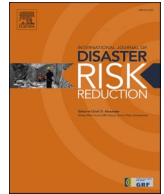




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# Gender-based emergency response and crisis management knowledge assessment: A cross-sectional study on Chinese tertiary student

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## ABSTRACT

While disaster risk reduction (DRR) has been thoroughly examined, the significance of gender in Chinese university students' emergency response (ER) and crisis management (CM) knowledge remains questionable. Though the significance of DRR is becoming more widely recognized, more needs to be known about how male and female students see potential risks and respond to emergencies. Using Krathwohl's knowledge typology to give a structured analysis, this study investigates gender-specific differences in ER and CM knowledge to close this gap. These distinctions must be understood to create gender sensitive DRR approaches. Thereafter, this cross-sectional study assessed ER and CM knowledge in 388 university students in Jiangxi Province, China, using a self-structured questionnaire. In contrast to conventional ideas that propose distinct gender differences, our results show more subtle distinctions. Though general knowledge levels were comparable across each gender, certain distinctions surfaced, such as the fact that female students were better at addressing threats such as electrocution, while male students understood natural threats such as cyclones better. In addition, these variations were affected by family contexts and academic backgrounds. The results underscore the necessity of DRR programs that consider these gender-based differences to improve their efficacy. In response to emergencies, policymakers ought to adapt interventions to accommodate the unique strengths and requirements of each gender. To gain a comprehensive understanding of these disparities, future research should investigate supplementary variables, including cultural influences and socio-economic status, and implement longitudinal methodologies.

## 1. Introduction

The risks associated with globalization, technological advancements, and increasing uncertainties have heightened societal

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vulnerability in today's interconnected world [1–5]. These risks, which encompass the pervasive influence of hyperreality, environmental degradation, war, and pandemics, necessitate a reassessment of sustainability practices [1,3–7]. Risk reduction emphasizes the significance of preparedness and comprehension of individual and collective relationships to cultivate a more resilient and secure society [8,9]. This is necessary to mitigate these threats. The Sendai Framework for Disaster Risk Reduction (2015–2030) is a critical guiding principle in this context, established during the third UN World Conference on Disaster Risk Reduction. This framework underscores the necessity of resilience education, which involves the integration of DRR into educational curricula and the establishment of secure learning environments [10,11].

International organizations like the United Nations Children's Fund (UNICEF) and the United Nations Office for Disaster Risk Reduction (UNDRR), as well as global agreements like the Sustainable Development Goals (UN SDGs), encourage national governments and education departments to incorporate DRR programs and pertinent education into their curricula [10]. Despite these recommendations, scholars (e.g., Ref. [12–17]) have observed that numerous educational institutions, particularly those in the Global South, neglect to conduct emergency drills or collaborate with local emergency response organizations [18]. The vulnerability of pupils to a variety of hazards is exacerbated by this oversight [19].

However, the notion of "risk perception" is an essential component of emergency response (ER) and crisis management (CM). It evaluates an individual's readiness to act and vulnerability in the presence of crises [20–23]. It is imperative to comprehend risk perception to conduct behavioral research and benchmark readiness, particularly in scenarios that involve multiple hazards [21]. Risk tolerance is variable among individuals, which influences their decision-making and behavior during emergencies [11,24]. In contrast, individuals with a higher risk tolerance may minimize the severity of crises and engage in riskier behaviors, while those with a lower tolerance may perceive the same situations as highly perilous and act more cautiously [11,25].

Although there is an unambiguous need for comprehensive ER and CM education, there is still a substantial lack of knowledge on how university students perceive and are adequately prepared for these dangers [16,26]. The existing disparity is further compounded by gender disparities, which have been demonstrated to impact risk perception and behavior in times of crisis [26–29]. Previous studies have recognized the significance of ER and CM education [20,26]. However, they frequently fail to consider the impact of gender-specific views and levels of readiness on the efficacy of this education [16]. Consequently, educational institutions may lack the necessary resources and expertise to effectively meet the specific requirements of male and female students, so exposing them to possible harm from both natural and man-made catastrophes.

The issue is exacerbated by the fact that most university curricula do not provide thorough instruction on ER and CM [16,30], especially in locations that are susceptible to recurrent catastrophes. If universities do not implement specialized interventions to address the gender-specific disparities in knowledge and readiness, they may not be able to develop a student population that is resilient during emergencies [16]. By evaluating the present level of ER and CM knowledge among university students in Nanchang, Jiangxi Province, China—a region susceptible to both man-made risks and natural disasters like heatwaves and floods—this study aims to address this knowledge disparity [16,31–33].

It's essential to comprehend the ER and CM information that male and female students possess to create educational interventions that work. Studies reveal that gender significantly influences how people perceive risk [14]; women tend to perceive hazards as higher and to value safety more than men do [26,28]. However, increased awareness of the risks does not necessarily equate to increased readiness or understanding [14]. There are often discrepancies in how male and female students deal with emergency circumstances because educational systems do not consider these variances [16,29,30].

Subsequently, it is also critical to investigate how gender disparities in knowledge affect overall preparation, particularly in the setting of Chinese educational institutions, where gender norms and expectations might further complicate these dynamics. According to early studies [34,35], female students may not have the confidence or experience to act decisively in a crisis [30], while male students may overestimate the severity of risks due to their overconfidence in their ER and CM capabilities. To better understand how educational interventions might be designed to close these inequalities, this study compares the knowledge, preparation, and perceived vulnerabilities of male and female students to thoroughly examine these differences.

Thereafter, the objective of this study is to emphasize the urgent necessity of providing university students with the necessary knowledge and skills to succeed in ER and CM. Additionally, it will emphasize the gender-based vulnerabilities and response capacities that are important, as gender significantly influences risk perception and response [26]. To evaluate the degree of susceptibility between male and female university students in China, this research employs Krathwohl's knowledge typology model [20], guided by the research question "To what extent do university students possess knowledge, readiness, and awareness of gender influences, and what disparities persist in their understanding of ER and CM?". This study endeavors to compare the knowledge and awareness of male and female students to improve emergency response systems and promote more effective risk management strategies in educational institutions by enhancing our comprehension of the relationship between gender and risk perception.

## 2. Literature review

### 2.1. Gender, risk perception, and their impact on resilience

It is imperative to investigate the interplay between gender and risk perception, which can either increase resilience or contribute to vulnerability, rather than solely focusing on vulnerability. Gaining a comprehensive understanding of risk perception is important for ensuring successful disaster preparation, especially when considering the influence of gender-specific characteristics on this perception [4,36]. According to research [6,27], men and women are susceptible to different psychological and socioeconomic factors that impact their risk perception [14].

Gender-specific factors, such as the ability to move around, the ability to make decisions, and the ability to access resources, have a

considerable impact on how people perceive and react to threats [22,37,38]. Women frequently encounter distinct obstacles resulting from conventional gender roles and cultural constraints, which might restrict their ability to adequately address emergencies, such as climate-related disasters like floods [37,39]. These obstacles may encompass limited availability of resources, diminished decision-making power, and restricted social support networks [36].

