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An Empirical Analysis of Women's Perception on Safety Culture and Disaster Vulnerability

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Abstract

This study empirically examines the vulnerability of the community and the perception of the women's safety culture in order to realize a community that is safe from disaster. The purpose of this paper is to analyze empirically the women's perception on safety culture and community vulnerability to disasters. The analytical results are as follows. First, according to the safety awareness scores, women tended to have higher risk perception than men. Second, the safety awareness scores by disaster type indicated that their risk perception was highest for man-made disasters. Third, disaster vulnerabilities were mostly found in women's living space, decision-making, demand responsibility, information accessibility, caregiver role, body, and resource accessibility. In short, gender differences appeared in perception on safety culture and disaster vulnerability in decision-making field.

Key words: gender, disaster, safety culture, risk perception, vulnerability

Ⅰ. Introduction

Human beings are curious about the cause of the accident. The scientific theory has been historically discovered the reasons in four stages. The first stage is that accidents are caused by the technical period. As technology develops rapidly, accidents occur due to mechanical malfunctions (Wiegmann & Shappell, 2001).

The second stage is about human error. The human operator's limit is the cause of the system failure rather than the mechanical malfunction. This served as an opportunity to shift the judgment of past errors from machine to man (Rochlin & Von Meier, 1994; Coquelle, *et. al.*, 1995). The third stage is for the sociotechnical period. The negative impact of poor ergonomics and system design on the interaction between human and technological factors is often the cause of errors and accidents (Gordon, *et. al.,* 1996).

The last stage is about safety culture. Accidents are not carried out by operators and interacting with isolated technology, but rather as a coordinated team embedded

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in the safety culture of a particular organization or community (Wilpert, 2000).

According to the Smith, *et. al*. (2006), the community's safety culture plays a significant role in encouraging people to act safely. The community's perception study of safe culture shows that individuals and communities are concerned with identifying and communicating practical ways to protect themselves from disaster risks that threaten their lives and property (Davis, *et. al*., 2003: 12-13).

The purpose of the safety culture awareness-raising activity is to inspire society and educate all residents of the community to reduce risk from potential threats. It can also serve as a positive outcome that these related programs create informed, vigilant, and independent communities that can protect themselves and support government policies in disaster management (Davis, *et. al*., 2003: 12-13).

Effective communication of disasters and raising awareness of safety culture among residents is to reduce social damage and physical loss in disaster situations. For example, when a flood occurred in the Mali region in 1998, more than 300 residents moved in advance to reduce damage through active communication on local government broadcasts. In 1998, Cuba raised awareness of the national risk and safety culture of hurricane threats, and fewer than 10 casualties were reported when the hurricane occurred in October 2001 (Shimizu, 1999).

This study empirically examines the vulnerability of the community and the perception of the women's safety culture in order to realize a community that is safe from disaster.

II. Theoretical Discussion

1. Safety Culture

The research on the perception of safety culture has started with the recognition of poor safety culture at the Chernobyl nuclear accident in 1986. Since the International Atomic Energy Agency (IAEA) has used a safety culture as a technique to analyze the incidents; Crash of Continental Express Flight 2574 in 1997, King's Cross Underground fire in London and the Piper Alpha oil platform explosion in the North Sea in 1998, and British Petroleum refinery in Texas City in 2005 (Cox & Flin, 1998; Mearns & Flin, 1999; Pidgeon, 1998).

Carroll (1998) defines safety culture that all groups and members place high values on safety (priority). The members of the group point to the expectation that they will act to preserve and improve the safety of the community, take personal responsibility for safety, and receive rewards consistent with these values.

Ciavarelli & Figlock (1996) consider safety culture as shared values, beliefs, assumptions and norms that can influence an organization's decision-making as well as individual and collective attitudes toward safety. Cooper (2000) says that safety culture is a subculture in a organization and affects members' attitudes and behaviors in relation to the organization's continued health and safety.

