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Research Article

Safety Knows No Pause: Identifying the Relationship Between Disaster Literacy and Public Health Nurses' Disaster Response Performance

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ABSTRACT

This descriptive quantitative study aimed to identify the relationship between disaster literacy and the disaster response performance of public health nurses in various health institutions in Davao City. The research utilized a self-designed questionnaire survey, with participants providing details on their sex and years of experience. The survey comprised 10 questions assessing disaster literacy and 7 questions evaluating disaster response performance. Statistical analyses including Mann-Whitney U and Spearman were employed. Results showed a mean disaster literacy level of 3.91, categorized as high. However, no statistically significant relationship was found between disaster literacy and nurses' disaster response performance, regardless of sex and years of experience. Although a slight correlation of 0.135 between disaster literacy and performance was observed, it was not statistically significant ($p=0.100$), as indicated by the scatter plot analysis. Based on the findings of this study, researchers have devised disaster strategies. These strategies aim to equip all public health nurses to effectively respond to disasters, regardless of sex, experience, or prior knowledge. It involves creating a standardized disaster preparedness and response plan, conducting regular drills covering various scenarios, implementing ongoing education courses, and assigning roles based on skills rather than sex or experience, with clear documentation of responsibilities.

Keywords: *Disaster Response, Disaster Literacy, Public Health Nurses*

Introduction

Public health nurses play significant roles and duties during all stages of catastrophes by using their scientific expertise and understanding of behavioral concerns, physiology, pharmaceuticals, cultural-family systems, and

epidemiological studies. Everyone must be prepared, morally and ethically, for the greater good of the community, whether it be the strikes of the terrorists or natural disasters. This presupposes that everyone will risk their general well-being and not depend on

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professionals involved because others need more confidence, knowledge, and training. Public health nurses will always be crucial in every disaster as they are on the front line of providing emergency response (Acabado, 2021).

On the other hand, the increasing media coverage of the devastating effects of disasters in Canada has increased the need to prepare healthcare facilities and communities for emergencies and disasters to reduce widespread morbidity and mortality. Although the causes and characteristics of these two incidents were very different, they showed that a coordinated response by healthcare facilities, safety precautions, and their absence significantly impacted the outcome.

Furthermore, there were specific issues in the Philippines, particularly in the Municipality of Columbia; some problems encountered were inadequate training materials and resources and a need for more training among the personnel in charge of catastrophe risk reduction. Despite these obstacles, staff members and medical professionals, especially public health nurses, agreed that any organization complied with the law. It was determined that the practice of disaster preparedness classes and training, as well as funding for the publishing and distributing of the program's training materials for institutions (NDRRMP, 2011).

A string of destructive earthquakes struck Southern Mindanao in the Philippines in October 2019. The first earthquake, measuring 6.3 on October 16, was followed by two more, measuring 6.6 and 6.5 on October 29 and 31, respectively. There were aftershocks with magnitudes greater than 5.0 between those three dates. The 6.3 magnitude earthquake that struck on October 16 affected 3,068 people in regions 11 and 12, leaving five people dead and 89 injured. The National Disaster Risk Reduction and Management Council (NDRRMC) reported that 326,816 individuals were affected by earthquakes on October 29 and 31, which had magnitudes of 6.6 and 6.5, respectively. Three persons were listed as missing in line with reports from the Philippine Institute of Volcanology and Seismology. In Davao City, 27 more people were injured in addition to the three extra fatalities. (NDRRMP, 2011).

The Advanced National Seismic System recorded a 6.9-magnitude earthquake on December 15 of the same year, along with a string of powerful aftershocks, nine of which had magnitudes equal to or greater than 5.0. This earthquake affected 242,840 people in Davao del Sur, caused 210 injuries, and claimed 12 lives (USGS, 2023).

Thus, Experience has shown that closer health surveillance and service provision are required during the recovery and rehabilitation phase following a disaster, mainly when infrastructure losses and disruptions in the provision of essential services are significant due to the damage caused by the disaster event (Presidiris T., et al, 2015).