On the other hand, males may encounter various types of susceptibility and capacity to recover from difficulties because of cultural expectations and duties [4,20]. For instance, males frequently experience most of the physical risk as a result of cultural expectations that promote behaviors or duties involving risk in potentially hazardous environments [26]. Although males may have more access to resources and decision-making authority in some situations, they also have difficulties regarding emotional expression and requesting assistance, which can influence their overall resilience [40,41].

Comprehending these disparities in gender is essential for formulating customized emergency response tactics that effectively cater to the distinct requirements and talents of both males and females [22]. To capture these subtleties and provide light on how various groups—including men and women—develop survival strategies in the face of different risks, gender-based vulnerability assessments have become essential [37,41]. In line with this direction, this study intends to improve the scholarship of crisis management and emergency response strategies by concentrating on these gender dynamics [37], thereby lowering vulnerabilities and promoting increased resilience across genders [22].

Moreover, the incorporation of risk perception with behavioral sciences enables the anticipation of individual reactions to threats and strengthens techniques to address risks [22]. An increased awareness of risk often results in the implementation of more proactive preventive measures. Nevertheless, the efficacy of these measures is contingent upon individuals' comprehension and confidence in the information they are provided with [11,42]. Individuals of various genders may exhibit distinct cognitive and behavioral responses to risk information, influenced by their unique life experiences and cultural expectations [25,43]. The level of trust in organizations and emergency management agencies has an important function in influencing how hazards are perceived and responded to La Torre et al. [5]. Enhancing risk education to account for gender-specific viewpoints might strengthen resilience, empowering communities to predict and reduce the consequences of possible disasters more effectively [36].

Furthermore, although risk perception plays a crucial role in preparedness, it is vital to comprehend its intersection with resilience. Resilience is the capacity to foresee, be ready for, and adjust to fluctuating circumstances, and it is impacted by gender-specific elements. Because of their societally expected responsibilities as caretakers and wage earners, women and men are in a unique position to affect resilience in homes and communities. By comprehending these functions, emergency preparedness endeavors might be more effectively customized to enhance resilience in areas where it is most required. Khan et al. [34] and Azad and Pritchard [28] argue that gender-specific approaches in ER and CM practices will make societies more resilient and lessen vulnerabilities.

With such scholarly direction, this work highlights the need to look beyond overall susceptibility and examine how gender differences in ER and CM knowledge influence adaptability. The study examines how male and female tertiary students perceive and respond to catastrophes to see how gender affects their crisis management. If risk science researchers and communicators better understand gender-specific perspectives in ER and CM, they can develop more effective and tailored emergency management strategies to reduce vulnerabilities and improve resilience among diverse student populations.

## 2.2. Institutional influence on student risk perception

To establish effective disaster preparation programs, it is imperative to acquire an understanding of the way in which university students perceive risk [30]. However, it is equally vital to investigate the link between academic institutions' roles and the extent to which this view exists [18,30]. Universities, as hubs of information, have a major effect on students' awareness and comprehension of risks through many instructional and preparatory programs [44,45].

Academic institutions frequently establish extensive ER and CM programs to provide students with the essential information and abilities to handle possible situations [18,30]. To lessen students' susceptibility and improve their preparation, these programs often involve evacuation drills, safety instruction, and professional development [13,46]. Nonetheless, the degree to which these institutional endeavors impact students' sense of danger has not been thoroughly investigated, thereby making this relationship an important field of research [30,45].

Studies conducted in countries like Japan, New Zealand, and Australia, where universities incorporate disaster preparation into their curricula, indicate that the active participation of educational institutions may greatly improve students' understanding of potential risks [17,23,47,48]. On the other hand, research conducted in different areas suggests that the impact of these programs on students' views may differ. This emphasizes the need of comprehending how various institutional roles influence risk perception [18,49].

The confidence and perception of the safety of students are also significantly influenced by the stability and preparedness of a university's emergency response system [47]. The significance of maintaining a proactive and comprehensive emergency response system within universities is underscored by research conducted by Cai et al. [50] and Weber et al. [30]. This system not only equips students with the necessary skills to deal with crises, but also enhances their overall sense of security [48]. Furthermore, the institution's impact on students' perceptions of preparedness and safety is further illustrated by the presence of well-maintained emergency supplies and the potential for universities to function as reserve forces during disasters [30,51].

Moreover, research has demonstrated that students' risk perceptions are substantially influenced by the incorporation of disaster awareness into university curricula and community engagement initiatives [42,48]. For example, the research conducted by Kang et al. [9] and Mohammed et al. [52] emphasizes the potential of targeted educational programs to improve students' comprehension of disaster risks and their ability to respond effectively. Ryan et al. [53] investigated the intersection of institutional support and family dynamics during emergencies in Los Angeles, to influence student perceptions. The role of institutions in cultivating a culture of

preparedness that extends beyond the university and into the broader community is emphasized by community-based tsunami education programs in Indonesia, as discussed by Timperio et al. [54]. Yu et al. [23] provides additional evidence that universities are essential for the dissemination of risk-related knowledge, which in turn influences the perception and management of potential hazards by students and their communities.

Subsequently, this study examines whether the educational and preparedness activities offered by universities are associated with an increased perception of risk among students. It also investigates whether there are disparities in the manner in which male and female pupils perceive these risks, which may be influenced by the character and extent of their education. This study seeks to offer insights into how universities can more effectively customize their ER and CM programs to meet the diverse requirements and perceptions of the student body by emphasizing the gender-based knowledge disparity that supposed to gain from different social institutions.

### 2.3. Krathwohl's model and hypothesis buildup

The knowledge typology model developed by David R. Krathwohl is an updated version of Benjamin Bloom's cognitive taxonomy [55,56]. Apart from Krathwohl, who added a new level of knowledge known as metacognitive knowledge and transferred Bloom's typology's noun form to verbal form, Bloom categorized knowledge into three broad categories: factual knowledge, conceptual knowledge, and procedural knowledge [55,56]. This model helped later research in education studies address psychomotor analysis [20,56]. In this research, we also employ these models to assess students' vulnerabilities, adhering to the guidelines set forth by Rashid et al. [20].

However, factual knowledge typically pertains to the fundamentals of a field, including glossaries, terminology, and specifics that one needs to be aware of to oversee daily operations [20,55,56]. As factual information for this study, we took into account the definitions of ER and CM, as well as various types of risk and fundamental aspects of an individual's behavior, such as mood swings and interactions with disabled friends, that are correlated with personal vulnerabilities [20,23,36,46,57]. In a line with above literary guidelines, we assumed that.

