



Original Article

A concept development of risk perceptions during COVID-19: Application of Schwartz-Barcott and Kim's Hybrid Model

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Abstract

Background: Healthcare behaviors, including preventive practices, treatment adherence, and decision-making during health crises, are strongly influenced by individual risk perceptions.

Objectives: This study aimed to understand risk perception during the COVID-19 pandemic.

Methods: A hybrid concept analysis was conducted using the Schwartz-Barcott and Kim model in three phases: theoretical (systematic review of 51 articles from PubMed, Scopus, Web of Science, SID, MagIran, and IranMedex, 2019–2024), fieldwork (semi-structured interviews with seven COVID-19 patients), and final analytical integration.

Results: The theoretical phase generated 139 initial codes and 10 subcategories, whereas the fieldwork phase yielded 172 initial codes and nine subcategories. COVID-19 risk perception emerged as a multifaceted phenomenon comprising three categories: antecedents (information overload, personal vulnerability, awareness of an unknown disease, distrust of guidelines, and observing pandemic realities), attributes (cognitive dimensions, including information seeking and severity judgment, and emotional dimensions of fear and anxiety), and consequences (ranging from adherence to protective protocols and altruism to pandemic fatigue and non-adherence). The fieldwork phase also identified culturally specific influences within the Iranian context, including reliance on spiritual beliefs and traditional medicine.

Conclusion: COVID-19 risk perception is a multidimensional construct with cognitive and emotional attributes shaped by specific antecedents and leading to behavioral consequences. This definition enables nurses to systematically assess patients' risk perceptions, identify barriers to preventive behaviors, and develop culturally sensitive interventions to improve adherence during future public health emergencies.

Implications for Nursing and Midwifery Preventive Care

- Assessing patients' risk perceptions helps nurses develop effective preventive strategies and improve adherence to health protocols during infectious disease outbreaks.
- Designing health messages that acknowledge religious and spiritual beliefs may reduce anxiety, strengthen trust, and promote preventive behaviors during public health emergencies.



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Introduction

The COVID-19 pandemic caused a public health crisis, as well as socioeconomic and geopolitical issues implications [1]. Lockdowns, job losses, economic crises, and mental health issues were all caused by this disease [2]. Although models such as the Health Belief Model (HBM) and Theory of Planned Behavior (TPB) explain preventive behaviors, they often fail to capture the culturally shaped and dynamic nature of risk perception during emerging pandemics, which this study addresses through hybrid concept analysis [3].

Risk perception, defined as individual judgments about threat characteristics and severity [4], plays a significant role in driving people to avoid, mitigate, adapt to, or disregard them [5]. Because COVID-19 is a new and unfamiliar virus with limited information and experience, it has generated heightened emotions and a strong sense of risk [6]. While research links perceived risk to preventive behaviors, detailed risk data for emerging diseases like COVID-19 remain limited [7]. The perception of risk and preventive behaviors will change over time as the disease is controlled [8]. Some authors argue that COVID risk perceptions specifically decreased over time [9].

This variability was especially apparent among vulnerable groups such as healthcare workers, further emphasizing the need for context-sensitive models that account for cultural and temporal dynamics [10].

Understanding risk perception is critical for promoting preventive behaviors (6) and managing health behaviors during pandemics [10, 11].

Schwartz-Barcott and Kim's hybrid model highlights how demographic, cultural, and temporal factors, such as Iran's religious and political context, shape risk cognition [12] and provides a framework to capture these dynamic influences systematically. Risk perception is socially embedded: Ulrich Beck theorized that modern societies intrinsically produce and distribute risks [13]. It also has cognitive (probability and severity assessments) and emotional (fear and anxiety) dimensions [14].

Protective Motivation Theory (PMT) reflects these through perceived susceptibility, severity, and

coping appraisal, which were influenced during COVID-19 by media and cultural narratives [15].

Although models like the Health Belief Model (HBM), Theory of Planned Behavior (TPB), and Extended Parallel Process Model (EPPM) predict health behaviors [16], they inadequately address the dynamic, culturally grounded evolution of risk perception in novel pandemics, including temporal shifts, non-Western cultural influences, and practical application for frontline workers.

Among various concept analysis approaches, Schwartz-Barcott and Kim's hybrid model was selected for three primary reasons [19]. First, unlike Walker and Avant's approach [26], which relies solely on theoretical literature, the hybrid model incorporates a fieldwork phase, enabling contextual understanding of the concept in real-world settings. Second, in contrast to Rodgers' evolutionary method [17] that focuses on historical development, this model is particularly suited for capturing the rapid temporal dynamics of risk perception during a specific crisis like the COVID-19 pandemic. Third, this model is specifically designed for nursing and healthcare disciplines, making its outputs directly applicable to clinical practice and intervention design. Based on the systematic review of 51 articles, COVID-19 risk perception is preliminarily defined as an individual's subjective evaluation of the likelihood of infection and the severity of its consequences, accompanied by emotional responses (fear and anxiety) and information-seeking behaviors, which is shaped by personal, social, and cultural factors [4, 11, 27]. However, existing definitions and frameworks predominantly focus on cognitive appraisals while inadequately addressing emotional dimensions, cultural contexts, and temporal shifts [7, 16]. Specifically, they fail to explain why identical threats yield divergent risk perceptions across cultures or how spiritual beliefs influence preventive behaviors [12, 71]. Furthermore, most studies have been conducted in Western settings, leaving a gap in understanding risk perception in non-Western, religious contexts like Iran [10]. This study addresses these gaps by developing a culturally sensitive, multidimensional framework for COVID-19 risk perception that

integrates cognitive, emotional, and contextual factors, to enhance pandemic response and preventive care.

Thus, this study develops a culturally sensitive conceptual framework for COVID-19 risk perception to enhance pandemic response [17]. Yet, current frameworks inadequately explain why identical threats (e.g., vaccination) yield divergent risk perceptions across cultures or how risk perceptions evolve. This results in knowledge gaps with real-world consequences: misperceptions delay treatments, increase stress, and trigger ineffective protection, while accurate awareness enables adaptation [18].