Cox & Cox (1991) believe that safety culture reflects the attitudes, beliefs, perceptions and values shared by employees in relation to safety. Cox & Flin (1998), Lee (1998), and Wilpert (2000) view safety culture as a product of individual and collective values, attitudes, perceptions, competencies, and behavioral patterns that determine a community's commitment to health and safety management.

Flin, *et. al*. (1998) argue that safety culture is a fixed attitude and opinion shared by a group about safety. Helmreich & Merritt (1998) refers to a common belief that safety culture is a common belief in the importance of safety and that all members are willing to comply with the group's safety standards and support others for their common purpose.

McDonald & Ryan (1992), Mearns & Flin (1999),

Pidgeon (1991), and Pidgeon & Oleary (1994) tell safety culture as: a set of norms, beliefs, attitudes, roles and social skills and practices to minimize exposure of employees, managers, customers and the public to dangerous or harmful conditions.

Mearns, *et. al.* (1998) defines safety culture as the attitude, values, norms and beliefs that people in a particular community share about risk and safety. Meshkati (1997) explains safety culture as combining individual characteristics and attitudes with community organizations that establish safety-related issues.

The Minerals Council of Australia (1999) refers to the safety culture of the community, which deals with management, supervision, management systems, and organizational awareness. Pidgeon (2001) says that safety culture is a set of assumptions and related practices that can build a belief in risks and safety.

2. Safety Vulnerability

1) Living Space

According to Godino & Coble (1995), the need for the establishment of women's shelters and response agencies for the victims of violence against women in disaster shelters is suggested. In particular, women victims of domestic violence need isolation and protection from their husbands in shelter.

The impact of living space on women in disaster management varies. In times of disaster, living spaces are often destroyed, so many families are forced to move to shelter. The problem is not that they are forced to move to shelter, but that a small number of women suffer violence in these shelter or are excluded from economic benefits. The economic exclusion is that the reconstruction or repair of public housing is slow, or the complex and difficult process of applying for aid can damage minorities and marginalized women (Ginige, *et. al.,* 2009: 559; Morrow, 1996: 5). Based on the previous works, a hypothesis is refereed.

H-1 : Women will be more vulnerable to safety in their living spaces than men.

2) Decision making

However, if women are excluded from decision making in the entire process of disaster management, it is difficult to establish practical and effective countermeasures. As a result, women are not only victims or agents, but also need empowerment to strengthen their roles in the decision-making powers and positions of the disaster management plan.

According to Ariyabandu & Wickramasinghe (2003), women have been recognized as victims or helpless victims in the role system for disaster relief and reduction. Women's abilities and knowledge in the role of disaster response and recovery have been overlooked. It has been considered undesirable for women to be in a decision-making position, particularly in the role of disaster recovery and mitigation.

H-2 : Women will be more vulnerable to safety in decision-making than men.

3) Consumption responsibility

In general, at home, women are the main agents of consumption and are responsible for the risks and causes of harm. In the event of a problem caused by consumption in the event of a disaster, the greatest burden is given to women at home, which places a heavy burden on women. Among the various types of disasters that occur in modern society, women are mainly responsible for various environmental risks such as purchasing food and beverages exposed to harmful substances caused by consumption activities. Therefore, providing accurate information to women with high consumption-related responsibilities at home can mean several measures to reduce the risk of

human life and property by reducing the likelihood of risk before a disaster. Some of these measures include public relations and campaigns for risk awareness, strengthening vulnerable structures, and planning activities at the community level (Khan, *et. al.,* 2008: 47).

H-3 : Women will be more vulnerable to safety in consumption responsibility than men.

4) Information access

Whether it is possible to prevent disasters in advance depends on the availability of information technology. In a case study by Kuppuswamy & Rajarathnam (2009), women in Tamil Nadu in southern India in 2004 suffered more damage than men during a natural disaster due to low access to information technology during the tsunami. They tried to improve women's information technology skills.

Women in the area minimized the damage in case of disasters by establishing and collecting networks, building livelihood information, collecting water and sanitation related information, and prescribing and collecting medical and educational information using systemized information technology. It has become a model for a sustainable community.