In addition, according to a study, to enhance and improve the nurses' disaster preparedness, more training should be conducted academically and institutionally (Sourtzi et al, 2015).

As a result, medical personnel must be trained and ready to respond to emergencies and disasters. Public and private education campaigns, reaction team training, and drills simulating emergency response situations are required to assist in emergency and disaster preparedness. Public awareness and education campaigns seek to foster a community that is well-informed, vigilant, and self-sufficient, capable of contributing fully to and cooperating with other citizens as well as elected leaders; with that, here in Davao City, public health nurses play a vital role throughout the disaster continuum and not just during the initial response phase, to address the health issues brought on by the catastrophe occurrence.

As a result, none of the above studies dealt with Exploring the Relationship Between Disaster Literacy and Public Health Nurse's Disaster Response Performance. Therefore, the present research generated new knowledge and aimed to determine the relationship between Disaster Literacy and Public Health Nurses' Disaster Response Performance. Specifically, it sought to answer the following questions:

1. Demographic Profile in terms of Gender and Work Experience.
2. The Level of Disaster Literacy of Public Health Nurses' in Davao City

3. Level of Public Health Nurses' performance in response to disaster in Davao City?
4. Are training courses for Disaster preparedness being conducted for the public health nurses' in Davao City?
5. Significant difference between the level of disaster literacy and performance of public health nurses' in response to the disasters, in terms of demographic profile.
6. Drafting a disaster preparedness program for Public Health Nurses' based on the result of this study.

Methods

This study utilized the descriptive quantitative research design to collect statistical information to analyze the population sample. A broadly used gap analysis technique allowed us to collect and classify specific demographic characteristics. Hence, the researchers chose this study design to investigate, describe, and explore the relationship between disaster literacy and public health nurses that could affect their disaster response performance and statistically analyze it. The survey questionnaire used in this study is one of the descriptive research techniques. The survey approach involved recording the public health nurses' answers through questionnaires or surveys. Thus, the researcher used questionnaires to collect and gather data from the respondents in this study. The public health nurses were identified using a population descriptive sampling technique. After completing the questionnaires, the public health nurses' responses were recorded for data analysis.

In addition, before conducting the research, the researchers sought approval and delegation of the responsibility from the College Dean of the College of Health Scienced Education in University of Mindanao. The questionnaire was duly approved and revised by the technical panel and the University Research Board Ethics. Once approved, the researchers conducted a pilot study with 150 public health nurses' in Davao City

Statistical Tool

Mann-Whitney U Test is used to compare the difference between two independent groups on a continuous or ordinal outcome. It

assesses whether the distribution of the two groups differ. This statistical tool typically applied when comparing the ranks of two groups to determine if one tends to have higher values than the other. As to Spearman's Rho, it is used to know if there's a monotonic relationship between two variables.

This, Whitney U and Spearman's rank correlation are both non-parametric techniques that involve ranking data but are used for different purposes. In this study, Whitney U compares two different groups, while Spearman evaluates the correlation between two variables.

Research Locale

The study was conducted at the City Health Office- Main, one of the agencies under the Local Government Unit located at 124 Pichon St. Poblacion District, Davao City, Davao del Sur, Philippines. City Health Office was established through RA 9160 or the Local Government Unit 1991, a 900 square-meter headquarters catering to up to 70 clients daily. Researchers chose this place as it will provide the information needed in this study. The study will be conducted explicitly in the City Health Office, where health professionals such as doctors, dentists, nurses, medical technologists, and midwives provide public health and clinical services in the rural setting.

Research Participants

The total population of Public Health Nurses in Davao City is 225. A minimum acceptable sample size of 150 public health nurses was recommended. The total population descriptive sampling technique is a teleological measurement technique wherein the total population (i.e., the total population) was examined for a particular number of characteristics. The sample frame contains the population of Public Health Nurses. Researchers used the population descriptive sampling technique to choose participants based on their knowledge and information gathered in the study. People participating in this study must be certified Public Health Nurses in the City Health Office of Davao City with a PRC license, regardless of age, gender, or religion. Participants in this study who are not a Public Health

Nurse worker and Public Health Nurses who haven't responded yet to a disaster are not eligible.

