Understanding the role of news and social media. *Harvard Kennedy School (HKS) misinformation review*. https://doi.org/10.37016/mr-2020-028. from.

Brown, K. D. (2021). *Selective avoidance on social media amidst the global pandemic of COVID-19*. University of Lethbridge (Master of Education)Retrieved from https://hdl.handle.net/10133/6146.

Buneviciene, I., Bunevicius, R., Bagdonas, S., & Bunevicius, A. (2021). COVID-19 media fatigue: Predictors of decreasing interest and avoidance of COVID-19–related news. *Public Health, 196*, 124–128.

Chang, C.-. C., & Huang, M.-. H. (2020). Antecedents predicting health information seeking: A systematic review and meta-analysis. *International Journal of Information Management, 54*, Article 102115.

Chen, X., Li, M., & Kreps, G. L. (2022). Double burden of COVID-19 knowledge deficit: Low health literacy and high information avoidance. *BMC Research Notes, 15* (1), 27.

Choo, C. W. (2017). Seeking and avoiding information in a risky world. *Information Research, 22*(3), 765.

de Bruin, K., de Haan, Y., Vliegenthart, R., Kruikemeier, S., & Boukes, M. (2021). News Avoidance during the Covid-19 Crisis: Understanding Information Overload. *Digital Journalism, 9*(9), 1286–1302.

Deline, M. B., & Kahlor, L. A. (2019). Planned Risk Information Avoidance: A Proposed Theoretical Model. *Communication Theory, 29*(3), 360–382.

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. *Journal of the Academy of Marketing Science, 40*(3), 434–449.

Ek, S. (2013). Gender differences in health information behaviour: A Finnish population-based survey. *Health Promotion International, 30*(3), 736–745.

Emanuel, A. S., Kiviniemi, M. T., Howell, J. L., Hay, J. L., Waters, E. A., Orom, H., et al. (2015). Avoiding cancer risk information. *Social Science and Medicine (1982), 147*, 113–120.

Fisher, K. E., & Landry, C. F. (2007). Understanding the information behavior of stay-at-home mothers through affect. In D. Nahl, & D. Bilal (Eds.), *Information and emotion. the emergent affective paradigm in information behavior research and theory* (pp. 211–233). Medford, NJ: Information Today, Inc.

Gisondi, M. A., Barber, R., Faust, J. S., Raja, A., Strehlow, M. C., & Westafer, L. M. (2022). A Deadly Infodemic: Social Media and the Power of COVID-19 Misinformation. *Journal of Medical Internet Research, 24*(2), e35552.

Griffin, R. J., Dunwoody, S., & Neuwirth, K. (1999). Proposed Model of the Relationship of Risk Information Seeking and Processing to the Development of Preventive Behaviors. *Environmental Research, 80*(2), S230–S245.

Griffin, R. J., Dunwoody, S., & Yang, Z. J. (2013). Linking Risk Messages to Information Seeking and Processing. *Annals of the International Communication Association, 36*(1), 323–362.

Griffin, R. J., Zheng, Y., ter Huurne, E., Boerner, F., Ortiz, S., & Dunwoody, S. (2008). After the Flood: Anger, Attribution, and the Seeking of Information. *Science Communication, 29*(3), 285–315.

Gutteling, J. M., & de Vries, P. W. (2017). Determinants of Seeking and Avoiding Risk-Related Information in Times of Crisis. *Risk Analysis, 37*(1), 27–39.

Hightow, L. B., Miller, W. C., Leone, P. A., Wohl, D., Smurzynski, M., & Kaplan, A. H. (2003). Failure to return for HIV posttest counseling in an STD clinic population. *AIDS Education and Prevention, 15*(3), 282–290.

Howell, J. L., Crosier, B. S., & Shepperd, J. A. (2014). Does lacking threat-management resources increase information avoidance? A multi-sample, multi-method investigation. *Journal of Research in Personality, 50*, 102–109.