Objectives

This study aims to conceptualize COVID-19 risk perception by applying Schwartz-Barcott and Kim's hybrid model to systematically define its antecedents, attributes, and consequences, ultimately providing a transferable framework for managing risk perception in future public health emergencies.

Methods

Design

Risk perception in COVID-19 was assessed using a hybrid model in this study. The hybrid model includes three phases: theoretical, fieldwork, and analytical, based on the method developed by Schwartz-Barcott and Kim [19].

Theoretical Phase

A systematic review was conducted following York University guidelines, including defining questions, setting inclusion criteria, developing a search strategy, identifying and screening studies, extracting data, and quality appraisal using the MMAT (v2018) [20], data synthesis, and dissemination planning.

Reporting adhered to the PRISMA 2020 Flow Diagram guidelines [21], and the review protocol was followed to ensure rigor [22].

The flow diagram illustrating the selection of sources is presented in Figure 1, and the characteristics of the

selected articles are summarized in Table 1. Databases including PubMed, Scopus, Web of Science, SID, MagIran, Iran-Medex, and ProQuest were searched (2019–2024) using Persian and English keywords related to risk perception and COVID-19. From 855 initial records, studies were screened based on predefined inclusion and exclusion criteria, and quality was independently assessed by three authors using MMAT. Eligible texts included peer-reviewed qualitative, quantitative, mixed-method, and instrument development studies, and various review types in selected languages, while non-research texts were excluded. After removing duplicates and screening abstracts, 51 documents scoring $\geq 70\%$ on MMAT were retained, representing studies from the Americas, Europe, Asia, and Africa [Figure 2]. Using Graneheim and Lundman's content analysis approach [25], 139 initial codes were organized into 10 subcategories and three main categories: antecedents, attributes, and consequences, while the literature search continued into the fieldwork phase.

Fieldwork phase

Setting and Participants

The fieldwork phase was conducted in urban areas of Iran between November 2022 and May 2023. Participants were recruited from multiple cities to enhance diversity. Inclusion criteria were: (1) confirmed COVID-19 diagnosis based on PCR test or physician diagnosis, (2) age ≥ 18 years, (3) ability to communicate in Persian. Exclusion criteria were: (1) cognitive impairment affecting recall, (2) severe psychiatric disorders.

Data Collection

Field data collection involved seven participants from November 2022 to May 2023. Participants varied in gender, age, marital status, education, occupation, and geographic location to capture diverse perspectives [Table 1]. Data saturation was reached when no new codes appeared in three consecutive interviews [23]. Semi-structured, in-person interviews (50–80 minutes) were conducted based on participants' preferences, recorded, and supplemented by observation of non-verbal cues.

Participants were asked about their risk perceptions before, during, and after infection. Interviews took place at a location chosen based on participant availability. All interviews were conducted in Persian, the native language of both participants and researchers. The transcribed interviews were then translated into English for publication purposes. To ensure accuracy and conceptual equivalence, the forward-backward translation method was employed: a bilingual expert translator first translated the Persian transcripts into English, and a second independent translator, blinded to the original text, back-translated the English version into Persian. Discrepancies were discussed and resolved through consensus between the two translators and the research team. The original Persian transcripts are available for validation upon reasonable request.

Data Analysis

Qualitative data were analyzed using Graneheim and Lundman's conventional content analysis approach [25]. The analysis process included the following steps: (1) verbatim transcription of all interviews, (2) repeated reading of transcripts to gain a holistic understanding, (3) identification of meaning units, (4) condensation and abstraction of meaning units, (5) coding, (6) categorization, and (7) identification of themes. Data were managed and organized using MAXQDA software, version 10.

To ensure trustworthiness, Lincoln and Guba's criteria were applied [24].

Credibility was established through prolonged engagement with participants, member checking in which participants reviewed their interview summaries, and peer debriefing through discussion of findings with two qualitative research experts.

Confirmability was ensured by maintaining a comprehensive audit trail that included raw data, analysis notes, and decision logs.

Dependability was achieved through external auditing of the coding process and categories by an independent reviewer. Transferability was facilitated by providing thick descriptions of participants' contexts and findings to enable readers to assess the applicability of the results to other settings.

Any coding disagreements between researchers were resolved through consensus, with a third researcher (CC) serving as a mediator for unresolved issues. The participants' profiles are summarized in Table 1. The analysis yielded 172 initial codes, nine subcategories, and three main categories (antecedents, attributes, and consequences).

Final Phase

In the third phase, the integration of theoretical and empirical findings was performed through a three-step process:

Step 1 (Comparative Matrix)

Findings from both phases were organized side-by-side in a comparative matrix based on the three main categories (antecedents, attributes, and consequences) to identify points of convergence and divergence.

Step 2 (Conflict Resolution)

In cases where fieldwork data contradicted theoretical literature, particularly regarding "distrust in domestically produced vaccines" and "reliance on traditional medicine" (e.g., Imam Kazem's medicine), which were less prominent in Western literature, the principle of "primacy of participants' lived experience within the Iranian cultural-religious context" was applied.

This decision was justified by the hybrid model's philosophical foundation that emphasizes contextual understanding of concepts in real-world settings [19]. The research team discussed divergent codes until consensus was reached; unresolved cases were mediated by a third researcher (CC).

Step 3 (Synthesis and Model Development)

After resolving conflicts, convergent codes were merged, and confirmed divergent codes were added as new attributes or antecedents to the framework. The constant comparative method [25] was used throughout to further clarify, define, and confirm the concept of COVID-19 risk perception.

The outcome of this process was the final definition of the concept and a graphical model [Figure 3] illustrating the causal relationships between antecedents, dual attributes (cognitive-emotional), and consequences.

Result

A literature review from multiple databases identified various definitions and aspects of COVID-19 risk perception, as well as its associated attributes.

1. Attributes and the Concept Definition

Understanding COVID-19 risk perception encompasses both cognitive and emotional dimensions, as observed in the literature review and the fieldwork phase. Cognitive dimensions include perceived susceptibility and severity of risks, while emotional dimensions involve worries and anxiety about potential exposure [26–33].

