

The Influence of Network Rumors on Public Health

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Abstract: With the rapid development of the Internet, some inaccurate information will be spread quickly and cause certain harm. The harm is often greatest in public health emergencies. The impact of the new coronavirus is still lingering in people's minds. So public health is one of the hottest topics today. The influence of network rumors on public health emergencies is one of the most important topics in today's research. A large number of studies have established models and unified studies on this topic. However, there is a lack of explanation for specific cases. This paper explains and analyzes the network rumors and public health emergencies respectively. Through the analysis of lectures, this paper studies the influence of network rumors on the Fukushima nuclear leakage and the salt grab incident in China. Finally, the study found that network rumors will have a greater impact on public health emergencies. In the case of China's salt rush, in particular, online rumors fueled the public frenzy. However, this study also found that network rumors have a short life span. There is still space for development to eliminate the development of network rumors.

Keywords: Network rumors, public health emergencies, fukushima nuclear disaster.

1. Introduction

As time passed, the network became more and more developed, and the information was transmitted more and more quickly. Even a trivial piece of information also can be widely known through the network. This is both a strength and a weakness of the network. Based on this characteristic of network, the online rumor was born. Specifically, unconfirmed assertions or tales circulate online prior to formal declarations and are referred to as rumors. Rumors that are untrue, prejudiced, and ambiguous frequently mislead the public and undermine public order and society [1]. In recent years, the world has been frequently encountering major public health emergencies such as Ebola virus, COVID-19 and Cholera which puts the global health situation on edge. This series of events has profoundly affected the public's sensitivity and attention to health information. Based on this situation, the demand for public health information has surged. simultaneously, the public is susceptible to network rumors that cause social panic [2]. Thus it can be seen that network rumors have a great impact on society, the public and so on. A few businesses have taken advantage of the pandemic to promote some of their items as COVID-19 therapies that work and to write incorrect prescriptions that have hurt some patients. Furthermore, there have been suspicions circulating that the virus is a political ploy between rival nations. Even certain rumors have contributed to the general public's worry about food shortages, which has led to a huge purchase of goods for storage. Also, rumors have led to psychological weariness and even suicide. In certain communities, the virus is viewed as a

social stigma, and those who are sick are the ones who must transmit it [3]. These examples are far more harmful than people think. In order to prevent the same thing from happening again in future public health events, studying the impact of online rumors on public health has far-reaching significance. The most widely known of all Public health emergencies is COVID-19.

Most research on online rumors and public health has focused on COVID-19. However, there is a lack of other case analysis of public health emergencies related to online rumors. This study will be based on case studies of China's salt rush caused by the Fukushima nuclear meltdown and other major public health events. This study mainly analyzes the influence of network rumors on public health emergencies from multiple perspectives.

2. Overview of network rumors

2.1. Characteristics of network rumors

.An unverified story can quickly become public concern after being spread by multiple news outlets and social media. It covers some sensitive topics. Public health is one of the topics the media uses to hype up. Its information is difficult to judge and the source is difficult to trace. It is easy to disturb public order, cause social panic, and pose a threat to national security. During an earthquake in Japan, an oil company's liquefied petroleum gas storage tank fell and caught fire on the eastern shore of Tokyo Bay. After the accident, rumors spread that harmful chemicals would fall in the rain as a result of the explosion of the oil tank. Please bring your umbrella and raincoat to avoid injury to your skin. This information has been refuted. However, many people still retweeted it on Twitter [4]. This rumor caused a certain amount of panic in Japan at the time. It has an impact on the public psyche.

2.2. Network rumor propagation mechanism

A lot of rumors tend to emerge during periods of social unrest and change. In every social change, the more stimuli there are, the wider the range of rumors. In addition, the frequent occurrence of Internet rumors is also related to other factors such as the international environment and people's psychological changes. Therefore, the spreading mechanism of rumors is a complicated and long-term process. In the absence of official information, rumors spread and were accepted by the public after being guided by a few people and blindly followed by some people. The more high-profile the event itself, and the less official information is available, the more likely rumors are to spread [5].