Howell, J. L., & Shepperd, J. A. (2012). Reducing Information Avoidance Through Affirmation. *Psychological Science, 23*(2), 141–145.

Howell, J. L., & Shepperd, J. A. (2013). Reducing Health-Information Avoidance Through Contemplation. *Psychological Science, 24*(9), 1696–1703.

Hua, J., & Howell, J. L. (2020). Coping self-efficacy influences health information avoidance. *Journal of Health Psychology, 27*(3), 713–725.

Hubner, A. Y., & Hovick, S. R. (2020). Understanding Risk Information Seeking and Processing during an Infectious Disease Outbreak: The Case of Zika Virus. *Risk Analysis, 40*(6), 1212–1225.

Huedo-Medina, T. B., Sánchez-Meca, J., Marín-Martínez, F., & Botella, J. (2006). Assessing heterogeneity in meta-analysis: Q statistic or I2 index? *Psychological Methods, 11*(2), 193–206.

Hunter, J. E., & Schmidt, F. L. (1990). *Methods of meta-analysis: Correcting error and bias in research findings*. Thousand Oaks, CA, US: Sage Publications, Inc.

Hwang, Y., & Jeong, S.-. H. (2021). Misinformation Exposure and Acceptance: The Role of Information Seeking and Processing. *Health Communication*, 1–9.

Johnson, J. D., Donohue, W. A., Atkin, C. K., & Johnson, S. (1995). A Comprehensive Model of Information Seeking: Tests Focusing on a Technical Organization. *Science Communication, 16*(3), 274–303.

Johnson, J. D., & Meischke, H. (1993). A Comprehensive Model of Cancer-Related Information Seeking Applied to Magazines. *Human Communication Research, 19*(3), 343–367.

Kahlor, L. (2010). PRISM: A Planned Risk Information Seeking Model. *Health Communication, 25*(4), 345–356.

Kim, H. K., Ahn, J., Atkinson, L., & Kahlor, L. A. (2020). Effects of COVID-19 Misinformation on Information Seeking, Avoidance, and Processing: A Multicountry Comparative Study. *Science Communication, 42*(5), 586–615.

Kim, H. K., & Kim, Y. (2019). Risk Information Seeking and Processing About Particulate Air Pollution in South Korea: The Roles of Cultural Worldview. *Risk Analysis, 39*(5), 1071–1087.

Kraemer, H. C., & Andrews, G. (1982). A nonparametric technique for meta-analysis effect size calculation. *Psychological Bulletin, 91*(2), 404–412.

Kuang, K., & Wilson, S. R. (2017). A Meta-Analysis of Uncertainty and Information Management in Illness Contexts. *Journal of Communication, 67*(3), 378–401.

Lee, J. (2021). Responses to media coverage of the COVID-19 pandemic and information behaviour in the Japanese context. *Search-Journal of Media and Communication Research, 13*(1), 111–126.

Leotti, L., Pochinki, N., Reis, D., Bonawitz, E., & LoBue, V. (2021). Learning about germs in a global pandemic: Children's knowledge and avoidance of contagious illness before and after COVID-19. *Cognitive Development, 59*, Article 101090.

Link, E. (2021). Information avoidance during health crises: Predictors of avoiding information about the COVID-19 pandemic among german news consumers. *Information Processing and Management, 58*(6), Article 102714.

Liu, C., & Zheng, Y. (2019). The Predictors of Consumer Behavior in Relation to Organic Food in the Context of Food Safety Incidents: Advancing Hyper Attention Theory Within an Stimulus-Organism-Response Model. *Frontiers in Psychology, 10*, 2512-2512.

Liu, M., Chen, Y., Shi, D., & Yan, T. (2021). The Public's Risk Information Seeking and Avoidance in China During Early Stages of the COVID-19 Outbreak. *Frontiers in Psychology*, 12.

Loiselle, C. G. (2019). Cancer information-seeking preferences linked to distinct patient experiences and differential satisfaction with cancer care. *Patient Education and Counseling, 102*(6), 1187–1193.