**H1.** Students, both male and female, exhibit differing factual comprehensions of ER and CM.

In contrast, to improve the conceptual understanding, we examined various risk and emergency service communications that were connected to the community and organizations in accordance with earlier studies [6,8,20,21,23,46]. This is because having a certain level of knowledge enables individuals to gather information and ideas and arrange them into groups that show connections [55]. And we assumed.

**H2.** Students, both male and female, have different conceptual grasps of ER and CM.

Furthermore, we have taken into consideration various known actions, such as responses to various disasters and hazards, actions related to emergency medical problems, and responses to a fire incident, to understand differences in students' procedural level knowledge [20,21,23,46]. This is because procedural understanding usually involves doing an event to attain a given goal [55,56]. The capacity to apply previously acquired knowledge to make plans, practice self-reflection, or comprehend the environment is known as metacognition [55]. In a line with this perspective we believe.

**H3.** Students, both male and female, have exhibit different procedural understandings of ER and CM.

We considered a number of abrupt event responses, such as terrorist attacks, accidents, harassment, abuse, and discrimination, to comprehend the difference in metacognition [5,6,8,20,21,29,46]. For the purposes of this study, it was assumed that all the students, male or female, had a similar degree of comprehension of metacognitive knowledge related to sensitivity to multiple hazards and varying risk perceptions. As a result, this study puts forth the following hypothesis in light of the body of available literature.

**H4.** Students, both male and female, have exhibit different metacognitive understandings of ER and CM.

## 3. Methodology

### 3.1. Study area, population, and sampling technique

Based on the suggestion of Cooper & Schindler [58], the present research examines the associations between constructs through empirical analysis of relevant primary data. In this regard, the primary data for this study were cross-sectional and collected utilizing a self-structured questionnaire [59]. However, the scales of the questionnaire for measuring the constructs were adapted from similar prior research. In this regard, Salkind [60] suggested that research methods that allow for evaluating respondents' viewpoints, such as questionnaire surveys, are effective for investigating the possible associations between presented parameters and constructs. Moreover, the unit of analysis for this research was young Chinese university students in Jiangxi Province who were older than eighteen and were studying in any category of tertiary-level study, i.e., bachelor's, master's, postgraduate, or doctoral research. The reason for choosing Jiangxi Province in China is because it is susceptible to both natural and man-made hazards [31,33].

The study used a nonprobability sampling approach called judgmental sampling since the student population is unpredictable owing to reasons including financial restrictions, readmission, graduation completion, dropout, course movement, and transfer. By focusing on pertinent responders, this strategy makes effective use of the limited resources available. Additionally, it guarantees the gathering of insightful and pertinent data, which improves the authenticity and dependability of the study's conclusions. In contrast to probability sampling techniques such as random or systematic sampling, judgmental sampling provides focused data collection,

efficiency, adaptability, and practicality, which makes it the best option given the particular requirements and limitations of the research [61].

This research distributed 500 questionnaires to reachable respondents, 403 of whom could be collected; ultimately, 388 questionnaires were found to be appropriately filled out, accurate, useable, and valid. Therefore, the research team had to finalize the total sample size to 388. The current study followed the suggestion of Boomsma [62] to finalize the total sample size. The authors recommended a sample size of at least 200 to address commonalities in social science research. On the other hand, other scholars, such as Kline [63] and Faul et al. [64], have indicated that the requirement for a standard sample size is more than or equal to 386. Moreover, the response rate of 77.6 % in this research is also greater than that in similar prior research in the context of China; for example, for Lin et al. [65], 60 %, and for Qing et al. [66], 41.8 %. Therefore, the current study assumes that this sample size is acceptable and convinced us to continue this research further.

### 3.2. Data collection, data analysis and interpretation

Data on the perceptions of the respondents were collected, between mid of March 2023 and end of October 2023, from both genders using cognitive level markers that were selected after a careful and rigorous review of the literature. The participants also answered a series of cognitively demanding questions. Each indicator was selected from empirical studies according to its degree of comprehension (Table 1). To quantify the indicators based on the students' comprehension, a 5-point Likert scale was used. As an illustration, 0) I don't know; 1) I read it but forgot; 2) I know but can't explain; 3) I know a little and can explain it; and 4) I know a lot and can fully express it. The researchers established that a few of the questionnaire items are capable of measuring discrete latent components.

Based on a 95 % confidence interval and  $\alpha = 0.05$ , self-administered questionnaire (SAQ) was used to gather questionnaires from 403 (388 were finalized) representatives who gave permission for the study to be conducted (Table 3). The respondents were able to finish the survey on their own with the support of the structured SAQs. These techniques enabled them to independently express their true reactions. A total of 46 questionnaires were used for additional analysis after being carefully reviewed, and any incomplete responses were discarded. There were 182 male and 206 female responders among them (Table 3). According to the descriptive statistics (Table 3), the mean age of the male students was 23.75 years, while the average age of the female students was 23.18 years. The majority of students (29.4 % of boys and 34.8 % of girls) were in the 23 years and under age group, with an  $X^2$  value of 1.026 and a  $P$  value of 0.795. All of the students were at varying stages of their education, ranging from bachelor's to doctorate, with the majority of them having completed their bachelor's degree (boys 23.7 % and girls 32.2 %).

To verify that the survey items were clear, a follow-up test was performed. A pilot study was carried out to evaluate the research method and the overall success of the full scale, and the questionnaire was prepared in both Chinese and English. The pilot test included 50 volunteers, chosen at random, or 10 % of the total sample size. All domains exhibited good levels of internal uniformity when the reliability of the questionnaire was assessed using Cronbach's alpha ( $\alpha$ ) coefficients for each construct (Table 2). The questionnaire's reliability and robustness in evaluating a variety of knowledge dimensions were confirmed by constructs such as factual, conceptual, procedural, and metacognitive levels of comprehension, which showed Cronbach's alpha ( $\alpha$ ) values ranging from 0.774 to 0.836. These results support the validity of the questionnaire in measuring respondents' complex levels of comprehension.

Besides, a panel of experts, comprising two of our colleagues, evaluated the face validity of the questionnaire and determined that it was successful in measuring the desired constructs, confirming the validity of the questionnaire by assessing the intended spectrum of knowledge with accuracy. Following data coding and processing using the statistical package for social science (version 22), a  $t$ -test was used to identify variations between boys' and girls' awareness of risk and vulnerability.  $T$ -tests are essential for comparing the means of two groups, assessing the statistical significance of observed differences, confirming or disproving a hypothesis, and offering a dependable way to infer important information from data. Finally, sources of knowledge were also counted to analyze the most common places where the respondent's gained knowledge.