In the fieldwork phase, this information-seeking appeared in daily and practical contexts:

"I used to watch COVID-19 stuff on TV, and if we thought someone had symptoms, we'd always Google it or call health centers to find out. We saw the symptoms. What should we do?" (Participant 3)

In addition to information-seeking, fear of contracting COVID-19 was a central dimension of risk perception, encompassing ongoing concern for self and others, as well as the risk of infection from non-compliant individuals:

"Honestly, we were worried about my parents getting sick since they said older people are more at risk" (Participant 2)

Risk perception refers to judgments about risk features and their impacts [10, 34]. The literature review reveals that key aspects of understanding risk include perceiving danger and prioritizing personal or family health [35–37].

2. Antecedents of the Concept

Based on the literature review, the following antecedents were identified as contributing to the perception of the risk of COVID-19.

2.1 Information Overload

The literature indicates that the volume and nature of COVID-19 information significantly influenced risk perception. Official sources enhanced accurate risk perception [38, 39], whereas excessive or conflicting information from unofficial sources led to uncertainty [40, 41].

Official and government sources (crowding and travel advice, and policy-driven measures) were regarded as reliable and authentic for obtaining

information [42–44]. People received contradictory and incorrect information from unofficial sources, such as social media, which caused uncertainty about the disease and, in turn, influenced their risk perception [45–47].

2.2 Personal Factors

Individual factors, including underlying diseases, sociodemographic characteristics, culture, and religious beliefs, influenced risk perception [11, 48, 49]. For example, pregnancy, chronic illness, poor physical condition, or psychological disorders increased susceptibility and shaped perceived risk.

2.3 Observing COVID-19 Realities

Understanding the risk of COVID-19 was also affected by factors like personal infection, living with someone who is infected, knowing someone who died from COVID-19, and working in healthcare [50–52]. As deaths and infections rose, COVID-19 restrictions and health protocols were intensified [53–55].

"I've seen and heard about people dying from COVID-19 around me. We lost both a mom and a son in our family. We took the disease seriously, and now I've got it and feel its pain" (Participant 3)

2.4 Shifting Awareness and Fear During COVID-19 Waves

Over time, as the severity of COVID-19 and its variants changed, governmental actions and public awareness also evolved, influencing perceived risk [56–58].

2.5 Attitudes toward COVID-19

Attitudes toward positive and negative information (for example, conspiracy beliefs), as well as high levels of past negative and future time perspective, can affect risk perceptions [59–61].

2.6 Awareness of an Unknown Disease

Fieldwork indicated that limited awareness of the disease led to differences in adherence to protocols and levels of fear:

"At first, there was this pandemic, and we had no idea what this disease was and what would happen to us" (Participant 4)

2.7 Risk Seriousness from the Individual's Viewpoint

Observing patients and fatalities altered individuals' perceptions of the disease's severity:

"When he was sick, he couldn't breathe well. He was ill, and I could see he was worried. I thought to myself, I don't want to get sick or be in this situation" (Participant 4)

2.8 Lack of Trust in Preventive Guidelines

Distrust in the healthcare system and frequent policy changes influenced preventive behaviors:

"Unfortunately, the doctors didn't think corticosteroids were the right prescription when I got sick. They let me go from the hospital under the same conditions" (Participant 6)

Table 1. Selected articles for analysis from a comprehensive literature search

ID	Aim	Sample	Study Design	Country	Author and year	MMAT Score
1.	Illustrating how risk awareness towards COVID-19 predicts people's preventive behaviors and the features that are associated with it.	77 studies	Systematic Review and Qualitative Synthesis	Italy	Cipolletta et al., 2022 [11]	100%
2.	Investigate the perceived risk and protective behaviors regarding COVID-19 among pregnant women.	225 pregnant women	Cross-sectional	Iran	Aghababaei et al., 2020 [48]	100%
3.	Exploring how people form COVID-19 mortality risk beliefs and the implications for prosocial behavior.	928 participants	Cross-sectional	USA	Abel et al., 2021 [50]	100%
4.	Exploring perceptions around COVID-19 and vaccine hesitancy among urban and rural populations in Western Nepal.	19 participants	Qualitative study	UK	Mahato et al., 2023 [66]	100%
5.	Investigating the willingness of international medical students to return to their home countries based on their risk perception of COVID-19.	897 medical students	Cross-sectional	China	Ahmad et al., 2021 [38]	100%
6.	Assessing perceived barriers and preventive measures of COVID-19 among healthcare providers.	183 healthcare providers	Institution-based cross-sectional survey	Ethiopia	Birihane et al., 2020 [41]	100%
7.	Presenting the first assessment of public risk perception of COVID-19 around the world using national samples in ten countries across Europe, America, and Asia.	6,991 public in ten countries	Cross-sectional	UK	Dryhurst et al., 2020 [81]	100%
8.	The psychosocial effects of changing the conditions for living with a chronic disease like diabetes.	20 people with diabetes	Qualitative Study	Denmark	Grabowski et al., 2020 [40]	100%
9.	Investigating the pandemic risk perception of COVID-19 after began of pandemic in Iranian society.	402 individuals from 28 provinces	Cross-sectional	Iran	Arefi et al., 2022 [65]	100%
10.	Evaluating COVID-19-related knowledge, preventive behaviors, and risk perception among Saudi Arabian medical students and interns.	710 fourth- and fifth-year medical students	Cross-sectional	Saudi Arabia	Alsoghair et al., 2021 [39]	100%
11.	Exploring nurses' experiences and perception of risk regarding using personal protective equipment during the first wave of the pandemic.	29 nurses	Qualitative descriptive design	Spain	Romeu-Labayen et al., 2022 [54]	100%