H-4 : Women will be more vulnerable to safety in accessing information than men.

5) Care role

CARE International (2002) study tells us that the role responsibilities have been shown to have a positive effect on stress due to the significant responsibilities of women's health and childcare in the event of a disaster. In general, women take the role of caring to prepare for and respond to disasters to protect their families. According to Dann & Wilson (1993), Fothergill (1999), Millican (1993), and Morrow & Enarson (1996), after the disaster, women remained at home to care for their families and increase their resilience.

In most societies, women are given daily roles of support, family care and parenting. These role responsibilities also play an important role in preventing, preparing, responding to and restoring household responsibilities and assumptions from risk factors, which can be confirmed by Fothergill (1996) studies. The role of caring played by women creates a sense of stability in the home in temporary shelters or temporary housing in the event of a major disaster, and encourages re-creation.

H-5 : Women will be more vulnerable to safety in caring roles than men.

6) Body

Women's bodies are more susceptible to disasters than men. In particular, in an aging society, older women can be considered to be very physically vulnerable to disasters. The physical and mental health of these women is more vulnerable than men, which acts as a factor to reduce the resilience of individuals, societies, countries and communities.

H-6 : Women will be more vulnerable to safety in the body than men.

7) Resource Access

According to Enarson, *et. al*. (2018), access to women's resources in response to and recovery from disasters was analyzed to be unequal. Women are excluded from the power structure and decision-making parties, making it difficult to access resources for practical help, and sometimes the basic needs structure is not properly resolved.

H-7 : Women will be more vulnerable to safety in resource access than men.

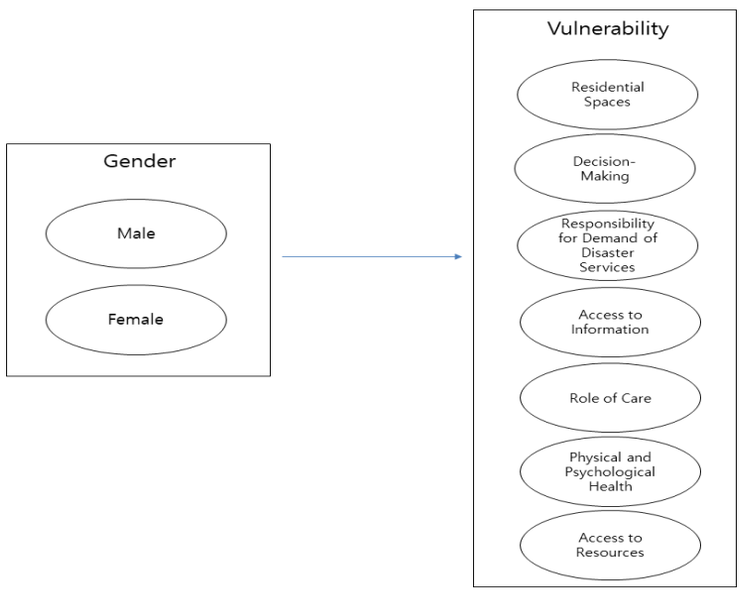

Figure 1. Gender vulnerability model of safety culture

Ⅲ. Research Model

Conventional researches have analyzed safety vulnerability. As a result, the gender vulnerability model related to safety culture is shown in <Figure 1>, focusing on the variables of living space, decision making, demand responsibility, information access, care role, body, and resource access.

According to <Figure 1>, the vulnerability of safety culture differs depending on gender. In particular, it is assumed that women are more vulnerable to living space, decision-making, demand responsibility, information access, caring role, body, and resource access by safety culture than men, and the model is verified through a survey data. In order to analyze the differences by gender, t-test is conducted. It verifies empirically the hypothesis which gender is significant in safty vulnerability.

Ⅳ. Empirical Analysis

1. Demographic Analysis

Safety culture awareness was investigated between February 17-28, 2020 by using the Internet for 100 of the panel data held by the Chungbuk Regional Safety Culture Research Group (Chungbuk National University, Seowon University, Gangdong University, Green Cheongju Council). Demographic and sociological statistics are shown in <Table 1>.