Research Instrument

This study used a validated questionnaire with Cronbach Alpha value of 0.821. The questionnaire is composed of three sections: (a) Demographic profile, (b) Level of Disaster Literacy of Public Health Nurses, and (c) Level of Disaster Response Performance of Public Health Nurses. The researchers used the Likert scale for the 17-item questionnaire to assess the respondent's answers. The questionnaire

encompasses five scales that will be used to rate the public health nurses' answers, each with its interpretation. A value of 5 states "Strongly Agree" and indicates a high level of agreement with the statement. A score of 4 states "Agree" and indicates agreement with the statement. A value of 3 states "Neutral" and indicates neither agreement nor disagreement with the statement. A score of 2 means "Disagree" and disagreement with the statement. Lastly, a score of 1 states "Strongly Disagree" and indicates a high level of disagreement with the statement. The panel members examined the survey questionnaires appropriately.

Result and Discussion

Table 1. Frequency and percentage distribution of respondents in terms of sex and work experience.

Profile Variables		Frequency	Percentage
Sex	Male	50	6.1
	Female	100	12.2
Work Experience	1	114	14.0
	2	36	4.4

The results (see Table 1) showed the distribution of the demographic profile of the 150 Public Health Nurses according to their sex and work experience. According to their sex, there are 50 male nurses, comprising 6.1% of the total respondents, and 100 female nurses, mak-

ing up 12.2% of the total nurse population. According to their work experience, 114 have one year of work experience, which is 14% of the total, and only 36 nurses have two years of work experience, accounting for 4.4% of the total.

Table 2. Consolidated findings on Level of Disaster Literacy of Public Health Nurses

	Mean	Standard Deviation	Descriptive Level
DL1	4.65	.505	Very High
DL2	4.51	.712	Very High
DL3	3.39	.933	Moderate
DL4	3.65	.760	High
DL5	3.58	.929	High
DL6	4.02	.798	High
DL7	3.46	.856	Moderate
DL8	3.74	.764	High
DL9	4.03	.709	High
DL10	4.07	.769	High
TOTAL	3.91	.247	High

The table shows the respondents' disaster literacy results (see Table 2). The overall mean level of disaster literacy is 3.91, with a descriptive level of High, indicating that the disaster literacy level of public health nurses in

Davao City is high. The table shows the level of disaster literacy (see Table 2). Among all the statements, number 1 scored the highest and has a mean of 4.65 and a standard deviation of .505 with a descriptive level of Very High,

which indicates that the Public Health Nurses have a very high level of knowledge of what a disaster, which means that they are well aware of the different disasters that could occur, and number 3 scored the lowest among the ten statements, it resulted with a mean of 3.39 and a standard deviation of .933 with the descriptive level of Moderate which indicates that the Public Health Nurses have moderate awareness that disasters are likely to happen in Davao City, which means that they lack understanding about the region's susceptibility to various types of disasters.

It is also stated by Di Zhang et. al., that Public Health Nurses has its innate professional and technical competence as being resilient in

disaster literacy. Public Health Nurses are working in high-stress environments possessed robust intelligence in emergency disaster nursing care (Zhang et. al., 2024).

In addition, nurses in Saudi Arabia however are more equipped with disaster management skills because they are employed and trained by military hospitals and officials (Al Thobaity et. al., 2015).

With this, with contrast to the present study, Public health Nurses here in the Philippines are trained with curriculum under the Commission on Higher Education and monitored under are professional regulation board or the PRC where it is a state run department.