12.	Investigating the Iranians' risk perception of coronavirus disease (COVID-19).	364 persons from 20 provinces	Cross-sectional	Iran	Samadipour, Ghardashi, et al., 2023 [46]	100%
13.	Strategies for infectious disease clinicians to apply risk communication principles and frameworks to improve patient care and public message development in response to COVID-19.	Not applicable	Review	USA	Malecki et al., 2020 [45]	N/A
14.	Investigating risk perception in 514 people over 60 years during the lockdown.	514 people over 60 years	Qualitative	Italy	Guastafierro et al., 2023 [35]	100%
15.	Investigating how risk perception and some factors associated with the decision to comply with vaccination modulated vaccine acceptance for COVID-19 as compared to seasonal influenza, and how these have varied during the lockdown phases.	2,267 questionnaires	Cross-sectional	Italy	Caserotti et al., 2021 [6]	100%
16.	Investigating the change in risk perception, perceived self-efficacy, and the perceived trust in the behavior of others, the decisions of health authorities and government provisions, and the variation of self-restraint behaviors during the spread of the Covid-19 epidemic in Italy.	707 university students	Cross-sectional	Italy	Diotaiuti et al., 2021 [71]	100%
17.	Assess the acceptance rate and risk perception of COVID-19 vaccines amongst the general population in Botswana.	5,300 adults	Cross-sectional	Botswana (Africa)	Tlale et al., 2022 [53]	100%
18.	Assess perceived risk and fear of contagion, as well as mental health outcomes among 650 Italian healthcare workers during the COVID-19 outbreak.	650 Italian healthcare workers	Cross-sectional	Italy	Gorini et al., 2020 [51]	100%
19.	Determining the Iranian healthcare workers' risk perception of the COVID-19 disease at the beginning of the crisis and the relevant effective factors.	165 Iranian healthcare workers	Cross-sectional	Iran	Samadipour, Zardosht, et al., 2023 [80]	100%
20.	Investigating the factors influencing Iranians' risk perception of COVID-19 disease.	364 people from 20 provinces	Cross-sectional	Iran	Samadipour & Ghardashi, 2020 [12]	100%
21.	Examining the longitudinal relations between time perspectives and COVID-19 risk perception and preventive behaviors.	460 Romanian young adults	Six-month longitudinal design	Romania	Zancu et al., 2024 [60]	100%
22.	Examining the association between risk perception and protective behavior regarding COVID-19 in returnee migrant workers.	384 Nepalese migrant workers	Cross-sectional study	Nepal	Khanal et al., 2024 [56]	100%
23.	Analyzing the role of social media use and emotions in risk perception and prevention behavior related to COVID-19.	391 participants	Cross-sectional study/ Structural Equation Model	Indonesia	Purtiwi et al., 2024 [4]	100%

24.	Validating the items of the Emotional Impact Questionnaire coronavirus disease-2019 (COVID-19) related to risk perception.	1,872 healthcare workers	Cross-sectional study	Brazil	Griesi et al., 2024 [33]	100%
25.	Exploring the role of vaccination status and emerging variants.	221,791 unique participants	Serial cross-sectional	Belgium	Waterschoot et al., 2024 [62]	100%
26.	Investigating the association between risk perception and COVID-19 preventive measures.	2,175 internally displaced persons	Cross-sectional study	Nigeria	Gidado et al., 2024 [63]	100%
27.	Assessing the risk perception of COVID-19 and the uptake of the COVID-19 vaccine.	400 patients with chronic diseases	A hospital-based cross-sectional study	Nigeria	Aibinuomo et al., 2024 [36]	100%
28.	Exploring the socio-political aspects of COVID-19 vaccine hesitancy, focusing on the relationship between COVID-19 risk perceptions, institutional trust, and vaccine hesitancy.	2,717 Chinese people	Social survey	China	Chen et al., 2024 [42]	100%
29.	Exploring the association between COVID-19-related distress, risk perception, stigma, and vaccine hesitancy and acceptance in the general population.	360 participants	Cross-sectional study	Pakistan	Omar et al., 2024 [67]	100%
30.	Investigating Chinese people's perception of risks after the lifting, the influence of risk perception on their compliance with COVID-19 measures, and the moderating effect of social media on this influence.	420 Chinese native speakers	Online survey	China	Wang et al., 2024 [34]	100%
31.	Exploring the association between residual symptoms of COVID-19 and psychological distress, specifically depression, anxiety, and fear of COVID-19, and examining the role of risk perception and intolerance of uncertainty in the association.	1,735 participants	Cross-sectional	China	Sun et al., 2024 [70]	100%
32.	Evaluating the association between coping styles and risk perception in the COVID-19 pandemic and the change in metabolic parameters.	177 individuals with type 2 diabetes	Prospective study	Mexico	Alcántara-Garcés et al., 2024 [64]	100%
33.	Investigating the role of the Dark Triad (psychopathy, Machiavellianism, and narcissism) in vaccine hesitancy, considering the sequential mediating effects of conspiracy beliefs and risk perception.	210 participants	Cross-sectional	Italy	Giancola et al., 2024 [59]	100%
34.	Investigating people's perception of eight COVID-19-related safety measures related to long-distance trips and how subjective perception of safety impacts their mode choice among car, train, and aircraft.	People who had long-distance travel/ The number of participants is not mentioned	Survey	Netherlands	Geržinič et al., 2024 [43]	100%
35.	Understanding the effect of different information types on risk perception and examining the relationship between	512 Beijing residents	Online survey	China	Wang et al., 2024 [69]	100%