## 4. Results

### 4.1. Factual-level understanding

A fundamental grasp of ER and CM is crucial for people of all genders, and for the sake of this study, the researchers regarded this knowledge as factual-level knowledge. Gender disparities in factual levels of emergency response (ER) and crisis management (CM) understanding among the participants in the survey are shown by analyzing the statistical results in Table 4. Overall, boys ( $Mean=2.12$ ,  $SD=1.306$ ) and girls ( $Mean=2.03$ ,  $SD=1.450$ ) seem to understand ER and CM relatively similarly, and the  $t$ -test ( $t\ value=0.578$ ,  $p\ value=0.563$ ) shows no significant difference in the mean scores.

Similarly, when understanding about personal safety in ER and CM is tested, both groups show similar levels of understanding; the difference in mean scores does not achieve statistical significance (girls:  $Mean=2.32$ ,  $SD=1.345$ ;  $t\ value=0.695$ ,  $p\ value=0.487$ ; boys:  $Mean = 2.42$ ,  $SD=1.407$ ). The ER and CM mean scores regarding hazards understanding vary slightly, with girls having a slightly higher mean score. However, this difference is not statistically significant (boys:  $Mean=2.31$ ,  $SD=1.037$ ; girls:  $Mean=2.47$ ,  $SD=1.089$ ;  $t\ value=-1.506$ ,  $p\ value=0.133$ ), suggesting that both genders have a fairly balanced understanding of this aspect. In the same way, there is no statistically significant difference in hazard familiarity between boys ( $Mean=2.31$ ,  $SD=1.393$ ) and girls ( $Mean=2.32$ ,  $SD=1.486$ ). This was confirmed by the  $t$ -test, which showed no statistically significant difference ( $t\ value=-0.016$ ,  $p\ value=0.987$ ).

However, there is a noteworthy distinction in the particular grasp of cyclones, with boys ( $Mean=1.97$ ,  $SD=1.408$ ) demonstrating a significantly better degree of understanding than girls ( $Mean=1.62$ ,  $SD=1.398$ ) as demonstrated by the  $t$ -test ( $t\ value=2.461$ ,  $p\ value=0.014$ ). Nonetheless, as the  $t$ -tests ( $t\ value=0.106$ ,  $p\ value=0.916$ ;  $t\ value=-0.786$ ,  $p\ value=0.431$ , respectively) show, there are no appreciable differences in boys' and girls' comprehension of cyclone signals or heatwaves (Table 4). This shows that there might be

**Table 1**  
Indicators and questions for accessing students' vulnerability.

Indicators and asked question	Literature
<b>Factual Level of Knowledge</b>	Abdelrahman [27]; Abi Jumaa et al. [12]; Edey et al. [29]; Girlando et al. [6]; Jing et al. [43]; Khan et al. [26]
<i>ER &amp; CM understanding</i>	
What is emergency response/emergency measure?	
<i>ER &amp; CM – individual safety</i>	
What are self-defense techniques?	
<i>ER &amp; CM understanding- hazard</i>	
What is a hazard?	
<i>Hazard familiarity</i>	
What are the types of Hazards?	
<i>Hazard specific understanding – cyclone</i>	
How many signals are there for cyclone/whirlwind?	
<i>Hazard specific understanding – cyclone</i>	
What is the meaning of each signal of cyclone?	
<i>Hazard specific understanding – heatwave</i>	
What is heat-stock?	
<b>Conceptual Level knowledge</b>	Abdelrahman [27]; Abi Jumaa et al. [12]; Dayrit et al. [36]; Girlando et al. [6]; Jing et al. [43]; Wang and Huang [16]; Yin et al. [22]; Zhu et al. [48]
<i>Risk communication capacity</i>	
Do you know the emergency organization contract number?	
<i>Risk management capacity</i>	
Do you know the contact number of fire brigade?	
<i>Risk communication capacity - organizational level</i>	
Do you know the victim support center?	
<i>Risk communication responses - fire-Brigade &amp; Police</i>	
What is 119 or 110?	
<i>Risk communication responses- Ambulance</i>	
What is 999 or 120?	
<b>Procedural level knowledge</b>	Amini Hosseini and Izadkhal [49]; Barten et al. [8]; Rashid et al. [20]; Wang et al. [45]; Yin et al. [22]
<i>Risk response- cyclone</i>	
What should we do during the cyclone?	
<i>Risk response- flood</i>	
What should we do during the flood?1.	
<i>Risk response- thunderbolt</i>	
What to do during a natural thunderbolt?2.	
<i>Risk response- earthquake</i>	
What to do in earthquake?3.	
<i>Risk response- Road accident</i>	
How to avoid accidents on the way (car/boat/others)?4.	
<i>Risk response-terrorist attack</i>	
What to do if there is any terrorist attack at the campus?5.	
<i>Risk response- snake bite</i>	
What do you do if your classmate is bitten by a snake?6.	
<i>Risk response-water accident</i>	
What to do if your classmate falls into the water?7.	
<i>Risk responses- personal safety</i>	
Do you know how to swim?8.	
<i>Risk response- Fire</i>	
What to do if there is a fire in your campus or neighborhood?9.	
<i>Risk response- electrocute</i>	
What to do if your classmate is electrocuted?10.	
<b>Metacognitive knowledge</b>	Khan et al. [26]; Khan et al. [34]; Rashid et al. [20]; Sullivan-Wiley and Short Gianotti [21]; Yu et al. [23]; Weber et al. [30]
<i>ER awareness &amp; CM capacity- first-aid</i>	
Do you know about how to take first-aid in case of any accident?	
<i>ER awareness &amp; CM capacity- harassments</i>	
Do you know about what to do if you or a classmate is being sexually harassed by a teacher/staff/other?1.	
<i>ER awareness &amp; CM capacity- discrimination</i>	
What to do if you or your classmate gets discriminated on the	

(continued on next page)

**Table 1** (continued)

Indicators and asked question	Literature
basis of race, religion, skin, color, health?2.	
<i>ER awareness &amp; CM capacity- microaggression</i> What to do if any friend or classmate is bullied at campus?3.	
<i>ER awareness &amp; CM capacity – drug abuse</i> Are the evils of drugs or topics of drugs discussed in the institution?4.	
<i>ER awareness &amp; CM capacity – equality</i> How to deal with your autistic friend?5.	
<i>ER awareness &amp; CM capacity – Gender equality</i> How to deal with other gender?6.	
<i>ER awareness &amp; CM capacity - child marriage</i> What to do to prevent child marriage?1.	
<i>ER awareness &amp; CM capacity – Eve-teasing</i> What to do if you or your classmate is a victim of eve-teasing? <i>ER awareness &amp; CM capacity – CPR</i> Do you know how and when we give CPR?2.	

(Author produces, 2024).

**Table 2**

Reliability statistics.

Constructs	Number of Item	Alpha (α)
Factual levels of understanding	7	0.792
Conceptual levels of understanding	5	0.774
Procedural levels of understanding	11	0.802
Metacognitive levels of understanding	10	0.836

**Table 3**

Descriptive information of the respondents.

