

REVIEW OF ENVIRONMENTAL RISK AND HEALTH RESEARCH

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Abstract: The relationship between environmental risks and health has become a hot topic in interdisciplinary discussions. Through literature review, it was found that there are differences in stance between research from the perspective of natural science disciplines and social science disciplines : the former mainly discusses the causal relationship and impact between environment and disease based on a realist stance, while the latter discusses a realist stance and Constructivist positions coexist, focusing on exploring the formation mechanism of people's understanding of the relationship between the two. Research results on environmental risks and health are mainly presented from two aspects: differences between regions and differences between populations. Based on the literature review, an outlook for environmental risk and health research is proposed.

Keywords: Environmental risks; Health; Natural sciences; Social sciences; Research review

1. REVIEW OF ENVIRONMENTAL RISK AND HEALTH RESEARCH

The rapid development of the global economy is also accompanied by the occurrence of various emergencies, such as the Pabol pesticide plant explosion in India as early as 1984, the Chernobyl nuclear power plant leak in 1986, and the 2015 The PX project explosion that occurred in Gulei, Zhangzhou, etc. Risk semantics has gradually surpassed economic semantics to become the main feature of today's society. As part of modernization, risks are produced and largely invisible. Among them, environmental risks transcend time and space, and their impact is not only on the current generation [1].

In the early days when environmental problems emerged, people only focused on the management of environmental hazards after they occurred. However, once many harmful substances enter the environment, their impact on the ecological environment and human health is often long-term [2]. The relationship between environment and health has become the focus of people's attention after the occurrence of major environmental incidents. This article sorts out the research on the relationship between environmental risks and health at home and abroad, further clarifies the connotation of environmental risks, summarizes the differences from different disciplinary perspectives in the research on the relationship between environmental risks and health, and looks at the regional differences and inter-population differences in the relationship between environment and health. From this perspective, we review the results of existing research and look forward to future research.

1.1 The Connotation Of Environmental Risks

To define environmental risks, academic circles generally follow two paths: natural science disciplines such as epidemiology, engineering, geography, etc. tend to use quantitative definitions based on the measurement of adverse consequences and probability of occurrence, such as "environmental risk". Risk (ER) = probability of accident (P) * consequences of accident (C)", which is defined as "caused by spontaneous natural causes or human activities, spread through environmental media, and capable of affecting human society and the natural environment. The probability and consequences of unfortunate events such as destruction, damage or even destructive effects " [3]. Some social science disciplines such as sociology and psychology follow the above-mentioned quantitative definition path, while others understand risks or environmental risks in a "meaningful" way and believe that environmental risks are constructed. The qualitative characteristics of "environmental risk" mainly include fairness of risk, clarity of interests, sense of personal and family involvement, media attention, confidence in preventing harmful consequences, etc. It is a comprehensive reflection of the influence of all parties and is understood by people. "Perceived " environmental risks [4]. Combining the above two approaches, environmental risk can be defined as a potentially dangerous state that is caused by natural or man-made activities and poses a threat to the economy, ecological environment, human health, etc. through the mediating effect of the natural ecological environment. Environmental risks are the dual results of social construction and scientific assessment, and have two characteristics: "uncertainty" and "possible harmful consequences." Environmental risks widely exist in human production and life and have diverse forms of expression. For example, risk sources can be divided into chemical risks, physical risks and risks caused by natural disasters. According to the classification of environmental risks, they can be divided into population risks, equipment risks and ecological risks.

Among them, health risks are the most important content of population risks [2].

2. OVERVIEW OF ENVIRONMENTAL RISK RESEARCH: DIFFERENT RESEARCH PERSPECTIVES FROM NATURAL SCIENCES AND SOCIAL SCIENCES

2.1 Environmental Risk Research From the Perspective of Natural Sciences

Environmental risk research originated from the understanding and evaluation of the consequences of natural disasters. The initial research focused on the fields of natural sciences, such as environmental science, geology and other disciplines. In the mid-1930s, Western scholars had conducted relatively systematic research on the risk assessment of natural disasters. In 1967, Glibert and other scholars' research on natural disasters extended from the simple field of geoscience to multiple disciplines. Later, academic research on environmental risks extended from natural disaster environmental risks to man-made environmental risks, especially environmental risks caused by major technologies. For example, in 1975, the U.S. Nuclear Energy Regulatory Commission proposed the "Nuclear Power Plant Risk Report" and systematically established a probabilistic risk assessment method, which was confirmed in subsequent nuclear power plant accidents [5]. At present, environmental risk research in the field of natural sciences mainly focuses on exploring the environmental risk assessment system. The assessment content includes: source term analysis, hazard determination, dose-reflection assessment, exposure assessment, risk characterization, etc., and based on this, environmental risk assessment Related discussions on risk management strategies [6][7].