Manierre, M. J. (2015). Gaps in knowledge: Tracking and explaining gender differences in health information seeking. *Social Science and Medicine, 128*, 151–158.

Marton, C., & Choo, C. W. (2012). A review of theoretical models of health information seeking on the web. *Journal of Documentation, 68*(3), 330–352.

Mata, R., & Nunes, L. (2010). When less is enough: Cognitive aging, information search, and decision quality in consumer choice. *Psychology and Aging, 25*(2), 289–298.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. Cambridge, MA, US: The MIT Press.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The, P. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Medicine, 6*(7), Article e1000097.

Montesi, M. (2021). Human information behavior during the Covid-19 health crisis. A literature review. *Library and Information Science Research, 43*(4), Article 101122.

Naeem, S. B., & Bhatti, R. (2020). The Covid-19 'infodemic': A new front for information professionals. *Health Information and Libraries Journal, 37*(3), 233–239.

Navarro, V. (2021). Why Asian Countries are Controlling the Pandemic Better Than the United States and Western Europe. *International Journal of Health Services, 51*(2), 261–264.

Nolte, J., Deng, S. L., & Löckenhoff, C. E. (2021). Age Differences in Media Consumption and Avoidance With Respect to COVID-19. *The Journals of Gerontology: Series B, 77*(4), e76–e82.

Orom, H., Schofield, E., Kiviniemi, M. T., Waters, E. A., & Hay, J. L. (2020). Agency beliefs are associated with lower health information avoidance. *Health Education Journal, 80*(3), 272–286.

Osterrieder, A., Cuman, G., Pan-Ngum, W., Cheah, P. K., Cheah, P.-. K., & Peerawaranun, P. (2021). Economic and social impacts of COVID-19 and public health measures: Results from an anonymous online survey in Thailand, Malaysia, the UK, Italy and Slovenia. *BMJ Open, 11*(7), Article e046863.

Ou, M., & Ho, S. S. (2021). A Meta-Analysis of Factors Related to Health Information Seeking: An Integration from Six Theoretical Frameworks. *Communication Research, 49*(4), 567–593.

Pahayahay, A., & Khalili-Mahani, N. (2020). What Media Helps, What Media Hurts: A Mixed Methods Survey Study of Coping with COVID-19 Using the Media Repertoire Framework and the Appraisal Theory of Stress. *Journal of Medical Internet Research, 22*(8), e20186.

Peterson, R. A., & Brown, S. P. (2005). On the Use of Beta Coefficients in Meta-Analysis. *Journal of Applied Psychology, 90*(1), 175–181.

Rao, S. R., Graubard, B. I., Schmid, C. H., Morton, S. C., Louis, T. A., & Zaslavsky, A. M. (2008). Meta-analysis of survey data: Application to health services research. *Health Services and Outcomes Research Methodology, 8*(2), 98–114.

Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin, 86*(3), 638–641.

Rosenthal, R., & DiMatteo, M. R. (2001). Meta-Analysis: Recent Developments in Quantitative Methods for Literature Reviews. *Annual Review of Psychology, 52*(1), 59–82.

Ruppel, E. K. (2016). Scanning Health Information Sources: Applying and Extending the Comprehensive Model of Information Seeking. *Journal of Health Communication, 21*(2), 208–216.

Saladino, V., Algeri, D., & Auriemma, V. (2020). The Psychological and Social Impact of Covid-19: New Perspectives of Well-Being. *Frontiers in Psychology*, 11.

Schwoerer, C. E., & May, D. R. (1996). Age and Work Outcomes: The Moderating Effects of Self-Efficacy and Tool Design Effectiveness. *Journal of Organizational Behavior, 17*(5), 469–487.

Sheng, X., & Simpson, P. M. (2015). Health Care Information Seeking and Seniors: Determinants of Internet Use. *Health Marketing Quarterly, 32*(1), 96–112.

Siebenhaar, K. U., Köther, A. K., & Alpers, G. W. (2020). Dealing With the COVID-19 Infodemic: Distress by Information, Information Avoidance, and Compliance With Preventive Measures. *Frontiers in Psychology*, 11.

