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Research on the Environmental Influencing Factors of Citizens' Emergency Quality for Accidents and Disasters

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Abstract: To accurately grasp the current situation of Chinese citizens' emergency quality for accidents and disasters, explore its external environmental influencing factors and scientific improvement paths, an emergency quality model including seven dimensions—emergency knowledge, emergency skills, self-cognition, personal traits, values, personal motivation, and social role—was constructed based on the Iceberg Competency Model. A questionnaire survey was conducted with 267 questionnaires distributed and 261 valid ones recovered, with an effective recovery rate of 97.8%. The results of data regression analysis show that in the emergency environment, family learning, school learning, public service advertisements, and school drills play a significantly positive role in improving emergency quality, with family learning having the most prominent impact, while the impacts of social media and other safety training institutions are not significant. Finally, targeted improvement countermeasures are proposed from four aspects: improving the emergency mechanism, expanding publicity channels, strengthening emergency education, and carrying out emergency drills, providing empirical support and practical reference for advancing the modernization of China's emergency management system.

Keywords: Accidents and disasters; Emergency quality; Influencing factors; Improvement countermeasures

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1. Introduction

As the basic literacy for responding to accidents and disasters, citizens' emergency quality directly determines their self-rescue and mutual rescue capabilities, psychological endurance, and behavioral cooperation in emergencies. It is a key link to improve the overall efficiency of emergency management and build a solid defense for public safety.

At present, scholars at home and abroad have carried out a series of studies on citizens' emergency quality. Francis Long put forward the key factors influencing individuals' emergency behavior decision-making [1]. Kim argued that government emergency management institutions overemphasize the ability of local institutions to respond to crises, underemphasize the shared responsibility of citizens, and neglect the role of citizens in emergency management [2]. Tatum Anderson believed that emergency drills should be fully utilized to strengthen emergency response [3]. Shun-ichi Tanaka held that a unique and reliable regulatory agency needs to be established to ensure the implementation of emergency management [4].

Domestic scholars have also conducted in-depth research in this field. Li Runze analyzed the countermeasures for improving emergency management from three perspectives: pre-disaster early warning, in-disaster command, and post-disaster recovery [5]. Liu Zezhao pointed out that the current emergency rescue relies too much on government forces, and it is necessary to coordinate the responsibilities and support forces of all parties [6]. Lu Wengang proposed that there are still deficiencies in the current emergency response and recovery stages, such as insufficient personnel awareness of prevention, lack of emergency skills, and imperfect post-incident evaluation mechanisms [7]. Song Jun analyzed the influencing factors of college students' emergency capabilities from three dimensions: emergency process, emergency environment, and capability elements [8]. Jiang Haiyan conducted an in-depth discussion on the improvement of citizens' emergency management quality [9]. Guo Tian et al. adopted a multi-stage stratified cluster random sampling method and found that the improvement process of rural residents' health quality deviated from expectations to a certain extent [10]. In the field of competency theory research, Tao Xia drew on the Iceberg Model and the Onion Model, and believed that the talent competency structure should be divided into five dimensions: knowledge, ability, values, emotion, and awareness [11]. Liu Yisha constructed a competency model for fire rescue personnel [12]. Qin Lifang merged the two dimensions of social role and self-concept into "social role and cognition" [13]. Yao Heng argued that most citizens generally lack emergency awareness and concepts, and school training and drills fail to keep pace [14]. Wu Haoran proposed measures to improve citizens' quality from the perspective of social governance innovation [15].

However, existing studies mainly focus on the construction of institutional mechanisms at the macro level, while there is a lack of micro analysis on the influencing factors of individual citizens' emergency quality. Against this background, it is of important theoretical and practical value to systematically explore the influencing factors and improvement paths of citizens' emergency quality for accidents and disasters.

Based on the Iceberg Competency Model, this paper constructs a seven-dimensional evaluation system for citizens' emergency quality for accidents and disasters, analyzes its influencing factors, and collects data for verification, aiming to deepen the understanding of the formation mechanism of citizens' emergency quality and provide a theoretical basis for the development of the emergency management discipline and the improvement of citizens' emergency quality for accidents and disasters.

2. Analysis of influencing factors of citizens' emergency quality for accidents and disasters

Emergency quality for accidents and disasters refers to an individual's ability and quality to make correct judgments and actions quickly when accidents and disasters occur, so as to respond to them with the fastest speed and minimal losses. Based on the Iceberg Model theory, this paper proposes that emergency quality for

accidents and disasters consists of seven dimensions: emergency knowledge, emergency skills, self-cognition, personal traits, values, personal motivation, and social role. Among them, emergency knowledge and skills are explicit competencies that are easy to identify, while emergency psychology, personal traits, values, personal motivation, and social role are implicit competencies that are difficult to detect.