First, in terms of gender, 51 women (51%) and 49 men (49%) participated in the survey. The residence was 89 (89%) in Cheongju, 6 (6%) in Chungju, 1 each (1%) in Jecheon, Boeun, Jeungpyeong, Jincheon, and Danyang.

The characteristics of residence are 91 (91%) in urban areas, and 9 (9%) in rural areas. Respondents' educational background was 2 middle school graduates (2%), 7 high school graduates (7%), 17 university (17%), 43 university graduates (43%), and 31 graduate school graduates (31%).

Age is 4 people (4%) 10-19 years old, 41 people (41%) 20-29 years old, 17 people (17%) 30-39 years old, 16 people (16%) 40-49 years old, 50-59 years old Fifteen (15%) and seven over the age of 60 (7%) participated in the survey.

Income is less than 2 million won 9 (9%), more than 2 million won-less than 4 million 25 (25%), more than 4 million ~ less than 6 million 24 (24%), more than 6

Table 1. Demographic analysis of Chungbuk safety culture

Classification		Frequency	Percentage	Valid percentage	Cumulative percentage
Gender	Female	51	51.0	51.0	51.0
	Male	49	49.0	49.0	100.0
Residence	Cheongju	89	89.0	89.0	89.0
	Chungju	6	6.0	6.0	95.0
	Jecheon	1	1.0	1.0	96.0
	Boeun	1	1.0	1.0	97.0
	Jeungpyeong	1	1.0	1.0	98.0
	Jincheon	1	1.0	1.0	99.0
	Danyang	1	1.0	1.0	100.0
Residence Characteristics	Rural area	9	9.0	9.0	9.0
	Urban area	91	91.0	91.0	100.0
Education	Middle school	2	2.0	2.0	2.0
	High school	7	7.0	7.0	9.0
	University attendance	17	17.0	17.0	26.0
	University graduation	43	43.0	43.0	69.0
	Graduate graduation	31	31.0	31.0	100.0
Age	10-19	4	4.0	4.0	4.0
	20-29	41	41.0	41.0	45.0
	30-39	17	17.0	17.0	62.0
	40-49	16	16.0	16.0	78.0
	50-59	15	15.0	15.0	93.0
	60-	7	7.0	7.0	100.0
Income	Less than 2 million won	9	9.0	9.0	9.0
	More than 2 million won ~ less than 4 million won	25	25.0	25.0	34.0
	More than 4 million won ~ less than 6 million won	24	24.0	24.0	58.0
	More than 6 million won ~ less than 8 million won	24	24.0	24.0	82.0
	More than 8 million won ~ less than 10 million won	5	5.0	5.0	87.0
	10 million won or more	13	13.0	13.0	100.0
Vocation	Self-employment	6	6.0	6.0	6.0
	Sales/service job	5	5.0	5.0	11.0
	Clerical/Technical job	32	32.0	32.0	43.0
	Management job	2	2.0	2.0	45.0
	Professional/free-lancer job	9	9.0	9.0	54.0
	Teacher, lecturer	2	2.0	2.0	56.0
	Student	21	21.0	21.0	77.0
	Housewife	5	5.0	5.0	82.0
	Others	18	18.0	18.0	100.0

million ~ less than 8 million 24 (24%), more than 8 million won ~ less than 10 million won (5%), and more than 10 million won (13%) participated in the survey.

The job characteristics were 6 self-employed (6%), 5 sales and service workers (5%), 32 office and technical workers (32%), 2 managers (2%), 9 professional and free workers (9%), 2 teachers (2%), 21 students (21%), 5 housewives (5%) and 18 other students (18%) participated in the survey.

2. Chungbuk Women's Perception of Safety Culture

<Table 2> shows the results of gender comparisons that surveyed Chungbuk's perception of safety in the living safety crisis.