Song, S., Yao, X., & Wen, N. (2021). What motivates Chinese consumers to avoid information about the COVID-19 pandemic?: The perspective of the stimulus-organism-response model. *Information Processing and Management, 58*(1), Article 102407.

Soroya, S. H., Farooq, A., Mahmood, K., Isoaho, J., & Zara, S.-e. (2021). From information seeking to information avoidance: Understanding the health information behavior during a global health crisis. *Information Processing and Management, 58*(2), Article 102440.

Sweeny, K., Melnyk, D., Miller, W., & Shepperd, J. A. (2010). Information Avoidance: Who, What, When, and Why. *Review of General Psychology, 14*(4), 340–353.

Van der Meer, V., Nielen, M. M. J., Drenthen, A. J. M., Van Vliet, M., Assendelft, W. J. J., & Schellevis, F. G. (2013). Cardiometabolic prevention consultation in the Netherlands: Screening uptake and detection of cardiometabolic risk factors and diseases–a pilot study. *BMC Family Practice, 14*, 29-29.

Van Stee, S. K., & Yang, Q. (2018). Online Cancer Information Seeking: Applying and Extending the Comprehensive Model of Information Seeking. *Health Communication, 33*(12), 1583–1592.

Wang, D., & Zhou, Y. (2022). The popularity of contradictory information about COVID-19 vaccine on social media in China. *Computers in Human Behavior, 134*, Article 107320.

Wang, X., Shi, J., & Kong, H. (2021). Online Health Information Seeking: A Review and Meta-Analysis. *Health Communication, 36*(10), 1163–1175.

Wartelle, A., Mourad-Chehade, F., Yalaoui, F., Chrusciel, J., Laplanche, D., & Sanchez, S. (2021). Effect of the COVID-19 pandemic lockdown on non-COVID-19 emergency department visits in Eastern France: Reduced risk or avoidance behavior? *Public Health in Practice, 2*, Article 100109.

Wohlin, C. (2014). Guidelines for snowballing in systematic literature studies and a replication in software engineering. In *Paper presented at the Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering.* https://doi.org/10.1145/2601248.2601268

Yang, X., Gu, D., Wu, J., Liang, C., Ma, Y., & Li, J. (2021). Factors influencing health anxiety: The stimulus–organism–response model perspective. *Internet Research, 31*(6), 2033–2054.

Yang, Z. J., Aloe, A. M., & Feeley, T. H. (2014). Risk Information Seeking and Processing Model: A Meta-Analysis. *Journal of Communication, 64*(1), 20–41.

Yang, Z. J., & Kahlor, L. (2012). What, Me Worry? The Role of Affect in Information Seeking and Avoidance. *Science Communication, 35*(2), 189–212.

Yi, Y. J., Stvilia, B., & Mon, L. (2012). Cultural influences on seeking quality health information: An exploratory study of the Korean community. *Library and Information Science Research, 34*(1), 45–51.

Zarocostas, J. (2020). How to fight an infodemic. *The Lancet, 395*(10225), 676.

Zhai, X., Wang, M., & Ghani, U. (2020). The SOR (stimulus-organism-response) paradigm in online learning: An empirical study of students' knowledge hiding perceptions. *Interactive Learning Environments, 28*(5), 586–601.

Zhao, S., & Liu, Y. (2021). The More Insufficient, the More Avoidance? Cognitive and Affective Factors that Relates to Information Behaviours in Acute Risks. *Frontiers in Psychology*, 12.

Zhou, X., Roberto, A. J., & Lu, A. H. (2021). *Understanding online health risk information seeking and avoiding during the COVID-19 pandemic*. Health Communication.

Zhou, Y., Acevedo Callejas, M. L., & MacGeorge, E. L. (2020). Targeting Perceptions of Risk from Injudicious Antibiotic Use: An Application of the Risk Information Seeking and Processing Model. *Journal of Health Communication, 25*(5), 345–352.