This study aims to analyze the impact of the external environment on each dimension of emergency quality for accidents and disasters. Through sorting out existing literature, the external environmental factors are divided into family learning, school learning, community learning, public service advertisements, social media, workplace learning, community-organized emergency drills, workplace-organized emergency drills, school-organized emergency drills, and other safety training institutions.

3. Data collection and analysis

3.1. Data collection of citizens' emergency quality for accidents and disasters

The questionnaire was designed against the background of accidents and disasters, with questions raised about citizens' specific performance and relevant cognition in such events. The basic personal information includes age, gender, place of birth, education background, major category, occupation, etc. A Likert scale was used to measure emergency quality and environmental factors, with five levels set for each measurement dimension—the higher the citizens' recognition, the higher the score. A total of 267 questionnaires were collected online through Questionnaire Star and social circles, with 5 invalid ones and 261 valid ones, resulting in a recovery rate of 97.8%. Demographic analysis shows that the sample has certain representativeness in terms of gender, age, and occupation distribution.

3.2. Regression analysis of citizens' emergency quality for accidents and disasters and environmental factors

The impact of each external factor on each dimension of emergency quality was analyzed in turn, and the results are summarized in **Table 1**. In the regression analysis, family learning has the greatest impact on the emergency knowledge, emergency cognition, and emergency role dimensions of emergency quality; community drills have the greatest impact on emergency skills; and school learning has the highest impact on personal motivation, emergency values, and emergency traits.

Overall, family learning has a relatively large impact on all dimensions of emergency quality except emergency motivation; school learning affects the in-depth components of emergency quality, including emergency motivation, emergency values, emergency traits and emergency role; community learning has no obvious impact on each dimension, but community drills have a significant impact on emergency knowledge, emergency skills, emergency role, self-cognition and emergency motivation; public service advertisements have an impact on all factors except self-cognition; social media has a significant impact on emergency motivation and emergency values; workplace learning has a significant impact on emergency skills, and workplace drills also have an impact on emergency knowledge and skills; school emergency drills have an impact on emergency skills, emergency values and emergency traits; other safety training institutions have a certain impact on all dimensions except emergency knowledge, traits and motivation.

Table 1. The impact of external factors on each dimension of emergency quality

	Emergency Knowledge		Emergency Skills		Emergency Role		Self-cognition		Emergency Values		Emergency Traits		Emergency Motivation	
	Standardized Coefficient B	Significance	Standardized Coefficient B	Significance	Standardized Coefficient B	Significance	Standardized Coefficient B	Significance	Standardized Coefficient B	Significance	Standardized Coefficient B	Significance	Standardized Coefficient B	Significance
Constant		0.017		0.666		0.001		0		0		0		0
Family Learning	0.232	0	0.184	0	0.226	0	0.25	0	0.159	0.007	0.204	0	0.099	0.092
School Learning	0.073	0.177	0.061	0.201	0.112	0.044	0.117	0.05	0.3	0	0.232	0	0.227	0
Community Learning	0.084	0.153	0.028	0.591	0.035	0.567	0.053	0.415	0.014	0.814	0.086	0.143	0.054	0.378
Public Service Advertisements	0.138	0.011	0.11	0.022	0.193	0.001	0.038	0.527	0.234	0	0.172	0.002	0.171	0.003
Social Media	0.007	0.893	0.018	0.697	0.039	0.467	0.027	0.639	0.16	0.003	0.015	0.767	0.155	0.005
Workplace Learning	0.069	0.208	0.134	0.006	0.079	0.162	0.079	0.191	0.042	0.455	0.017	0.755	-0.039	0.49
Emergency Drills - Community-organized	0.132	0.015	0.199	0	0.118	0.035	0.18	0.003	-0.071	0.21	0.102	0.06	0.151	0.008
Emergency Drills - Workplace-organized	0.135	0.013	0.12	0.012	0.01	0.856	0.035	0.562	0.003	0.954	0.017	0.754	0.079	0.163
Emergency Drills - School-organized	0.1	0.067	0.134	0.006	0.096	0.086	0.06	0.315	0.215	0	0.153	0.005	0.082	0.148
Other Safety Training Institutions	0.086	0.119	0.161	0.001	0.127	0.026	0.13	0.033	-0.119	0.039	0.061	0.268	0.055	0.34

4. Research on countermeasures to improve citizens' emergency quality for accidents and disasters

The regression analysis results show that family learning, school learning, community learning, public service advertisements, social media, workplaces, and drill organizers have different impacts on each dimension of emergency quality. To better improve citizens' emergency quality, this paper holds that all relevant entities can cooperate and complement each other to carry out diversified cultivation paths, as follows:

4.1. Consolidate the basic positions of family and community, and lay a solid foundation for emergency literacy cultivation

Families and communities are the primary scenarios for the public to access emergency knowledge, and they have the most significant impact on emergency knowledge, emergency skills, and emergency motivation, especially in community drills.