2.3. The impact of network rumor on public health

This research mainly focuses on public health emergency. This part will take public health emergency as an example. Most immediately, listening to rumors can cause people to have health problems. Such like it would accelerate the spread of the virus rather than control it. For instance, Health officials in Nigeria have found several cases of overdoses of chloroquine. This is because people have listened to rumors that chloroquine can treat COVID-19. Moreover, Rumors of a nationwide lockdown in the United States led to panic buying of daily necessities, which led to chaos in social order [6]. During the COVID-19 pandemic, studies have found that people who are exposed to vaccine-related information online are more likely to be misled into choosing not to be vaccinated. Another study by the Royal Society for Public Health found that 40 percent of people have seen negative information about vaccinations on social media [7]. Such rumors about vaccines mislead the public and lead to public resistance to vaccines, which increases the spread of the virus.

3. Overview of a public health emergency

3.1. Definition of public health emergency

The public health emergency is an occurrence of a disease or health condition. Besides public health emergencies also include environmental pollution, natural disasters and so on. It poses a major threat to society and the state. It can cause a large number of deaths in a short period of time, economic decline and other consequences [8]. On December 13, 2019, the World Health Organization reported the novel coronavirus for the first time. On 30 January 2020, WHO declared the outbreak of the virus a Public health Emergency of international concern and named it COVID-19. As of 31 October 2020, more than 45 million people have been infected with COVID-19 and more than 1.2 million have died. Similar public health emergencies include Severe Acute respiratory syndrome coronavirus (SARS-CoV) in 2002, H1N1 influenza in 2009, Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in 2012, Ebola virus disease (EVD) in 2013, and Zika virus in 2015 [9].

3.2. Characteristics of public health emergency

Suddenness and unpredictability: (1) Public health emergencies often come unexpectedly. Their occurrence time, place and impact scope are difficult or even impossible to predict in advance, showing a high degree of unexpectedness and suddenness. (2) Wide social impact and group: such incidents often quickly affect multiple individuals, and even the entire community, workplace or living group. It has wide range of impacts with significant community harm and group characteristics. (3) Severity of social harm: The sudden outbreak of public health emergencies combined with the large number of people affected often lead to huge economic losses and social unrest. It is not only a direct threat to public health, but also a serious threat to social stability due to the suddenness of the disease and the widespread impact.

3.3. Classification of public health emergencies

Public health emergencies can be divided into the following categories according to their causes: (1) Diseases caused by biological pathogens. Infectious diseases caused by viruses, bacteria, fungi and other biological pathogens such as influenza, COVID-19, plague, etc. (2) Food poisoning incidents: poisoning incidents caused by excessive intake of harmful substances. (3) Mass poisoning caused by harmful pollution: people are poisoned by harmful substances exposed to the environment or work, such as nuclear radiation pollution and chemical leakage. (4) Natural disasters: earthquakes, volcanic eruptions, typhoons, etc. The degree of harm and scope of impact can be divided into four levels. Different levels require different emergency response measures. Public health emergencies can also be classified as particularly significant (Level I), significant (level II), major (level III), and general (level IV) based on their scope and urgency (From Hotan City Center for Disease Control and Prevention).

4. Fukushima nuclear disaster in Japan

4.1. Event background

On March 11, 2011, the east coast of Japan was hit by a massive 9.0 magnitude earthquake. A tsunami followed. The waves reached a staggering 39 meters. It mercilessly engulfed about 217 square miles of mainland Japan. In both natural disasters, the Fukushima Daiichi nuclear power plant where about 150 miles northeast of Tokyo was severely damaged. The disaster has had a profound impact on Japanese society because the problem of radioactive contamination at the Fukushima nuclear power

plant continues to simmer. It raises public concerns about possible contamination of groundwater systems [10].