	perceived risk and travel behavior during a pandemic outbreak.					
36.	Investigating how risk perception affects the consumption behavior of green food.	612 participants	Online survey/Partial least squares-structural equation modeling	China	Li et al., 2024 [68]	100%
37.	Investigating the public's perceptions of COVID-19 infection and fatality risks.	40,000 participants	Cross-sectional study	Japan	Chiba et al., 2024 [72]	100%
38.	Examining whether negative judgments could be partially understood as a form of scapegoating.	Two vignette-based studies	Risk estimation	USA	Graso et al., 2024 [82]	100%
39.	Investigating the key social media features that influence tourist behavior and introduce the concept of perceived risk.	576 tourists	Survey /Structural Equation Modeling	Pakistan	Hussain et al., 2024 [47]	100%
40.	To identify anxiety and risk perception due to the COVID-19 pandemic, as well as the self-efficacy of dental students to take preventive measures.	Students of the School of Dentistry of a public university in northeastern Mexico in May 2020 (n = 412)	Cross-sectional study	México	Gómez Campusano et al., 2024 [83]	100%
41.	To describe the specificities and interrelationships between the categories of risk perception and pandemic fatigue.	Digital data sources from March to April 2021	Narrative bibliographic review	Cuba	Fabelo Roche et al., 2024 [61]	N/A
42.	To describe the protective behaviors adopted by Portuguese higher education students during and to analyze their relationship with the perception of risk and the mediating role of fear of COVID-19.	335 students aged between 18 and 29 years old	Descriptive study	Portugal	Köster et al., 2023 [57]	100%
43.	To evaluate the perception of risk of contagion of COVID-19 and to know its possible associations with socioeconomic and health variables in the Colombian population.	2,563 Colombians between 18 and 65 years old	Descriptive study	Colombia	Matar-Khalil et al., 2022 [31]	100%
44.	To explore the reactions of anxiety, fear and the perception of risk to COVID-19 in student volunteers at the Red Zone at the Central University Marta Abreu de Las Villas.	67 participants	Quantitative, cross-sectional and descriptive design	Cuba	Jiménez Puig et al., 2022 [58]	100%
45.	To conduct a study to learn about risk perception, the information received and the occupational engagement of workers in a university hospital in the face of the pandemic.	992 workers in the Majadahonda Puerta de Hierro University Hospital	Cross-sectional study	Spain	Sánchez-Herrero et al., 2022 [44]	100%
46.	To identify conceptual limitations in terms of central importance for epidemiology related to risk; Theoretically argue a	Bibliographic sources provided by	Review	Cuba	Román Hernández & Román	N/A

	psychodynamic conception of risk and the perception of risk that allows access to their subjective expressions to identify elements causes of behavior.	PubMed, Scielo and Dialnet, (2000-2021)				Hernández, 2021 [55]	
47.	To characterize the perception of risk about Covid-19 who have case contacts confirmed and health workers who work in these institutions.	106 subjects participated, of them 70 case contacts and 36 health workers	Mixed study	Santiago de Cuba		Santana González et al., 2021 [29]	100%
48.	To characterize aspects related to risk perception during the social distancing by COVID-19 in Cuba; To evaluate the level of knowledge and perception of population risk.	251 Cubans	Descriptive Study	Cuba		Pell del Río et al., 2021 [37]	100%
49.	To analyze associations between perceived risk from COVID-19 and symptoms of depression, anxiety, and stress among workers in healthcare units.	2,996 workers from different professions	Cross-sectional study	Brazil		Silva-Costa et al., 2022 [32]	100%
50.	To explore the perceptions and experiences of COVID-19 patients who received outpatient treatment.	9 patients who received a COVID-19 diagnosis and had outpatient treatment for the disease	Exploration rapid qualitative study	Chile		Pérez et al., 2024 [84]	100%
51.	To analyze the prevalence of post-traumatic stress disorder in nursing staff and the variables that may contribute to its development.	344 nurses, nursing assistants and nursing supervisors	Cross-sectional study	Spain		Blanco-Daza et al., 2022 [52]	100%

Table 2. Profile of Participants in the Fieldwork Phase

Participant	Gender	Age (years)	Marital status	Occupation	Education	Clinical Status
1	Male	30	Married	Self-employment	Diploma	Admitted to general ward
2	Male	49	Married	Self-employment	Diploma	Admitted to general ward
3	Female	51	Married	Housewife	Diploma	Admitted to general ward
4	Female	31	Single	Nurse	Bachelor	Admitted to ICU
5	Male	52	Married	Psychologist	Master	Admitted to general ward
6	Male	33	Married	Faculty member	Master	Admitted to ICU
7	Female	56	Married	Employee	Master	Admitted to ICU

Table 3. Synthesis of Concept Development: Convergences and Divergences Between Theoretical and Fieldwork Phases

Category	Convergent Findings (Confirmed in Both Phases)	Divergent Findings: Theoretical Only	Divergent Findings: Fieldwork Only (New)	Final Decision
Antecedents	- Information overload - Personal vulnerability - Observing pandemic realities - Shifting awareness during waves - Cognitive: severity judgment	- Attitudes toward COVID-19 (conspiracy beliefs) - Time perspective (past negative, future)	- Distrust in preventive guidelines (domestic vaccines) - Cultural-religious beliefs (Imam Kazem's medicine) - Lack of trust in doctors	- Retained: all convergent - Removed: time perspective (not salient in fieldwork) - Added: distrust in guidelines, cultural beliefs
Attributes	- Cognitive: information-seeking - Emotional: fear, anxiety - Concern for self and others	- Perceived sensitivity (HBM) - Psychometric paradigm (Sjöberg)	- Collective risk framing (family/community focus) - Religious coping as cognitive frame	- Retained: all convergent - Added: collective risk framing - Cultural context integrated into definition
Consequences	- Adherence to protective protocols - Following vaccine news - Psychological impact (anxiety, distress) - Economic impact	- Obsessive-compulsive behaviors - Changes in dietary habits	- Altruism (helping colleagues despite risk) - Spiritual appeal (prayer, virtual ceremonies) - Use of traditional medicine (Imam Kazem) - Pandemic fatigue (neglecting protocols)	- Retained: all convergent - Added: altruism, spiritual coping, traditional medicine - Contextualized: pandemic fatigue in Iranian context

3. Consequences

3.1 Adhering to Government Guidance

People's risk perception heavily influences their adherence to government measures and expert advice. The measures involved social distancing, adjusting work routines, reducing travel and meetings, using protective equipment, and administering vaccinations. Compliance with preventive orders demonstrated trust in experts and the government, as well as the effectiveness of risk prevention [4, 62-64].