According to <Table 2>, the overall average score appears to be 6 points, out of 10 in Chungbuk's perception of safety and security of life. By gender, women's overall average score was 5.

71, whereas men's score was 6.31, and the safety perception score for women was about 1 point lower than men's.

Specifically, by type of life and safety crisis, women scored low on the perception of the life safety crisis on the vulnerable class safety crisis and the occupational life safety crisis. In the case of men, the vulnerable class safety crisis was the lowest. The highest type measured was the safety risk of living facilities for women (6.67 points), and the highest for men was the health and safety crisis (6.94 points).

<Table 3> shows the results of gender differences in recognition of the natural disaster crisis in Chungbuk.

According to <Table 3>, the natural disaster safety perception score of Chungbuk residents was 5.55 points. By gender, women's score was 5.16, while men scored 5.96, indicating that women's natural disaster safety perception scores were lower than men's.

Specifically, when categorized by natural disaster type, women had a low score of earthquake disaster perception, and men had the lowest safety perception score of heavy rain disaster. The highest safety perception score was high in females with a heavy snowfall disaster (5.75) and males with a typhoon (6.45).

The results of gender difference in recognition of man-made disaster safety in Chungbuk are as shown in <Table 4>.

Table 2. Comparison of perception of living safety crisis

Classification	Female	Male	Total
	Mean	Mean	Mean
Vulnerable people safety crisis	4.49	5.00	4.74
Economic safety crisis	5.02	5.20	5.11
Crime security safety crisis	5.12	6.67	5.88
Traffic safety crisis	5.43	6.43	5.92
Occupational safety crisis	4.98	5.65	5.31
School life safety crisis	6.63	6.55	6.59
Food safety crisis	5.75	6.59	6.16
Household goods safety crisis	6.41	6.82	6.61
Health safety crisis	6.49	6.94	6.71
Living facility safety crisis	6.67	7.16	6.91
Living environment safety crisis	5.14	5.92	5.52
Living infrastructure safety crisis	6.33	6.82	6.57
Total	5.71	6.31	6.00

Table 3. Natural disaster safety perception

Classification	Female	Male	Total
	Mean	Mean	Mean
Typhoon	5.35	6.45	5.89
Earthquake	4.49	5.90	5.18
Torential rain	4.96	5.35	5.15
Heat wave	5.27	5.92	5.59
Heavy snow	5.75	6.16	5.95
Total	5.16	5.96	5.55

Table 4. Man-made disaster safety perception

Classification	Female	Male	Total
	Mean	Mean	Mean
Fire	4.24	5.78	4.99
Building collapse	5.10	6.16	5.62
Ship sinking	5.55	6.47	6.00
Fall	5.37	6.22	5.79
Explosion	5.41	6.10	5.75
Particulate matter	2.75	3.41	3.07
Sinkhole	4.20	5.51	4.84
Hazardous chemicals	4.24	5.27	4.74
Total	4.61	5.62	5.10

On <Table 4>, the safety perception score of Chungbuk's man-made disaster crisis was 5 points. By gender, women

scored 4.61, while men scored 5.62, which was lower than men. Specifically, by categorization by man-made disaster, women had a very low score of 2.75 for particulate matter safety perception, and men also had the lowest for particulate matter at 3.41. The highest score was 5.55 points for women, and the sinking rate was 6.47 points for men.

3. Chungbuk Women's Safety Vulnerability

<Table 5> shows the analysis of safety vulnerabilities related to the safety culture of women in Chungbuk.

In the residential space vulnerability, the mean of women was 2.6993 (SD = .62983), and that of men was 2.4966 (SD = .62406). It was found that there was no significant difference as t = 1.616 (P> .05). In the decision-making vulnerability, the mean of women was 4.3922 (SD = .68785), and men were 4.0816 (SD = .85603). It was found that there was a significant difference as t = 2.004 * (P <.05).