Table 3. Consolidated findings on Level of Disaster Response Performance of Public Health Nurses

	Mean	Standard Deviation	Descriptive Level
DR1	4.89	.387	Very High
DR2	3.73	.711	High
DR3	3.66	.684	High
DR4	3.88	.741	High
DR5	2.15	.862	Low
DR6	3.37	.755	Moderate
DR7	3.95	.838	High
TOTAL	3.66	.356	High

As shown in Table 3, the level of disaster literacy. Among all the statements, number 1 scored the highest and has a mean of 4.89 and a standard deviation of .387 with a descriptive level of Very High, which indicates that the Public Health Nurse has experienced being in a disaster, which means that they have been directly involved in or affected by a disaster situation. Number 5 scored the lowest among all the statements, with a mean of 2.15 and a standard deviation of .862, indicating that the Public Health Nurses did not have difficulty responding to the disaster victims.

In disaster settings, PHNs conduct rapid health assessments to identify the most urgent needs, such as access to food, water, shelter, and medical care. They are trained to evaluate the physical and mental health status of populations, especially in shelters and temporary housing. Research underscores that Public Health Nurses' ability to conduct effective surveillance and management is crucial to preventing disease outbreaks and ensuring that healthcare resources are appropriately allocated (Weiner J., et al., 2020)

Table 4. Test of Difference between Disaster Literacy and Disaster Response Performance when grouped according to sex.

	U	W	Z	Asymptomatic Significance (2-tailed)
Disaster Literacy	2475.500	3750.500	-.098	.922
Disaster Response Performance	2486.000	7536.000	-.056	.955

The table shows the results of analyzing the significant difference between the disaster literacy and disaster response performance of Public Health Nurses when grouped according to their sex with the use of the Mann-Whitney Test (see Table 4); the result shows that the significance of .922 for Disaster Literacy and .955 for Disaster Response Performance, both are

above significance level of 0.05 which indicates that there is no significant difference between the Disaster Literacy and Disaster Response Performance of Public Health Nurses when grouped according to their sex. According to Jones, R., & Brown, K. (2019), gender was not a significant predictor of disaster knowledge (Eman et al, 2021).

Table 5. Test of Difference between Disaster Literacy and Disaster Response Performance when grouped according to work experience.

	U	W	Z	Asymptomatic Significance (2-tailed)
Disaster Literacy	1965.500	2631.500	-.383	.701
Disaster Response Performance	1912.500	8467.500	-.619	.536

The table shows the results of analyzing the significant difference between the disaster literacy and disaster response performance of Public Health Nurses when grouped according to their work experience with the use of the Mann-Whitney Test (see Table 5); the result shows that the significance of .701 for Disaster Literacy and .536 for Disaster Response Performance are above significance level of 0.05 which indicates that there is no significant difference between the Disaster Literacy and Disaster Response Performance of Public Health Nurses when grouped according to their work experience.

perception to disaster literacy and management is not really related to previous work experience, but rather an insufficient number of training opportunities and educational initiative. However the scope of this study was doctors not public health nurses. Unfortunately, limited research has confirmed the difference between Disaster Literacy and Disaster Response Performance, especially to Public Health Nurses. Therefore, the value of the present research results can only be established in guidance of creation of outline plans, modules and disaster management exercises that can bridge the gap between disaster literacy to public health nurses' disaster response performance.

As Goniewicz., et al., (2020) mentioned in their research, one reason as to why lack of

Table 6. Test of Relatedness between Disaster Literacy and Disaster Response Performance of Public Health Nurses in Davao City

Correlations				
Spearman's rho	DisLit	Correlation coefficient	DisLit	DisResp
		Sig. (2-tailed)	1.000	.135
		N	.	.100
DisResp	DisResp	Correlation coefficient	.135	1.000
		Sig. (2-tailed)	.100	
		N	150	150

The table above shows the results of the Significant Relationship between Disaster Literacy and Disaster Response Performance of Public Health Nurses in Davao City (see Table 6). The significant correlation coefficient value

of 0.135 indicates a slight correlation between the level of Disaster Literacy and Disaster Response Performance. However, a significance of 0.100 indicates no significant relationship between Disaster Literacy and Disaster

Response Performance. This supports a study that found a weak and negative relationship between knowledge and performance, revealing that knowledge may not necessarily influence desired performance. According to Ajzen et al. (2011), most educational campaigns, particularly in the health domain, concentrate on sharing accurate knowledge of a general nature. Once people have acquired knowledge, they are expected to engage in the desired performance. However, this approach often results in disappointment as people continue to take unnecessary risks or engage in socially undesirable behavior (Cahapay M. et al, 2020).