4.2. Public response

The Fukushima nuclear accident in March 2011 changed attitudes towards nuclear power. Public support for nuclear power has plummeted. Such a dramatic shift is due both to the trauma of a massive disaster and to some rumors. Rumors about radiation in Japan have had a negative impact on Japan's neighbor, South Korea. In 2013, South Koreans were still living in the shadow of the Fukushima disaster. Chosun Ilbo reported that several rumors turned out to be false, including: "Radioactive food from Japan was imported to South Korea." The Korean Food and Drug Administration (KFDA) explained that rumors about contaminated seafood are not true. Although many rumors have been proven to be false information, there are still many people who believe that they are true [11].

4.3. The way to deal with this problem

The citizens of Fukushima City are suffering not only from the harm caused by radiation but also from the psychological damage caused by the rumors. The first thing institutions and governments need to do in this situation is to build trust. Christopher mentioned a good practices in his article. For example, establishing a useful channel for the dissemination of information in Fukushima City. Governments and institutions should responsive to affected residents by using language that makes it easier for people to understand. This not only smoothes the mood of the people, but also stops the spread of rumors [12].

5. Specific case study

5.1. Incident description

After the Fukushima nuclear disaster. There are rumors that the Fukushima nuclear meltdown will contaminate the sea and make edible salt scarce. There are even rumors that eating iodized salt can prevent nuclear radiation. These rumors spread widely in China. Nuclear radiation has had a huge psychological impact on Chinese citizens. Therefore, the salt buying rush appeared in China [13].

5.2. Immanent cause

5.2.1. Social media and conformity

Social media accelerates the emergence of conformity in events. Weibo, as one of China's largest social media software, played a driving role in the initial spread of the salt grab rumor. At first, ten messages about the salt grab appeared on Weibo. The information is so brief that it is easy to misunderstand. Subsequently, the number of people receiving these messages grew rapidly[14]. The spread of rumors can lead to false conformity. Social conformity can be simply understood as the fact that people often align their actions with those of the majority[15]. The event was that a man was browsing Weibo when he was bored. The man suddenly saw a post about people rushing for salt. At this moment the man felt a great panic. So he hurried to the supermarket and bought several packets of table salt. Other people shopping in the supermarket saw this man's crazy behavior and asked him what happened. The man tells the reason. As a result, more and more people are frantically buying salt in supermarkets.

5.2.2. Network rumors and the lack of scientific and cultural level of the public

The root of public sentiment easily affected by network rumors is that the public's scientific and cultural level is insufficient. For people with limited scientific knowledge, they lack the judgment and thinking ability of the science of information. When these people see rumors like iodized salt prevents nuclear radiation or contaminated sea water will lead to a shortage of edible salt, they have no way to use scientific principles to analyze the truth of the information. And thus public easily deceived. Furthermore, the public faced with a large amount of information about nuclear radiation was influenced by emotions and intuition, which led to the spread of these rumors without thinking.

5.3. The disappearance and solution of rumors

Social media is a double-edged sword. It both plays a positive role and negative role in the process of spreading rumors.

5.3.1. Official refutation

Social media merges all sectors of society. Weibo refuted the rumor within a short time after it spread quickly [14]. Major websites such as Sina.com, Sohu.com, China.org.cn, People's Daily online have also sent messages. Ministry of Health, Ministry of Commerce, China Salt Company and other national official platforms stand out to explain. Not only that, the police also issued a statement that the rumor-monger will be held criminally responsible. Gradually, the salt buying storm subsided [13].

5.3.2. Popularizing knowledge to the public

- 1) Popularize relevant knowledge to the public.
- 2) Ensure market supply of salt.
- 3) Crack down on illegal traders [14].

Spreading relevant knowledge to the public is the most important of these three ways. Only when people realize that rumors are rumors, the salt market will remain open and the illegal traders will automatically disappear. Spreading relevant knowledge to the public is the most important of these three ways. Only when people realize that rumors are rumors, the salt market will remain open and the unscrupulous traders will automatically disappear [14].