In the vulnerability of demand responsibility, the mean (mean) of women is 2.8824 (SD = 2.8824) and 2.9082 (SD = .70470) for men, which is not significant as t =-. 206 (P> .05).In the vulnerability of access to information, it was found that there were no significant differences as 2.4804 (SD = .86000) for women and 2.5510 (SD = .76543) for men, which was t =-. 433 (P> .05).In the vulnerability of the role of care, females were 2.5980 (SD = .93819) and males were 2.5306 (SD = .83795), which was not significant as t = .379 (P> .05).

In short, the vulnerability of women's safety culture in Chungbuk showed women's vulnerability in the decision making of safety culture policy.

Table 5. Safey vulnerability of women's safety culture in Chungbuk

Safety vulnerability		N	Mean	Standardization deviation	t
Living space	Female	51	2.6993	.62983	1.616
	Male	49	2.4966	.62406	
Decision making	Female	51	4.3922	.68785	2.004*
	Male	49	4.0816	.85603	
Demand responsibility	Female	51	2.8824	.54395	-.206
	Male	49	2.9082	.70470	
Information access	Female	51	2.4804	.86000	-.433
	Male	49	2.5510	.76543	
Care role	Female	51	2.5980	.93819	.379
	Male	49	2.5306	.83795	
Body	Female	51	2.9216	.78976	.511
	Male	49	2.8469	.66304	
Resource access	Female	51	2.1176	.88650	-.577
	Male	49	2.2143	.78395	

*p<.05

V. Conclusion

Research into citizen awareness and effectiveness to improve community safety culture is ongoing. In particular, it analyzed that improving safety culture through citizen participation has the effect of reducing accidents and disasters in the community (Blackburn, 2017; Mays, *et. al.*, 2016; Little & Pak, 2018).

Based on Tarkkanen & Tyni (2019), they discussed the importance of the role of citizens with non-governmental organizations (NGOs) in crisis management in the Finnish community. In particular, citizens insist that it plays an important role in promoting safety culture and revitalizing citizens to improve the safety and safety of the community, and also plays a major role in strengthening the psychological resilience within the local government after the disaster.

This study encourages to vitalize civil activities related to promoting the safety culture of the community in the future by analyzing the crisis and vulnerabilities of the civil society in order to improve the safety culture of the Chungbuk community. In order to prepare an equal and universal safety culture policy, it was intended to deal with the vulnerabilities of women's safety culture in Chungbuk.

The results of the perception of the people related to the Chungbuk safety culture are as follows. First, gender perceptions of safety in Chungbuk Province differed by

gender. The survey on the perception of safety in the life safety crisis, natural disaster crisis, and human disaster crisis, it was confirmed that women tended to perceive the risks of safety as lower than men, and perceived them as more dangerous.

Second, there were differences in perception scores for each type of disaster crisis in Chungbuk. Among the types of living safety crisis, natural disaster crisis, and man-made disaster crisis, the safety perception of the man-made disaster crisis was the lowest, and the man-made disaster crisis perception score was high. Particularly, among man-made disasters, the particulate matter disaster was measured at a very low score of 2 points.

Third, the difference in the vulnerability of safety culture in Chungbuk exists in a decision-making field. As a result of the investigation for establishing a universal and equal safety culture for the Chungbuk residents, decision-making vulnerabilities appeared in the areas of women's residence, decision-making, demand responsibility, information access, care roles, and physical and resource access.

The implications for improving the safety culture in Chungbuk are as follows. First, it is necessary to increase the proportion of women in decision-making related to the development of disaster and safety culture policies. In order to provide sufficient services for women's disaster and safety culture policies, it needs to increase the proportion and roles of women in relevant decision-making powers.

Second, customized policy is important to develop a safety culture depending on local characteristics. This study analyzed that Chungbuk's safety culture and awareness of safety appeared differently by the type. Safety culture policy and program development are essential to accomplish the safety policy needs of the residents in accordance with the regional characteristics.

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References

Ariyabandu, M. M. and M. Wickramasinghe. 2003. *Gender Dimensions in Disaster Management*. Colombo: ITDG South Asia Publication.