Conclusion and Limitation

In 150 total respondents, almost all have only one year experience as a Public Health Nurse. In the context of Disaster Literacy, Public Health Nurses in Davao City shows wide range of knowledge in disaster management.

Among all the statements in the level of Disaster Literacy, number 1 scored the highest and has a mean of 4.65 and a standard deviation of .505 with the descriptive level of Very High, which indicates that Public Health Nurses have a very high level of knowledge what a disaster is, which means that they are well aware of the different disasters that could occur. Number 3 scored the lowest among the ten statements; it resulted with a mean of 3.39 and a standard deviation of .933 with a descriptive level of Moderate, which indicates that the Public Health Nurses have moderate awareness that disasters are likely to happen in Davao City, which means that they lack understanding about the region's susceptibility to various types of disasters. Regarding the Level of Disaster Response Performance, the overall mean is 3.66, with a standard deviation of .356, which indicates that the Public Health Nurses in Davao City have a high level of disaster response performance. Among all the statements under Disaster Response Performance, number 1 scored the highest and has a mean of 4.89 and a standard deviation of .387 with the descriptive level of Very High, which indicates that the Public Health Nurses have experienced being in a disaster, which means that they have been directly involved in or affected by a disaster situation. Number 5 scored the lowest among all the

statements, with a mean of 2.15 and a standard deviation of .862, indicating that the Public Health Nurses did not have difficulty responding to the disaster victims. There is no significant difference in disaster literacy and disaster response performance when grouped according to their demographic profile, which is their sex and work experience. This indicates that each public health nurse's disaster literacy and disaster response performance cannot be based on their sex and work experience. There is a slight correlation between disaster literacy and the disaster response performance of Public Health Nurses; however, there is no significant relationship between the two variables, which indicates that the disaster literacy of each public health nurse does not influence their disaster response performance.

This study is limited by its reliance on cross-sectional survey data, which captures disaster literacy and response performance at a single point in time, preventing an analysis of changes in literacy or performance over time. Additionally, the study's sample is drawn from public health nurses within a specific region, which may limit the generalizability of the findings to other geographic areas or health systems with different training programs and disaster response protocols. Another limitation is the potential for self-reporting bias, as participants may overestimate their disaster literacy or response capabilities due to social desirability. Furthermore, the study does not explore the role of external factors, such as organizational support or the availability of resources during a disaster, which may significantly impact nurses' response performance.

Recommendation

Based on the results of this study, the researchers have developed a disaster preparedness plan. This plan ensures that all public health nurses, regardless of sex, work experience, or prior disaster literacy, can respond effectively to disasters.

Below are the proposed plan by the researchers:

- Develop a standardized disaster preparedness and response curriculum that all nurses must complete.

- Conduct mandatory regular disaster drills simulating various scenarios (natural disasters, pandemics, industrial accidents) to ensure all nurses are familiar with protocols and can perform under pressure.
- Implement mandatory continuing education courses to keep all nurses updated on the latest best practices and innovations in disaster response.
- Assign specific roles and responsibilities to each nurse in advance, based on their skills rather than their sex or experience level. Roles should be clearly defined and documented.
- Prepare standardized disaster response kits, including medical supplies, personal protective equipment (PPE), and communication tools. Ensure these kits are readily available and regularly checked.
- Maintain an updated list of emergency contacts and resource providers accessible to all staff.
- Implement community education programs to raise disaster literacy among the general public. This can indirectly enhance the effectiveness of public health nurses by ensuring the community knows how to act during disasters.
- Conduct regular performance reviews during and after drills to identify strengths and areas for improvement.

With this proposed plan, the researchers believed that Public Health Nurses would be able to respond effectively.

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