Socioeconomic characteristics		Gender of the respondent (N = 388)					
		Boy (N = 182)		Girl (N = 206)		Chi-Square test	
		Freq	%	Freq	%	X <sup>2</sup>	P Value
Education of the respondents	Undergraduate	92	23.7	125	32.2	7.368	0.025
	Master	74	19.1	57	14.7		
	Ph.D.	16	4.1	24	6.2		
	Mean	1.58		1.51			
	Std. Deviation	0.649		0.697			
Age of the respondents	< =23	114	29.4	135	34.8	1.026	0.795
	24–26	48	12.4	47	12.1		
	27–29	5	1.3	8	2.1		
	30+	15	3.9	16	4.1		
	Mean	23.75		23.18			
	Std. Deviation	3.667		4.055			

(Source: Field survey, 2023)

differences in the two groups’ comprehension of cyclones, which could be impacted by things like previous exposure, interest, or educational emphasis.

Regarding knowledge of heatwaves, cyclone signals, and acquaintance with hazards, no appreciable variations are seen. All of these results point to a relatively stable level of ER and CM comprehension in both groups, with subtle differences in the knowledge of individual hazards. Ensuring equitable diffusion of knowledge across multiple communities is essential, and these insights play a critical role in driving educational initiatives and policy measures that aim to improve preparedness for disasters and risk reduction techniques.

#### 4.2. Conceptual level understanding

Table 5 illustrates some important findings from the investigation of gender variations in conceptual levels of ER and CM

**Table 4**  
Different genders' factual levels of ER and CM understanding.

Indicators	Boy (N = 182)		Girl (N = 206)		T Test	
	Mean	SD <sup>a</sup>	Mean	SD	t value	P Value
ER & CM understanding	2.12 <sup>b</sup>	1.306	2.03	1.450	0.578	0.563
ER & CM – individual safety	2.42	1.407	2.32	1.345	0.695	0.487
ER & CM understanding- hazard	2.31	1.037	2.47	1.089	-1.506 <sup>c</sup>	0.133
Hazard familiarity	2.31	1.393	2.32	1.486	-0.016	0.987
Hazard specific understanding -cyclone	1.97	1.408	1.62	1.398	2.461	0.014
Hazard specific understanding -cyclone signal	1.15	1.193	1.14	1.228	0.106	0.916
Hazard specific understanding -heatwave	1.06	1.201	1.17	1.361	-0.786	0.431

<sup>a</sup> SD= standard deviation.

<sup>b</sup> Each scale indicates: 0 = I don't know; 1 = I read it but forgot; 2 = I know but can't explain; 3 = I know a little and can explain it; and 4 = I know a lot and can fully express it.

<sup>c</sup> A negative (-ve) value indicates that girls are more likely than boys to sense vulnerability.

comprehension. First off, there is no statistically significant difference in the mean scores of risk communication ability between girls ( $Mean=1.21$ ,  $SD=0.701$ ) and boys ( $Mean=1.12$ ,  $SD=0.825$ ), indicating that both genders have a comparable understanding of the communication components associated with risk ( $t\ value=-1.197$ ,  $p\ value=0.232$ ). Comparable organizational-level comprehension of risk communication is seen across boys ( $Mean=2.64$ ,  $SD=1.283$ ) and girls ( $Mean=2.81$ ,  $SD=1.364$ ) ( $t\ value=-1.284$ ,  $p\ value=0.200$ ). Similarly, no significant difference is detected in risk communication ability. These results imply that, within the examined sample, both genders had a baseline awareness of risk communication principles that were consistent.

On the other hand, there are notable gender disparities in some areas of risk assessment and reaction tactics. In contrast to girls ( $Mean=1.18$ ,  $SD=1.500$ ), ( $t\ value=2.391$ ,  $p\ value=0.017$ ), boys ( $Mean=1.57$ ,  $SD=1.643$ ) have a noticeably higher mean score in risk management capability, indicating that boys may have a stronger grasp of risk management techniques. Additionally, compared to girls ( $Mean=2.40$ ,  $SD=1.564$ ), ( $t\ value=2.155$ ,  $p\ value=0.032$ ), boys ( $Mean=2.73$ ,  $SD=1.464$ ) exhibit a significantly higher mean score in risk communication responses related to ambulance services, suggesting a higher level of proficiency in understanding emergency response protocols regarding ambulance services. According to these results, it is critical to take gender differences in conceptual knowledge into account when creating and carrying out ER and CM programs. The goal is to guarantee inclusive and comprehensive approaches that cater to a range of population needs and abilities in education.

#### 4.3. Procedural-level understanding

The information from Table 6 sheds important light on the procedural comprehension levels of crisis management (CM) and emergency response (ER) about gender. All things considered, the results show that boys and girls have very similar understandings of the procedural aspects of emergency response in a variety of settings. Statistically insignificant differences in mean scores for risk responses to cyclones (boys:  $Mean=1.99$ ,  $SD=1.259$ ; girls:  $Mean=1.86$ ,  $SD=1.435$ ;  $t\ value=0.954$ ,  $p\ value=0.341$ ), floods (boys:  $Mean=2.81$ ,  $SD=1.061$ ; girls:  $Mean=2.97$ ,  $SD=1.152$ ;  $t\ value=-1.397$ ,  $p\ value=0.163$ ), thunderbolts (boys:  $Mean=2.34$ ,  $SD=1.319$ ; girls:  $Mean=2.62$ ,  $SD=1.315$ ;  $t\ value=-2.095$ ,  $p\ value=0.037$ ), earthquakes (boys:  $Mean=2.94$ ,  $SD=1.078$ ; girls:  $Mean=3.05$ ,  $SD=1.233$ ;  $t\ value=-0.921$ ,  $p\ value=0.357$ ), road accidents (boys:  $Mean=2.75$ ,  $SD=1.209$ ; girls:  $Mean=2.79$ ,  $SD=1.211$ ;  $t\ value=-0.318$ ,  $p\ value=0.751$ ), snake bites (boys:  $Mean=3.00$ ,  $SD=1.035$ ; girls:  $Mean=2.92$ ,  $SD=1.235$ ;  $t\ value=0.674$ ,  $p\ value=0.501$ ), water accidents (boys:  $Mean=2.86$ ,  $SD=1.284$ ; girls:  $Mean=3.09$ ,  $SD=1.238$ ;  $t\ value=-1.798$ ,  $p\ value=0.073$ ), personal safety (boys:  $Mean=2.76$ ,  $SD=1.671$ ; girls:  $Mean=2.62$ ,  $SD=1.692$ ;  $t\ value=0.810$ ,  $p\ value=0.419$ ), and fires (boys:  $Mean=2.84$ ,  $SD=1.210$ ; girls:  $Mean=2.87$ ,  $SD=1.248$ ;  $t\ value=-0.270$ ,  $p\ value=0.788$ ) underscore a consistent comprehension of procedural protocols across genders for most scenarios examined.