Most research on environmental risks in the field of natural sciences is based on a realist stance, treating the adverse consequences that may be caused by the environment as real objects, and trying to establish a set of environmental risk assessment indicators to combine environmental events with various possibilities. Conduct causal association or correlation analysis on adverse consequences. Health risk is an important dimension in environmental risk assessment, coexisting with ecological risks, economic risks and other dimensions.

2.2 Environmental Risk Research From the Perspective of Social Sciences

Research on environmental risks from the perspective of social sciences mainly focuses on administration, communication, anthropology, sociology and other disciplines. Compared with natural sciences, social sciences rarely discuss the indicator system of environmental risks. In domestic research, the discussion of environmental risks focuses on three levels: first, the presentation of environmental risks (issues). For example, explore the differences in cognition of environmental risk issues among various subjects in environmental issues, such as enterprises, governments, residents, and media, as well as the interaction and game process of each subject in the construction of risk issues [8][9]; secondly, Communication of environmental risks. In the field of administration, the game process between government environmental risk information disclosure and the public has been discussed, and the types of environmental risk information disclosure and the role of public participation in risk information disclosure have been analyzed [10]. Communication studies focus on exploring two aspects. One is the writing characteristics of environmental risk issues, including discourse characteristics, risk rhetoric, writing angle, role setting, frame selection, etc. [11][12]; the other is the communication characteristics of environmental risks., such as discussing the characteristics of environmental risks spread by various subjects in risk communication based on the expanded framework of risk society [13]. Third, environmental risk management and risk communication, research on this topic is concentrated in subjects such as administration and sociology. Some scholars focus on how the government strengthens responsibility and normative management in risk prevention and control, and how to improve legal mechanisms [14][15]; some scholars explore the positioning of the people, government, and enterprises in risk communication, pointing out that the people and The importance of enterprises actively participating in risk communication emphasizes that the timing of risk communication should be before the risk occurs [8]. In addition, rational communication of risks is inseparable from the construction of trust among all parties [16]. In the field of social sciences, the starting point of environmental risk research is dual—realism and constructivism coexist. Social science research starting from a realist standpoint focuses on discussing how to intervene in possible adverse consequences of the environment, including assessment, prevention, management, and system improvement. Social science research starting from a constructivist standpoint examines in more detail the processes of social construction with social, political, and cultural characteristics through which specific environmental conditions are identified as unacceptable and dangerous, thus forming a “crisis situation” [17]. Based on this premise, the relationship between environmental events and their potential consequences, the degree of correlation, the role of each subject in the process of constructing risks, the way environmental risks are presented, how people understand the relationship between environmental events and adverse consequences, and the impact of people's understanding on Issues such as the impact of coping behavior have become a focus of constructivists. In terms of the number of research results, the amount of research results on the relationship between environment (risk) and health in the social sciences is far less than that in the natural sciences. Limited by the boundaries of social science subject knowledge, existing research is not enough to directly verify the relationship between the two from a scientific perspective. Instead, it relies more on qualitative research methods in anthropology to explore how people understand disease and disease. The relationship between the environment, or supplemented by quantitative statistical methods, combined with natural scientific research data to summarize the relationship between events and health consequences, and use relevant theories to further explain. Next, the author will combine the results of natural science research and social science research to sort out the academic results of domestic and foreign scholars studying the relationship between environment and health, and present them from two perspectives: regional differences in the impact of environmental risks on health and the impact of environmental risks on health Interpopulation differences in effects.