Blackburn, R. M. 2017. Highway Madness!: Politics and Citizen Participation in Postwar US Traffic Safety Technology and Policy. Doctoral Dissertation. Massachusetts Institute of Technology.

Carroll, J. S. 1998. Safety Culture As an Ongoing Process: Culture Surveys As Opportunities for Inquiry and Change. *Work & Stress*. 12(3): 272-284.

Ciavarelli, A. Jr. and R. Figlock. 1996. Organizational Factors in Aviation Accidents. *Proceedings of the Ninth International Symposium on Aviation Psychology*. Columbus, OH: Department of Aviation. 1033-1035.

Cooper, M. D. 2000. Towards a Model of Safety Culture. *Safety Science*. 36(2): 111-136.

Coquelle, J. J., B. Cura, and B. Fourest. 1995. Safety Culture and Quality System. *Proceedings of the International Topical Meeting on Safety Culture in Nuclear Installations*. Vienna, Austria. 193-202.

Cox, S. and R. Flin. 1998. Safety Culture: Philosopher's Stone or Man of Straw? *Work & Stress*. 12(3): 189-201.

Cox, S., and T. Cox. 1991. The Structure of Employee Attitudes to Safety: A European Example. *Work & Stress*. 5(2): 93-104.

Dann, S. and P. Wilson. 1993. Women and Emergency Services. *Women in Emergencies and Disasters*. Symposium, Queensland Bureau of Emergency Services, Brisbane. 2-15.

Davis, I., M. Hosseini, and Y. O. Izadkhah. 2003. Public Awareness and the Development of a Safety Culture: Key Elements in Disaster Risk Reduction. Proceedings of the Fourth

International Conference of Earthquake Engineering and Seismology, 12-14 May 2003 Tehran, Islamic Republic of Iran.

Eiff, G. 1999. Organizational Safety Culture. *Proceedings of the Tenth International Symposium on Aviation Psychology*. Columbus, OH: Department of Aviation. 1-14.

Enarson, Elaine, Alice Fothergill, and Lori Peek. 2018. Gender and Disaster: Foundations and New Directions for Research and Practice. *Handbook of Disaster Research*. Switzerland: Springer. 205-223.

Fothergill, A. 1996. Gender, Risk, and Disaster. *International Journal of Mass Emergencies and Disasters*. 14(1): 33-56.

Fothergill, A. 1999. Women's Roles in a Disaster. *Applied Behavioral Science Review*. 7(2): 125-143.

Ginige, K., D. Amaratunga, and R. Haigh. 2009. Mainstreaming Ggender in Disaster Reduction: Why and How? *Disaster Prevention and Management: An International Journal*. 18(1): 23-34.

Godino, V. and C. Coble. 1995. The Missouri Model: The Efficacy of Funding Domestic Violence Programs as Long-term Disaster Recovery. Final Evaluation Report, The Missouri Coalition Against Domestic Violence, St Louis.

Gordon, R., R. Flin, K. Mearns, and M. T. Fleming. 1996. Assessing the Human Factors Causes of Accidents in the Offshore Oil Industry. Paper Presented at the Third International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production. New Orleans, LA.

Helmreich, R. L. and A. C. Merritt. 1998. Organizational Culture. In R. L. Helmreich and A. C. Merritt. eds. *Culture at Work in Aviation and Medicine*. Brookfield, VT: Ashgate. 107-174.

Khan, H., L. G. Vasilescu, and A. Khan. 2008. Disaster Management Cycle: A Theoretical Approach. *Journal of Management and Marketing*. 6(1): 43-50.

Kuppuswamy, S. and S. Rajarathnam. 2009. Women, Information Technology and Disaster Management: Tsunami Affected Districts of Tamil Nadu. *International Journal of Innovation and Sustainable Development*. 4(2-3): 206-215.

Lee, T. 1998. Assessment of Safety Culture at a Nuclear Reprocessing Plant. *Work & Stress*. 12(3): 217-237.