Nonetheless, significant differences are observed in the average risk reactions to particular situations. When compared with females, boys have a substantially higher mean score in risk response to terrorist attacks (boys:  $Mean=2.26$ ,  $SD=1.436$ ; girls:  $Mean=1.98$ ,  $SD=1.446$ ;  $t\ value=1.964$ ,  $p\ value=0.047$ ), which may indicate that boys have a greater understanding of or experience with the processes associated with such incidents. The risk response to electrocution, on the other hand, is substantially higher for girls than for boys (girls:  $Mean=3.05$ ,  $SD=1.225$ ;  $t\ value=-2.588$ ,  $p\ value=0.010$ ), suggesting that girls may be more competent or conscious of managing hazards associated with electricity. The necessity for customized and gender-sensitive approaches in ER and CM programs is highlighted by these disparities, which may result from various experiences, exposure to training, or social factors.

**Table 5**  
Different genders' conceptual levels of ER and CM understanding.

Indicators	Boy (N = 182)		Girl (N = 206)		T Test	
	Mean	SD	Mean	SD	t value	P Value
Risk communication capacity	1.12	0.825	1.21	0.701	-1.197	0.232
Risk management capacity	1.57	1.643	1.18	1.500	2.391	0.017
Risk communication capacity - organizational level	2.64	1.283	2.81	1.364	-1.284	0.200
Risk communication responses - Fire-Brigade & Police	2.05	1.592	1.93	1.602	0.753	0.452
Risk communication responses - Ambulance	2.73	1.464	2.40	1.564	2.155	0.032

**Table 6**  
Different genders' procedural levels of ER and CM understanding.

Indicators	Boy (N = 182)		Girl (N = 206)		T Test	
	Mean	SD	Mean	SD	t value	P Value
Risk response- cyclone	1.99	1.259	1.86	1.435	0.954	0.341
Risk response- flood	2.81	1.061	2.97	1.152	-1.397	0.163
Risk response- thunderbolt	2.34	1.319	2.62	1.315	-2.095	0.037
Risk response- earthquake	2.94	1.078	3.05	1.233	-0.921	0.357
Risk response- road accident	2.75	1.209	2.79	1.211	-0.318	0.751
Risk response-terrorist attack	2.26	1.436	1.98	1.446	1.964	0.047
Risk response- snake bite	3.00	1.035	2.92	1.235	0.674	0.501
Risk response-water accident	2.86	1.284	3.09	1.238	-1.798	0.073
Risk responses- personal safety	2.76	1.671	2.62	1.692	0.810	0.419
Risk response- fire	2.84	1.210	2.87	1.248	-0.270	0.788
Risk response- electrocute	2.73	1.231	3.05	1.225	-2.588	0.010

Moreover, whereas most procedural knowledge seems to be gender-neutral, focused interventions could be required to address certain areas of inequality. Emergency response systems can guarantee more inclusive and efficient solutions that meet the various needs and capacities of every individual by recognizing and addressing these disparities. In the end, these initiatives contribute to stronger and more equitable ER and CM procedures by strengthening community safety and resilience.

#### 4.4. Metacognitive level understanding

An environment free from discrimination is essential to a person's complete development, and discrimination is a crisis that no one ever wants to confront. As a result, it is critical to investigate and address harassment, discrimination, microaggressions and other social evils through the accessibility of ER responses and CM management. The authors classified this information as metacognitive-level knowledge since these events render an individual vulnerable and require collaborative action for alleviation.

In a similar vein, first aid kits are necessary for the treatment of injuries received on campus in an emergency. Thus, keeping first aid materials in hand can help to guarantee the safety of students. Overall, the study revealed (Table 7) that awareness of smoking was lower for both boys and girls ( $t$  value = -1.721,  $p$  value = 0.086). There are two possible causes for this. For instance, there are two possible explanations for this. The students were not given adequate information regarding the location and use of first aid supplies in an emergency, and the institution may not have had any first aid supplies in the first place.

Overall, these findings indicate (Table 7) that there is no apparent knowledge gap between male and female students. While there was little difference between the genders in terms of risk perception, girls were more likely than boys to be aware of several metacognitive indicators, such as harassment ( $t$  value = -0.255,  $p$  value = 0.799), drug abuse ( $t$  value = -0.675,  $p$  value = 0.500), disability equality ( $t$  value = -1.714,  $p$  value = 0.087), gender equality ( $t$  value = -0.882,  $p$  value = 0.378), child marriage ( $t$  value = -1.603,  $p$  value = 0.110), eve-teasing ( $t$  value = -0.029,  $p$  value = 0.977), and knowledge about CPR ( $t$  value = -1.284,  $p$  value = 0.200).

In addition, male respondents slightly outperformed female respondents in two specific indicators: discrimination ( $t$  value = 0.701,  $p$  value = 0.483) and microaggression ( $t$  value = 0.993,  $p$  value = 0.321). The average respondents' responses seemed less knowledgeable and self-assured in their capacity to address societal evils. To safeguard student safety and maintain an inclusive atmosphere, universities must be prepared for emergencies. Increasing readiness will not only protect future generations and countless lives but also strengthen communities' overall capacity to combat social problems.

#### 4.5. Sources of knowledge

The study provides insight into how risk is perceived and what factors influence it, with a focus on the importance of different knowledge sources. Although educational settings are important, it's also important to acknowledge the wider range of information sources that influence student's comprehension of ER and CM related knowledge. While a significant portion of female respondents (23 %) first learned their information in an academic context, the data shows that academic settings are not the only places where

**Table 7**  
Different genders' metacognitive levels of ER and CM understanding.

Indicators	Boy (N = 182)		Girl (N = 206)		T Test	
	Mean	SD	Mean	SD	t value	P Value
ER awareness & CM capacity- first-aid	2.38	1.149	2.58	1.173	-1.721	0.086
ER awareness & CM capacity- harassments	2.31	1.443	2.34	1.412	-0.255	0.799
ER awareness & CM capacity- discrimination	2.22	1.365	2.12	1.516	0.701	0.483
ER awareness & CM capacity- microaggression	2.14	1.434	2.00	1.487	0.993	0.321
ER awareness & CM capacity - drug abuse	2.66	1.503	2.76	1.490	-0.675	0.500
ER awareness & CM capacity - disable equality	3.08	1.179	3.28	1.053	-1.714	0.087
ER awareness & CM capacity - gender equality	2.62	1.435	2.75	1.391	-0.882	0.378
ER awareness & CM capacity - child marriage	2.83	1.312	3.04	1.257	-1.603	0.110
ER awareness & CM capacity - eve-teasing	2.66	1.327	2.66	1.396	-0.029	0.977
ER awareness & CM capacity - CPR	2.64	1.283	2.81	1.364	-1.284	0.200

knowledge may be found (Fig. 1). Academic settings were cited as the primary source of ER and CM information by just 13 % of the male respondents. Importantly, both genders (20 %) gain knowledge from their family contexts, indicating the importance of interpersonal ties in ER and CM level knowledge.