3. ENVIRONMENTAL RISK AND HEALTH RESEARCH RESULTS

3.1 Regional Differences in the Relationship Between Environmental Risks and Health

Foreign scholars' research on the relationship between environmental risks and health partly exists in sociology, geography and other disciplines. They mainly use quantitative research methods and find that the distribution of environmental risks is different between different types of countries, between cities, and in different regions within cities., there are also differences in the impact on people's health. To discuss the differences in health impacts between cities, Stevens . combined the national census, population health survey data, and indicators related to the impact of environmental hazards on infectious diseases to compare the mortality rates in various regions and found that in Mexico Unsafe water, fuel, and particulate matter in the air in the community have a greater impact on human health and life span [18]. Discussing different areas within the city, Lee's research found that communities where people of color live face more environmental risks, and residents suffer from higher proportions of various diseases [19]. To discuss differences between countries, for example, Passchier-Vermeer's research found that noise exposure in industrialized countries and regions can seriously affect people's health [20].

Regional differences in the impact of environmental risks on health in China are mainly reflected between rural and urban areas, and many disciplines have paid attention to this topic. Urban residents are mainly threatened by environmental problems such as garbage incineration, water pollution, vehicle exhaust emissions, and particulate matter released from fuel combustion, which has increased the proportion of people suffering from respiratory diseases, liver cancer, and intestinal cancer [21][22]. However, the environmental risks and health problems faced by rural residents are "even worse" than those faced by urban residents. Some scholars call farmers "environmentally vulnerable groups." In order to ensure economic growth, national ecological security and overall environmental interests, farmers' environmental rights are suppressed and even face survival dilemmas. They bear environmental obligations that are unequal to the rights they enjoy [23]. Overall, rural residents bear higher environmental risks and health problems than urban residents, and they face environmental injustice [24]. Based on this situation, the author mainly takes the study of "cancer villages" as an example to sort out some literature on rural environment and health issues. The term "cancer village" is commonly used in research on rural environment and health issues in China. "Cancer village" is a discourse jointly constructed by the media, government and residents, and is not a scientific definition. It integrates "pollution-health-rural areas" into a whole, which to a certain extent shows the rural bias in the distribution of environmental risks in urban and rural areas in China. Anthropologist Chen Ajiang once summarized the background of four cancer villages in Guangdong, Jiangxi, and Zhejiang, and proposed that the "pollution-cancer" relationship is on a continuum and is divided into several progressive levels : (1) Not at all It is determined that (2) there is more basis and speculation; (3) there is a definite understanding of the relationship between the two, that is, it is confirmed that the two are related. Residents' perceptions of environmental health risks in different villages are greatly influenced by external knowledge (knowledge from the media, scientists and civil society organizations) and lie between the two poles of the continuum. In addition, the way villagers respond to environmental risks is mainly restricted by economic factors and social structures. In another study, he used field surveys and statistical data analysis to explore the causes of cancer among villagers in the Huaihe River Basin from the two dimensions of "internal" and "external". He believed that in addition to "external causes " represented by external pollution, ", the "internal causes" of villagers' daily life may also cause cancer, and pointed out that the difference in focus on "internal" and "external" will affect people's disease cognition and coping methods. Another anthropologist, Wainwright, explored the attribution of cancer from the perspective of villagers' cognition. Studies have found that people tend to causally associate the environment with cancer only when attributing cancer to water pollution will produce beneficial results. The two anthropologists followed different paths in exploring the relationship between environment and cancer: the former combined statistical data and natural science research data to try to explore the "internal causes" and "external causes" of cancer from a realist standpoint. However, this attempt lacked rigor. The argumentation process, the reliability of the conclusion is open to question; the latter, starting from a constructivist standpoint, believes that the relationship between the environment and cancer is a dimension of people's cognition of responsibility attribution and certain prerequisites are required to generate this cognition. This research The idea cleverly promotes the strengths of social sciences and avoids the shortcomings of social sciences.