Little, K. and K. T. Park. 2018. Fukushima's Black Bags: How Citizen Scientist Activism Is Framed by Cultural Contexts, Environmental Justice, and Ethical Reasoning.

Mays, C., J. Valůch, T. Perko, I. Daris, C. Condi, A. Miśkiewicz, and N. Železnik, *et. al.* 2016. Looking for Citizen-centered Communication: Dialogues between Radiological Protection or Nuclear Safety Specialists and Media Professionals. *Journal of Radiological Protection*. 36(2): S143.

McDonald, N. and F. Ryan. 1992. Constraints on the Development of Safety Culture: A Preliminary Analysis. *Irish Journal of Psychology*. 13(2): 273-281.

Mearns, K. J. and R. Flin. 1999. Assessing the State of Organizational Safety: Culture or Climate? *Current Psychology: Developmental・Learning・Personality・Social*. 18(1): 5-17.

Mearns, K., R. Flin, R. Gordon, and M. Fleming. 1998. Measuring Safety Climate on Offshore Installations. *Work & Stress*. 12(3): 238-254.

Meshkati, N. 1997. Human Performance, Organizational Factors and Safety Culture. Paper Presented on National Summit by NTSB on Transportation Safety. Washington, D.C. April 1997.

Millican, P. 1993. Women in disaster. *Women in Emergencies and Disasters*. Symposium, Queensland Bureau of Emergency Services, Brisbane.

Minerals Council of Australia. 1999. *Safety Culture Survey Report of the Australia Minerals Industry*. Author: Australia.

Morrow, B. H. 1996. Hurricane Andrew Through Women's Eyes. *International Journal of Mass Emergencies and Disasters*. 14(1): 5-22.

Morrow, B. H. 1996. Hurricane Andrew Through Women's Eyes. *International Journal of Mass Emergencies and Disasters*. 14(1): 5-22.

Pidgeon, N. 1998. Safety Culture: Key Theoretical Issues. *Work & Stress*. 12(3): 202-216.

Pidgeon, N. and M. Oleary. 1994. Organizational Safety Culture: Implications for Aviation Practice. In N. Johnson, N. McDonald, and R. Fuller. eds. *Aviation Psychology in Practice*. Brookfield, VT: Ashgate. 21-43.

Pidgeon, N. F. 1991. Safety Culture and Risk Management in Organizations. *Journal of Cross-cultural Psychology*. 22: 129-141.

Rochlin, Gene I. and Alexandra von Meier. 1994. Nuclear Power Operations: A Cross-cultural Perspective. *Annual Review of Energy Environment*. 19: 153-187.

Shimizu, Y. 1999. Disaster Preparedness: A Priority for Latin America. *In World Disaster Report, Focus on Reducing Risks, 2002*. 41.

Smith, G. S., Y. H. Huang, M. Ho, and P. Y. Chen. 2006. The Relationship between Safety Climate and Injury Rates across Industries: The Need to Adjust for Injury Hazards. *Accident Analysis & Prevention*. 38(3): 556-562.

Tarkkanen, L. and J. Tyni. 2019. The Role of the Non-governmental Organisations and Citizens in Crisis Management within the Finnish Communities. In Conference Proceedings of 12th International Scientific and Professional Conference Crisis Management Days 2019. University of Applied Sciences Velika Gorica.

Wiegmann, D. A. and S. A. Shappell. 2001. Human Error Analysis of Commercial Aviation Accidents: Application of the Human Factors Analysis and Classification System (HFACS). *Aviation Space and Environmental Medicine*. 72(11): 1006-1016.

Wilpert, B. 2000. Organizational Factors in Nuclear Safety. Paper Presented at the Fifth International Association for Probabilistic Safety Assessment and Management. Osaka, Japan.

Yule, S. J., R. Flin, and A. J. Murdy. 2001. April 27-29. Modeling Managerial Influence on Safety Climate. Poster Presented at Society for Industrial and Organizational Psychology (SIOP) Conference. San Diego, CA.

[1] https://www.care-international.org/

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