Further, findings indicates that students' knowledge is greatly influenced by a variety of sources outside of school and their families, including print media, non-academic literature, radio, television, and the Internet. This varied intake of information emphasizes how educational institutions must modify their curricula to incorporate a broad range of informational sources to keep up with the rapidly changing nature of knowledge acquisition. Comparably, while most respondents—female respondents in particular, 27 percent—apply their knowledge of ER and CM in academic settings, a sizable portion also uses it in familial contexts (15 percent for both genders) (Fig. 2). This demonstrates the diverse range of risk management education, which transcends traditional educational settings and includes real-world experiences.

Furthermore, it is important to remember to include resources like electronic media, social media, and community networks. These platforms play a crucial role in building resilience by providing information about risks. Understanding the complex environment of ER and CM requires acknowledging the roles played by various sources. Despite, this analysis emphasizes the importance of acknowledge and take into account the wide range of sources that contribute to student's awareness of risk [43], even while academic environments continue to be crucial for knowledge acquisition. Accepting this diversity can improve students' preparation and general risk awareness while also improving ER and CM associated education.

## 5. Discussion

Young adults, especially those attending colleges and schools, are among the most susceptible groups when it comes to emergencies or any sudden incidence [23,30]. They could have suffered harm or been exposed to possibly fatal conditions if they had not employed the right knowledge [4,21]. One possible explanation for this could be a deficiency in academic endeavors, which could be enhanced by including novel theoretical ideas in the curriculum [16,18,29]. Aiming to guiding policy makers, consistent with these views, the study's objective was to evaluate the understanding of emergency response and crisis management across male and female university students in Jiangxi Province, China, given the province's high risk of sudden onset disasters [31,33].

To support the objective of the study, we hypothesized (H1) that students—male and female alike—display varying factual comprehensions of ER and CM. In terms of factual comprehension of ER and CM, our results indicate that there are often no notable disparities between male and female students. In contrast, such evidence contradicts our hypothesis, which predicted differences in factual comprehension between genders. Such evidence, howsoever, conform to research [6,43] indicating that gender differences in factual understanding of crisis management and emergency response may not be substantial or may rely on the circumstances. Although the general comprehension levels were comparable, certain specific areas showed some subtle variances. It was noteworthy that boys understood cyclones substantially better than girls did. This result is in line with some literature (e.g., Ref. [12,26,42]) suggesting gender differences in the areas in which people acquire knowledge and have interests. These differences may be influenced by the contact, interest, or educational emphasis.

Consistent with the second research hypothesis, the study's findings also indicate that there are no statistically significant disparities in the conceptual comprehension of risk communication between male and female students. Supporting some earlier studies conducted by Rashid et al. [20], this study reveals both genders exhibit similar understanding of risk communication concepts, suggesting a baseline knowledge that is constant across the sample. Nonetheless, significant differences between the sexes are noted in some domains of hazards and response strategies. When it comes to their capacity to handle risks and communicate those risks concerning ambulance services, boys score substantially higher on mean scores than girls do. This suggests that, depending on the situation, male students might understand risk management strategies and emergency response procedures more conceptually. Combining these results with previous research (e.g., Ref. [20,26,37]) highlights the significance of gender-sensitive methods in training and education initiatives to guarantee inclusive and thorough emergency preparedness strategies that meet the requirements and abilities of different groups of people.

The examination of Hypothesis 3 provides important insights into how male and female students conceptualize ER and CM

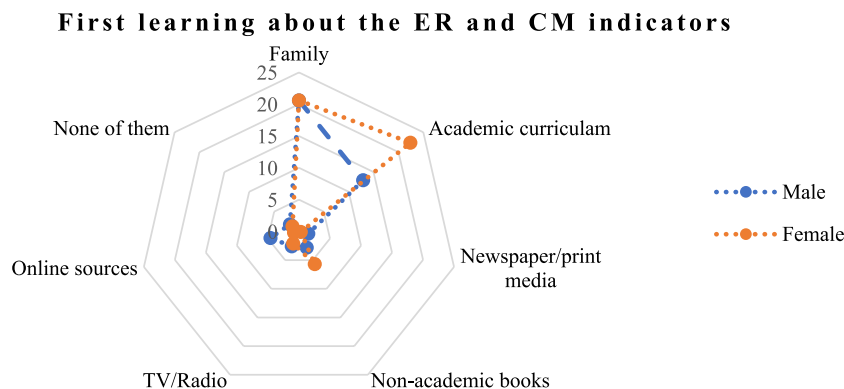


Fig. 1. Respondents' first source of knowledge about the ER and CM indicators.

## ER and CM related knowledge practicing place

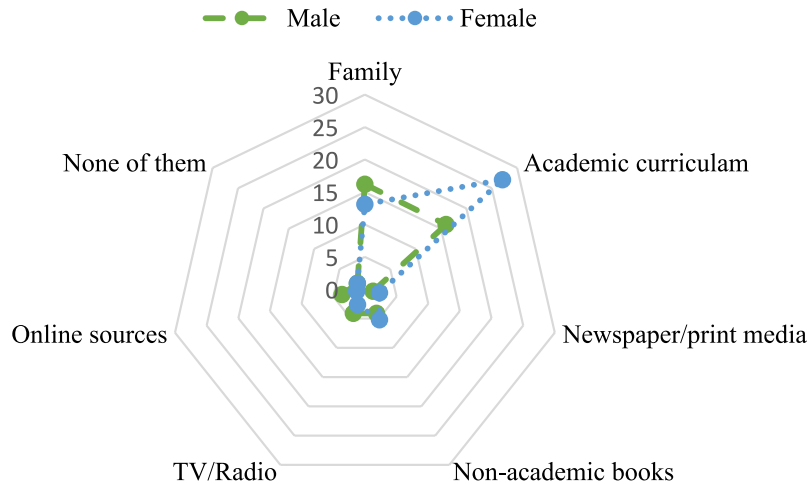


Fig. 2. Most common risk management practices.

procedurally. Unlike some existing literature, which suggests that procedural understanding is uniform across genders [26,27], this study reveals substantial differences in ER and CM scholarship among male and female students, emphasizing the need for specific and gender-sensitive approaches in emergency response education. For example, boys had found higher mean scores in risk response to terrorist attacks, whereas girls have found higher competency in managing the hazards connected with electrocution. These variations could result from a range of experiences, exposure to training, or cultural factors [8]. Following some earlier studies (e.g., Edey et al. [29], Girlando et al. [6], Rushton et al. [35]) to successfully address each student's requirements and capacities, the findings highlight the requirement of gender-sensitive, specific strategies in ER and CM education.