Risk perception influenced compliance with preventive measures, including masks, gloves, social distancing, and vaccination:

"When I first heard that pollution is no joke, I always wear a mask when I leave home... I never lay a hand on anyone. When I get home, I'm all like, 'Hey kids, stay away while I wash my hands'" (Participant 5)

3.2 Fatigue

The continued use of masks and protective gear, along with the ongoing presence of the disease and the government's enforcement of preventive protocols, left people exhausted. There was a risk of neglecting preventive protocols [35, 61, 65].

3.3 Following up on Vaccine News

Continuous media coverage influenced interest in vaccination or skepticism among some individuals [36, 59, 66, 67].

3.4 Impact on Individuals' Behavioral Habits, Psychology, Economy, and Spirituality

COVID-19 affected various aspects of individuals' lives, including behavioral habits, psychological, economic, and spiritual dimensions. Upon perceiving the threat, individuals sought to maintain their physical and mental health while protecting themselves and their families. Efforts included strengthening the immune system through dietary modifications and increased consumption of vegetables [68] and reducing the use of public transportation to minimize infection risk [43, 69]. The prevalence of anxiety, distress, and obsessive-compulsive disorder increased among individuals. The lockdowns caused economic crises for some businesses, and family income declined due to job loss or illness.

The cost of protective equipment, such as masks and gloves, also imposed a financial burden on

households. Financial difficulties further exacerbated mental and emotional health problems. Ultimately, individuals' coping strategies and perception of COVID-19 risk led them to seek spiritual refuge [54, 64, 70].

3.5 Looking for COVID-19 Infection Prevention Methods

Individuals sought both scientific and pseudo-scientific prevention methods:

"It all depends on the type of vaccine. If it's from abroad, sure, I'll take it. If not, I don't want it"

(Participant1) *"I use Imam Kazem's medicine for myself and my kids; no need for a vaccine"*
(Participant 7)

3.6 A Sense of Altruism

Risk perception promoted cooperation and social support:

"Once I got better, people suggested I change departments, but I declined. I gotta talk to my colleagues, boost their morale, and lend a hand"
(Participant 6)

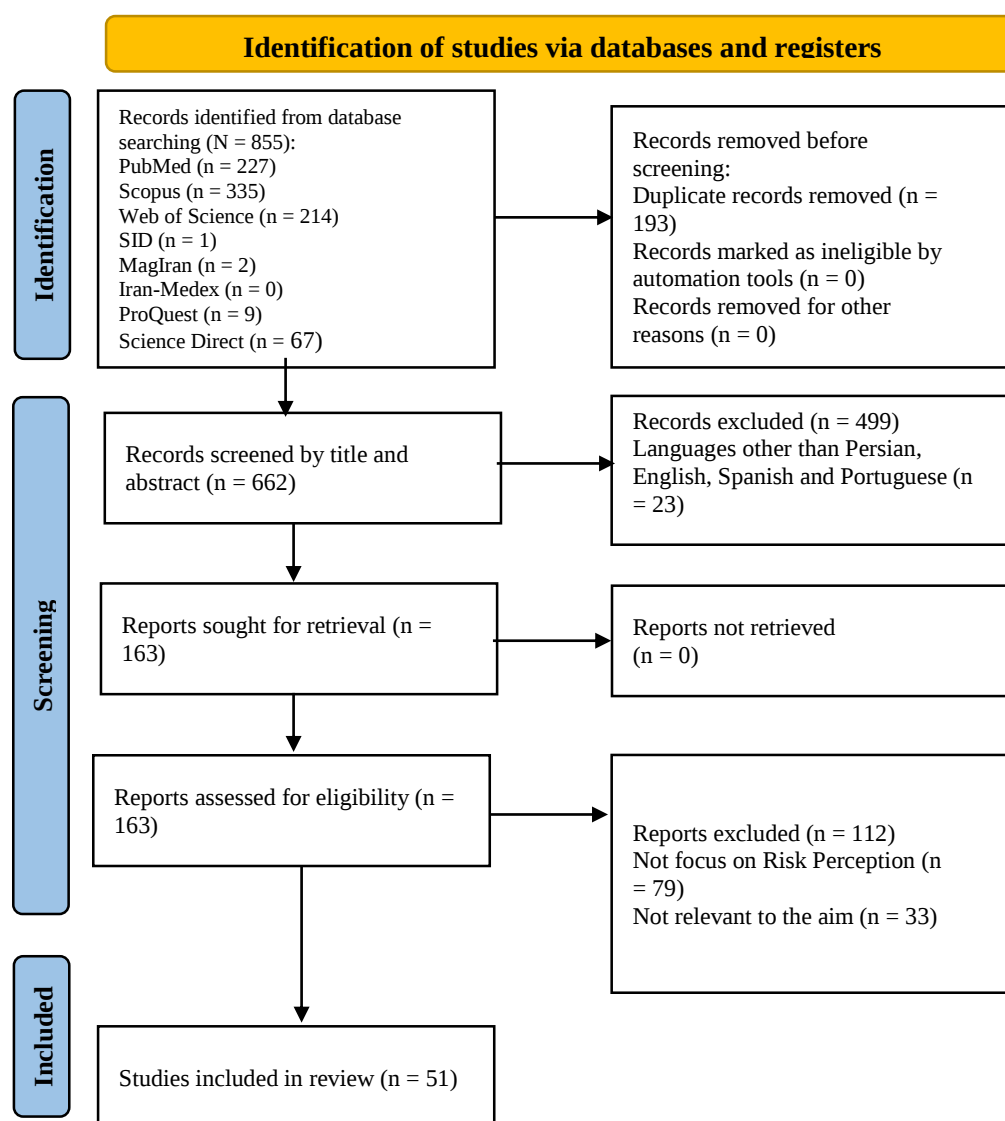


Figure 1. Flow Diagram Illustrating the Selection of Sources.