3.2 Inter-Population Differences in the Relationship Between Environmental Risks and Health

Inter-population differences in environmental risks and health problems In addition to the differences between urban residents and rural residents represented by the above-mentioned urban and rural areas, people with different race, age, wealth and poverty characteristics are affected by the degree of health problems caused by the environment. There are also differences in the above. age level. Many scholars believe that children are a vulnerable group in environmental risks. Because their physical development is immature, environmental risks cause more serious harm to them than adults and have a more far-reaching impact. An earlier domestic study showed that pollution in industrial areas can have an impact on children's health, such as reduced non-specific immune function of the body and high sister chromosome exchange rate. In comparison, adults are more resistant to pollution than children. Research by foreign scholars Zartarian and others found that children are sensitive to pesticide exposure. Even if they have less concentrated exposure to chemical substances, due to their skin area and weight ratio, various developing organs, permeable skin and higher metabolism will put them at higher health risks than adults. Dimensions of race and socioeconomic status. Most studies show that people of color and low-income people are at higher risk of environmental risk exposure and also face

more severe health problems. Research from New Zealand and the United Kingdom shows that people in low-income communities are more likely to suffer health hazards caused by adverse environments due to poorer living conditions and external environment than high-income communities. Evans took lead exposure as an example and comprehensively examined the exposure of people of different races and income levels to environmental health risks. The study found that poor children of African Americans living in cities were highly exposed to lead, while This lead exposure can be transmitted between generations, with physical effects on children lasting into adulthood. professional level. Research shows that workers exposed to chemicals in factories and farms are among those at greater risk to their health from environmental risks. For example, Metzger's research found that workers who frequently mix and load pesticides face greater health risks. A survey by Goldman . found that parents who work in the production of chemical materials may bring chemicals into the home through work clothes and carry environmental risks from the workplace into the home, thereby affecting the health of family members, especially children.

4. PROSPECTS FOR ENVIRONMENTAL RISK AND HEALTH RESEARCH

Scholars in the natural sciences and social sciences have made certain achievements in the field of research on the relationship between environment (risk) and health. This article attempts to sort out the research results from the two major disciplinary backgrounds, discuss the differences in disciplinary perspectives in environmental risk research, and summarize existing research from two levels of research on the relationship between environment and health—regional differences and inter-population differences. Among the differences in disciplinary perspectives of environmental risk research, natural science research mainly takes a realist stance as the starting point, and explores the causal relationship between environment and diseases through experimental methods, quantitative analysis and other research methods, with special emphasis on environmental risk assessment. Achieve effective risk assessment, risk prevention and risk management as the ultimate goal. The starting point of social science research reflects duality -realism and constructivism coexist. Among them, due to the limitations of the subject knowledge system, research based on the realist stance mostly combines the research results of natural sciences and field survey data to summarize and analyze the relationship between the two. The argumentation method is mainly inductive, and the conclusions are difficult to generalize and be credible. degree is lower. Research based on the constructivist stance cleverly circumvents the knowledge shortcomings of social science in exploring the environment-health relationship. Most of them focus on studying the way people respond to environmental risks, and examine how people build relationships in the process of facing environmental risks. Links between environment and disease. When the scientific relationship is unclear, explore from a sociological or anthropological perspective how people understand the uncertain relationship between these variables, how the media, government or business present this relationship, and how people respond to risks It has become a meaningful topic, but among the existing studies, this type of research is still very limited and deserves further exploration. Judging from the perspective selection of existing research and the presentation of research results, the discussion of environmental risks and health issues focuses on fragmentary or segmented discussions, that is, it is believed that different regions and different groups of people are affected by socioeconomic status, institutional arrangements, (Due to the influence of factors such as race, culture, and physiological characteristics, there is an unfair distribution of environmental risks. This is discussed using the manifestation of disease as an important basis for unfair environmental distribution. However, risk is distributed much more evenly in a risk society than in an industrial, class society. “Poverty is hierarchical, chemical smog is equal”. The academic community urgently needs to pay attention to environmental risks and health issues on a cross-regional or global scale. Currently, there are few studies on this topic. To sum up, for scholars engaged in social science research, when facing issues with unclear scientific relationships, they should give full play to their disciplinary advantages while mastering basic natural science knowledge, and use more standardized and rigorous empirical methods. Research explores how people perceive the relationship between the environment and health, what factors influence this perception, and how people take action. Alternatively, we can further explore the game process among the various subjects in the debate on the environment-health relationship, which is of great significance to improving environmental risk management and achieving rational risk communication. In terms of the choice of research horizons, scholars should conduct research as global ecological citizens as much as possible, pay attention to the study of cross-regional or global environmental risks, and challenge the inherent concepts of regionalization of risk distribution and division by population.

COMPETING INTERESTS

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