To investigate students' comprehension of and ability to confront social issues like harassment, discrimination, and micro-aggressions, the fourth hypothesis explores the metacognitive understanding of ER and CM among both male and female students [20, 34,42]. The study depicts an intricate portrait, showing that there isn't a knowledge difference between the sexes in general. Gender equality, drug misuse, harassment, child marriage, eve-teasing, and CPR are among the metacognitive markers that girls show a greater knowledge of than males, even though both genders indicate similar levels of risk perception. In contrast, male respondents comprehend discrimination and microaggressions marginally better than female respondents. On the other hand, the average responses point to the need for increased confidence and understanding while dealing with societal concerns. These findings highlight how crucial it is for educational institutions to have emergency plans in place to protect student safety, uphold an inclusive environment, and ultimately increase communities' ability to address social issues [20,29,30].

All things considered, the results concerning the sources of information on ER and CM highlight the complex ways in which students sense risk. Family environments are vital in forming respondents' awareness of risk, even though a considerable percentage of respondents identify academic environments as their primary source of ER and CM-related learning [23,47]. Additionally, students' acquisition of knowledge is aided by supplemental sources such print media, nonacademic literature, and online platforms [23,47]. The preceding findings highlight the significance of incorporating a range of risk factors into academic programs and motivating students to actively seek out information [29]. Institutions may better equip students to handle emergencies and improve community well-being by utilizing a range of resources to raise risk awareness and preparedness.

### 5.1. Theoretical contribution

Based on the results, this study's theoretical implications have a significant impact on risk science scholarship and interaction. The work clarifies the complex understanding of gendered factors in ER and CM comprehension and reveals important pathways for expanding risk science by utilizing Krathwohl's knowledge typology model and hypothesis buildup [55,56]. Through recognition and consideration of the differences in factual, conceptual, procedural, and metacognitive knowledge between male and female students, researchers can improve upon current models and frameworks to represent the intricacies of risk perception and reaction more accurately. Gender viewpoints are underrepresented in risk science research, which eventually contributes to more inclusive and resilient communities by improving the comprehension of weaknesses and the efficacy of risk communication techniques.

Furthermore, investigating ER and CM information sources provides a theoretical understanding of the multidimensional way risk perception in students. By acknowledging the importance of educational and family settings as primary knowledge sources, in addition to media and digital platforms [23,47], future researchers can broaden the scope of theoretical frameworks to include a wider variety of influences on risk consciousness and readiness. The creation of comprehensive risk education programs and communication techniques that address the different requirements and preferences of student groups can be informed by an understanding of the interactions between these disparate sources of information [34]. Consequently, this study's theoretical ramifications go beyond its

immediate conclusions to enhance the theoretical discourse in risk science studies and interactions, opening the door for more comprehensive methods of emergency response, crisis management, and resilience-building initiatives.

### 5.2. Implications for education and policy

Our results highlight the significance of broad dissemination of knowledge among diverse populations and the necessity of governmental and educational actions to enhance readiness for ER and CM procedures. This is in line with previous research [20,31,37] that supports gender-sensitive methods in emergency response training and disaster risk reduction. The findings of this study indicate that risk understanding is an essential part of emergency response and crisis management training and that the two sexes may be equally proficient in this area. Policymakers need to acknowledge the small differences in the conceptual understanding of ER and CM between male and female students. Through an awareness of these distinctions, policymakers may create specialized educational initiatives that cater to the unique needs and capacities of every gender. Courses may, for instance, include focused training sessions on subjects like risk management strategies and paramedic emergency response procedures, where gender differences are noted.

Additional research results indicate that tailored and gender-responsive strategies are necessary to meet the unique requirements and abilities of both male and female students. To promote inclusion and student engagement, courses of study should be designed with a range of examples and scenarios that appeal to both genders. In addition, educators and legislators must work toward promoting equal opportunity for men and women in the availability of learning opportunities and resources, guaranteeing that every student possesses the abilities and know-how required to handle emergencies and crises. This involves considering that male and female students have different learning styles, interests, and degrees of prior knowledge. Policymakers may improve the effectiveness and quality of ER and CM programs by using evidence-based strategies and interventions. To track development and make wise modifications to policies and programs over time, this entails carrying out routine evaluations and assessments.

### 5.3. Limitations and future study guidelines

The research on gender variations in ER and CM understanding may not be able to provide a comprehensive body of information in disaster science. Much of the sample is made up of students, which might restrict how broadly the findings can be applied to other demographic groups. Due to the dependence on self-reported data from surveys, the accuracy of the results may be impacted by potential response biases such as social desirability and recollection bias. The study's focus is limited to gender disparities, with no consideration given to other variables such as socioeconomic position or prior emergency response training [37]. Establishing causal linkages or capturing temporal variations in understanding levels across time are made more difficult by the cross-sectional approach. Furthermore, it's possible that certain confounding factors, including a person's unique cognitive makeup or past emergency exposure, weren't sufficiently considered. Improving the critical scholarship of the results will require addressing these constraints in further study.

## 6. Conclusion

The study investigates how susceptible Chinese university students are to different risks and crises. It examines risk perception using Krathwohl's knowledge typology, exposing gender differences and the need for specialized treatments to increase emergency resilience. The research highlights the intricate relationship between individual cognition, society norms, and institutional readiness, underscoring the complexity of risk perception dynamics. It demands an all-encompassing strategy that welcomes gender-sensitive viewpoints and cuts across disciplinary boundaries. The scholarship of this study has guided evidence-based strategies to protect the well-being of students and enhance community resilience in an uncertain environment, which was barely highlighted in earlier studies. Besides, progressing Sustainable Development Goal 5 in highly populated nations like China requires intergovernmental authorities to work together and take gender equality into account. This requires an understanding of risk perception in educational institutions. Research on how people perceive risk should take gender and cultural issues into account. Additional research may improve crisis management skills and provide students the tools they need to handle situations, such as statistical models and cultural studies.

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### Ethical considerations

This study did not seek formal ethics committee permission since it posed minimal risk to participants. According to the UK Economic and Social Research Council's (ESRC) Framework criteria, ethical approval is not necessary for research that does not contain identifiable personal data, sensitive issues, vulnerable populations, or any kind of intervention [67]. All participants gave their informed permission freely, nevertheless, after being fully informed about the nature and objectives of the study. There were safeguards in place to guarantee the confidentiality and anonymity of participant replies. The study followed ethical standards by respecting the freedoms of participants and confirming that there was neither harm nor risk involved.

### Informed consent

An informed oral consent has taken each of respondents involved in this research.

### CRediT authorship contribution statement

**Xia Yu:** Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Mohammad Bin Amin:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Methodology. **Predushchenko Olga:** Writing – original draft, Software, Investigation, Formal analysis, Data curation. **Md Atikur Rahaman:** Writing – original draft, Software, Resources, Project administration, Investigation, Formal analysis, Data curation. **M.M Abdullah Al Mamun Sony:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Methodology, Conceptualization.

### Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used Grammarly in order to improve English language and detect the grammatical error. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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