3.7 Appeal to Spirituality

Individuals turned to virtual worship and religious ceremonies to reduce anxiety and find solace:

"I sensed that everyone was praying for me, and it hit me hard. People from all over Iran called and prayed for my recovery" (Participant 6)

3.8 Final Analytic Phase

In the third phase, the findings from the theoretical and fieldwork phases were systematically integrated to develop a comprehensive and context-sensitive definition of COVID-19 risk perception. [Table 3] The integration process followed a three-step comparative method: (1) findings from both phases were organized into a comparative matrix based on the three main categories (antecedents, attributes, and consequences); (2) convergent codes were merged, and divergent codes, particularly those reflecting culturally specific factors such as distrust in domestic vaccines and reliance on traditional medicine, were evaluated and retained based on the principle of participants' lived experience within the Iranian cultural-religious context; and (3) the final synthesized framework was constructed.

The integrated definition of COVID-19 risk perception derived from this synthesis is as follows: COVID-19 risk perception is a multidimensional and dynamic construct defined as an individual's subjective cognitive appraisal of infection likelihood and severity, accompanied by emotional responses

(fear and anxiety) and information-seeking behaviors.

A complex interplay of antecedents including information overload, personal vulnerability, awareness of an unknown disease, distrust in guidelines, and observation of pandemic realities shapes this perception.

It manifests through dual attributes, cognitive (severity judgment, information-seeking) and emotional (fear, worry). It leads to diverse behavioral consequences ranging from adherence to protective protocols and altruism to pandemic fatigue and non-compliance. Crucially, this framework extends existing definitions by incorporating culturally specific factors, particularly in the Iranian context, such as reliance on spiritual beliefs, use of traditional medicine, and collective risk framing, which significantly influence how risk is perceived and responded to beyond purely individual cognitive appraisals.

This integrated definition, validated across both theoretical and empirical phases, confirms COVID-19 risk perception as a complex, multifaceted, and culturally embedded phenomenon.

The developed framework [Figure 2] illustrates the causal relationships between antecedents, attributes, and consequences, providing a practical tool for understanding and managing risk perception in future public health emergencies.

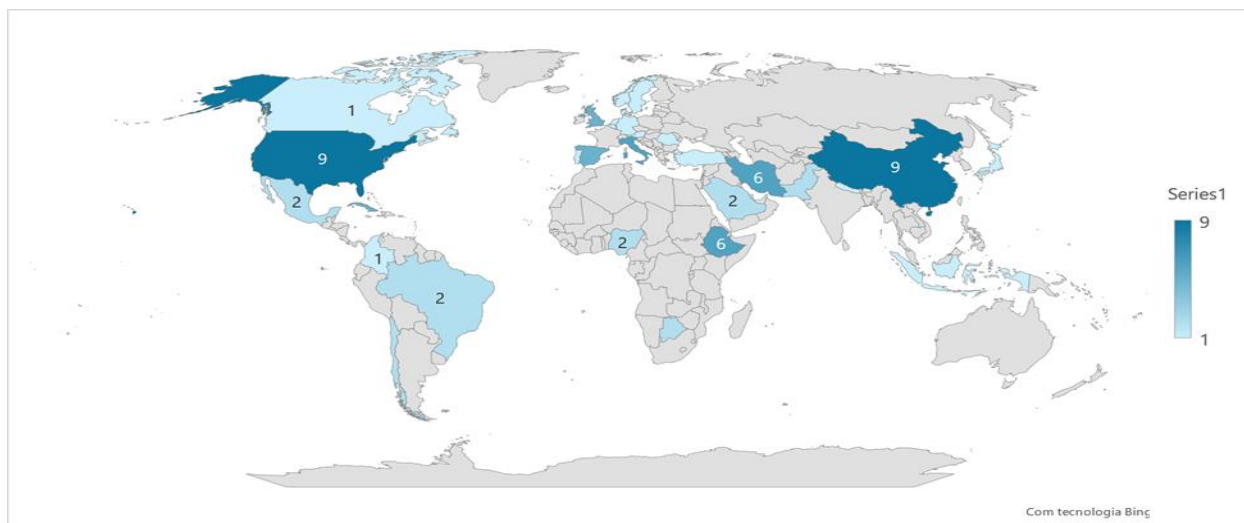


Figure 2. Geographic distributions of studies included in concept development.

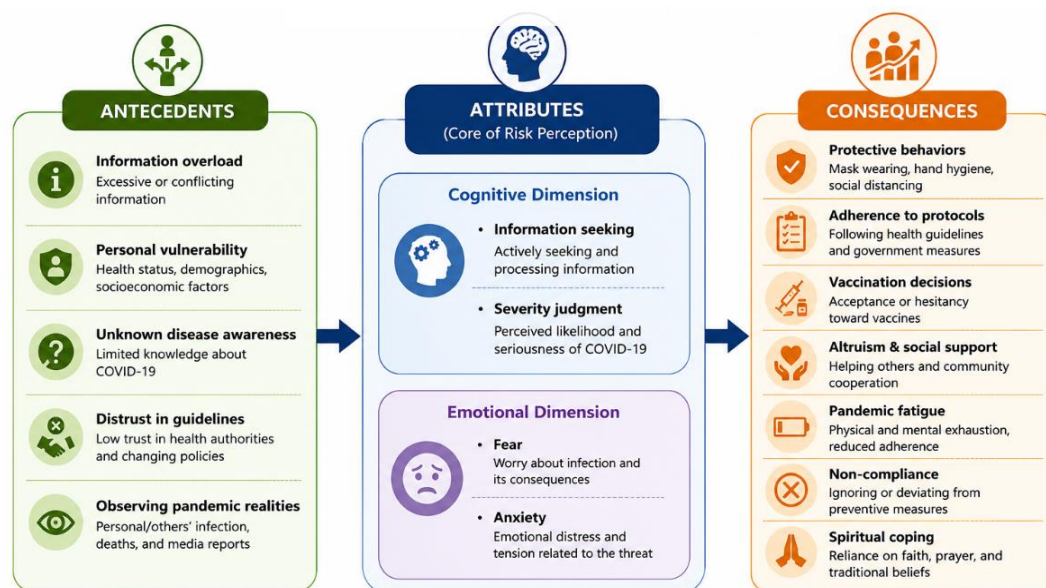


Figure 3. Conceptual Framework of COVID-19 Risk Perception: Antecedents, Core Attributes, and Consequences