4.1.1. Deepen the integration mechanism of family emergency education

Promote the popularization of emergency knowledge in families by compiling a *Family Emergency Knowledge Manual*, which includes practical content such as emergency supplies reserve lists, initial fire disposal, and trauma first aid. Rely on community grid workers to carry out a "door-to-door campaign" to guide families in formulating emergency evacuation routes, and organize regular "family emergency skills competitions" in the form of parent-child interaction to improve the family penetration rate of emergency knowledge.

4.1.2. Build a scenario-based practical space in communities

Set up "emergency experience corners" at the community level, equipped with smoke heat escape channels, AED simulation trainers, and other equipment, allowing residents to improve their emergency skills through practical operation. Combine with the neighborhood mutual assistance network to carry out a "community emergency drill day" every quarter, simulating scenarios such as earthquakes and fires to strengthen residents' cognition of emergency roles and collaboration capabilities. At the same time, incorporate emergency performance into the community civilization points system to encourage residents to participate actively.

4.2. Optimize the educational scenarios of schools and workplaces, and improve the effectiveness of emergency education

Schools and workplaces are important carriers for emergency literacy cultivation, and their educational content and forms can be optimized.

4.2.1. Construct a "trinity" emergency education system in schools

Incorporate emergency education into the compulsory courses of primary and secondary schools, and establish a teaching model of "theoretical teaching + skill operation + scenario drills". Integrate disaster risk identification, emergency laws and regulations, and other content into theoretical teaching; carry out assessments on cardiopulmonary resuscitation, knotting for escape, and other skills in practical operation; organize at least 2 immersive emergency drills every semester, with scenarios designed according to the characteristics of seasonal disasters to improve students' emergency response capabilities.

4.2.2. Implement a "one post, one policy" emergency training in the workplace

Develop customized emergency training courses according to the risks of different industries and positions. For example, the manufacturing industry focuses on first aid for mechanical injuries and chemical leakage disposal, while office spaces focus on fire evacuation and epidemic prevention and control. Establish a "closed-loop management mechanism for emergency training effects", evaluate training quality through drill reviews and skill spot checks, and urge enterprises to shift from "passive compliance" to "active improvement."

4.3. Strengthen the effectiveness of drills and professional training, and improve the practical emergency response capabilities

Emergency drills and professional training are the core links to improve emergency skills and psychological quality, and their quality and efficiency need to be enhanced through scenario design and resource integration.

4.3.1. Construct a hierarchical and classified emergency drill system

Formulate differentiated drill plans for different scenarios such as communities, schools, and enterprises—communities focus on neighborhood mutual assistance and grassroots response, schools focus on student escape and psychological intervention, and enterprises focus on post linkage and accident disposal. Promote the "double-blind" drill model with no advance notice of time and no preset scenarios, which is as close to real disaster situations as possible, to improve the public's emergency response speed and disposal accuracy.

4.3.2. Activate the enabling role of professional training institutions

Encourage social emergency training institutions to develop standardized courses, focusing on carrying out special training for mobile groups such as food delivery couriers and online car-hailing drivers. Establish a "pool of emergency training teachers", inviting professionals such as firefighters and first aid doctors to serve as lecturers to improve the authority and practicality of training. At the same time, promote the establishment of cooperation mechanisms between training institutions and communities/enterprises to achieve precise docking of emergency resources.

4.4. Build a diversified social communication network, and create a national emergency atmosphere

Public service advertisements and social media are important channels for disseminating emergency knowledge and shaping value recognition, and their precise communication is needed to improve public emergency motivation.

4.4.1. Build an empathic communication matrix of public service advertisements

Produce a series of short videos of "ordinary people's emergency stories" to show the importance of emergency response through real cases, and release them accurately through channels such as community elevators and short video platforms. Launch themed public service advertisements in conjunction with nodes such as the "National Disaster Prevention and Mitigation Day" to strengthen the public's risk perception and sense of responsibility. At the same time, integrate emergency elements into urban public spaces and create an immersive emergency atmosphere through the visual design of subway stations, bus stops, and other scenarios.

4.4.2. Construct an interactive communication ecosystem of social media

Launch a topic challenge of "My Emergency Tips" relying on platforms such as Douyin and WeChat, encouraging users to share practical emergency knowledge and expanding the communication coverage through traffic support. Invite experts in the emergency field to carry out live science popularization, and set up interactive links such as lucky draws and live connections to improve user participation. At the same time, establish an "emergency information rumor refutation mechanism" to correct false information in a timely manner and maintain the scientificity and authority of emergency communication.

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