6. Conclusion

This paper explores the spreading process, influence and solution of network rumors in China's salt grab incident caused by Fukushima nuclear leakage incident. Through this study, it is found that network rumors have a great negative effect on public health emergencies. Whether it is the new coronavirus epidemic in recent years or the Fukushima nuclear leakage incident in this article, online rumors still occur. Network rumors can also cause public panic and social chaos. Through the study of Fukushima incident, this paper also found that there are certain limitations of Internet rumors. Although network rumors can cause certain harm, but the life of network rumors is very short. With the development of the Internet, the speed of refuting rumors is getting faster and faster. This paper makes up for the lack of influence of Internet rumors on public health emergencies in specific events. This paper also provides other researchers with a comprehensive understanding of network rumors and the relationship between public health emergencies and network rumors. At the same time, there are some limitations in this study. As public health science develops, new cases should be studied, and future research should reflect problems and improvements based on current affairs research.

References

- [1] Wang, X., Li, Y., Li, J., et al. (2021). A rumor reversal model of online health information during the COVID-19 epidemic. *Information Processing & Management*, 58(6), 102731.
- [2] Li, N. (2024). Study on administrative law regulation of Internet rumors in public health emergencies. Shandong Normal University.
- [3] Hezam, I. M., Almshnanah, A., Mubarak, A. A., et al. (2023). COVID-19 and rumors: A dynamic nested optimal control model. *Pattern Recognition*, 135, 109186.
- [4] Takayasu, M., Sato, K., Sano, Y., et al. (2015). Rumor diffusion and convergence during the 3.11 earthquake: A Twitter case study. *PLoS One*, 10(4), e0121443.
- [5] Liang, J., & Yang, M. (2015). On spreading and controlling of online rumors in we-media era. *Asian Culture and History*, 7(2), 42-46.
- [6] Tasnim, S., Hossain, M. M., & Mazumder, H. (2020). Impact of rumors and misinformation on COVID-19 in social media. *Journal of Preventive Medicine and Public Health*, 53(3), 171-174.
- [7] Islam, M. S., Kamal, A. H. M., Kabir, A., et al. (2021). COVID-19 vaccine rumors and conspiracy theories: The need for cognitive inoculation against misinformation to improve vaccine adherence. *PloS One*, 16(5), e0251605.
- [8] Allen, T., & Spencer, R. (2023). Barriers and enablers to using an emergency operations center in public health emergency management: A scoping review. *Disaster Medicine and Public Health Preparedness*, 17, e407.
- [9] Majumder, J., & Minko, T. (2021). Recent developments on therapeutic and diagnostic approaches for COVID-19. *The AAPS Journal*, 23, 1-22.
- [10] Bakhshi, S., Lynn-Nicholson, R., Jones, B., et al. (2014). Responding to a radiological crisis: Experiences of British Foreign Office staff in Japan after the Fukushima nuclear meltdown. *Disaster Medicine and Public Health Preparedness*, 8(5), 397-403.
- [11] Kim, S., & Kim, S. (2017). Impact of the Fukushima nuclear accident on belief in rumors: The role of risk perception and communication. *Sustainability*, 9(12), 2188.
- [12] Hobson, C. (2015). Rebuilding trust after Fukushima.
- [13] Wang, Q.C. (2011). The influence of Japan's Fukushima nuclear crisis on Chinese public and media intervention. *Young Writers (Chinese and Foreign Literature Edition)*, (03), 85-87.
- [14] An, B.H. (2012). Research on the spread and response of rumors of major catastrophic events: Taking "salt grab" rumors as an example. *China Science and Technology Information*, (11), 176-177.
- [15] Chen, X., Liu, J., Luo, Y.J., et al. (2023). Brain systems underlying fundamental motivations of human social conformity. *Neuroscience Bulletin*, 39(2), 328-342.