Discussion

The hybrid model analysis identified culturally specific patterns of COVID-19 risk perception in the Persian-Islamic context. Unlike Western studies that emphasize individual susceptibility and severity [8, 43], Iranian participants viewed risk as a collective threat to family and community. Faith-based practices, such as virtual prayer ceremonies, played a key role in managing anxiety, unlike in more secular settings [57, 71]. Institutional trust also differed: while some participants expressed skepticism toward domestically produced vaccines, studies from countries with higher institutional trust, such as Denmark and Japan, have reported greater vaccine acceptance [53, 72]. However, this observation is drawn from the qualitative accounts of participants in this study and does not constitute a formal cross-country comparison; rather, it highlights potential cultural and contextual variations that warrant further investigation. These findings confirm that risk perception is culturally shaped, and the fieldwork phase highlighted context-specific dynamics that theoretical models often overlook. Although frameworks such as the Health Belief Model (HBM) and Protection Motivation Theory (PMT) explain individual risk appraisal and preventive behavior [16, 73], they do not fully

capture the cultural, systemic, and temporal dynamics shaping COVID-19 risk perception. While constructs such as perceived susceptibility and severity were evident in participants' fear and information-seeking, dominant themes in the Iranian context included collective risk framing, spirituality as a coping strategy, and institutional distrust [12], which extend beyond individual cognition. The hybrid analysis indicates that health behavior theories and pandemic models should incorporate cultural factors (e.g., collectivism, faith-based coping), systemic influences (e.g., trust in authorities), and temporal changes (e.g., pandemic fatigue) to guide nursing interventions and risk communication better. The developed framework offers several practical applications for nurses and midwives in preventive care settings. First, by identifying specific antecedents of risk perception (e.g., information overload, personal vulnerability, distrust in guidelines), the model enables nurses to systematically assess patients' risk perception barriers and tailor educational interventions accordingly. Second, the model's identification of cognitive and emotional attributes helps nurses address both informational needs (e.g., providing accurate, culturally appropriate information) and emotional concerns (e.g., reducing

anxiety through empathetic communication). Third, the framework highlights the importance of culturally sensitive health messaging, particularly in religious contexts, by incorporating spiritual beliefs into health communications, which can enhance trust and improve adherence to preventive protocols. Fourth, by recognizing the consequences of risk perception (e.g., pandemic fatigue, altruism), nurses can anticipate potential behavioral outcomes and design supportive interventions that sustain long-term compliance. Collectively, this framework provides evidence-based guidance for developing targeted preventive care strategies during infectious disease outbreaks and other public health emergencies. In Iran, information-seeking was a key aspect of COVID-19 risk perception, but it also fueled the use of pseudo-scientific treatments, complicating disease control and delaying proper care. People sought information to protect themselves and others, yet misinformation, especially online, led to confusion and vaccine hesitancy [74, 75]. As awareness and information increase, perceptions of risk decrease, and control over epidemics improves [76]. The rapid spread of false information during the pandemic created a multidimensional threat, prompting people over time to verify information more carefully [77, 78]. This concept led to similar consequences in both the theoretical and fieldwork phases [Table 2]. The results showed heightened altruism and cooperation among healthcare providers, who worked tirelessly to save patients despite limited resources, immense pressure, and personal illness. Even after recovery from COVID-19, they returned to support colleagues, demonstrating dedication on the pandemic's frontline [79]. This study has several limitations. Excluding grey literature may have missed important narratives. The small sample size (seven participants) limits transferability, and the sample's demographic diversity was limited as most participants were from central and northern urban regions of Iran, potentially underrepresenting rural experiences. Data collection in 2022–2023 may not fully capture early-pandemic dynamics, suggesting that longitudinal studies are needed. The distinct religious-political context of Iran may limit

applicability to secular societies, requiring cross-cultural validation. Furthermore, as researchers embedded within the Iranian cultural-religious context and as nursing faculty with clinical experience, our backgrounds may have influenced data interpretation; to mitigate this, we employed peer debriefing, member checking, and maintained an audit trail to ensure transparency. To address these limitations, future research should include larger, more diverse samples from varied geographic regions, employ longitudinal designs, incorporate quantitative methods for triangulation, and conduct cross-cultural comparative studies.

Conclusion

Conducting a concept development of COVID-19 risk perception helps healthcare providers understand the characteristics of this concept and the factors that shape its development. The findings of this study can help health system managers and staff prepare for and respond to future situations, such as pandemics and other health crises.

Ethical Consideration

This study was approved by the Research Ethics Committee of Zanzan University of Medical Sciences (IR.ZUMS.REC.1400.290) and conducted in accordance with the 1964 Helsinki Declaration. Participants received verbal and written information, provided written informed consent before interviews, and were assured of confidentiality and anonymity in reporting results.

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Conflict of Interest

One of the authors serves as the Editor-in-Chief of the journal *Preventive Care in Nursing and Midwifery (PCNM)*. To ensure impartiality, the review and editorial handling of this manuscript were conducted independently of the author,

following the journal's standard peer-review processes. The final acceptance decision was made solely by the Executive Manager and the Editorial Board, without the author's involvement in the review or decision-making process.

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 All authors read and approved the final manuscript.

Artificial Intelligence Utilization

This article was not written using artificial intelligence. However, the language and grammar of the final manuscript were edited and refined using DeepSeek, an AI-based language tool, to improve readability and clarity. All scientific content, data analysis, interpretation, and conclusions remain the original work of the authors.

Data Availability Statement

The data supporting the findings of this study are available from two sources. The data for the theoretical phase (literature review) are from previously reported studies and datasets, which have been cited throughout the manuscript. The qualitative data (transcripts from interviews) generated and analyzed during the fieldwork phase are not publicly available to protect participant

confidentiality, as required by the research ethics committee. Anonymized data are available from the corresponding author upon reasonable request.

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